International Students Conference

Research in Architecture

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Research in Architecture

EDITOR

Prof. Nilesh Pore

Hosted by

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Message from Advisor

It has been an immense pleasure for me to be part of the 5th International Students Conference- "Research In Architecture" held on the 27th and 28th of April 2023 at D Y Patil School of Architecture.

It was my first visit to DY Patil School of Architecture, building peer friendships and getting to know the beautiful Pune. It was also my first-time stepping foot into India, a colourful country filled with beautiful people.

During the conference, I am grateful to be able to witness so many enthusiastic and bright candidates of Architecture sharing their research findings passionately. It has definitely brought a lot of positive energy and dynamism to the lecture hall when these papers were presented.

I would like to take this opportunity to congratulate all candidates who have presented as well as participated in the conference. I strongly believe that knowledge sharing is a significant part in advancing education, which we particularly do not see abundance of it in the Asian region. I hope that this effort will continue, building a research culture that can be shared within the region.

Dr. Veronica Ng

Associate Professor
Head, School of Architecture, Building & Design
Taylor's University Malaysia

Message from Advisor

Best wishes

Prof. Abhay Purohit
President,
Council of Architecture, New Delhi
President, MASA

Message from Advisor

It gives me great pleasure to greet you all to the 5th International Students Conference on Research in Architecture, which is being held at DY Patil School of Architecture in Lohegaon, Pune. Being a part of this conference since its inception has been an honor, and I'm happy to see its exponential expansion and now reaching a global audience.

The unique conference is a significant step towards the school's objective of being the hub for Architectural research and innovation. As with the previous four editions, this conference, which is hosted on a hybrid platform, is a huge success.

My warmest regards to everyone involved in the student conference.

Dr. Sushant Patil
Advisor/Trustee,
Ajeenkya DY Patil Group, Pune

Message from Principal

It is with great satisfaction that I pen down my thoughts on successful completion of 5th International Students conference at DY Patil School of Architecture. Our 4th International Research in Architecture student's conference was a successful endeavor with International collaboration which encouraged us to set our foot forward to the 5th International Research in Architecture student's conference. This year we are collaborating with, Taylor's University, Malaysia. Relentless work by our college and its members gives the students of Architecture the opportunity to strengthen their knowledge and explore avenues in research.

At DY Patil School of Architecture, we think providing such a platform is the first step towards developing inclination and propensity for research for the students present this work and get peer -reviews, interact with co-students from other institutes and participate in an open ended channels for intellectual discussions. It lays the groundwork for being a successful professional by assisting with decision-making and encouraging the growth of an inquisitive attitude. Research has enormous relevance in the subject of Architecture. The work completed at such a young age and the themes chosen are quite encouraging. I'm happy to see that the students have seized the chance to use a live platform to present a wide range of research to a jury. Additionally, it demonstrates the students' curiosity and desire to pursue interests outside of Architecture, which is undoubtedly positive for the field.

I am grateful to Dr. Veronica Ng, Head of School of Architecture and Building Design, Taylor's University at Malaysia for their support and encouragement. I thank MASA for continuing to be our knowledge partner and supporting us since the first edition of the conference. I also value the assistance that the Heads of the institutions have given their students in attending the conference, particularly the guides who have helped the students to succeed

I congratulate the convener Prof. Aprajita Kaushik and her team of dedicated faculty and students on successfully hosting this event. I also appreciate the hard work put in for the success of the conference by the teaching and non-teaching staff of DY Patil School of Architecture.

I would like to mention the support received from the paper reviewers and the panel of judges who gave their time and valuable inputs for the conference. A special mention to the eminent jury panel and paper reviewer for their time and valuable contributions.

I appreciate the continuous support I received from our Chairman Dr. Ajeenkya DY Patil, Vice Chancellor Prof Hrridaysh Deshpande Ajeenkya DY Patil University, our Advisory Board Prof Abhay Purohit, Dr. Veronica Ng, Dr. Sushant Patil and our mentor-supporter Prof. Jayshree Deshpande for helping us to successfully hosting the conference.

Wishing the best to all the participating students and organisers!

Prof. Shubhada Chapekar
Dean,
DY Patil School of Architecture
Ajeenkya DY Patil University, Pune

Message from Convener

It's my pleasure to welcome you all to the 5th International Students Conference Research in Architecture on 27th and 28th April 2023 by DY Patil school of Architecture held at Ajeenkya DY Patil University, Charoli, Pune. It was a privilege and honor to be the Convener of conference with the support from our knowledge partner, Taylor's University Malaysia and Maharashtra Association of Schools of Architecture (MASA).

Walking down memory lane, the last year's International Students Conference of 2022, the 4th Edition saw a huge response with more than 100 paper published. This year our journey began in October 2022 as we floated our first teaser on 5th October 2022. Followed by the call of Abstract ending on 5th January 2023. We received 203 abstracts for B Arch out of which 74 were selected for full paper submissions. 81 for M Arch and 06 were selected for full paper submission. The papers were selected through double blind paper review. The reviewing committee consisted of eminent experts in the field of Architectural research from practice as well as academics from across India and Abroad.

The 2 day conference was held in hybrid mode. The first day on the 27th April began with Inauguration by hands of Prof Hrridaysh Deshpande our Vice Chancellor, Ajeenkya DY Patil University, Pune and Guest of honor Dr. Veronica Ng Head, School of Architecture, Building & Design, Taylor's University Malaysia. First day was reserved for the online presentation of selected papers with 7 session. 28th April, second day was reserved for offline presentation by student participants with 7 session. The closing of day two ended with valedictory by our chief guest Prof Jayshree Deshpande, COA-TRC, Pune; Chief guest Prof Radhika Nagpal, Principal Gateway College and guest of honor Dr. Veronica Ng Head, School of Architecture, Building & Design, Taylor's University Malaysia.

Looking back now, experience of hosting the conference on a hybrid mode was challenging and would not have been possible without the guidance of our principal Prof. Shubhada Chapekar and immense support by my colleges and conference faculty coordinators Prof Nilesh Pore and Prof Aditi Garg, and conference student coordinators Ms Ahana Kabra, Mr Soumik Paul, Ms Anagha Khandelwal and Mr Rishab Mittal.

I sincerely thank all the Members of Advisory board for the kind support extended to us Prof. Abhay Purohit, President Council of Architecture and MASA; Dr. Veronica Ng Head, School of Architecture, Building & Design, Taylor's University; Dr. Sushant Patil, Advisor/Trustree Ajeenkya DY Patil Group, which has laid a perfect path for the conference.

I express my gratitude to all my colleagues, organizing committee, students and the staff who helped to conduct the conference smoothly and congratulate them on the success of the event.

All the members of the paper reviewing committee, panel members for all the sessions, we are very grateful to Taylor's University Malaysia for sponsorship and for being our knowledge partner and MASA for sponsoring awards.

Kudos to all the students and my colleagues for making this conference a success.

Prof. Aprajita Kaushik
Convener,
5th International Students Conference Research in Architecture
School of Architecture
Ajeenkya DY Patil University, Pune

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List of Winners

Sr. No.	*Category*	*Name of Winner*	*Name of Institution*	*Title of the Research Paper*	*Position Secured*	*Amount*
1	B.Arch	Krish Mewawala	Rachna Sansad's Academy of Architecture, Mumbai	Climate Responsive Strategies of Art Deco Buildings in the Marine Drive Precinct, Mumbai	Best Paper	2500
2	B.Arch	Isha Salvi	CTES College of Architecture	Kathakar Kendra: An Ode to Kathak Traversing Through Architectural Spaces	First Runner Up	1500
3	B.Arch	Vidhi Bhannushali	CTES College of Architecture	The Presence of an Absence Creating an Unwinding Journey of Remembrance	Second Runner Up	1000
4	B.Arch	Narendra Gajalley	VITS PVP College of Architecture	Weekly Street Markets in Pune: An Ephemeral Phenomenon	Special Mention	NA
5	B.Arch	Jahnavi Miriyala, Padamshree E.V., Anvika Reddy	R.V. College of Architecture	Walkability in Vajarahalli	Special Mention	NA
6	M.Arch	Ar. Narendra J. Sardeshpande	Dr. D.Y. Patil Pratishthan's Dr. D.Y. Patil College of Architecture, Akurdi, Pune	Tailoring of Contract between the Owner and the General Contractor for Building Construction Projects	Best Paper	2500
7	M.Arch	Ar. Jinay R. Sampat	CTES College of Architecture, Mumbai	Proposal of a Tool for Efficient Planning of Material Delivery Schedule based on the Traffic for Buildings Undergoing Redevelopment in Mumbai City	First Runner Up	1500
8	M.Arch	Ar. Prajakta Ganu	School of Art and Architecture, Sushant University-Gurugram, India	Rethinking the Use of Excavated Soil in Mumbai	Second Runner Up	1000
9	March	Ar. Kamakshi Tomar	Smt. Manoramabai Mundle College of Architecture, Seminary Hills, Nagpur	The Impact of Different Cultures Across Countries: An Explorative Study with Courtyards	Special Mention	NA

Contents

Message from Advisor—Dr. Veronica Ng ..... *v*
Message from Advisor—Prof. Abhay Purohit ..... *vii*
Message from Advisor—Dr. Sushant Patil ..... *ix*
Message from Principal ..... *xi*
Message from Convener ..... *xiii*
Conference Committees ..... *xv*
List of Winners ..... *xvii*

1. Climate Responsive Strategies of Art Deco Buildings in the Marine Drive Precinct, Mumbai 1
   Krish Mewawala and Dr. Shilpa Sharma
2. Kathakar Kendra: An Ode to Kathak Traversing Through Architectural Spaces 12
   Isha Salvi and Prof. Ar. Tanvee Joshi
3. The Presence of an Absence: Creating an Unwinding Journey of Remembrance 19
   Vidhi Bhanushali and Prof. Ar. Tanvee Joshi
4. Weekly Street Markets in Pune: An Ephemeral Phenomenon 25
   Gajalley Narendra Nampelly and Ar. Aarthi Chandrasekhar
5. Walkability in Vajarahalli 39
   Jahnavi Miriyala, Anvika Reddy, E.V. Padhmashree, Ar. Hiranmayi Shankavaram and Ar. Ajinkya Kanitk
6. Tailoring of Contract between the Owner and the General Contractor for Building Construction Project 46
   Ar. Narendra J. Sardeshpande and Ar. Asawari Sohani
7. Proposal of a Tool for Efficient Planning of Material Delivery Schedule Based on the Traffic for Buildings Undergoing Redevelopment in Mumbai City 56
   Jinay R. Sampat, Prof. Umesh Mallya and Prof. Kalyani Salvi
8. Rethinking the Use of Excavated Soil in Mumbai 60
   Ar. Prajakta Ganu, Ar. Kalyani Salvi and Ar. Kalyani Shah
9. The Impact of Different Cultures Across Countries: An Explorative Study with Courtyards 65
   Ar. Kamakshi Tomar, Dr. Lakshmi Rao and Dr. Poonam Khan
10. Formulating Architectural Elements for Legislative Assembly Complex: Case of Pondicherry 73
    Kashish Vaibhav Shah and Ar. Madhura Deshpande
11. Evaluating Architectural Features/Elements as per DGS Orders, Circulars and Notices Related to Maritime Training 77
    Nidhi Dhananjay Desai and Ar. Shubhashree Upasni
12. The Effect of Spatial Quality of Café on Customer Preference 83
    Prajakta Rajendra Surate and Ar. Priyamvada Chitale
13. Investigating Use of Materials in Restaurant Construction in Tier II City from the Point of View of Embodied Energies 88
    Ankit Bhagwan Avhad and Prof. Sushma Parashar
14. Gender Construct and Spatial Characteristics: Analysis of Parks in Mumbai 94
    Varada V. Avachat, Ar. Rohit Shinkre and Ar. Shilpa Sharma

15. The Healing Anatomy of Design Need for Provision of Psychiatric Rehabilitation Centers 106
Savri Kulkarni and Ar. Anuja Inamdar

16. A Study on Factors Influencing Quality of Indian Public Spaces 114
Anvita Dubey, Ar. Anita P. Yammiyavar and Ar. Vinaya Hiremath

17. Raipur's Designation as Capital City, Its Impact on Educational Institutional Campus of Nit Raipur 124
Karanjgaokar Prachiti and Ar. Shekhar Garud

18. Institute for MSME and Entrepreneurship Development: Necessity and Learning Environment 145
Abhishek Khawale and Ar. Rajesh Rokade

19. The Kashi Vishwanath Temple: The Heart of Moksha Nagari 151
Sejal Taras, Ar. Dinesh Hipparkar and Dr. Ar. Shahid Rahmat

20. Study of Existing Living Conditions of Construction Labourers Settlement in Pune 157
Kunal Patni and Ar. Sarika Thakoor

21. Formulating Design Factors of 5 Star Rated Resort with Sustainable Approach 165
Savi Kishor Sheth and Ar. Madhura Deshpande

22. Revival of Municipal Marketplaces in Mumbai 171
Diksha N. Lalwani, Dr. Shilpa Sharma and Ar. Akbar Biviji

23. Study of Equitable Distribution of an Urban Space Affects User Satisfaction 180
Kedar Deshpande, Ar. Ravindra Patwardhan and Dr. Jyoti Tholiya

24. Repair & Maintenance of a Building's Façade Element at Dadar Parsi Colony Heritage Precinct 193
Ar. Rashmi Tapke and Ar. Shweta Parab Ekawade

25. Changing Phases of Cities and its Street during Festivals: Understanding the Context of the Nagpur City 198
Sanika Rehpade and Ar. Shruti Mutalikdesai

26. Exploring the Fantastic in Architecture 214
Hinal Solanki, Prof. Yagnik Bathija, Prof. Neha Panchal and Dr. Shilpa Sharma

27. Residential High Rises as Vertical Communities: To Improve Social Interaction between People 222
Aditi Anil Jain and Ar. Aarthi Chandrasekhar

28. Kinetic Architecture: An Exploration and Experimentation of Design 236
Manav Shah, Prof. Yogita Nagpure and Prof. Tanvee Joshi

29. Laurie Baker in Gujarat: A Study of Works and Regional Setting 242
Hetvi Patel and Ar. Naresh Chhatwani

30. Displace: Case of Placelessness of Riverine Community in Assam 249
Komal Pawaskar and Ar. Parag Rawool

31. Natural Light Enhancing the Quality of Space in Modern Churches 255
Shivam Anilkumar Agrawal, Ar. Vijaya Shrinivasan and Ar. Rashmi Joshi

32. Examining Contemporary Issues in Architectural Identity in Heritage Precincts: 269
Case of Ghanta Ghar, Jodhpur
Akshita Rathi and Ar. Sudhir Deshpande

33. Study of Spatial Semantics in Indian Cinema: Case of Sanjay Leela Bhansali 275
Anushka Anand Kulkarni and Dr. Sharvey Ramesh Dhondge

34. A Study of the 'Core of an Institution', Architecture of Anant Raje 293
Vimarsh Shah and Ar. Naresh Chhatwani

35. वाचाल तर वाचाल Re-Imagining the Dying Culture of Reading and Public Libraries 300
Yashashree Sawant and Ar. Harshada Punde

36. Traditionalism in Modern Residential Architecture of Emerging Indian Cities 306
Vedika Malani and Ar. Shekhar Garud

37. Workspace Fabric Design of I.T. Offices in Regards to the Introversion Spectrum 317
Gokhale Tanvi Rahul and Ar. Aarthi Chandrasekhar

38. Enabled Community Gardens for Senior Citizens of St. Patricks Town, Hadapsar, Pune 334
Sufiya Babajan Almelkar and Ar. Romeiro Silveira

39. Colonial Architecture of Jaora 347
Hemin Pansera and Ar. Naresh Chhatwani

40. Extended Building Edge 355
Savan Sharma and Ar. Naresh Chhatwani

41. House Form and Settlement Pattern, Study of Patel Community at Amreli, Gujarat 360
Raj Gedia and Ar. Naresh Chhatwani

42. Interactive Streets: Connecting People to Livable Streets: A Case of Walkers Street, Nagpur 365
Akshita Sathe and Ar. Akshay Gandhi

43. Relationships of Children's Play Activities with Diversity in the Landscape 382
Elements in Residential Open Spaces in Pune
Rachana S. Solanke and Prof. Pradnya N. Patki

44. Problems of Children Raised by Commercial Sex Workers: A Case of Budhwar Peth in Pune 389
Pranav Anand Salunke and Ar. Hrishikesh Purandare

45. Impact of Urban Landscape on Social Interactions on Streets – F.C. Road Pune 394
Prathamesh Shailendra Khatav, Dr. Jyoti Jain Tholiya, Dr. Aparna Dixit and Ar. Anita Kavthekar

46. Perception of the Built-form through Meta-theatricality 401
Prerna Suryawanshi and Dr. Shilpa Sharma

47. Planning Play Area in Housing Society with Children 408
Oswal Preksha Bharat and Ar. Aarthi Chandrasekhar

48. Study of Inclusive Design Attributes in Outdoor Play Spaces in Housing Societies 423
Nirantari Shinde and Dr. Priyamvada Chitale

49. Perception of Neighbourhood Parks- Post-COVID Scenario 429
Manaswi Topale and Dr. Priyamvada Chitale

50. Identifying Infrastructural Needs for Employment, Empowerment Centre for Local 434
Community at Khadakwasla, Pune
Swaraj Ajay Mate and Ar. Madhura Deshpande

51. Nilyaashram: Home to Education 439
Grishma Vasani, Prof. Yogita Nagpure and Prof. Tanvee Joshi

52. Educational Environment for Autistic Children 445
Dungarwal Smit Rahul and Ar. Aarthi Chandrasekhar

53. Perception of Colour: Using Architectural Colour Palette as a Psychological Stimuli 460
Keshav Agrawal and Ar. Ramiya Gopalakrishnan

54. Exploring 'Borders' as Zones of Transaction 467
Madhura Khevalkar, Ar. Rajratna Jadhav and Dr. Shilpa Sharma

55. Analysis of Seat Characteristics on Choice of Seat by Guests in Restaurants in Pune 477
Vedant Galinde and Ar. Pradnya Patki

56. MUD Architecture: Why Not? 484
Siddhi Shivram Parab, Shweta P.R. Subramanian, Prof. Vinita Kolhe and Prof. Nayana Raut

57. Development of a Hill Station: In the Organic Town of Gangtok, Sikkim 492
Angela Soden Khangsarpa and Ar. Tejaswini Marode

58. Evolution of Workspaces with Respect to Technology 505
Parth Bhutalia and Dr. Shilpa Sharma

59. Study of Natural Lighting in Reading Spaces of Institutional Library 514
(Sinhgad Institute Central Library, Pune)
Rashmi Sharad Patil, Dr. Smita Suryawanshi and Ar. Ashwini Shitole

60. Land Use Map a Case of Varanasi 520
Sandeep Sahu, Ar. Dinesh Hipparkar and Ar. Shahid Rahmat

61. Sensory Environments in Learning Centre for the Visually Impaired Children 525
Antara Shah and Ar. Rajesh Rokade

62. Wind Induced Parametric (Computational) Design 534
Divya Gupta and Prof. Anuprita Surve

63. Energy Efficiency Retrofit—Need of the Moment? 540
Ar. Nikita Karani and Ar. Umesh Mallya

64. Impact of Migration in Shaping the City of Mumbai 547
Naomi Advani and Ar. Swati Chokshi

65. Open Spaces and Campus Infrastructure 557
Gayatri Atluri, Shreya Dubey, Vishnupriya Chenji,
Ar. Hiranmayi Shankavaram and Ar. Ajinkya Kanitkar

66. To Study Design Parameters of Net Zero Energy Building in India 571
Anjali Balu Bhange and Ar. Mahesh Rameshwar Bangad

67. Patterns and Layouts Used in Galleries 576
Rupam Patil and Ar. Rajesh Rokade

68. Post Occupancy Implementation Challenges of Sustainable Strategies 583
in Residential Sector in Pune
Isha Karmalkar and Ar. Neha Joshi

69. Recycled Plastic Used as a Construction Material 592
Akanksha Lonkar and Ar. Kavita Patil and Ar. Sarika Thakoor

70. Art and Architecture of a Sustainable Community: Warli Tribe in Jawhar 599
Neha Aher and Ar. Rajesh Rokade

71. Outdoor Recreational Spaces in Prisons of India 606
Himanshu Rawle and Ar. Rajesh Rokade

72. Use of Calligraphy Art in Islamic Architecture 613
Rashmi Abhay Karhade and Ar. Kavita Patil

73. Leisure Activities in Malls 618
Rugved Penkar and Ar. Rajesh Rokade

74. Preferences of Gated Community Residents for Morning Walk Routes 622
Aadya N. Pedanekar and Prof. Atul Bhagwat

75. Comparison Study of Defensive Architecture of Maratha and Rajput Forts: 627
A Case Study (Shivneri and Chittaurgarh) Research Report
Rushika Kshirsagar and Dr. Shilpa Dhawale

76. The Children's of Banjara's (N.T) 637
Tejasvini Ishwar Jadhav and Prof. Ar. Rajesh Rokade

77. Biodiversity Conservation and Rehabilitation Centre 642
Hrithik Chavan and Ar. Rajesh Rokade

78. The Silence of LGBTQIAPD+ Spaces in India 647
Shrushti Mane and Ar. Mitali Hindlekar

79. चहल पहल: Exploring Social Spaces of Jaunpur 653
Sushma Pal and Ar. Kirti Desai

80. Halfway Housing Post Prison in Indian Context 658
Lavanya Soparkar and Prof. Rajesh Rokade

81. Co-Working Space in Incubation Center 667
Garima Jhawar and Ar. Rajesh Rokade

Author Index 675

Climate Responsive Strategies of Art Deco Buildings in the Marine Drive Precinct, Mumbai

Krish Mewawala[1] and Dr. Shilpa Sharma[2]

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ABSTRACT: A plethora of architectural styles were introduced in the city of Mumbai, then-Bombay, over time, from Neo-Classical to Bombay Gothic to Art Deco. Certain symbolic decorations or details found on Art Deco buildings drew inspiration from nature in the tropics and from Bombay's identity as a port city that added local flavour and identity. The style that emerged from the city itself thus came to be known as Bombay Deco. The research paper looks at the architectural elements and strategies of Bombay Art Deco buildings of the Marine Drive precinct responded to the tropical maritime climate of Mumbai by incorporating climate-resilient elements and features. The study is conducted through primary and secondary sources. The literature reviews the various histories and theories put forward by architectural historians regarding Art Deco and the local maritime climate of Marine Drive. The primary studies include an examination of four buildings located at Marine Drive and at Oval Maidan. The paper concludes that just as Art Deco, as a comparatively newer style of architecture responded to the climate of the city, so should newer buildings built today need to be designed according to the climate, so that its users are comfortable.

Keywords: *Art Deco, Marine Drive, Bombay, Climate-Response, Façade Elements, Tropical, Maritime.*

1. INTRODUCTION

The seven islands of Bombay have seen a constant change in their governance and authoritative control even before the Portuguese and British settled in Bombay in 1534 and 1661 respectively. Along with the shift in power and governance, a plethora of architectural styles were also introduced over time. Portuguese architecture dominated the cityscape during the fourteenth century was replaced by the Neoclassical style with its simplicity of geometric forms and classical symmetry in the sixteenth century. Following which, the Gothic style with its pointed arches, lofty pitched roofs and elevated turrets arrived in the 1870s was successful in flaunting British might. The impetus for the emergence of these multiple styles was the British presence, and each of these styles became the marker for their dominance in the city (Mehrotra & Dwivedi, 2003).

Eventually in the 1920s and '30s, along with the emergence of the first set of Indian architects who joined British architectural practices, the new Art Deco style of architecture emerged in Mumbai, then-Bombay, which transformed Bombay's image from Victorian and historic to a cosmopolitan and modern city. The original Art Deco style had been adapted successfully to Indian conditions and available technology. In fact, certain symbolic decorations or details that are found on Art Deco buildings, drew inspiration from nature in the tropics and Bombay's identity as a port city to add local flavour and identity. The style that emerged from the city itself, thus came to be known as Bombay Deco.

The city of Bombay, now known as Mumbai, has a maritime, tropical, warm and humid climate. The climatic data of Colaba, Mumbai (Mausam, 2022) shows that the mean average temperature is 27.2°C. This means that the sun needs to be avoided for most of the day, particularly in the summers. The wind direction is from the west and the southwest. The moisture-laden winds in the monsoons are from the southwest, from June to September. There is a continuous mild sea breeze that blows all through the year from the west, and its effect is particularly experienced along the coastline (see Figure 1). It is extremely important that buildings respond to the climate of a city so that its users would be comfortable.

Even though traditional, pre-Colonial houses commonly used passive, architectural strategies in order to maintain thermal comfort, most newer buildings were not designed according to the climate. They had barely any breeze flowing through. Most houses on the ground floor faced high compound walls preventing any sunlight or wind. The openings brought in rainwater during monsoons and the harsh sun during summers, forcing them to be closed most of the time. However,

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Bombay Art Deco made use of the traditional climate-responsive architectural strategies once again, which went towards making users thermally comfortable in all seasons.

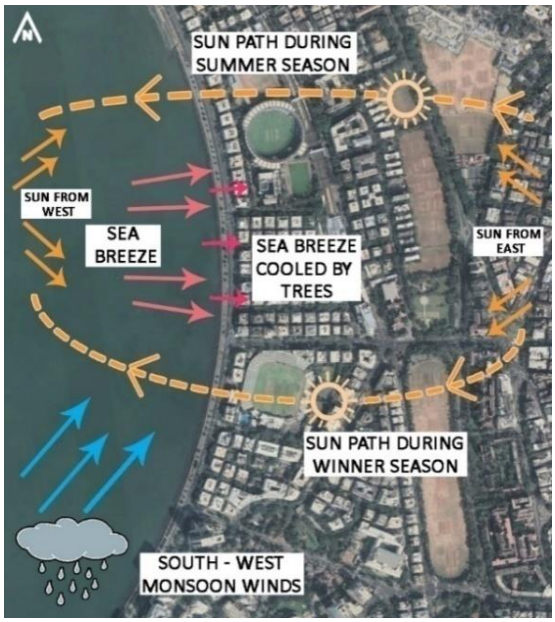


Figure 1: Micro-Climate of Marine Drive in Bombay (Mumbai)
(*Source:* Author, based on Google Earth)

The goal of this research paper is to understand how the architectural elements of Bombay Art Deco buildings of the Marine Drive precinct responded as climatic strategies.

The following are the objectives in order to achieve the aim:

- To understand the emergence of Bombay Art Deco architecture in Mumbai.
- To study the different architectural strategies in response to Mumbai's climate.
- To understand different Art Deco features with respect to Mumbai's climate.

2. LITERATURE REVIEW

The literature reviewed has helped to understand not only the emergence and growth of Art Deco in Bombay, but also how it singularly responded to its warm and humid maritime climate. In *Bombay Deco*, Mehrotra and Dwivedi (2008) explain that the cause for the popularity and emergence of Art Deco was that the wealthy were fascinated by its flamboyance, while others saw it as a symbol of aspiration and upward mobility. The *Art Deco Mumbai Trust* (2022) states that the rulers of the princely states formed an eminent class of people occupying Art Deco buildings that were designed mainly for wealthy traders and merchants. They preferred these buildings since they normalised royalty and grandeur, permitting them to blend in with the others, whilst providing utmost comfort. Alongside, newer forms of family entertainment like the cinema and social clubs, and modern forms of residences, like living in apartments, emerged with Art Deco.

The first planning scheme in the Backbay Reclamation was the grouping of residential buildings facing the Oval Maidan. The second set of buildings was the one that lined the Marine Drive, both built in the Art Deco style (Dalvi, 2015). Hence, Bombay became a trendsetter and marked a social change. The simultaneity of the advent of Art Deco architecture and the intensification of urban development in Bombay took place because of the newly introduced construction material–RCC, which indicated the dawn of modernism in the city (Mehrotra & Dwivedi, 2008).

Iyer (2014) further described how the Art Deco style brought along with it a change in the city's overall development moving it closer towards being a contemporary city of its times. Art Deco thrived due to the technology it used, influencing the typology of its structures and eventually transforming the image of the city. The style always focussed on functionality, expression and practicality over mere surface decoration.

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After the Backbay Reclamation in the 1930s, a master plan based on effective zoning of the residential, business, trade, production, educational and commercial sectors was set up for the city of Bombay. The first zone allotted was to the residential sector in the west which was such that it could be ventilated and would not receive direct sunlight for most of the day, while enjoying the views of the sea (Dossal, 2010). In addition, Dalvi (2015) explains that the 'sub-formants', or the wings adjacent to the 'nucleus' of the building, contain architectural elements like cantilevered balconies, grilled fenestrations, chajjas and canopies, which form climatic protective devices that form the most important part of the decorative façade. Hence, Art Deco architecture in this city was specifically recognized as the Bombay style since it incorporated local variations and adaptations in its design, giving the buildings in the city a unique identity. Mehrotra and Dwivedi (2008) reiterate that designers paid attention to aesthetics with surface embellishments and abstract motifs that were inspired by the maritime climate of Bombay. This led to the origin of the names, Tropical Deco and Bombay Deco.

The Art Deco Style of architecture generalises grandeur and comfort for every user involved in the structure by using climate-responsive strategies as an element of façade ornamentation in its design. These elements give a unique character to the Art Deco style in the city of Mumbai.

3. MATERIAL AND METHODOLOGY

In order to examine the aspects mentioned above, the study will be conducted through primary and secondary sources. The literature will review the various histories and theories put forward by architectural historians regarding Art Deco and the local maritime climate of Marine Drive. The primary studies will include an examination of four buildings as case studies, at Marine Drive and at Oval Maidan.

4. RESULTS AND DISCUSSION

The Art Deco style takes its name from the *Exposition Internationale des Arts Decoratifs et Industriels Modernes* held in Paris in 1925. In the early 1900s, designers drew inspiration from artifacts unearthed in Egypt, Greece, Central America, Africa, Japan, and China, which influenced this ultra-chic style that quickly became the rage over the world. Art Deco was introduced to Bombay in the 1930s, and it now has the second largest number of Art Deco buildings in the world, after Miami. The first set of Art Deco buildings in the city were the four cinema theatres in and around this area which was the central business district at the time - Regal Theatre at Colaba Causeway, Central Plaza at Girgaon and Metro Cinema at Marine Lines and Eros Theatre at Churchgate (see Figure 2b).

This was immediately followed by the construction of the line of buildings adjacent to the Oval Maidan in the 1930s. This was Phase I of the Art Deco buildings in the city (see Figures 2a and 2b). The impetus for the construction of these buildings was the land made available due to the Backbay Reclamation. The original extent of land was only till the fence of the Oval Maidan, formerly the Esplanade, beyond which it was all the sea until the late 1920s. This style fit in very well in the city due to the technology available at the time. The extreme heat of the climate of Bombay helped reduce the setting time of reinforced cement concrete (RCC), which was the material used in Art Deco architecture to create its iconic visual identity. As a result, this 'modern' style thrived in Bombay, resulting in a large number of Art Deco buildings on the newly-reclaimed land of Marine Drive, with the aim of changing the image of the city from a historical and old-age one to a modern one. With balconies facing the sea on one side and a large playing field on the other, the Art Deco buildings beside Oval Maidan once had some of the best views in the city.

Following this, the next set of buildings that were constructed in the 1940s were those along the Marine Drive promenade (see Figures 2a and 2b). This was the Phase II of Art Deco construction in the city. These buildings directly received the sea breeze, and were well-ventilated throughout the year (Art Deco Mumbai Trust, 2019). The choice of land too played an integral role in the climate-responsiveness of this style. At one point in time, open space existed between these two phases of Art Deco buildings, permitting air to freely flow into the homes situated in these two lines of buildings, from almost all sides.

There was also a sudden shift in building names within the precinct, reflecting the emergence of Indian architects as designers of structures for the first time in the city. Colonial names like *Empress Court, Windsor House, Fair Lawn*, etc., reflecting a European aspiration, gave way to names like *Vishwa Mahal, Swastik Court and Soona Mahal*. As a result of this change, European names of buildings became a minority compared to the Mahals, Bhavans, and Sadans that began to sprout.

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Figure 2a: Context of Area under Study
(*Source:* Author)



Figure 2b: Phases of Art Deco Buildings in Bombay
(*Source:* Author, based on Google Earth)

Energy-Efficient Buildings in India (Majumdar, 2002, pp. 223–227) describes the passive, architectural strategies for warm and humid climates such as that of Bombay: double-glazed windows and wall insulation, maximization of daylight use, use of energy-efficient appliances, larger openings with overhangs and higher ceilings. These climate-responsive elements played an extremely important design feature on the facade, giving the style its identity of decoration and elegance. Weather shades over windows, called 'eyebrows', and balconies served as important elements in the design. These elevational treatments with climate-responsive features was the most integral part of Art Deco architecture (Iyer, 2014).

The residents of the first two sets of Art Deco buildings recall that up until the first decade of the 21st century, they did not require air-conditioning in their homes. The structures were designed with climate as an important consideration. Ventilation was ensured by the sea breeze blowing through the fenestrations all through the day, without the use of artificial systems, just as light entering the house was maximized, while preventing the harsh sunlight.

Deco Dekho-Bombay Deco and its Elements (2020) enlists the various forms, features and elements which play an integral role to respond to climatic resilience, such as eyebrows, balconies and compound walls. They are important façade design elements, which are quintessential to Bombay's Deco aesthetic. All these also affected the imagery depicted on the buildings, giving them a unique character. These are discussed in detail below.

4.1 Eyebrows

Eyebrows or chajjas are cantilevered weather shades above external openings. They vary in shape and may be rectilinear or curved. Their edges are painted in a dark contrasting colour as compared to the building facade. They may extend continuously along the building, while emphasizing horizontality in the design (see Figures 3a and 3b).

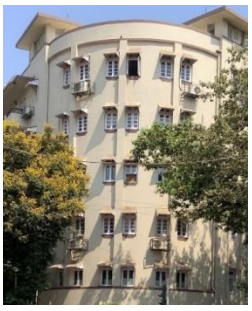


Figure 3a: Eyebrows at Rajesh Mansion
(*Source:* Author)

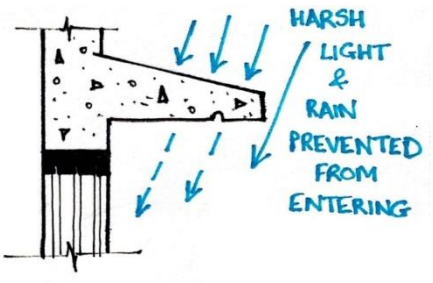


Figure 3b: Climate-Resilience of Eyebrows
(*Source:* Author)

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4.2 Balconies

Balconies are semi-open spaces on the external faces of apartments, that permit users to enjoy the exterior. They may either project from or are flushed with the facade. They serve as the main element catering to cross-ventilation (see Figures 3c and 3d).



Figure 3c: Balconies at Seksaria Building
(*Source:* Author)



Figure 3d: Balconies at Sonawala Building
(*Source:* Author)

4.3 Windows

Windows are a prominent feature of the facades of Art Deco buildings, serving as the principal element permitting windflow in the structure. In some buildings, windows are designed to resemble the portholes of a ship, drawing inspiration from the maritime nature of the city.

4.4 Nucleus

Well-placed balconies or windows are prominent features in the elevated blocks which are called the 'nuclei' of the structure. These help in wind circulation within the common areas and the staircase blocks of the structure (see Figures 3e and 3f).



Figure 3e: Windows in the Nuclei at Soona Mahal
(*Source:* Author)

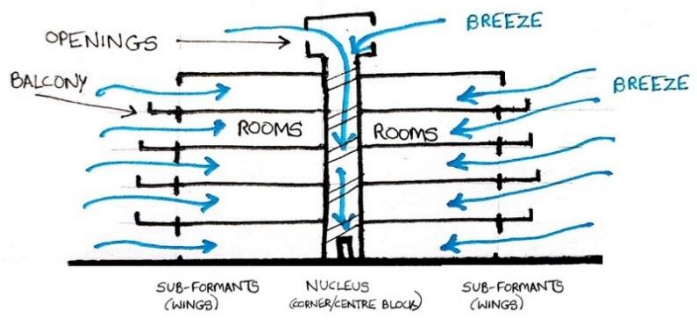


Figure 3f: How Nuclei Windows Function in Staircase
(*Source:* Author)

4.5 Grilles

Most elements like windows, balconies, compound walls and gates of the structures have ornate grille work made in metal, concrete or wood. The patterns of the grilles incorporate geometry or are inspired from tropical or maritime designs. The perforations in their patterns allow light and air, while minimizing the rain and direct sunlight entering through them.

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4.6 Compound Walls

In Art Deco, the compound walls demarcating the boundary of a property or building were low in height, with metal or concrete grilles. These enabled people, even pedestrians on the outside to experience the structure. Importantly, they permitted the users on the ground floor to receive light and breeze (see Figures 3h and 3i).

In the planning of Art Deco buildings in Mumbai, the architects do not just design their plots and make buildings within fixed boundaries. An attempt is made to design neighbourhoods, and include the users even outside the buildings (i.e. pedestrians, general public, hawkers, etc.) within the structure. In the creation of this neighbourhood, the compound wall plays an integral role, and defines how a user outside the plot boundary can also experience the design. The short compound walls between the edge of the street and the plot also enable passer-bys to feel included as a part of the design (see Figure 3g). The short walls between buildings, that are decorated with flowers and plants, also facilitate interactions between the users of adjacent buildings. The walls between two adjacent buildings lying on different streets are also designed with a relatable height, but lined with glass chips to add to the security, however, not visually disconnecting the structures.

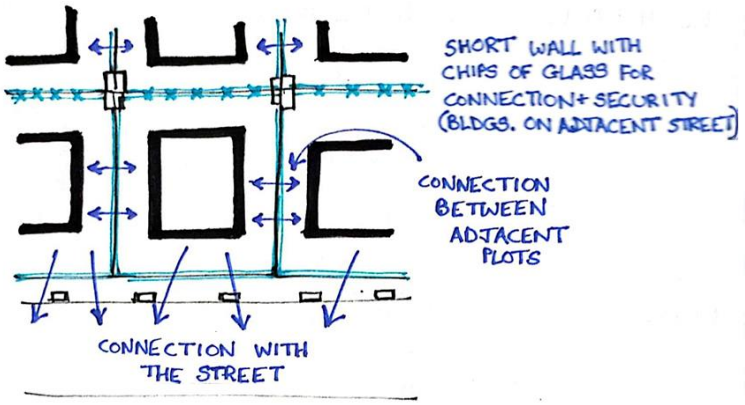


Figure 3g: Creation of a Neighbourhood

(*Source:* Author)



Figure 3h: Short Compound Wall at Firdaus

(*Source:* Author)

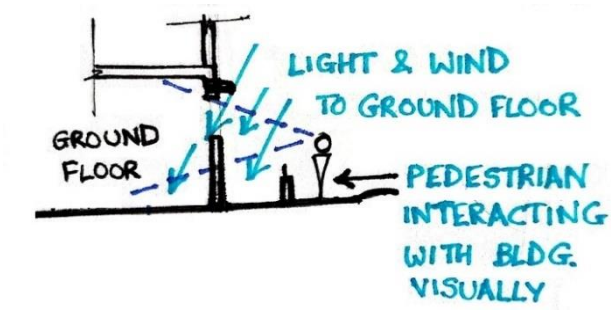


Figure 3i: How Short Compound Walls Function

(*Source:* Author)

7. COURTYARDS

The courtyards form an integral component of the Art Deco buildings of Marine Drive. All the service-oriented spaces like kitchens and bathrooms are built around these courtyards to facilitate the service lines to run along them. In addition, they also allow cross–ventilation (see Figure 4).

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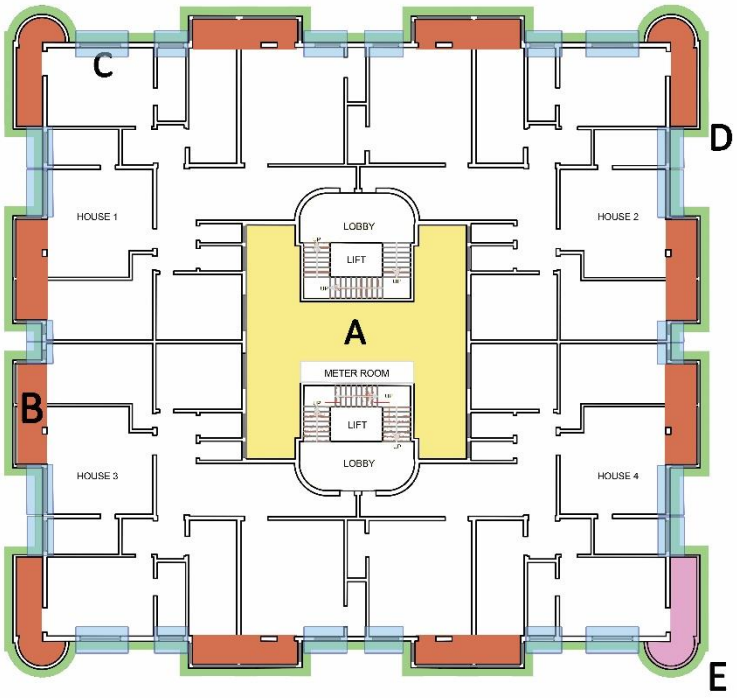


Figure 4: Typical Floor Plan Indicating Climate-Resilient Elements in a Typical Art Deco Building
(a) Balconies (b) Courtyard (c) Windows (d) Chajjas (e) Nucleus
(*Source:* Author)

Art Deco buildings are uniquely characterised by certain symbolic decorations and details incorporated into its ornamentation, which draw inspiration from nature in the tropics and Mumbai's identity as a port city. This includes tropical imagery due to the city's location in the tropical belt as well as inspiration from nautical features, due to its adjacency to the sea.

Stylized imagery of tropical flora and fauna, palm trees, and sea waves are distinctly found in railings, grilles, bas reliefs, and glass panels in many Art Deco structures. Additionally, to suit the tropical theme, many buildings have soft pastel shades on their facades. The design of some structures was also inspired from the luxurious ocean liners that emerged in the port city in this era. Elements like windows that resembled the portholes of a ship, streamlining or 'speed lines' on building facades, observatory towers and the railings found on the decks of ships are among the nautical features found across the Art Deco structures in Bombay. In this manner, the climate of the city also affects the ornamentation and imagery on the façade in turn.

5. INFERENCES

From the literature review and findings discussed above, the following are the observations made regarding the Art Deco buildings of both the Phases discussed above (see Table 1):

Table 1: Comparison of Features and Elements in Art Deco Buildings in Mumbai

	Parameters	***Case Study 1***	***Case Study 2***	***Case Study 3***	***Case Study 4***	***Observations***
1.	Name of Building	Empress Court	Shiv Shanti Bhuvan	Keval Mahal	Sonawala Building	NA
	Figure Reference	Figure 5a	Figure 5b	Figure 5c	Figure 5d	
2.	Location	Along the Oval	Along the Oval	Marine Drive	Marine Drive	

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	Parameters	*Case Study 1*	*Case Study 2*	*Case Study 3*	*Case Study 4*	*Observations*
3.	Phase of Construction	Phase-I	Phase-I	Phase-II	Phase-II	
4.	Nucleus orientation	North - East	South - East	West	West	The buildings along the Oval have their nucleus (stairwell) and main entrances facing the Oval Maidan towards the East, North-East, or South-East, whereas those along Marine Drive face the sea on the West, such that maximum wind flows in from all sides having open spaces.
5.	Heights of rooms	3.3 m	3.3 m	3 m	3.15 m	All the Art Deco buildings have a similar height, around 20 m–26 m, to maintain uniformity (see Figure 5e). This enables all buildings to get adequate light and ventilation from all sides, without being obstructed from neighbouring structures.
6.	No. of storeys	7	6	6	7	
7.	Height of Bldg. (approximate)	26 m	21 m	21 m	22 m	
8.	Elements					
	Eyebrows	NO Continuous on top 2 floors	YES Individual	YES Continuous	YES Continuous	The eyebrows serve as weather shades above external openings, and serve to prevent direct sunlight and rain from entering the building.
	Balconies	YES Flushed with facade	YES Projecting	YES Projecting	YES Projecting	Balconies account for cross-ventilation in the structure, and serve as a link to the outdoors.
	Windows	Rectangular with verandah	Rectangular with verandah	Rectangular	Rectangular/ Circular	Windows serve as the principal element permitting cross - ventilation in the structure.
	Nucleus	YES Approx. 3 m ht. above terrace slab	YES Approx. 1 m ht. above terrace slab	YES Approx. 1 m ht. above terrace slab	NO No upward projection of nucleus	Balconies or windows in the nuclei help in wind circulation within common areas.
	Grilles	YES Steel grilles for Windows/ Compound Walls/ Glazing	YES Steel – Windows/Compound Walls/Gate/ Balconies	YES Steel – Balconies/ Windows/ Gate	YES Concrete – Balconies/Compound Walls	The grilles allow light and air inside the structure, and minimize the rain and direct sunlight entering through them.

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	Parameters	***Case Study 1***	***Case Study 2***	***Case Study 3***	***Case Study 4***	***Observations***
	Compound Walls	YES Short 0.8 m with grill above	YES Short 0.75 m with grill above	YES Short 1.2 m	YES Short 1.2 m	The short compound walls of Art Deco buildings permit the indoor spaces on the ground floor to receive light and breeze.
	Courtyard	YES (8 m × 5 m)	NO	YES (10 m × 6 m)	YES (10 m × 8 m)	Courtyards help in cross–ventilation in internal rooms of the structure.

Source: Compiled by Author.



Figure 5c: Keval Mahal, along Marine Drive
(*Source:* Author)



Figure 5d: Sonawala Building, along Marine Drive
(*Source:* Author)



Figure 5e: View of Marine Drive Showing Uniform Height of the Art Deco Buildings
(*Source:* Author)

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As observed above, almost all the Art Deco buildings of the Marine Drive precinct incorporate different design strategies such as eyebrows, balconies, courtyards and grilles to respond to Mumbai's climate. The facades are also characterised by symbolic features and decorations, which draw inspiration from nature in the tropics and Mumbai's identity as a port city.

6. INFERENCE

Even though Art Deco was a comparatively newer style of architecture, it responded to the tropical maritime climate of Mumbai by incorporating climate-resilient elements and features. Almost all buildings have climate – responsive elements to ensure all the users of the building are comfortable.

On the façades of the buildings, the eyebrows serve as weather shades to the openings, and prevent direct sunlight and rain from entering inside the structure. Well – placed windows and balconies along the façade account for cross-ventilation and wind flow in the structure. Those on the nuclei help in wind circulation within common areas. The courtyards serve to provide cross – ventilation to the internal areas of the structure. The grilles on balconies, windows and compound walls allow light and air to pass through even the solid elements of the envelope and enter the structure. They also serve to reduce the rain and direct sunlight entering through them. The short compound walls permit even the ground floor to receive enough light and breeze.

Even though Art Deco buildings used passive, architectural strategies in order to maintain thermal comfort, most newer buildings these days are not designed according to the climate. They barely have any breeze flowing through. The openings brought in rainwater during monsoons and the harsh sun during summers, forcing them to be closed most of the time. Most houses on the ground floor faced high compound walls preventing any sunlight or wind. This makes users experience discomfort most of the times in newer buildings.

It is extremely essential that all buildings must similarly respond to the climate of the city, such that all users using the spaces inside it would automatically be comfortable.

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Kathakar Kendra: An Ode to Kathak Traversing Through Architectural Spaces

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ABSTRACT: As the world is modernizing, people are forgetting the traditional Indian cultures and values, which has resulted.

Changes in the preferences of people. Due to this scenario, various transformations have taken place in the traditional Indian culture including its art forms. Traditional performing art forms include various dance forms, drama, theatre, music, etc., all of these are connected to each other in multiple ways. These art forms are losing their essence and this can be observed in the portrayal of the Indian art and culture through various representations like media, movies, television, etc. For example, Indian dance forms are taken over by the new Bollywood dance forms and their various types.

As per Bharatmuni's Natyashastra, there are eight Indian classical dance forms which include: Kathak, Bharatnatyam, Odissi, Kathakali, Mohiniattam, Kuchipudi, Manipuri and Satriya. These eight dance forms have their origin and importance in Indian culture.

Originally, Kathak was performed in temple setting. Later it was performed in courts/darbars and then eventually.

In auditoriums and amphitheaters. The setting of spaces for kathak performances have changed from century to century. It is a dance form which usually needs a space where the dancer can express himself very freely and narrate the stories in an intricate manner. Kathak is one of the main genres of ancient Indian classical dance forms which is traditionally originated from north India and is practiced by kathakar community.

Therefore, it is necessary to explore the association between Architectural spaces and kathak and have a learning.

Environment for this Indian classical dance form especially in urban areas.

Present research aims to study academic and training approaches for kathak as a dance form by understanding the association of architectural spaces with kathak along with its connect between built and unbuilt spaces and study the parameters that can provide a holistic environment for kathak dancers with respect to learning, creating and performing art, close to the nature yet within the urban context.

Keywords: *Indian Classical Dance Forms, Kathak, Kathakar, Institute, Holistic Environment.*

1. INTRODUCTION

Kathak is one of the eight classical dance forms mentioned in Bharatmuni's Natya-Shashtra which has been originated from North, Uttar Pradesh and still being practiced in India. However, nowadays importance of kathak is transforming and from darbars and temples it has reached to amphitheaters and auditoriums and has been showcased on various media platforms. Through all this process, kathak is still being transformed. Hence, making people aware of this dance form becomes very important.

The word Katha means "story" and kathak means "a storytelling". Thus, a person narrating these stories is called a "kathakar". Kathakar is the name of the community of musicians and dancers associated with kathak. During the pre-colonial period, these kathakar communities used to move from one place to another and try to narrate the mythological stories through poetry, music and dance.

Kathak originated as a single dance form and had variations through three gharanas known as Jaipur, Lucknow and Banaras gharanas. The word Gharana comes from the Hindi word 'ghar' means house. These gharanas have been started by various kathak exponents with lot of dedication and practice. The three gharanas are different from each other with respect to their styles, costumes, makeup, body language and as well as their space settings.

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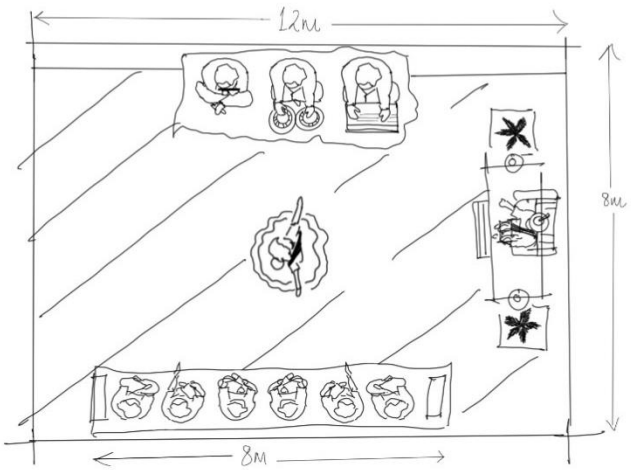


Figure 1: Probable Kathak Performance Setting of Jaipur and Lucknow Gharana

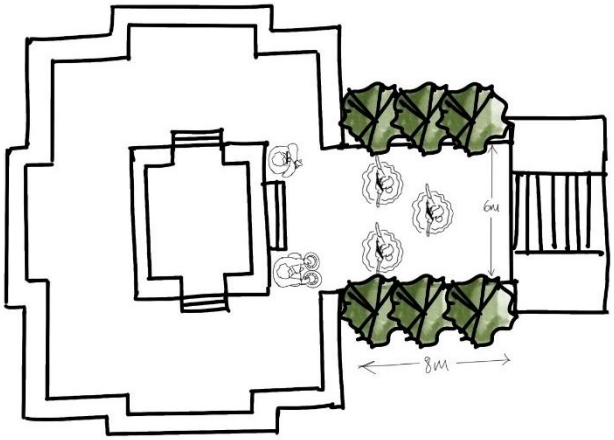


Figure 2: Probable Kathak Performance Setting of Banaras Gharana

Kathak is an adaptive dance form, it has evolved and re-evaluated itself as per the changing times. Setting for kathak performances has kept changing from temples to royal courts to amphitheaters, multipurpose performance halls and now to the well- equipped modern auditoriums.

Today, Kathak is very much experimental. Collaborations with other dance forms and different musical nodes have also become a new trend. Modern Bollywood jazz, semi classical music, etc. are merged and experimented with Kathak. This has been possible because of influence of media. Thus, a centralized space is required for these kathak dancers where they can learn and collaborate under one roof.

Present research aims to study academic and training approaches for kathak as a dance form by understanding the association of architectural spaces with kathak along with its connect between built and unbuilt spaces and study the parameters that can provide a holistic environment for kathak dancers with respect to learning, creating and performing art, close to the nature yet within the urban context. (n.d.)

2. LITERATURE REVIEW

There is not much literature available on kathak, however there are a few instances from where we can get an idea about kathak and its evolution with respect to architectural spaces. One of the finest examples is Bharatmuni's Natya-Shashtra, in which Bharatmuni has established kathak as a classical dance form. He has mentioned kathak in his book by providing users with ample of knowledge regarding kathak and its various components. He has also talked about navaras (nine emotions) however the idea of rasa getting merged with kathak and architectural spaces has not been explored as yet. (Bharatmuni)

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The evolution of kathak is well explained in the book called Dance trail—which is a book by guru vaishali dudhe, it also tells us about how the modern kathak dance form is different from the old tradition. Various gharanas, biographies, mudras, bhedas, abhinay darpan, navrasa, guru-shishya tradition, etc are included in this book. This book is used as a text book by kathak dancers for their theory papers, however for outsiders it gives full idea about kathak. (Dudhe)

Summing up the existing literature on kathak dance seems at first quite straightforward. Beginning in the late 1930s, a growing number of publications on Indian dance and in more recent decades, specifically on kathak have provided readers with lots of colorful pictures, lists of current dancers, and a history of kathak that is consistent in both its details and lack of references or critical examination. (walker)

The literature has helped a lot of students/viewers to understand about kathak much more in depth. There are lot of scholarly articles, books talking a lot about kathak, however many of them have different views, opinions on it.

Indian classical dance and Architecture can be perceived through art forms. Some notable articles mentioned like "kathak dance- a critical history" by Margaret Walker explain how dance and architecture go hand in hand. Dance is something which involves traveling from one place to another, transitions, rhythmic patterns, smooth flow, etc. all these parameters also go hand in hand with architecture and thus they go well together.

The setting of Kathak has changed from century to century. This is due to the spaces around and the environment around that gets created. Kathak is a dance form which usually needs a space where the dancer can express himself very freely. The space should be such that the dancer should be able to narrate the stories very expressively and intricately. Kathak as a dance form has always evolved and is still evolving. There is an attempt to study various kathak settings and architectural spaces, it has been attempted and studied from a kathakars point of view. However, from an architect's point of view we can contribute towards making the spaces better.

There are various festivals celebrated in India where sets are designed or any backdrop is decided for performing classical dances so as to make people aware of our traditional cultures. So the main aim behind organizing such events/ festivals is to introduce people with traditional Indian dance forms and also its diverse culture associating it with architectural elements.

This shows that how kathak has been a part of India since a long time and how yet it hasn't lost its essence.

It has always been showcased in the form of storytelling with respect to murals, artworks, carvings, sketches, etc. kathak has been depicted from Vedic period through all these art forms and thus these things have made people aware about kathak and its importance.

Therefore, it is necessary to explore the association between Architectural spaces and kathak and have a learning environment for this Indian classical dance form, especially in urban areas.

To understand the association between spaces and the dance form, these case studies were conducted to study the similar kind of pattern.

1. **Kalakshetra, Chennai:** ***Location:*** Thiruvanmiyur village on the outskirts of Chennai, ***Site area:*** 99 acres (70% of the area is open space)
   Site surrounding: The complex is only few meters away from the sea on the eastern side and two schools on the eastern side too. Organic planning- Reviving old traditions-forest like environment-connected to nature.
2. **Nrityagram, Bangalore:** ***Location:*** Hesaraghatta, Bangalore, ***Site area:*** 1000 acres land, ***Built in year***: 1990
   Organic planning: open planning concept- vernacular architecture- connected to nature.
3. **Akhil Bharatiya Gandharva Mahavidyalaya Mandal:** ***Location:*** vashi, navi Mumbai, ***Area***: 850 sq., Centre for examination for kathak, tabla and other Indian classical dance forms and music. Dance classes are available too. Organic planning—concrete structure—open courtyards.
4. **Kalashram, Delhi**
   Location: Gulmohar Park, New Delhi, And ***Area:*** 600 sq.m
   CENTRE FOR: Kathak, vocal and instrumental music, painting, yoga, Sanskrit, stagecraft, dramatics and so on.
   This is a school of Pt. Birju Maharaj.

All of above case studies were studied to understand how kathak and architectural spaces are associated with each other. All of the above case studies have one thing in common and that is the connect with the nature that has been provided and that they have several built and unbuilt, semi open and open spaces which are required for a dancer to rehearse. Each space has

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its own essence. All of these case studies have a common style of architecture which is vernacular style. Traditional and local use of materials has been done to make the structure contemplate with the earlier settings of kathak.

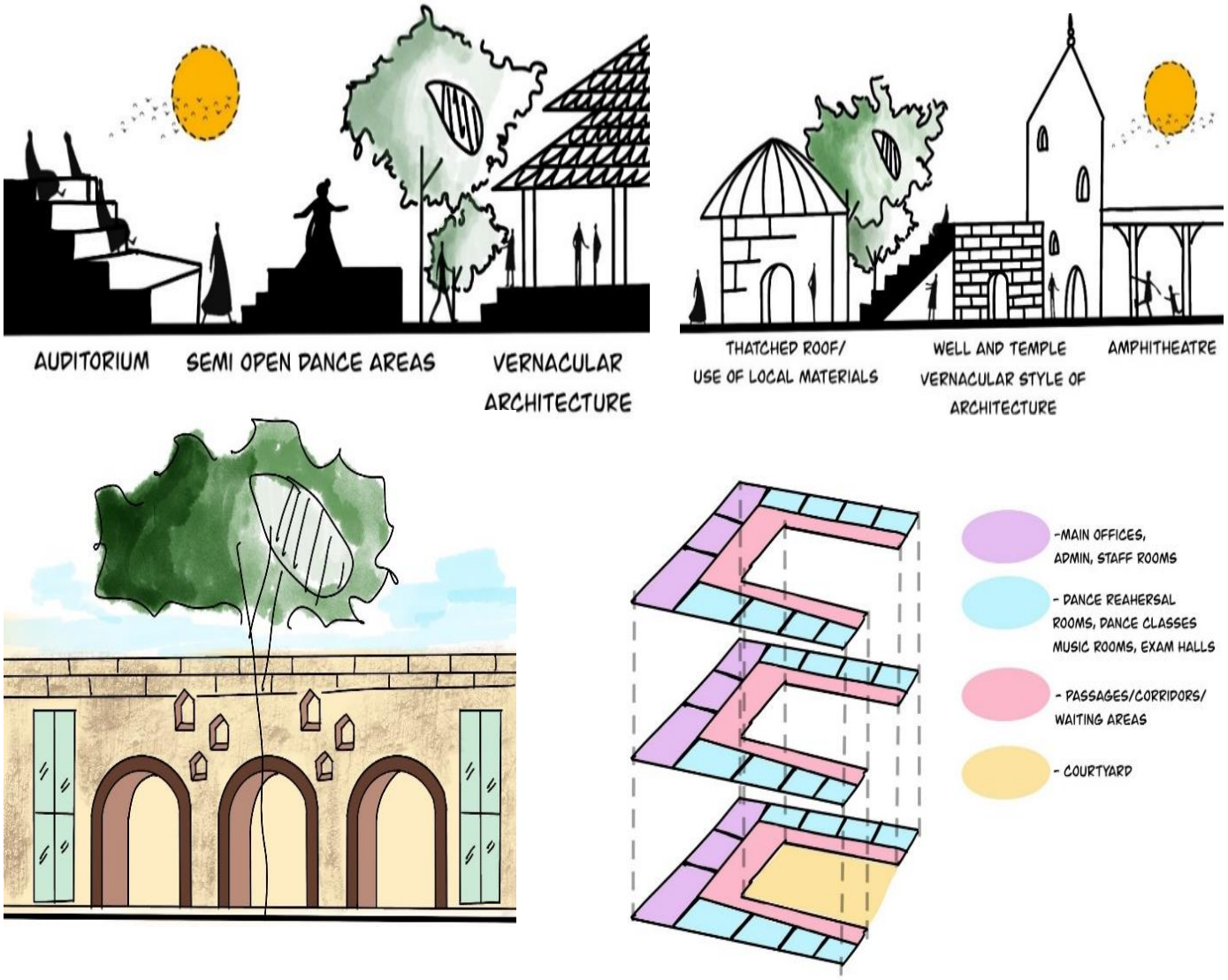


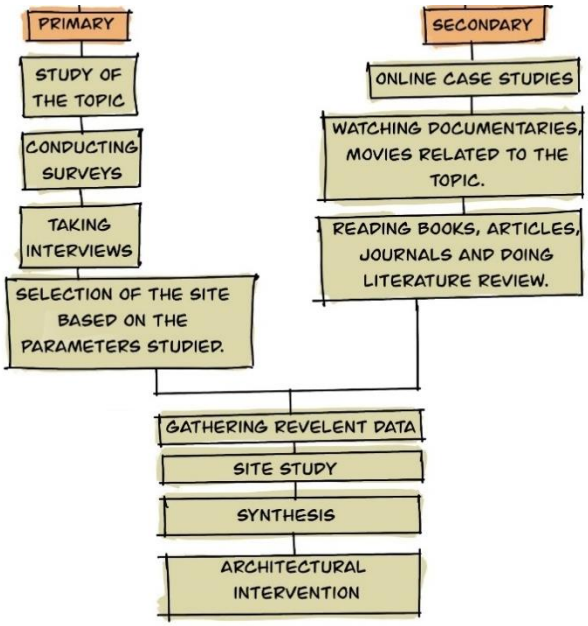
Figure 3: Inferences of Settings from All the Case Studies

3. MATERIAL AND METHODOLOGY

A survey was conducted to understand kathak from various groups of people from common people to kathak dancers. Studying of literature by keeping parameters in mind was done through reading books, articles, journals, watching documentaries, movies, etc. few case studies were also studied to understand association of architectural spaces with kathak. Conducting surveys, taking interviews of kathak exponents and students was done to understand more in depth about kathak and their views on it. After gathering all the data, the parameters that were set for selecting the site were discussed and the site was selected based on all the researched data and its conclusion.

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Table 1: Research Methodology



Following was the data collected from a survey which was conducted for various age groups including common people who didn't learn and know anything about kathak, kathak learners and kathak exponents.

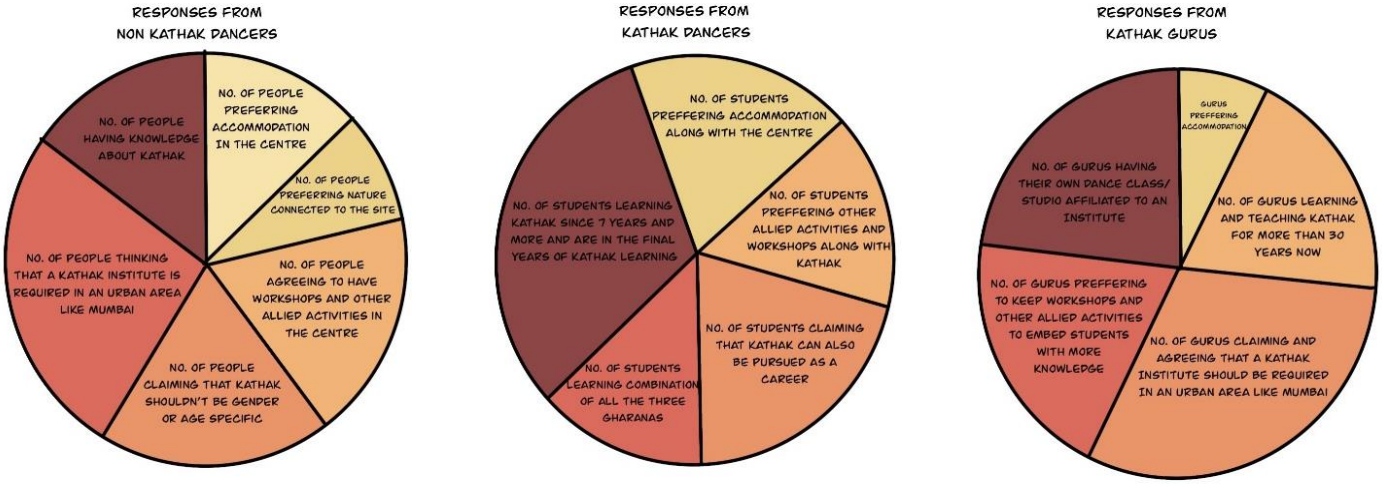


Figure 4: Data Collection

Inferences of Data Collected from Non-Kathak Dancers: Most of the survey was answered by people from the age group of 20 to 25, out of these people 50% of people have no knowledge about kathak at all but they are eager to learn about it. However, most of them knew about its evolution, its gharanas and its origin too. Kathak is a vast topic so making people aware about it is important. Also, most of them suggested to have spaces like amphitheaters, libraries, museums so as to provide and share knowledge about kathak. Thus, the conclusion is to have an institute where students get ample of knowledge about kathak, learn other allied activities, participate in workshops, interact with each other, perform, give exams and stay together as a community.

Inferences of Data Collected from Kathak Dancers: Most of the survey was answered by the ones who are learning kathak since 7 years and more. Most of them were in their final years of kathak and were practicing all the gharanas. They have seen many changes in kathak in this past few years, like how kathak has been emerged with other dance forms and how it has been linked with contemporary. Most of them prefered a studio with mirrors however some think that mirrors

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can be a distraction. Most of them had suggested for other dance form workshops so as to get know about other forms as well. Also, most of them faced the same problem or difficulty related to how it was difficult for them to learn kathak, to maintain posture, to keep up with the body posture because of Bollywood influences, time commitment for kathak, etc. thus, having an institute where they can stay there itself and can save time, energy and commitment issues is preferable.

4. RESULTS AND DISCUSSIONS

Kathak performing spaces have been evolved throughout centuries. The settings have been changed from temples where the dancers performed to worship and to please the deities. Then, the setting shifted towards Mughal era where kathak was being performed in darbars/courts as a source of entertainment to the kings. The focus of kathak shifted from pure and delicate movements to more of sensual movements. Then, kathak was being practiced in small semi open halls, multipurpose halls, etc. today, kathak is performed in large auditoriums where people gather to watch dancers give their exams and perform together on a stage. Even though it is an acknowledged dance form, there is still an absence of a centralized space for kathak where dancers from all over India can come together and learn, experiment, share their experiences with each other. Modern architectural spaces today can also respond to kathak as a dance form with respect to light, colors, semi open and open spaces, stage settings, connectivity with nature, etc.

Stage setting is basically arranging the property and scenery, to present the place or scene of the play or the performance, on the stage. These settings were different earlier as kathak was first performed in temples and courts. The setup differed with respect to the space, the musicians, the audience, etc. today kathak is practiced and performed in huge halls, studios, amphitheaters and auditoriums, so the setting of the each space is different from what it was earlier. Now, the spaces are huge and it gives the dancer a kind of comfort he or she needs.

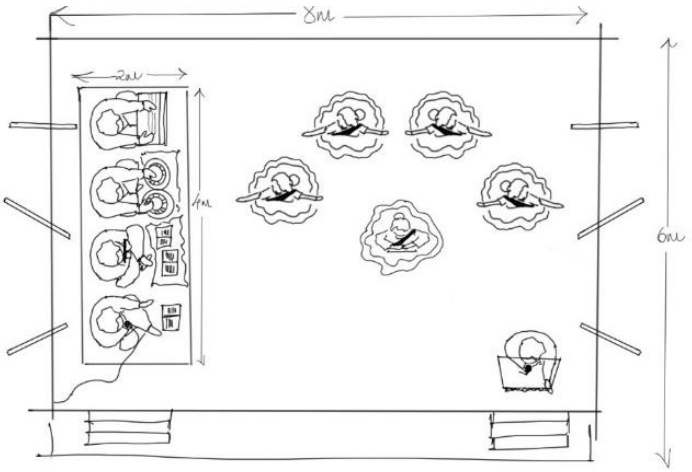


Figure 5: Probable Arrangement of Modern Kathak Setting

Talking about navaras, i.e. nine emotions; these emotions are studied in kathak however they are not yet used to get merged with architectural spaces and kathak with respect to colors, emotions, etc. Kathak is an expanse field of performing arts, it is not just about dance, it is also about theory, literature and music. The above research has been done to understand various layers of kathak and how architecture can help kathak to evolve or how it's important to have these settings. In Mumbai, there are various dance studios, classes, etc. but Mumbai doesn't have a kathak institute which has full-fledged kathak requirements. According to the data gained from the research done, 60–70% of people don't have an idea about what kathak exactly is. Their definition of kathak is what they see in movies and theatres. The research also shows that there are various kathak dancers but most of them are self-taught and haven't taken education of kathak but claim that they are kathak dancers which are obviously media influencers, instagram reel makers, etc. but this is not what kathak is about.

This research is an overall review of what kathak is and how important it is for our Indian culture and how these spaces and settings can help kathak to grow. The association of architectural spaces with kathak is important and such built and unbuilt spaces are required for kathak to be performed. Therefore, having a space which is connected to the nature, away from city's hustle bustle, having easy accessibility, having view points, easy transportation, etc becomes really important and these all above become parameters for selection of the site.

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5. CONCLUSION

The research concludes that a centralized community centric space is required for kathak dancers in India where architectural settings will play an important role by having settings that are required by kathak dancers. Site setting which is connected to nature and far away from city's hustle bustle will be required for such program.

Thus, to conclude, this research has justified its aim through various surveys and interviews conducted, through research papers and on site observations and has gained a clarity of how important it is to have a centralized space of kathak for kathakar community and lay persons where all of them can learn kathak under one single roof which will help them to share their ideas, thoughts, learnings, etc. with each other.

ACKNOWLEDGEMENT

I would like to thank my mentor, Prof. Ar. Tanvee Joshi for her valuable guidance and unwavering support and encouragement throughout the process of the project. I would like to express my warm gratitude to my parents, my friends and Dheeraj Chogale sir who constantly supported me and walked with me through this process as a guide by giving his inputs and sharing his experiences and thoughts with me.

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The Presence of an Absence: Creating an Unwinding Journey of Remembrance

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ABSTRACT: When a loved one dies, life changes forever; the person moves from 'loving in presence' to 'loving in memory'. Farewell to someone close is always difficult. The past of any individual is riddled with memories, feelings, and legacies and is also hereditary. Grief practically never escapes a person. Everyone from all walks of life has experienced something similar. The memories associated with loved ones and the ways by which individuals recall them are determined by the societal framework that has emerged through collective memory. The life of the person who is suffering from the loss of the loved one needs grieving, mourning, healing, and remembrance hence a transition period is required, however, there are not many spaces built for ease of transition. There is a turning point in the course of healing moving from the darker side to the light. Spaces that enable understanding and healing of loss through ritual, narrative, remembrance and gathering are very important in this process. Healing spaces help in creating inner peace and well-being as a physical space affects and transforms the healing process.

This research aims at addressing queries such as; how an architectural design can provide spaces for people to heal by moving forward and recollecting memories of their loved ones with their social networks in an urban fabric of everyday spaces? This research attempts to analyze the lack of current spaces in urban areas and the possibility of inserting spaces for people to grieve, mourn and heal and preserve memories.

Keywords: *Grieving, Mourning, Transition Spaces, Healing Spaces, Preserving Memories.*

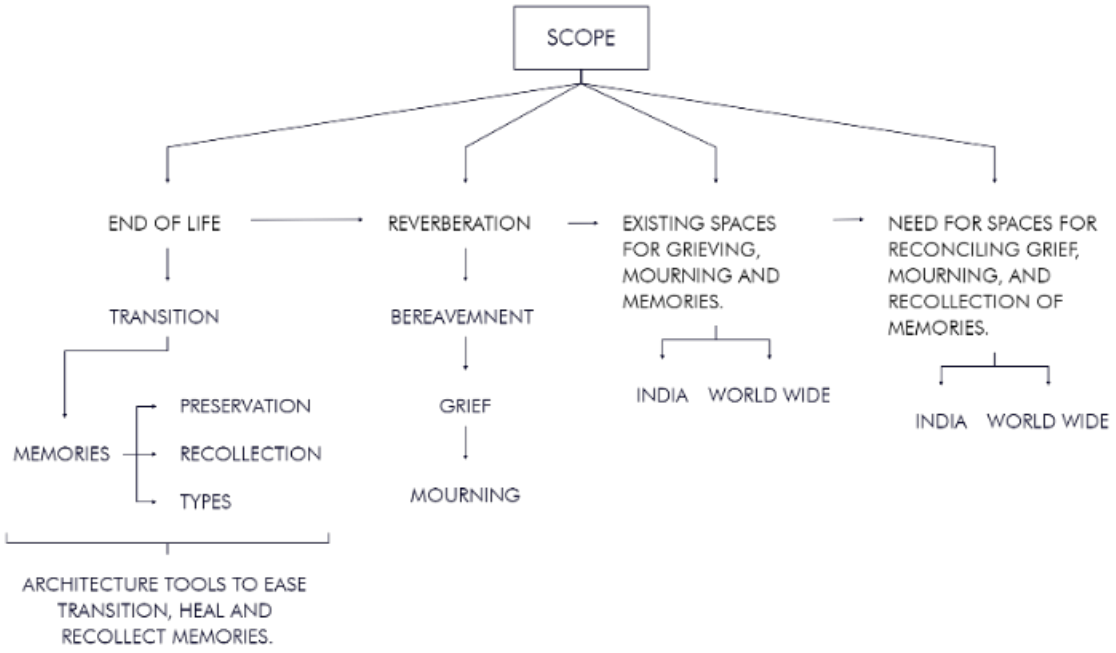
1. INTRODUCTION

Death has always been considered as one of mankind's greatest worries. There are certain universal similarities with regard to death as well as differences that get influenced by cultures. Although bidding farewell is a personal gesture, architectural spaces can play an important role in comforting people and helping to reconcile grief, mourning, healing and remembrance of memories. Ideally, the concept of death and cremation and burial chambers are considered dark and dull. The process of losing a loved one is very personal, but the environment in which the end of the journey takes place is borrowed and often offers no comfort to the mourner. Even though the person's journey is over, a new journey for those left behind has just begun and it's never easy. That is why it's so important that the first steps are as comfortable as possible and that the family member who has just lost a loved one feels as supported as possible. There are many spaces that are directly or indirectly associated with the loss of loved ones. All these spaces get filled with varying degrees of emotions like grieving, healing and remembrance. Losing a loved one is never facile, and there is little comfort for families going through such a great loss and dealing with the emotional impact it has, collectively and individually. Grief has no geographical or historical boundaries. It is evidently displayed across time, age, and culture. Grief is something to be "reconciled" and move toward healing, not something to be "resolved". It is logical that people look to the past to address the present because society is constantly confronted with a wide range of cultural problems. The only comfort offered to the living is the reminder that even though they are gone, their memories can still sustain them. For example, religious places can segregate people who don't participate in organized religion, and crematoriums/cemeteries can feel more industrial. The spaces for burial or cremating are so inadequate that families can barely stand for the last rites and the neighborhood parks and open spaces are so inadequate for a person to sit and remember the person and nor there is space to grieve than home though these emotions are personal they need a space to evoke to heal and to ease the transition. Hospitals are spaces where there is immediate grieving. Though western countries have developed bereavement rooms in hospitals but are the four walls with a window enough for the family to accept the loved one is no more a part of their lives?

The research aims to explore various possibilities to create spaces to ease the transition of reconciling grief, mourning and healing and to recollect and preserve memories of loved ones who are not a part of their lives.

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Flowchart 1: Understanding the Scope of the Research



2. LITERATURE REVIEW

One can find large quantum of literature that helps in understanding varying stages of emotions that a person feels with loss of loved one. The literature review parameters are set based on research components which are grief, mourning, healing, memories and spaces associated with each stage.

Grief and Mourning: The parameter comprises the study of different aspects of grief, types of grief, the ways which can help a person to recover and interviews of people who are part of the journey sharing their experiences of how the stages of grief are myth there is no definite stage of grieving, the support a person requires from family and friends. Mapping grief for a conceptual framework for understanding the spatial dimensions of bereavement, mourning and remembrance and the need for spaces for grieving in an urban fabric.

Grief, loss, and bereavement: an overview (Article December 1999, Naji abi-hashem): This article provides a broad overview of the subject of sorrow through the definition of popular terms, a discussion of loss types and nature, a list of grieving reactions, and explanation of factors affecting bereavement severity, morbidity and mortality of mourning.

Mapping grief—A conceptual framework for understanding the spatial dimensions of bereavement, mourning and remembrance (Article 2016, Avril Maddrell): This article emphasizes the importance of bereavement's geographical aspects as a universal human phenomenon. Grief, mourning, and remembrance are felt in and mapped upon (i) physical spaces, such as the public and private spheres of daily life; (ii) embodied-psychological spaces of the interdependent and co-producing body-mind; and (iii) virtual spaces, such as those created by digital technology, religious-spiritual beliefs, and non-place-based community.

Healing: The parameter comprises the study of the way forward after the event and the process an individual goes through to come out of that loss in form of experiences shared by people and books which help people understand ways to heal and accept the loss being inevitable. Exploring the concept of healing spaces, the science of well-being and how nature helps people heal faster than practicing indoors.

Exploring the concept of healing spaces (Research paper 2018, Jennifer DuBose): This literature discusses the idea of healing into its antecedent components (emotional, psychological, social, behavioral, and functional), and then offers the available data to show how healthcare environments can promote recovery. The six sets of environmental factors—homelike atmosphere, access to views and nature, light, noise management, barrier-free environment, and room layout—were found to have a direct impact on or promote one or more dimensions of healing.

ISBN: 978-93-89934-68-7

Healing gardens (Book 2016, David camp): The concept of a "healing garden" has gained widespread acceptance as a unique type of landscape design that addresses the physical, psychological, social, and spiritual requirements of garden users as well as their caregivers, family members, and friends. The first section of this book concentrates on the concept, kinds, and design concerns, which are demonstrated by in-depth theory and graphics. The second section of the book offers informative design explanations, thorough plan drawings, and images of the completed, built projects on a variety of treatment modalities.

Memories: The parameter comprises the study of memories, the ways to recollect, and the relation between architecture and memories.

Land of memory: Architecture as an in-between the living & the deceased (Research paper 2011, Tsang yikwo) - Talks about architecture as an in-between the living and the deceased, it provides a place and space for the memory between the living and the deceased. And it is not just a disposal space, but it is also a place for emotional expression and cultural inheritance. The literature review helps to understand the grief, morning and its stages an individual goes through in terms of, culture, religion their effects and how difficult it is to express and move forward with the pain of losing someone with help of theories, examples and case studies. Architecture can act as a reflection of the social and cultural conditions of the time. It is this ideal that has created a need to upgrade memory by creating a bond between space and memory.

To understand the architectural spaces associated with these stages case studies of existing architectural spaces and systems have been studied

Case Studies: The study are secondary cases out of which some are discussed where the understanding of grieving, healing and memories is understood with the function of spaces and how it helps to help to reconcile and heal with memory preservation.

1. **Mahaprasthanam, a crematorium** (2015, 14973.4 sq.m. Hyderabad, India, Architects-D A studios)—Symbol, Eternal Embrace, Ulterior honor, Farthest farewell
2. **Eskenazi Health hospital healing waters** (2014, 172 sq.m. Indianapolis USA, Architects-Land Collective, Fluidity design consultants)—Healing with nature -Water as a soothing element, Filtered sunlight and sense of protection, Barrier-free.
3. **Hanover hospital garden** (2010, 600 sq.m. Hanover Canada, Architects-Brydges Landscape architecture)—Honor the memories, Dry stream as a remembrance, Immersed in color, scents and textures making it a restful garden.
4. **Diamond Hill Columbarium** (2009, 7750 sq.m. Hong Kong, Architects-ArchSD) – Niches, Gardens. The idea of tradition is represented in the columbarium as an individual memory of the collective memory.

Material/Methodology: The research contributing to the study of the dissertation has been carried out by understanding the need for spaces for reconciling grief, mourning and recollecting and preserving memories. The process also involves referring to books, taking interviews, and online references for a deeper understanding of the worldwide concept of death rites and how architecture helps to heal by carrying out live and online case studies. Site study and site parameters are important aspects to study for design intervention. This has further guided to understand the relevance of the argument and the need for places in India. The Online articles and books provide base information about the required theories to understand the various perspectives and approaches to the concept. The primary and secondary data help to understand the concept in the Indian context which further directs site selection and design philosophies that can be combined for an architectural intervention.

Table 1: Study of Existing Spaces in Mumbai

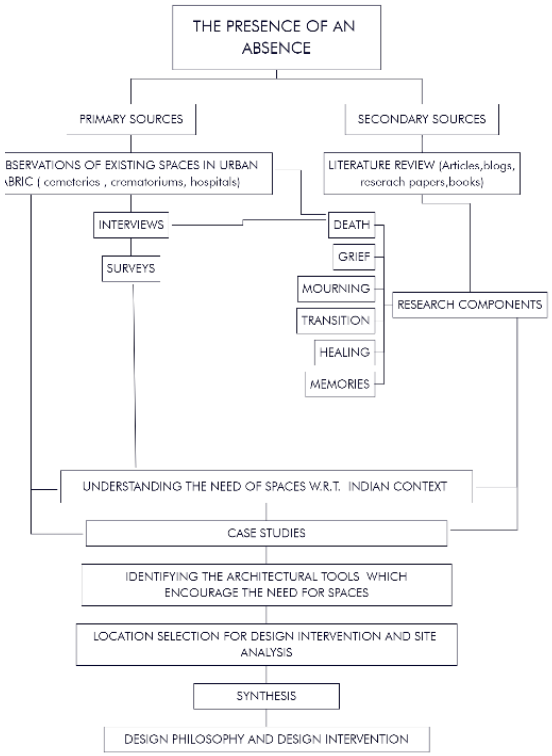
Name	*Area*	*Spaces*	*Spaces Required*
Kena Jagannath Shankar Sheth Smashan Bhoomi.	3 acres	Temple, Ritual space, 2 pyres, Ash storage room	Ambulance entry, storage rooms, washrooms, division of activities.
Bada Qabristan	7 acres	Mosque, Burial grounds, shops	Ambulance entry, storage rooms, washrooms, division of activities, prayer halls for women.
Sewri Christian cemetery	40 acres	Church, prayer hall, graves	Barrier-free, space for last rites, seating.

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3. RESULT AND DISCUSSION

The above study gives the idea of the existing spaces where though it is divided by religion somewhere these spaces are required at the neighborhood level where the importance of the crematorium and cemeteries are understood by the people as death is universal these spaces where are considered dark and dull should be redesigned with the addition of elements of reconciling, healing and preservation of memories with architectural tools like spaces, nature, light and ventilation, color, senses. Phenomenology is a philosophy of experience. Theoretically, phenomenology considers the work of art as a mediator between the consciousness of the artist and the user.

Flowchart 2: Methodology of the Research Paper



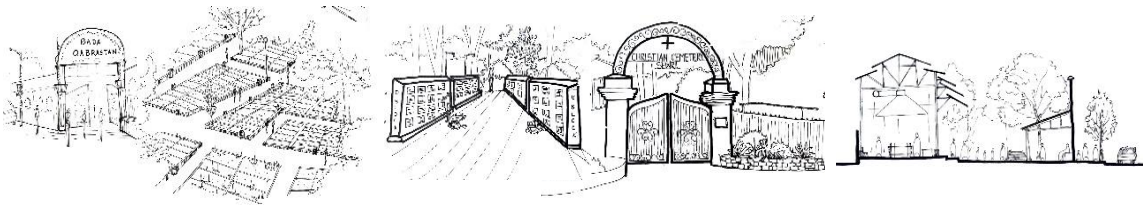


Figure 1: Sketches of Existing Crematorium, Cemeteries in Mumbai

Table 1: Phenomenology in Architectural Spaces

Space ←	*Engagement* →	*Senses*
		Emotions
		Experience
		Perception

Light: Light has a significant impact on architecture as well as our psychological behaviors. The necessity for open areas and windows that enable more natural light to enter should be considered in the design. Natural lighting brings a sense of peace and tranquility, which benefits relaxation and stress reduction while also boosting positive vibes. This is why most individuals feel relaxed when they go for a morning stroll outside. The higher the intensity of the lighting, the greater the

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intensity of a person's emotions. As functions and settings change, so do their lighting requirements. When attempting to be creative, there is use of low lighting, whereas when trying to focus, bright lighting is used.

Spaces: People's activities are controlled by spaces, which creates a flow from element to element, directing people where to go, what to see, and what's significant. When planning an indoor environment, considering the functionality of the area, the amount of time people would spend in it, and the atmosphere you want the room to generate. Large open spaces are often more pleasant and welcoming, whereas confined or cramped areas have a more negative influence.

Color: Color is a very effective communication tool that may be used to indicate actions, impact emotions, and sometimes even change physiological responses. Certain colors have been related to improved heart rate, higher metabolism, and light sensitivity. While color perception is sometimes subjective, some color effects have significant universal meaning. Warm colors including red, orange, and yellow and are found in the red region of the color wheel. These warm hues trigger emotions varying from feelings of comfort and warmth to rage and aggression. Cool colors fall on the blue end of the spectrum, such as blue, purple, and green. These hues are widely perceived as tranquil, yet they may also evoke feelings of grief or apathy.

Nature: A space flooded with natural light demonstrates a level of safety and also the exposure of the individual. Maintaining natural light and providing light and shadow create a sense of belonging. People follow either light or shadow. A well-lit space also creates a sense of safety and comfort hence increasing the use of such space. Natural materials such as stones, wood, sand, water, etc. establish an identity of a space. Being not similar the materials help in creating a unique identity of the space. Such building materials bring a clean environment and hence pleasure and comfort. Green spaces help in reducing stress and are loved by almost everyone to carry out activities like exercise, reading, and chatting around green spaces. Trees provide shadow and can provide designated seating space with comfort under it, Plants add and attract i.e. into space and have the potential to occupy bulkily volumes hence creating a cozy, cool, live, and comfortable environment.

Body, Space, Senses: Sensory design emphasizes the multi-sensory experience influencing people's attitudes, behaviors and well-being. It is a proposal emphasizing how the composition of sensory stimuli in the built environment is arranged to enhance the quality of life and experience, keeping the users on the focal point with this approach, the effect of the architecture on occupants can be better attuned through sensory design for healing. This can be done by adding inserts in existing spaces which can be crematoriums, cemeteries and neighborhood spaces such as gardens.

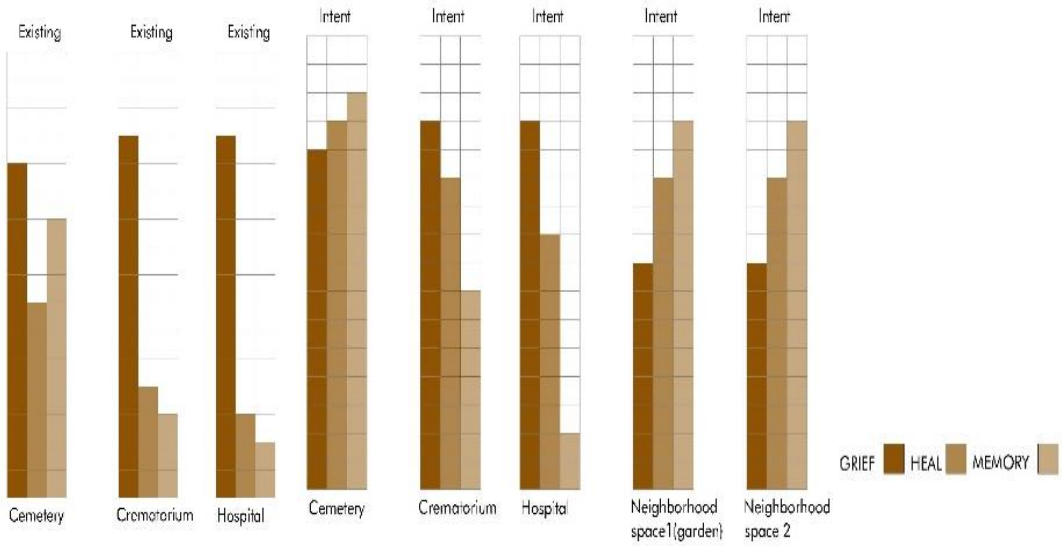


Figure 2: A Comparison of Existing and Intent by Adding Inserts in Existing Spaces

4. CONCLUSION

The event commemorates the bereave d's final moments with the departed, which are etched in collective and individual memory. A moment of such importance deserves architecture that represents it, a space for collective thought, reflection,

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and celebration. The case study analysis has a recurrence of certain architectural traits and materials. Each case study has a similar design language in that they are modest structures with little to no ornamentation that are sympathetic to their surroundings. Each of the case studies chosen had a unique concept with a focus on the earth and the sky, a weighted suspension, and the application of light and shadow were visible. The contemplative mode depicts architecture as direct and intentional; it not only helps but also initiates a contemplative experience. The circle as a form has an introspective element; it directs, confines, and occasionally restricts its occupant. It provides an opportunity to internalize and center oneself. In typical ceremonial locations, one diverts our sight to the stage at the front of the hall, peering through a cluster of the backs of other mourners' heads, never catching another's eyes. The preliminary sketches are a study of the circular form with the goal of creating an introspective place.

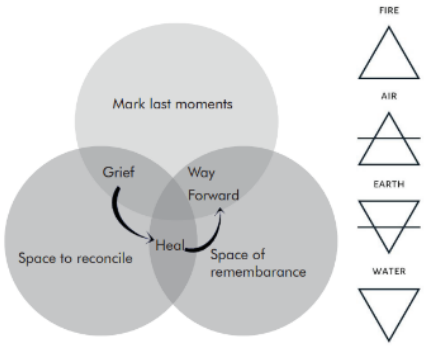


Figure 3: Possible Architectural Spaces

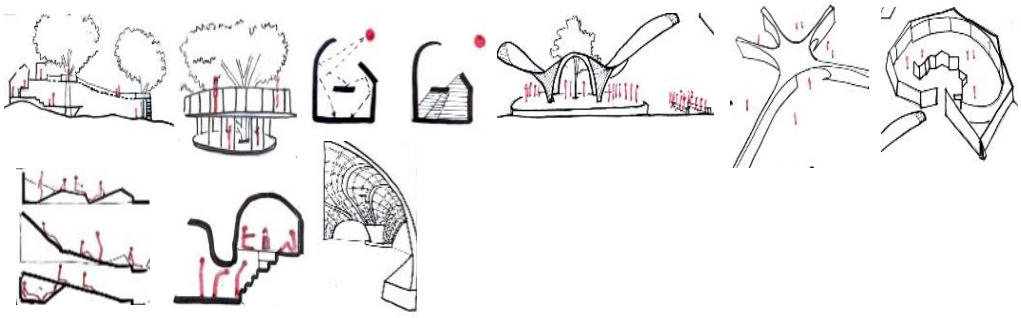


Figure 4: Possible Outcomes for the Inserts

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I would like to thank my mentor, Prof. Ar. Tanvee Joshi for guiding through my research and encouraging me to pursue this topic. Ar. Manzer Mirkar Sir for his insightful discussions and for giving a way forward to research. I would like to express my warm gratitude to my parents, my friends and Dheeraj sir for all the support.

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[4] https://www.youtube.com/watch?v=khkJkR-ipfw&t=482s
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Weekly Street Markets in Pune: An Ephemeral Phenomenon

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ABSTRACT: The temporality of Local street markets indicates the level of adaptability it carries in terms of the context it belongs to. The title aims at understanding the phenomenon of spacial and qualitative flexibility of the street markets in Pune in terms of time, place, scale, periodicity, etc. This flexibility creates a more prominent aspect of how multidimensional their work would be which highlights the cultural layer it holds. By understanding the pattern of temporal local street markets, a lot of decoding can be done in terms of the intangible and the tangible aspects revolving around the market. Here the word 'Temporal' clearly gives a idea of the moulding nature of the local street markets in various dimensions of space and time. From this research one can decode the multidimensional characteristics of local markets showing a detailed analysis of how the markets use up these streets and how their flexibility adds to the character of the public spaces. As it has some urban scale to it, visual documentations and one-to-one interactions form the bases for data analysis. This temporal analysis of the local street markets will allow urban designers, social and cultural architects to intellectually respond to these street changes and understand the modeling of the temporal elements on the street which can be replicated and adapted based on the context. This together clarifies how ephemeral designs can change the overlook of a city and yet retain the cultural identity of the same.

Keywords: *Temporary, Flexibility, Ephemeral, Street Market, Multifunctional, Variation.*

1. INTRODUCTION

Streets play a very important role in making Indian public spaces cheerful and culturally diverse. Street vendors form an integral part of the street activity by creating a social place for interactions. These local street markets have a lot of character in terms of the flexibility it shows up with the change in the contextual scenario whether it be a daily change or occasional changes. These flexible aspects are not just limited to physical factors but also includes the intangible aspects of sound, taste, smell, etc.

The title 'Temporal nature of Punes Juna Bazaar ' aims at understanding the phenomenon of spacial and qualitative flexibility of the Indian street markets specifically Juna Bazaar in Pune in terms of time, place, scale, periodicity, etc. Every Wednesday and Sunday in Kasba Peth, one of Pune's oldest markets, the 250-year-old Juna Bazaar, also known as Pune's Chor Bazaar, sells a variety of goods from brass statues to handicrafts and paintings from improvised stalls. Thus the scope of the research is limited to only weekly local markets which open up once a week or so. But due to this limitation, one can understand how within a day the complete street scene changes. With good scrutiny, one can also find delightfully odd objects, such as a collection of small fragrances, alcohol bottles, or even fashionable locks. This street market use up the footpath and its edges to set up its stalls. In some places, the market pours into the main street impacting the daily road activities. Here the word 'Temporal' clearly gives a clear idea of the moulding nature of the local street markets in various dimensions of space and time. From the above research one can decode the multidimensional characteristics of local markets specifically 'Juna Bazaar' showing a detailed analysis of how the markets use up these streets and how their flexibility adds to the character of the public spaces. It shows up how the local street markets mould themselves with the change in the periodic occasion.

2. LITERATURE REVIEW

Bazaar; it is the city's most fascinating location for wholesale, both trade, and retail businesses.

Ahmedabad, Gujarat's old walled city, is home to Manek Chowk. One of the most significant public areas of the Walled City and a long-established commerce district is Manek Chowk. It consists of both official and unofficial commercial

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endeavors, religious and cultural sentiments, and a bustling social scene as analyzed in 'Streets as Public Spaces: Lessons from Street Vending in Ahmedabad, India' (Saumya Lathia, 2019).

The stores around here offer a wide range of goods, from cheap jewelry to hosiery. The gold and silver shop is primarily located on the southern edge of the chowk. A 20-hour workday is typical for Manek Chowk. From early-morning cow grazing activities to busy commercial and business activities during the day to a bustling street food market that operates far into the night, unorganized vending activities impede transportation. There is less room for pedestrian mobility as a result of shop extensions onto sidewalks and roadways.

Manek Chowk is Ahmedabad's busiest market throughout the day, where traditional steel kitchen and tableware, fruits, and spices are offered alongside specialty fabrics made using Gujarat's traditional handicrafts. The square is converted into a sizable outdoor restaurant at night, replete with tables, chairs, vendor booths, and a sizable throng of foodies. The transformation that takes place as darkness falls is this chowk's most intriguing feature. The switch is carried out by the lariwallahs with almost clockwork accuracy, just like a factory would during a shift change. During the day, it is a bustling day, throughout the week and weekends, and during seasons and holidays. Physical mapping of attributes including sound, scent, land usage, building use, pedestrian movement, vehicular movement, and other layers will be used to present the study that has been done.

Morning Evening

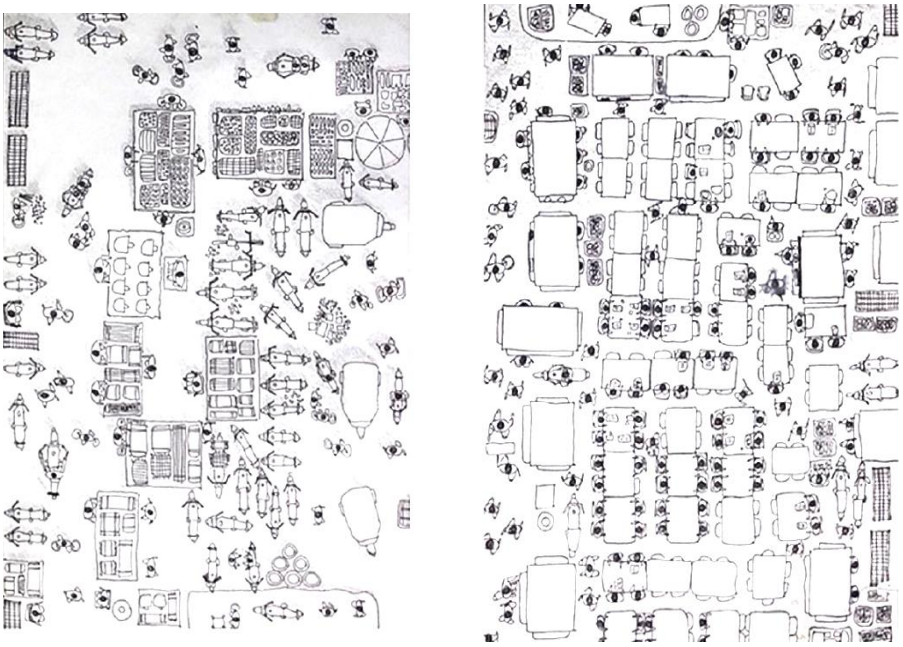


Figure 1: Illustration Indicating the Change in the Streetscape at Different Times of the Day in Manek Chowk

The hawker community, which makes the street in Crawford Market the most vibrant, is its most important characteristic. The hawkers are placed so that they are an extension of the official shops, bridging the gap between official and informal operations. For example, outside of Bombay Dyeing, a store that sells bed covers and curtains, you can find hawkers selling identical goods of local quality whereas outside of Mangaldas Market, a clothing store, you can find hawkers selling clothing at significantly lower prices. As a result, there is a wide range in the size, affordability, and product quality business street and develops a lively nighttime character. By analyzing the case study of Manek Chowk, one can understand the theoretical interpretation of the street markets can be done.

'Through the Bazaars of Mumbai' penned by Ashlesha Kale is yet another article that widens the horizon on bazaar culture and its dynamic attributes. The purpose of this essay is to comprehend Mumbai's daily urbanism through a critical examination of one of the city's busiest market streets. To comprehend the intricacies and dynamics of the urban landscapes in the city of Mumbai, market areas and bazaars are studied. As far as the methodology of the paper is concerned critical

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mapping has been used to understand the physical levels in which the plaza and streets function, and various interviews have been performed to ascertain how locals interpret the area. To grasp the change, simultaneity, and fluid aspect of this site, photos and films were captured at various times during the of businesses, serving a wide range of customers. The sidewalk is taken up by these impromptu activities, which extend about 1.5 metres into the roadway on either side.

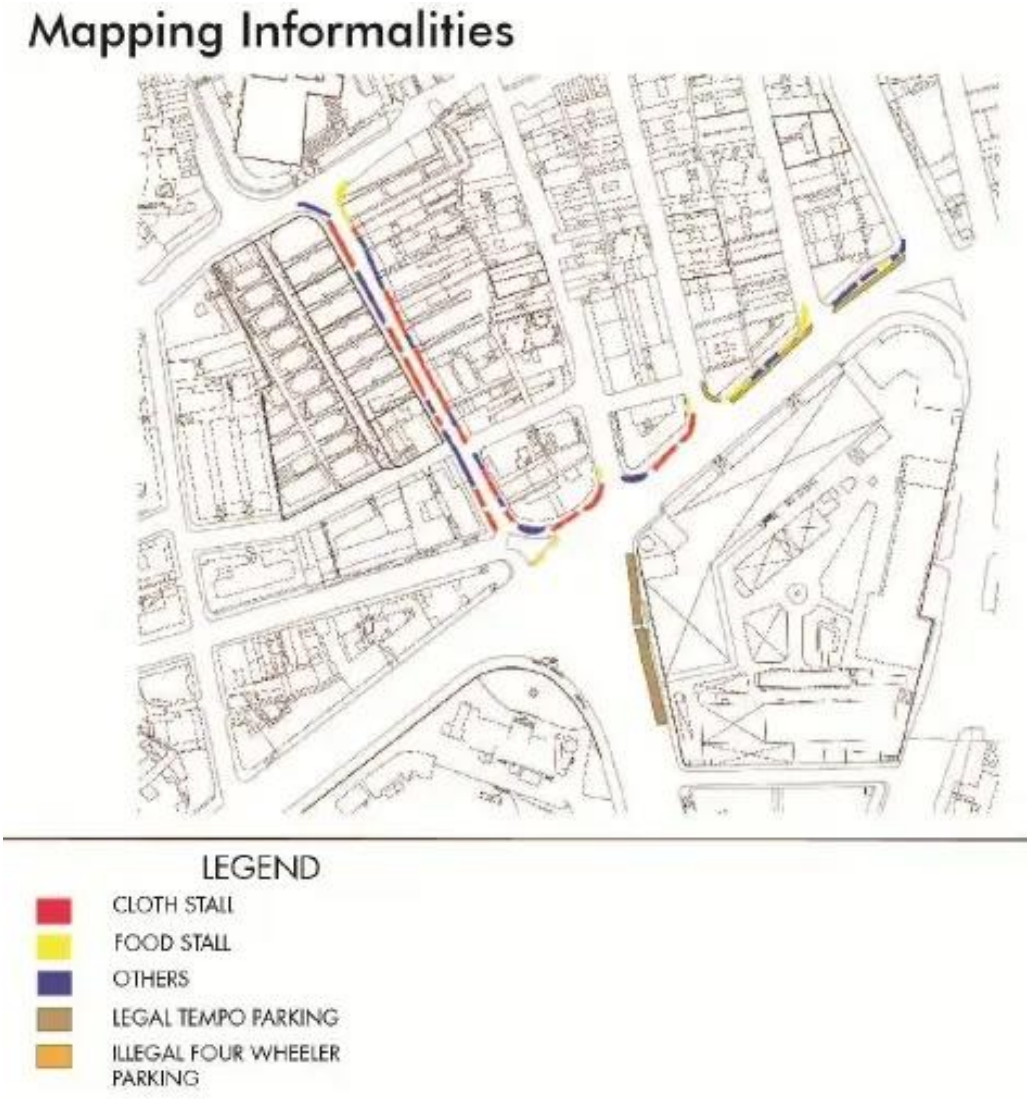


Figure 2: Mapping Informalities for Crawford

The paper makes an attempt to map the street markets in various intangible aspects of smell, sound, movement, and the variations it carries daily. With the above analysis, the relevance of redevelopment of Cowfard market is highlighted.

'Inclusive Streets for Fostering the Notion of Public Space' penned by Ar. Bhagyalaxmi S. Madhapur, Dr. Mamatha P. Raj studies Gandhi Bazaar, a notable street in the historic district of Delhi. This research primarily intends to explore and discuss numerous issues faced by Indian streets in this setting. Bangalore's Basavanagudi neighborhood is used as a case study. The analysis aims to investigate. How inclusive design methods and tactics promote greater utilization of already-existing public space by maximizing space management and time-based sharing, which helps with crafting inventive use of the public realm for a variety of stakeholders. The encroachment by the vendors makes it difficult for the pedestrians to walk on footpaths. The public realm, which is fundamentally a crucial component of shared community space, has an impact on the form and purpose of the neighbourhoods. The physical environment is currently being developed in a way that excludes the user group, leading to unsuitable and useless development spaces. Every day, thousands of people go through the area for a variety of purposes.

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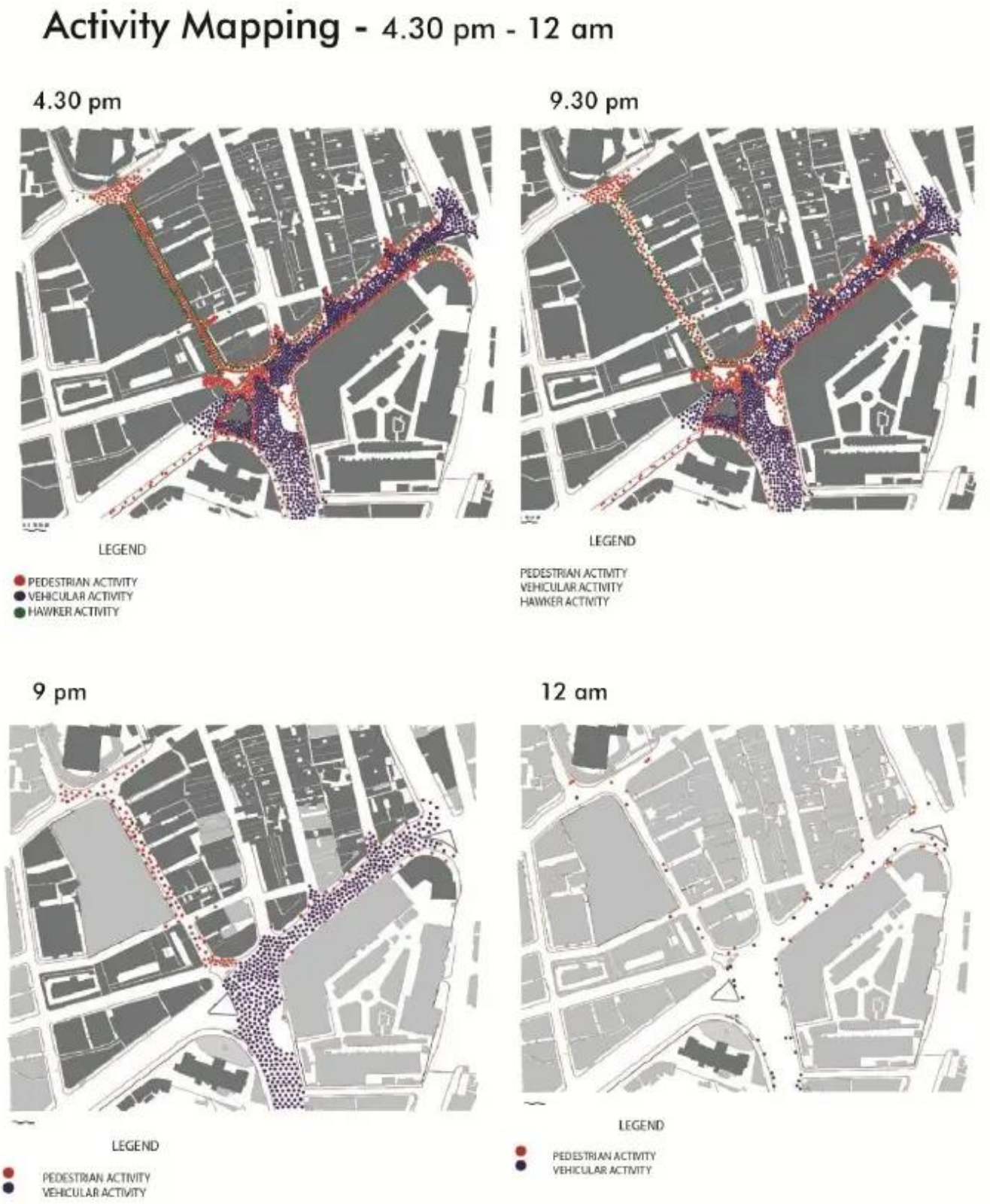


Figure 3: Activity Mapping from 4:30 to 12 am

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Figure 4: Building Type Variation

Urban perspective (Designing the Public Realm) by Ar. Arsheil Chugh explores the functions of contemporary urban public spaces, particularly those found in Chandni Chowk's public plazas, chowks, and roadways, as well as the connections between these spaces' physical architecture and the activities that take place there. It depicts the project's activities, with a concentration on the work. In a defined urban public space, people engage in passive to active bodily engagement and their interaction within such an area, such as a street. On the other side of the Lahore gate of the Red Fort, which is also known as one of Delhi's most famous streets, Chandni Chowk sometimes referred to as Moonlight Square, is one of Delhi's most significant ancient streets. Chandni Delhi's Chowk is more than just a bustling bazaar; it is the city's most fascinating location for wholesale, both trade, and retail businesses.

- Chandni Chowk was originally designed and built, but as it increased in importance as a commercial hub, it drew more trade and expanded randomly.
- The sizes of the stores vary; there are no set measurements.
- The development of narrow streets was influenced by climatic variables.
- There is no standard procedure for signage.
- Wide streets make it difficult to circulate.
- Mobile and semi-mobile vendors are present among the pedestrians.

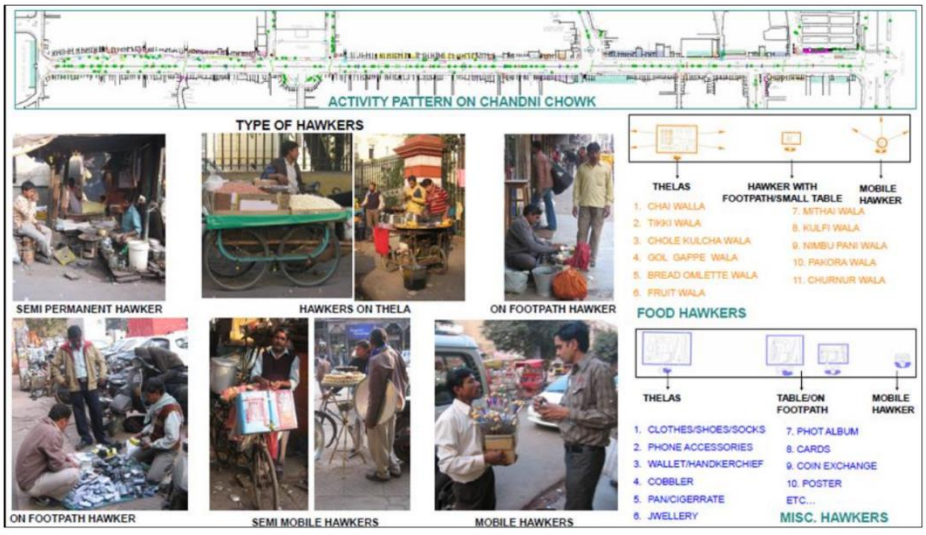


Figure 5: Activity Mapping of Chandani Chowk

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3. RESEARCH METHODS

The term temporality is akin to the frequent, change, changes and alterations which might happen periodically, occasionally or rarely. The temporality in market places might be on the daily, mouthly or occasionaly bases. This temporality is seen clearly in weekly markets where the market forms and deforms within the same day or couple of days.

It consists of the following steps: It consists of the following steps: data collection, data assembly, data clarification, and an analytical investigation based on the data assembly.

- A special public street in Chandni Chowk, Delhi.

This methodology includes research into the theories of many urban designers and planners, which further offers possibilities to comprehend how people's actions relate to the physical structure of contemporary urban public spaces based on Place components, Principles, and standards.

4. ANALYSIS, RESULTS AND DISCUSSION

An historic market is a necessary component of every city. With the exception of the wet season, Juna Bazaar takes place every Wednesday and Sunday from 8 am to 6 pm in Mangalwar Peth. Vehicles are not allowed to enter the area at this time to ensure the safety of shoppers and pedestrians.

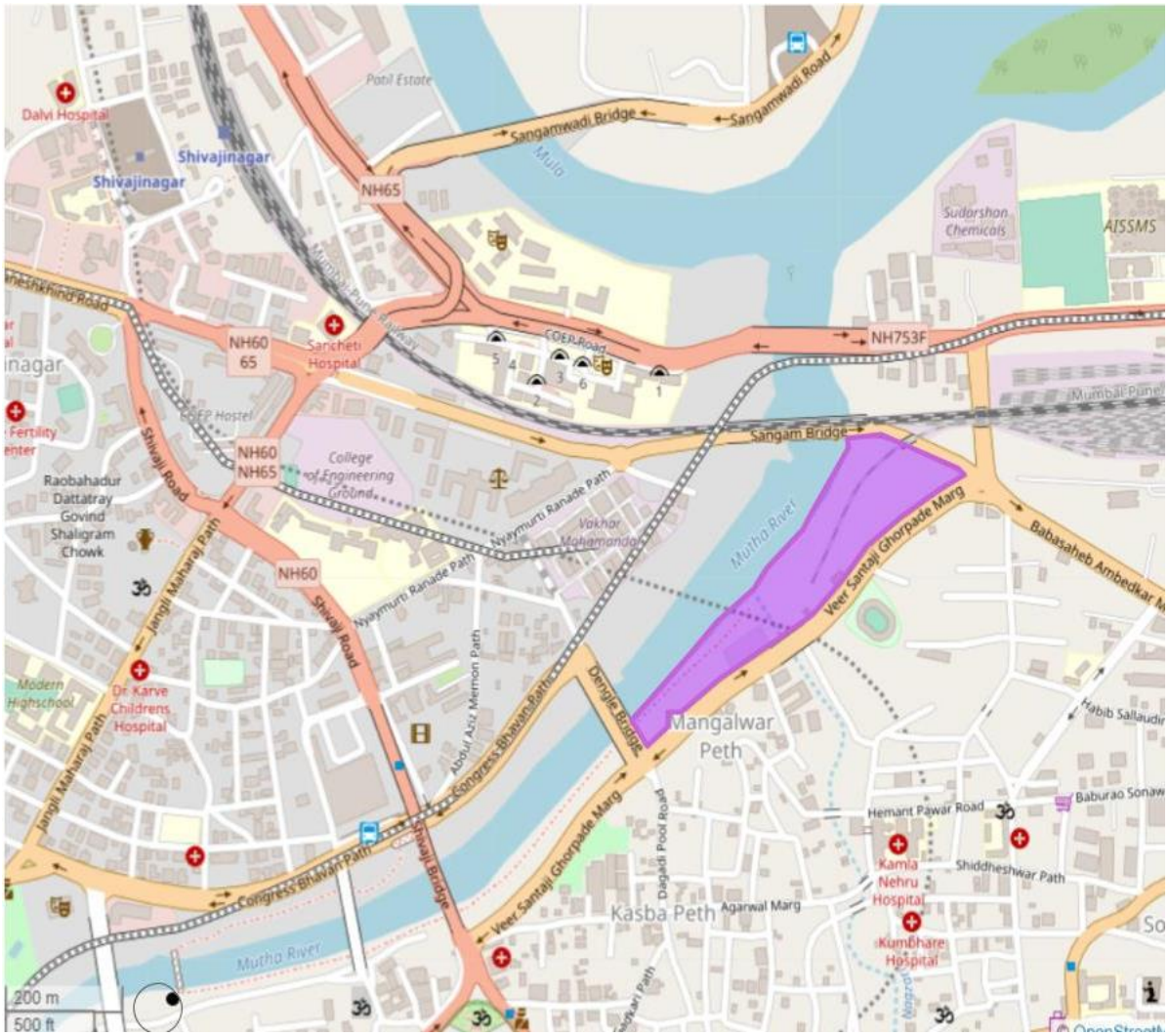


Figure 6: Junna Bazaar, Pune

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Nava Paul, formerly known as Shivaji Bridge, ends at the market, which is located across from Shaniwar Wada. Kumbhar Wada and a statue of Narhar Vishnu Gadgil are located across from Juna Bazaar. Dr. Anil Awachat's book Punyachi Apurvai confirms what is widely held to be true: following the end of Peshwai rule, this market used to congregate in the ground across from Wada Shaniwar. After then, Juna Bazaar relocated to the old village section of Gaothan and eventually to its current position at Mangalwar Peth, under the Shivaji Bridge. The market has been around for approximately 220 years, despite its repeated moves.

Shopkeepers set up their temporary stores at mutually agreed-upon sites between 8:30 and 9 am every Wednesday and Sunday, and take them down by 5:30 pm. The majority of the vendors here are often from Mangalwar Peth, Somwar Peth, Nana Peth, and Rasta Peth. Some of these families have been engaged in this activity for many years.

Many passionate buyers' homes are decorated with antiques from this area. Additionally, the market has given filmmakers props, heritage scholars food for thought, and even artifacts for museums. For the Raja Dinkar Kelkar Museum in Pune, Dinkar Kelkar purchased numerous items from this bazaar. Additionally, many low-income individuals purchase necessities from these stores at reasonable costs, supporting the families that own and operate these establishments. The Wednesdays and Sundays in Junna Bazaar start at 8 am in the morning with the vendors setting up their stalls.

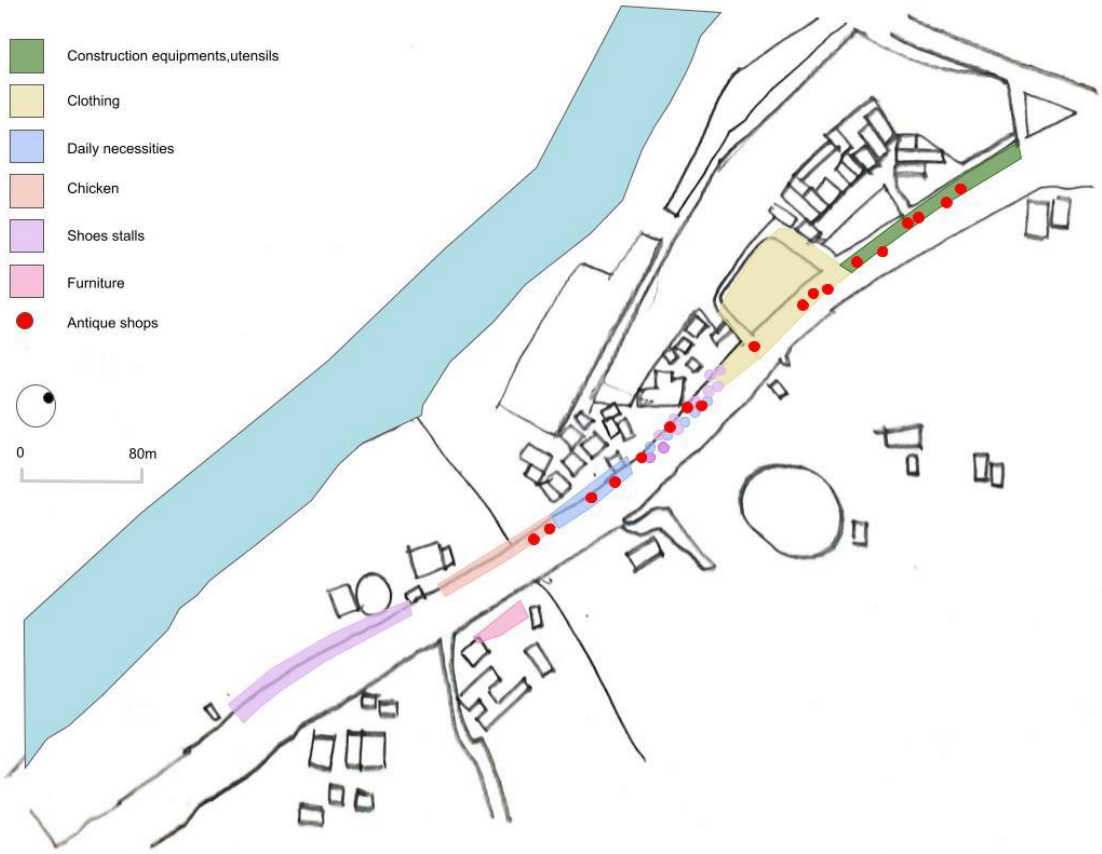


Figure 7: Activity Mapping of Juna Bazaar

When entering from Dangle bridge, the first set of stalls that appear is shoe stalls. These stalls are set up on the existing footpaths with polls at the edge of the footpath. Similarly, the fencing of the compound wall is used for a similar purpose. Early mornings doesn't cause harsh sunlight thus the use of tarpaulin sheets is limited but as the day follows the use of tarpaulin sheets are common. One of the most temporal aspects of these shoe stalls is their adaptability to the changing vehicular pattern. Few stalls use up parked vehicles to tie these tarpaulin sheets and this is how a continuous change in the pattern of temporary roofing happens throughout the day.

As we move further, their is a clear end to the shoe stalls due to the existence of a residential cluster. Close to this cluster lies a dead bridge which is prominently for the commodity selling. Due to the Muslim community living close by, most of

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the non-vegetarian stalls such as chicken stalls reside on the bridge. As the use of thelas can be seen the frequent movement of these thelas can be seen for easy pack up. In addition to these stalls few temporary antique stalls are also placed. These vendors generally travel reach Junna Bazaar on cycles, 2 wheelers to carry their commodities. There is no complexity of temporality in this phase of the market as they use a simple mat and a large umbrella for shade from the sun. Because of these, the pickup after 5:30 pm is very simple and easy. As soon as the bridge ends there is an influx of daily commodities stalls which are set up. From here a narrow walkway is created with stalls at both sides. These common commodity stall use khatiyas (which are foldable in nature) to display the products with steel chairs which are foldable in nature.

One can see the prominent use of bamboo as the structural material to form the frame of the stalls similarly it helps to cover the top as well. The use of khatiya helps the vendors not to dig up holes in the ground to frame the stalls. The bamboos are directly attached to the khatiyas for the purpose of easy disassembly of the stalls.

5. TEMPORALITY OF TRAVEL

There is an extensive range of classes of vendors who come up to sell their goods in the markets. Based on the scale, spacial requirement of the stall and travel distance temporality in the mode of travel can be seen. Small vendors who generally sell goods like small electronic items, small household items, etc tend to travel using their bicycles on which the luggage, grocery bags with shading umbrellas can be carried easily. Moreover, these travel items help them for easy pack up as well.

For larger good vendors prefer using bikes and scooters for travel. They once used to get the goods on the site are used to provide support to the tarpaulin sheets as roofing. At the same time, they do form a visual barrier and obstacle separating the road, market, and settlements. Other kinds of travel modes include small trucks, carts, haatgaadis, etc. Again here they are also supposed to act as storage, shelter, and space for vending.

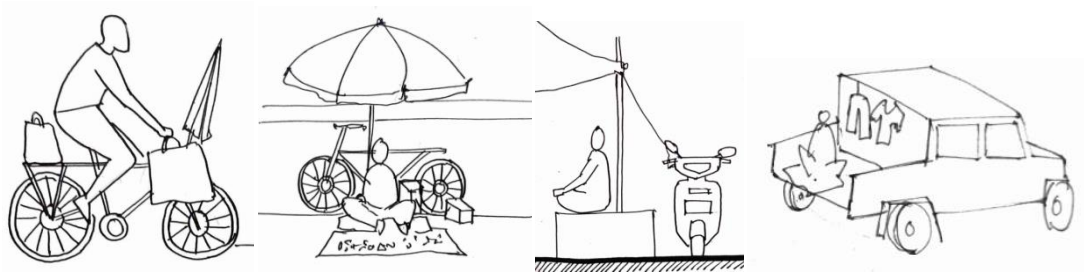


Figure 8: Travel Elements and Their Use in the Market

5. TEMPORALITY OF MATERIAL PALETTE

As the market is only available on Wednesdays and Sundays temporality of material palette is one of the most important elements to be considered. The choice of material palette used in the market are such that the stalls can be easily constructed as well as dismantled easily.

Shoe stalls in the market are placed on the footpath with the existing compound wall and a raised seating which itself is useful for the stall owners to install their own stalls easily. The compound wall is used as a backdrop where all the shoes can be displayed as well as most of the support which is required for the roofing system which is the tarpaulin sheet is taken from the railing above the compound wall. Whereas the raised seating is used by few stall owners to display their shoes, sitting place and storage space as well. The sitting place also consists of poles which are used by the stall owners to attach the roofing system and get the stability much needed.

Mainly the used metal stalls whether shoes can be start and displayed clearly few stall on a used Khatiya to lay all the shoes and create display. It is accompanied by few basic furniture like plastic chairs or foldable metal chairs. Considering the roofing tarpaulin sheets are used generally of the colour yellow and blue which goes throughout the shoe section creating a beautiful shaded pattern and central corridor for the locomotion of the public.

Next section of stalls which come up is the chicken stalls where vendors induce readymade carts with cages to keep the chickens safely The cards have vehicles or Wheels on them helping the vendors for easy movement of the cards during the start of the day and end of the market as well. Cages are self shaded does did don't depend on the context and can be

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transported or placed anywhere within the Bazaar. Does this vendors are not accompanied by any other kind of transportation system has these carts and cages self independent.



Figure 9: Material Palette Used in Daily Necessary Stalls

Table 1: Material Palette Matrix

Cycles,Carts	Steel rods/bars	Tarpaulin sheets	Steel foldable/plastic chairs	Ropes,Cables
Scooty,bikes	Bamboos	Shading umbrellas	Clothes/sheets for seatings	Clothes
Tempos,small trucks	Carts,Khatiya,metals stands	Cloths ,Bedsheets	Khatiya	

	Transport	Structural materials	Roofing materials	Furniture	Connecting materials
Shoes stalls					
Clothings					
Daily necessities stalls					
Antique stalls					-
Construction equipments and utensils stalls					-
Chicken stalls			Self shaded		-

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Other priliminary stalls generally used plastic or tarpaulin sheets that are lead on the ground and then the objects (electronics, gadgets, small domestic items) are displayed over it with the simple metal rod supporting the shaded umbrellas are used for shading purposes and for the seating purposes they generally use plastic mats whereas other storage generally happens on the vehicles they travel on. This is how the very basic stalls tend to work in Juna Bazar also during the time of the day as the sun changes its shading pattern these tend to move where the shade is accessible. For the stalls which display domestic daily objects generally, Khatiyas is used as the display object. As it is self-stable it is easily possible for the vendors to install it as well as dismantle it. Moreover, the sides of the legs of khatiyas are used to tie bamboo with the help of ropes or clothes which in turn are used to attach the tarpaulin sheets or any kind of other roofing systems. This kind of module is very self Independent and is used by many other vendors at various places. Where these are not available for the vendor they generally tend to insert a steel rod in the ground to which bamboo is attached with the help of rope or cloth strips and then the complete system is created. Here the roofing system is quite uneven where some use a roofing system few don't use creating a interesting pattern of shade and shadow. This pattern is used for the clothing section as well. Stalls such as antique stalls utensil stalls and construction equipment stores are also very primitive and use plastic or tarpaulin sheets to lay or display all the products and a simple umbrella is used for shading purposes.



Figure 11: Parking Activity on Regular Days

6. THE TEMPORALITY OF MOVEMENT AND PARKING

For days except for Wednesdays and Sundays, the parking system is generally governed by two-wheelers and small trucks. Dense parking takes place on these days as there is no functionality of the road in general except for vehicular movement. On Wednesdays and Sundays, this heavy-density parking gets shifted to the other side of the road where Juna Bazar doesn't exist. There are only a countable number of two-wheelers and trucks are seen on the lane of Juna Bazaar which is mostly owned by the vendors themselves, used for storage of the materials as well as used as a structural element. During the bazaar schedule, two-wheelers generally occupy the space between the settlements and stalls.

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Figure 11: Parking Activity on Regular Days

7. THE TEMPORALITY OF SMELL

Bazaar is divided into different sections of stalls at different intervals of time and emotions. Moving from the Dengle bridge to the Juna Bazar one can experience a rubbery sharp smell accompanied by chemicals. Through the enclosed path of the foot shoes stall just made stronger and stronger and as the section gets completed the smell reduces with distance.

The next stall typology that one approaches is the chicken stalls. One can experience a foul smell which is quite uncomfortable but as the portion of the chicken stall is very small it doesn't create a very strong emotional impact. It is followed by a casual street smell accompanied by a rustic metallic smell from utensils, construction equipment, and antique stalls. As there is a separate section for clothes the smell associated with it also plays an important part. There is no general pattern change in the smell as the vendors' positions are quite fixed.

8. THE TEMPORALITY OF COLOUR

As we move through the sections of Juna Bazaar, one can see the changes in the visual pattern which is generally associated with the objects being sold. A strong visual presence of yellow and blue can be seen in the market due to the usage of tarpaulin sheets. These sheets create such colored canopies that attract passers. Due to the scale of the clothing section, a larger visual impact of various colors can be seen. Other visual impacts include the metallic shine and rustic appearance of utensils and antique objects.



Figure 12: Smell Palette Variation

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9. INFERENCE

Juna Bazar also known as Mangalwar Bazaar during the era of Shivaji Maharaj when it was held on Tuesday shows an integral part of Pune city and its streets with strong historical influence in the present time. Stretch over half a kilometer Junna Bazaar is a source of livelihood for around 700 shop owners. The complete working of Juna Bazaar shows a lot of variety in terms of the multifunctionality and temporal working of the Bazaar.



Figure 13: Colour Palette Variation

Temporality of Juna Bazaar

	Tangible		***Intangible***
1.	Travel and transportation	1.	Smell
2.	Material Pallete	2.	Colour
3.	Execution		
4.	Movement		
5.	Parking		

These ephemeral elements come together to show the multidimensionality on the dynamic behavior of Juna Bazaar or any kind of local Bazaar which functions weekly. Thus it is important to understand how these Bazaars form the heart of the city because of the variation that it produces and affect the people experiencing it and the context which it resides in. Even though Juna Bazar had been displaced a number of times, the essence of the Bazaar remains constant and rather the street molds itself to welcome the temporal aspect of the Bazaar.

This case study comprehends that temporal designs are unique in terms of the context that it belongs to and at the same time these ephemeral matrix of elements (materials, movement, smell, color, etc.) are applicable to similar contexts. One can also understand that the local weekly Street markets of Pune especially Juna Bazar follows a particular element of the matrix that is replicable yet unique with change in the stalls. Similarly, these elements of the matrix are also visible clearly in the intangible aspects as well. This study allows urban designers and architects to understand the phenomenon of change, modulation, repetition, and pattern. This matrix of materials and elements can also be adapted for large-scale ephemeral designs thus indicating that ephemeral designs can form the backbone of future designs retaining the cultural value of the urban form.

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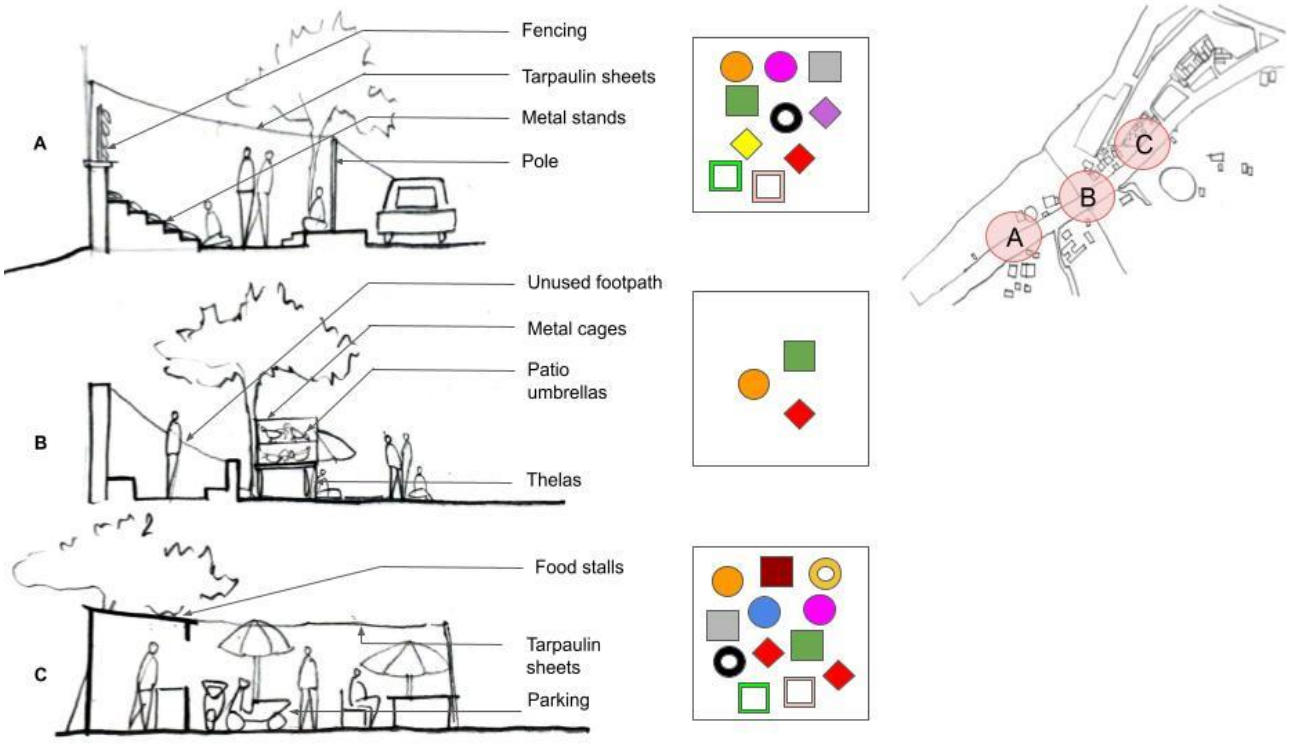


Figure 14: Combination of the Material Palette at Different Intervals of the Market

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Walkability in Vajarahalli

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ABSTRACT: Like most metropolitan cities, rapid urbanisation in Bengaluru adopted Transit Oriented Development (TOD) as a response to the growing population needs and infrastructural networks. This intent to ease the transport flows continues with the growth of the metro lines panning the extents of the city. The last mile connectivity is one of the major challenges of TOD currently achieved through metro feeders or simply by walking. This study demonstrates the challenges of the last mile connectivity at Vajarahalli metro station. From the pilot surveys conducted and analysed it was inferred that walkability was a huge aspect of urban and street design and plays a very important role in how a city and its people function on a day-to-day basis as they move from one place to another. In a study conducted for women's mobility we found that in Vajarahalli, women preferred walking (for the lack of feeders) and traversed more than 800 metres from the metro station on a daily basis for various purposes. When asked about what could make their journey by foot easier, they pointed to the quality of footpaths and how safety becomes an issue for their mobility.

The research done about walkability through CDSA - iNagrik (Centre for Development Studies and Activities, Pune) and Epicollect (data collection tool) at Vajarahalli made us aware that walkability was not just about friendliness towards pedestrians but had many integral layers to it that responded to a particular context. Physical and visual characteristics, safety and design quality are the main factors that play a massive role in the making or breaking of street design. To understand the true importance of the above- mentioned topics, the study puts forth findings tested against the available design standards and various other important references where we analysed and pointed out conclusions.

Keywords: *Vajarahalli, Women, Walkability, Last Mile Connectivity, Street Design, Design Quality.*

1. INTRODUCTION

Bangalore is one of the largest metropolitan cities of India that has undergone massive and rapid development changes just over the past few years as a response to the growing population's needs. The transportation system is an integral part of the infrastructure of Bangalore and is primarily touched upon on the topic that this study has been conducted on. Vajarahalli is a well sought after area located in the southern part of the city. This locality is near Talaghattapura, Raghuvanahalli and 2nd phase judicial layout. Kanakapura Road is among the major stretches in the southern region of Bangalore city. This stretch extends from the CBD area to BDA limits and BMRDA limits and then further connects into the confines of the Bengaluru rural district. Even though this road acts as a major transport route, traffic, numerous vehicles, time, money, and space become constraints that the government has tried to address through the transit-oriented development policy (TOD). It aims to address challenges like rapid growth of private vehicles, inadequate road network, long commuting time, traffic congestion, road fatalities, and vehicular pollution. Acknowledging these challenges, the state government, through its ambitious plans of expanding Metro and suburban rail services in the city, helped mass transit to achieve its full potential and aid in sustainable mobility. To meet its objectives, the policy adopts the 6Ds – density, diversity, design, destination accessibility, distance to transit, and demand management. [Transit Oriented Development for Indian smart cities]

The different phases of the metro rail transit thus constructed had been both a boon and a bane with regard to the transport system in different areas of Bangalore. The advantages are many but one of the most ignored aspects of a transport system is the last mile connectivity i.e., the connectivity between the main backbone [nearest MRT junction] and the end. Thousands of users on a daily basis commute through Vajarahalli junction for work, social events and many other reasons. However, our focus is on women's mobility. This is because looking at mobility and safety from a neutral perspective leaves things incomplete whereas viewing it through the lived experience of women helps solve issues accurately and almost completely for said major user group. From the background study, it has been observed that most women walk from the MRT station to reach their final destinations. It was hence inferred that walkability not only played a huge role in urban

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and street design, but also plays a very important role in how a city and its people function on a day-to-day basis as they move from one place to another. Our aim is to try and make people aware about the walkability aspect of the footpaths in and around the context of Vajarahalli metro station. Recognizing gender in urban planning and design has been at the centre of a gendered approach to urban infrastructure, and thus also becomes a part of the main aim of this paper. Conducting surveys, observing and analysing an area of 800 metres and taking the Vajarahalli metro station as the centre becomes the scope of our paper as well as the first and most important source of data. A few of the limitations faced were the accuracy of the research samples with regard to location [pinpointing the exact location of the break/obstacle in the footpaths using latitudes and longitudes.], lack of previous research studies on this topic, limited access to data and time constraints.



Figure 1: Photo Montage Done by Author (The photo montage shows different characteristics of Vajarahalli with regard to footpaths. It shows the story of visuals a woman sees as she walks every morning and enlightens us on the walkability aspect.)

2. LITERATURE REVIEW

The various attributes that come under walkability are divided into 2 categories, physical and experiential. Under the physical category we delved into the quality of roads, surface treatment, width of the road, transport amenities, traffic points, Context, Legibility, building accessibility, intersection density, and residential density as our main topics. And under the experiential category, we delved into safety of women, time spent, distance travelled, readability of roads and ease of access.IRC 2012 (Indian Road Congress) lists different physical characteristics of footpaths and has been largely referred to in order to have a set of guidelines to which the present scenario can be compared to. Each of these characteristics have been noted down and analysed to come across observations and inferences that make us capable of trying to understand and address certain issues with regard to the quality of footpaths in and around Vajarahalli.

According to the standards from ITDP [Institute for transportation and development policy], comfort, continuity, and safety are the governing criteria for the design and construction of pedestrian facilities (ITDP). For this reason, the footpaths are divided into 3 main zones: the frontage zone, the pedestrian zone, and the furniture zone. According to IRC [Indian Road Congress], in a residential zone like Vajarahalli, the minimum clear width of 1.8m is required for the footpaths which is the uninterrupted walking space for pedestrians. The ideal height should not exceed more than 150 mm and they should have a flat walking surface with proper drainage where puddles should be prevented from forming. Guide tiles should also be laid along the length of footpaths to assist people with vision impairments. In places where bus stops interfere with the movement of pedestrians, the footpath should be redesigned to avoid conflict and wherever required, to provide access to private properties and vehicle ramps should be provided in the furniture zone. All these factors had given an image in our minds as to how footpaths and other facilities ought to be made in order to be suitable and safe for the needs of people.

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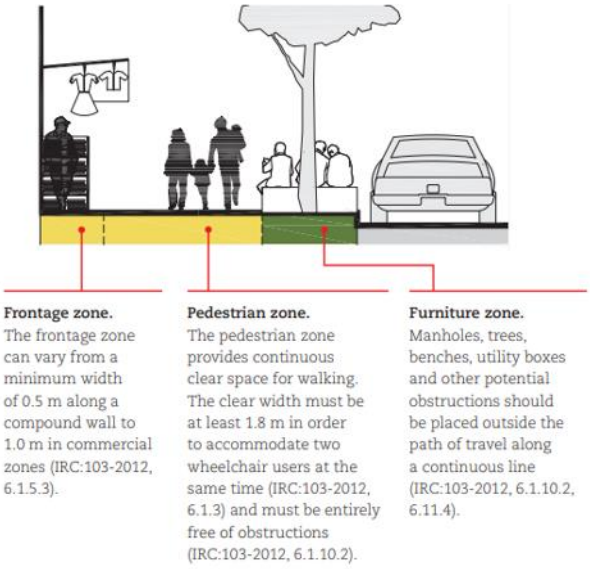


Figure 2: Zoning Standards

Source: ITDP year-2013.

3. MATERIAL AND METHODOLOGY

Taking Vajarahalli into consideration for an experimental study to further understand the current issues and upsides of a planned city in terms of road safety for women, a recent survey has been conducted through google forms and other tools to inquire about the same. The conducted study delved into the walkability attribute that is directly related to the various pathways that connect a user from the MRT to their destination. The area of 800 m radius has been studied taking the MRT station as the centre point as it is the busiest area of Vajarahalli and also comes under the transit-oriented development policy. About 75 women of various ages have been asked to fill our questionnaire and about 200 entries on footpaths regarding safety and ease of walkability have been noted using EpiCollect5 and CDSA's iNagrik.

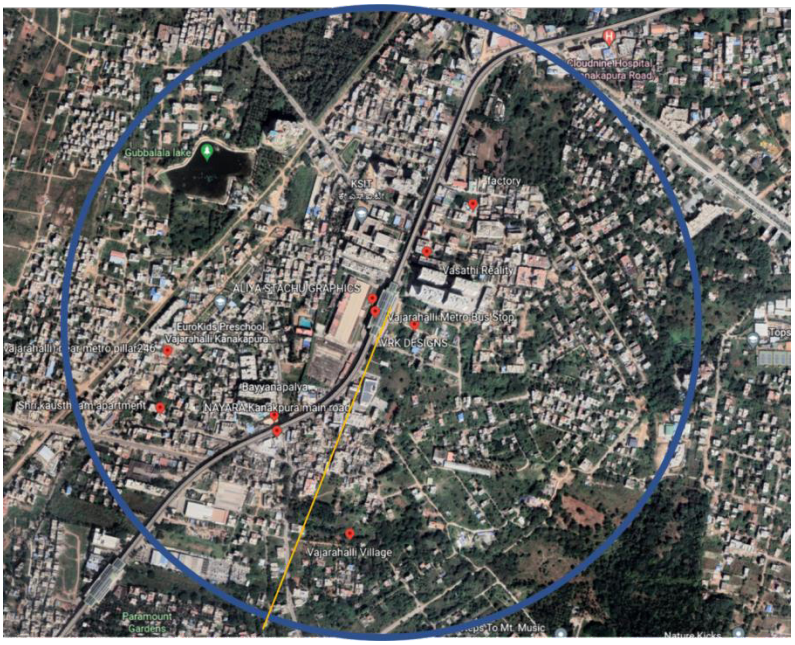


Figure 3: Area Surveyed for the Study

(*Source:* Google Earth)

ISBN: 978-93-89934-68-7

The questions asked in the google form to the females who use the Vajarahalli metro station regularly were as follows:

Table 1: Questions Asked to Female Population around Vajarahalli Metro Station

	Questions
1.	What is your regular mode with regard to commuting?
2.	For what do you walk?
3.	Do you travel back during the night times?
4.	In order to reach your destination, how much do you have to walk?
5.	Please rate the quality of the different paths as you walk.
6.	Please rate on how safe it is to travel during the night.
7.	How often do you travel the same routes?
8.	What do you think could lessen your travel time in terms of infrastructure facilities?
9.	Since how long have you been travelling through the same roads?
10.	Have you seen any changes in these paths in all the time you have travelled?

The study was done on Tuesday, 22nd November from 4 pm to 7 pm. The different aspects that were covered with regard to walkability in Vajarahalli are related to time, distance, frequency and quality. The surveys done using the epicollect5 and iNagrik were done over a series of days covering different areas within the context and in return gave scope for a series of evaluations and observations that guided us in our research.

3. RESULTS AND DISCUSSION

About 48 percent of the 75 women surveyed, took the option of walking from the metro station to their house out of which only 48 percent of the women travelled during the night. While 61.2 percent of the women claimed Vajarahalli to be safe to travel during the night (safe being a 3 or above on a scale of 1 to 5), their answer to the question of travelling at night has been a huge no. This may be because, while the town has definitely provided walkways, the feeling of safety has not been imparted which may take a couple of years to achieve as the general idea of the horrors of a woman on street has clearly not been rebutted – whether its harassment or societal judgement of a woman staying out late at night on the roads alone even if the town has been planned in a way that reduces or in the least avoids these issues.

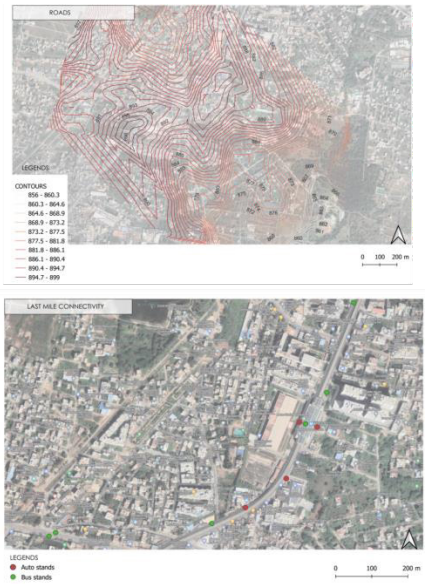


Figure 3(a): Contour Mapping and Transport Hubs in Vajarahalli

(*Source:* Google Earth and QGIS)

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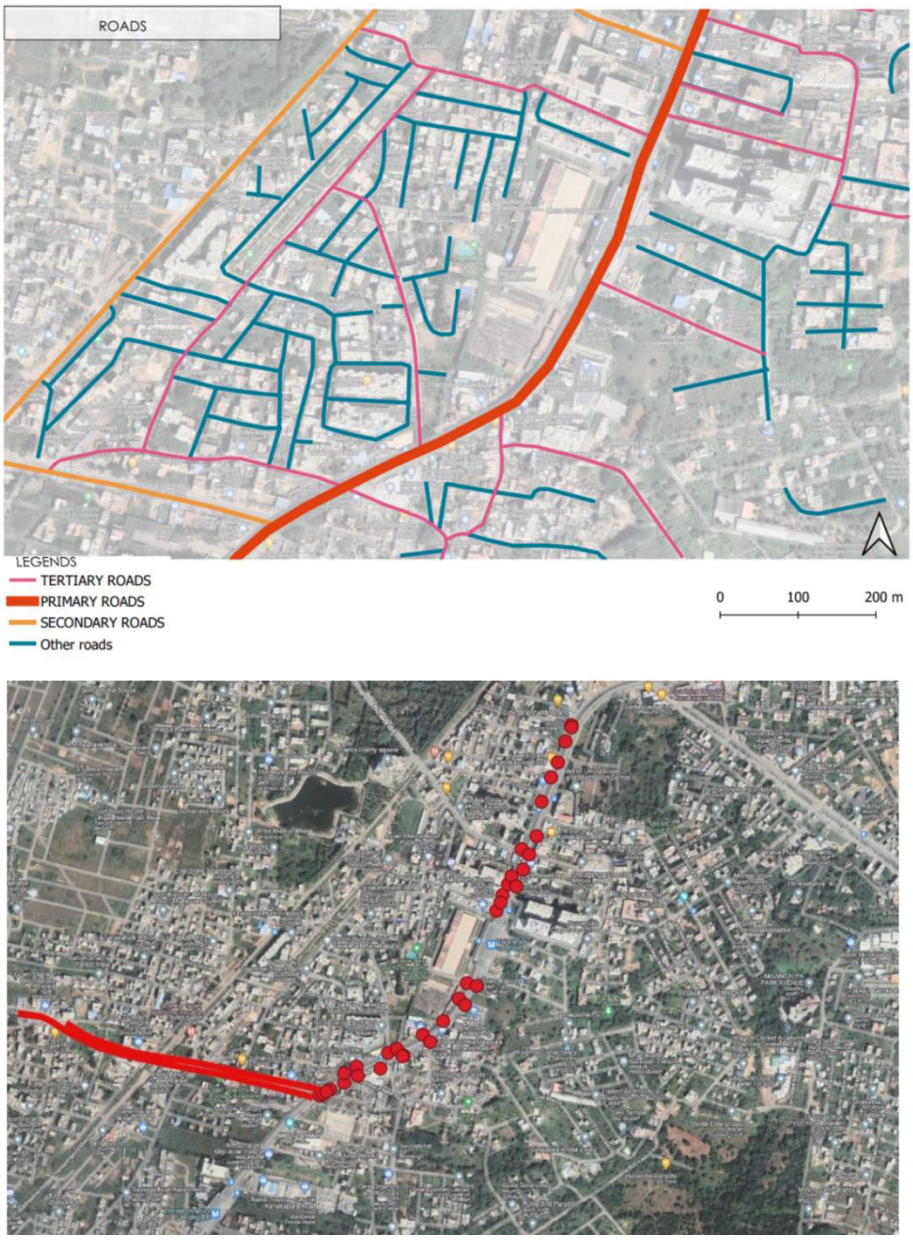


Figure 3(b): Auto Stands and Bus Stands Mapping in Vajarahalli

Source: Google Earth.

The many open places of business located immediately around the metro station and extending outwards at least until the nearest bus and auto stands help women feel a lot safer and provides them a sense of security to be able to go inside and wait for help in case of any feeling of threat. This builds an 'informal surveillance' and as quoted by the author Jane Jacobs, provides "eyes on the street". Patterns of mixed land use are also seen in Vajarahalli, with residential buildings right behind the commercial ones near the metro station connected to the Kanakapura road which reduces the load of any work-related commute during night on a woman. A few errors were also noticed and observed - the provided footpaths were not maintained well and 26 out of 75 of the women complained about the height being too much to climb on, especially for the elderly and pregnant women. The secondary roads on which the entrances to the residential houses are facing, are dimly lit and even though the properly lit main road is not far away, it does little to ensure women's safety in these alleyways with dead ends. It also lacks any sort of street furniture (save for the signages) like benches and handrails that aid in a) breaking the stereotype of a woman not hanging around in public and b) making them feel welcome in a public space.

ISBN: 978-93-89934-68-7



Figure 4a: Mapping Different Types of Roads in Vajarahalli (*Source:* Google Earth)

Figure 4b: Mapping Breaks in the Footpath in Vajarahalli (*Source:* Google Earth and Epicollect 5)

Figure 4: Images from Vajarahalli Taken during the Surveys by the Author

A study of these standards set a certain expectation towards the construction of footpaths that were to be dashed down when the site was visited and surveyed and questions we had were answered by the user group. The width of the footpath, the height, the surface treatment, the various obstacles, and the continuity of the footpath were taken down in order to compare it with the standards that were studied. There were a lot of issues that made the footpaths in Vajarahalli very pedestrian unfriendly. The footpath designs did not follow the guidelines set. There were no footpaths in some integral areas making the pedestrians share the road with vehicles and construction debris. There were potholes and broken paths, hanging utility wires, parked vehicles, garbage, open drain holes, and discontinuity in the paths. In addition to this, some areas also lacked pedestrian navigation systems and street lighting during the nighttime making the users more vulnerable. Vehicles getting onto wide enough footpaths during peak traffic hours and the constant honking adds to the unease of the place and makes it even more unfriendly to anybody who wishes to walk these roads.

The heights of the footpath were varying according to the slope of the natural land. In a similar manner, the widths were also varying according to the widths of the road. The continuity had been affected because some of the footpaths seemed to have been constructed after the construction of the roads and not along it. Because of this, there were many breaks in the footpath and a variety in the kind of surface treatment done in various zones of the same road and sub-roads. Since some of the main obstacles had been street vendors pilfering some space of the footpath, the cleanliness of the footpath couldn't be maintained. Because of poor planning of services and poor maintenance of the same, the issue of drains and potholes had become common and troublesome. There are many breaks in the footpath. A pedestrian walking through the main road is encountered by many breaks because of the following reasons: Broken pavement blocks, entry to a site. The quality of footpath is good near the metro station and farther away there are broken pavers, obstruction, break in continuity.

- **Footpath Surface:** The footpath along this path has 3 types of surfaces: concrete pavers, concrete slabs, and stone slabs. The main road has concrete pavement and the secondary and tertiary roads had stone and concrete slabs.
- **Footpath Width and Height:** The width of the road is according to the standards. The height varies, at some places the height is a lot making it difficult for elderly women who walk more than 800 m every day for work.
- **Obstruction:** Obstructions are caused due to light poles and signage in a few places. It is also caused in front of construction sites, where the construction materials have been spread to the footpath swell. In a few areas of broken pavements garbage has been thrown as well. Electric conduits are also left on the footpath without encasing it.
- **Encroachment:** Encroachment is not much in the main road (kanakapura road) except 1–2 vendors. In secondary roads in case of commercial roads, commercial buildings have encroached the pavements. The shop frontage has extended some part of the shops on the ground floor to the footpath which forces people to walk on the road.
- **Potential for Vehicle Conflict:** Even though the footpath is raised there are no handrails present. On a few secondary and tertiary roads there is no footpath which might cause vehicle conflict.
- **Continuity:** The continuity is broken many times. curb ramps have not been provided which makes it difficult of elderly women to access and impossible for disabled people to access.
- **Pedestrian Crossing:** There are zebra crossings provided in all T-junctions. In the Mid-block crossing near the metro station, it is not present.
- **Street Furniture:** Streetlights are the only type of street furniture seen. Benches and dustbins are not provided anywhere.

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4. CONCLUSIONS

From the multiple surveys conducted and analysed we inferred that walkability was a huge aspect of urban and street design and plays a very important role in how a city and its people function on a day-to-day basis as they transit from one place to another. We learned that women walked often and more than 800 m from the metro station on a daily basis for various purposes. When asked about what could make their journey by foot easier, they educated us on the quality of footpaths and how more often than not, the design of a footpath was overlooked and how safety becomes an issue for their mobility.

State-provided services seem to be continuously gendered and differentiated, just as they are in urban fringe areas and neighbourhoods like Vajarahalli. These personal acts of violence are put together differently in the city due to factors like the placement of streetlights, public transportation, public restrooms, and the temporality of gendered presence. The supply of infrastructure alone will not immediately address violence against women, despite the fact that both physical and digital infrastructures serve as the locations and conduits for private geographies of violence throughout the city, and on the other hand, the absence of fundamental infrastructures has an intimate impact on women that is perceived as an extension of the interpersonal violence they experience at home or in their community.

Some of the issues seem to be out of our hands, for example, it is unfair to demand that the street vendors no longer occupy the space they may have been using for a long time to make the footpaths more accessible. It makes us wonder whether the standards in the first place should have considered a space for street vendors to continue their endeavours without disturbing either the footpath or affecting the livelihood of the vendors. The idea of the three zones, the frontage, the pedestrian, and the furniture has been completely disregarded which could be based on different factors like economics, planning, time, and development because of which quite a few of the standards have taken a back seat in the design of the footpaths of Vajarahalli. There could be many reasons as to why the pathways for pedestrians have been so blatantly disregarded but now, it is best to think of some of the solutions that could make the life of pedestrians easier. There are many small things that could be done to make the pathways a little safer. There should be unavoidable punishments for footpath violators and constant surveillance even during the night. There should be regular maintenance and weekly cleaning sessions along with monthly repairs to fix any damages and repair broken elements.

The larger issues are where the reason government bodies refuse to take systematic responsibility. This is because of the lack of legal protection afforded to pedestrians over the years. A working paper by CPPR [Centre for Public Policy and Research] analyses the existing legal framework for laws protecting pedestrians. It finds that pedestrians are vague reference points, if at all, in the Indian penal code 1860, motor vehicles act 1988, national urban transport policy 2006, and the rules of the road regulation 1989. Lack of legal protection means that government bodies are not accountable for the state of footpaths even though the KMC [Karnataka Municipalities Act] 1966 says that it is BBMP's responsibility to maintain public roads, footpaths, and pavements. The KMC act or other laws have not set standards or guidelines on the construction of footpaths in Bengaluru. So, the design and construction are usually arbitrary, at the discretion of the contractor. This is quite a serious situation where small changes have been initiated in the past few years. This issue however has not been fully resolved because of which it has to be pointed out again until justice can be served, and people are held accountable. With this change, things would automatically begin to look up and make the roads and pathways much safer.

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Tailoring of Contract between the Owner and the General Contractor for Building Construction Project

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ABSTRACT: The contract is a typical output of a make-or-buy decision and it indicates the transfer of risk to a party who can handle the risk in the best-suited way. Design-Bid-Build method is a traditional and commonly used delivery method for most projects including government projects. The owner hires an Architect as their representative to prepare designs & other construction documents. Item rate tenders are commonly used for the selection of the general contractor. The tender document contains a scope of work, instructions to bidders, conditions of the contract, specifications & drawings which together form a contract document while making an agreement with the successful bidder.

So comprehensive contract document can be treated as a tool to fulfill tangible project & product ("building" in building construction projects) requirements. Irrespective of this well-defined system, many projects are characterized by unsuccessful deliveries and/or claims. The probable reasons for this might be that the contracts are not administered & managed with due seriousness and project success criteria are not explicitly included in the tender documents.

Every contract for building construction projects should be tailored for specific projects & for a specific owner to suit their requirements. The broad framework of knowledge areas mentioned in the Project Management Body of Knowledge (PMBOK) guide can be used with relevant process outputs for tailoring the contracts for specific projects of specific clients. This paper explores the inclusion of conditions and requirements related to performance measurement baseline in the building construction contract.

Keywords: *Scope, Schedule, Cost, Performance Measurement Baseline, Tailoring of Contracts.*

1. INTRODUCTION

A contract is a typical output of a make-or-buy analysis. It is based on the principle to allocate the foreseen risk to a party best equipped to deal with it against incentives. It is basically a legally binding communication between those parties. So clarity of expression should be the essential principle followed in drafting contracts to convey the message accurately between the parties entering into the contract. Any contract should be executed on the basis of maximizing benefits & minimizing conflicts. All the parties should be clear about procurement requirements & agreed upon the terms & conditions before entering the contract. The contract should be fair to all the parties in the best interest of the project.

In India, government projects and other large projects funded by international funding agencies like the World Bank use standard contract formats like FIDIC which is worldwide acknowledged. Similarly, the NEC4 contract format is also a recognized format and is used by many organizations. These contracts are known for their fair & balanced format irrespective of their limitations.

In India, many other organizations that handle various construction projects of various sizes have developed their own approaches & typical formats of contract & contract documentation as a part of their own Organizational Process Assets. Experienced contractors generally bid for such projects without reading the contract in depth since they are familiar with the general format of the contract. User stories indicate formats of contracts used for many private sector projects do not integrate stakeholders' project requirements and are mostly one-sided and which are in favor of the Client. For such projects, the tailoring of the contract should be a joint effort of the designer, the owner & the concerned managers so that the particular contract will capture the actual project requirements. Such tailored contact can be useful in fulfilling the project's procurement requirements and in turn, can ensure the project's success.

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The literature review indicates that cost & schedule over-overruns, quality compromises, and stakeholder satisfaction are commonly found issues of disputes. The majority of issues are attributed to the contractor's ill performance. In a price-based and client-controlled Indian Construction Industry, the contractors are selected on the basis of their lowest prices. On this background, the contract becomes an important tool to assure successful project delivery. If the contract does not capture the particular project requirements then the contractor tries to recover the losses by exploiting loopholes in the contract or ultimately bear the losses within his bearing capacity and deliver the project.

The scope definition, schedule, cost, quality, risk & stakeholder satisfaction are main the parameters for the evaluation of project success. For building construction projects in the private sector, the stakeholder community is limited. The client, the consultant & the contractor are important influential stakeholders. The consultant plays important role in procuring the main product, in the form of building, from the external vendor—the contractor—on behalf of the client. The procurement is done within a framework of contract documents where project scope, schedule & cost becomes the prime factors of success measures. Further research aims at exploring how the contracts can become instrumental in delivering the project successfully.

2. LITERATURE REVIEW

The completeness of the project can be perceived in the framework of the Project Management Plan. Proper engagement & satisfaction of the stakeholders is key to the success of any project (PMBOK guide, 6th edition). The completeness should be given from the perspective of all the stakeholders like the client, the consultant, the contractor, and other stakeholders. For any building construction project, the contract is a way to provide completeness to the project.

A complete contract should provide a "techno-legal" framework for the scope & requirements of the project. The contract should clearly specify the state & results expected from the deliverable and any knowledge transfer related to the deliverable (PMBOK guide, 6th edition).

The researchers have discussed various aspects of contracts like classification of contracts, standard formats of contracts, and approaches towards drafting contracts (Sai, O.C., Kenneth, T.W.Y. and Pui, S.C., 2006, Besaiso, H. 2016, Jagannathan, M. & Delhi, V. 2020). However, the project exists & operates in a constantly changing environment so any explicit form of contract is always prone to disputes (Jagannathan, M. & Delhi, V. 2020).

There is a logical link between risks, conflicts, claims & disputes which is caused by inefficiently drafted contracts. It ultimately results in time & cost overruns. The construction industry is a major contributor to the Indian GDP, and the consequences of disputes cause a major loss in GDP (Moza, A. & Paul, V. 2019). Construction practices need to be more responsive on the background of large projects, design complexities, limited time, large funding & cash flows, etc. Losses due to time & cost overruns for small & medium projects are also warranting responsive actions since considerable manpower is involved in construction activities across India. In the research on claim analysis, it was found that awarded amount is very less as compared to claimed amount. The study of the relationship between claims & conditions of the contract indicates that contracts are drafted mainly in favor of the client (Moza, A. & Paul, V. 2019). Conditions of contract are the source of disputes even though standard formats of contracts like C.P.W.D., and FIDIC are adopted for the projects.

The researchers have checked the suitability of standard contracts like FIDIC & NEC in the context of projects in Palestine & Egypt. The qualitative research with a holistic approach can be generalized to other Asian countries also because the same aspects of disputes are commonly experienced in all construction projects. FIDIC is restricting itself to legal aspects. Whereas other research on the techno-legal aspect (Bari, P., Bhatt, V. & Sawant, P., 2019) suggests that the FIDIC contract is all-inclusive if it is used with the provision of "Condition of Particular Application" which helps in dealing with a contradiction between civil laws & contract conditions.

In research on exploring the effect of implementing the FIDIC red book 2017 approach in the Egyptian construction industry as against implementing ad-hoc contract forms, the researchers summarize five factors of success for project implementation as effective quality control and assurance system, feasibility study, the accuracy of design to frame the clear scope of work, sufficient time for tender preparation, and effective cost control system (D. Mohamed Abdel-Hamid and A.-R. Alaa El-Din Mostafa, 2022). All these five factors can be comprehensively added to the contract form. The new approach of FIDIC focuses on:

(a) Dispute avoidance or minimizing disputes – Earlier research indicates that the cost & time incurred in the arbitration are considerably high.

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(b) Selection of the suitable contractor for the project – The suitable contractor is the one who can own the appropriate risks and can handle the disputes professionally.
(c) Clear & well-drafted contracts – Such contracts are useful for a better understanding of contract requirements & for better contract management.
(d) Appointment of an experienced "Engineer" – An experienced engineer can avoid &/or handle disputes in a better way.

The engineer's weaknesses & the inability of FIDIC standard forms have proved incapable to cope with rapid changes in the Egyptian construction industry.

The research concluded that the NEC3 contract is much more suitable for managing the projects than the Red book contract of FIDIC (Besaiso, H., 2016 and Raslan, N. & Nassar, A., 2017). The main reasons behind the appropriateness of NEC3 are simplicity of contract language, pro-active approach in managing projects, flexibility in contract conditions, and aim towards completion of projects whereas The research indicates that contracts based on the functions (aims) associated with particular conditions are best-suited contracts for the construction Industry (Valentinas P., Sigitas M. & Eva T., 2010)

None of the particular formats of contract or particular approach towards the contract is explicitly appropriate for any particular project as every project is unique in nature (PMBOK guide, 6th edition). So contracts need to be tailored in the same way as the project management processes are tailored for the particular project. While re-drafting the contract for a particular project, some contractual arrangements can be a combination of both conservative & liberal views (Jagannathan, M. & Delhi, V., 2020). With a liberal approach, the contract can be equitable, relational, and based on the best value model.

Classical or neoclassical forms of traditional contracts have the provision of maximum contingencies for covering claims or the provision of a third party to resolve them. The contractor bids higher prices to cover the risks beyond contingencies. But relational contracts deal with route causes since it values relationship, trust, communication, and project management ethics (Sai, O.C., Kenneth, T.W.Y. and Pui, S.C., 2006).

The Indian Construction Industry Structure (CIS) is a price based/client-controlled industry structure (Nihas, S. & Barlish, K. & Kashiwagi, D., 2013). The contractors are pre-qualified and recommended for their lowest price offer & based on their experience (Egemen, M. & Mohamed, A., 2005), and then selection criteria change as per the perception & requirement of the client & consultant. The low bid selection criteria define the performance of the project at the onset and start creating disputes since the stakeholders start looking at the project from their own perspectives and do not support the project's objectives. To overcome this problem best value model is suggested for the Indian construction Industry as the best value model suggests that the contractors should have been selected based on their performances and the client should assure the quality and not control the quality.

Various researchers have contributed to understanding contract-related problems, and their probable solutions through various case studies. Then also a gap between standards and practical implementation is experienced.

On the background of the fact that the owner who rarely utilizes construction services majorly performs the procurement from the sellers like general contractors. In such procurements contracts between the seller & buyer plays an important role. These contracts are generally handled by various consultants like the architect, the project manager, the contract manager, the legal consultants, etc. The literature review & user stories indicate the problems in contract administration due to the gaps between the owner's expectations and their proper documentation in the contract document. This problem warrants a streamlined activity of contract drafting among the stakeholders who are related to contract management & contract administration.

PMBOK guide is the most popular body of knowledge & framework among others like the International Project Management Association (IPMA), 2006, Office of Government Commerce (OCG), 2007, etc. (Alwaly, Khaled & Alawi, Nahg. 2020). So PMBOK guide (6th edition) and Construction extension to the PMBOK guide is used to understand the conceptual framework of the contract.

The further research paper will aim to explore how the inclusion of various baselines in the contracts can be useful in tailoring particular contracts for the successful delivery of the project.

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3. RESEARCH METHODOLOGY

3.1 Rationale behind Research

The literature review indicates that research is done on specific types of contracts, approaches towards drafting the contracts, relational aspects of the contracts, and application of different types of contracts in different construction industries. A lot of secondary data is available on contract management, contract administration & claim management. Claim management has become an important aspect of managing construction projects. Schedule & cost overruns and various claims from the contractors indicate the gap between the actually expected requirements & the requirements mentioned in the contract can be one of the reasons behind the unsuccessful delivery of the project. So the research is undertaken to map those gaps in contract documents.

Aim

To assess the possibility of successful project implementation through the identification of requirements affecting performance measurement baseline & their inclusion in building construction contracts

Hypothesis

The inclusion of a performance measurement baseline in building construction contracts can facilitate successful project implementation.

Objectives

1. To study the deviation of the contract terms from the performance measurement baseline
2. To map the specific project requirements which affect scope, schedule & cost baselines separately or in an integrated way.

Scope

1. The research will be done with respect to construction contracts for building.
2. The research will use the concept of performance measurement baseline described in the PMBOK guide.

Limitation

The research will exclude in-depth inquiry into contract drawings & item specifications.

Research Question

1. Are project requirements mentioned in contract documents, apart from in contract drawings, specifications & BOQ, affect performance measurement baseline?
2. Are the project requirements affecting the performance measurement baseline explicitly mentioned in contract documents?

Sample Size

It was decided to adopt the purposive sampling method due to time constraints. A total of six practicing architects/project managers were approached for sharing the contract documents prepared for their own architectural projects. All six have responded to the request. Only three sample contracts for a different typology of buildings were chosen based on the exclusion/inclusion criteria for mapping the gaps related to the performance measurement baseline.

Source of Sample

The architects & the project managers, who are involved in the contract-based execution of buildings, were approached to share their complete tender documents.

Inclusion Criteria

1. Contracts should be for building construction projects.

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2. Contracts should be complete with a preamble, general & special conditions, drawings & BOQ, and annexures/addendums if any.

Exclusion Criteria

1. Incomplete contract documents.
2. Contracts with only specialized contractors.

Research Design

Contracts between the client & the General contractor are studied to map the project requirements which may affect the performance measurement baseline. Three contracts for different typologies of buildings are studied. The concept of performance measurement baseline, as mentioned in PMBOK 6th edition, is adopted for the study. The meaning of performance measurement baseline is "Integrated scope, schedule & cost baselines used for comparison to manage, measure & control project execution". Baseline means "The approved version of the work-product that can be changed only through formal change control procedure and is used as a basis for comparison to actual results".

Research Tool

The questionnaire for mapping was developed based on the relevant processes mentioned in PMBOK guide 6th edition under the scope, schedule & cost knowledge areas.

Project Scope

The project & product-related requirements mentioned in the tender documents, apart from being covered in price bid documents, are mapped along with their probable impacts on schedule & cost. The inclusion of general & detailed working drawings, technical specifications, variation in the extent of quantities & definition of the extra item is enquired through mapping.

Project Schedule & Project Cost

With reference to the PMBOK guide, 6th edition, the inclusion of relevant outputs of certain processes are mapped in general & specific conditions of the contract. The clauses related to the inclusion of milestone/bar-chart and incentives related to it, work packages, frequency of follow-up meetings, early warning meetings, pre-qualification of bidders on the basis of their capacity to execute the project, and definition of extra items are mapped in the contract document. These outputs are used to check & control the performance of the project as mentioned in PMBOK guide 6th edition

4. DATA COLLECTION AND ANALYSIS

The research data was collected from tender documents for institutional buildings, hospital buildings & residential apartment buildings. Generally, the project &/or product requirements of construction projects are included in drawings, specifications & BOQ. The purpose of the data mapping & analysis is to understand a number of requirements mentioned in other forms of contract and their accessibility & explicitness so that the bidder can take due cognizance of it while bidding.

The inclusion of scope requirements & conditions affecting the schedule &/or cost of the project is identified and mapped by reading all the documents. All the instructions to the contractor, specific requirements of the client, or conditions mentioned in the contract document which require tangible outputs from the contractor and which require time to perform and include labour, material & other indirect costs, are mapped explicitly. All such requirements are further mapped for their inclusion in a type of document in a particular contract.

Requirements Related to Scope (Price bid requirements)

In construction projects, the project requirements are mostly covered in the form of drawings, technical specifications & BOQs. Clear, precise & detailed requirements along with its attributes are expected to be covered here. Based on these details the scope requirements and schedule & cost estimates can be baselined and can be controlled in the execution phase. The inclusion of these requirements is mapped at a high level to assess its effect on project delivery. The results are tabulated in Table 1.

ISBN: 978-93-89934-68-7

Table 1: Mapping of Price Bid Requirements

S. No.	*Requirements*	*Inclusion in the Number of Contracts*
1.	General working drawings	3
2.	Detailed working drawings	2
3.	Technical specification	2
4.	Accepted variance in quantities	0
5.	Definition of "Extra Item"	2

General working drawings facilitate the reader to locate the items in the project and their overall dimensions. BOQ gives an idea about the quantity of individual items and items' general specifications. Whereas detailed working drawings and technical specifications help in understanding the features of individual items and their execution process which are not generally covered in general working drawings and BOQ.

Absence of detailed working drawings indicates that no specific detailing of item features is expected while execution. Absence of technical specifications indicates that no specific way of execution or any specific standard is expected while execution.

Accepted variance in quantities should be binding on both, the owner & the contractor. The owner should be aware of the variance in quantities to be executed with respect to the quantities mentioned in BOQ as major variance can affect the schedule and cost of the project. Whereas the contractor should be aware of variance in quantities to be executed with respect to the quantities mentioned in BOQ as his overhead cost for the execution of a particular item may change considerably and it can affect his planning of work.

An explicit definition of the extra item can help to reduce the number of claims.

Other Requirements Related to the Scope

These are other project requirements that are not covered in tender drawings, BOQs & technical specifications. These project scope-related requirements are mapped in contract documents, except Price Bid documents, which will affect the schedule of the project & direct or indirect cost of the project. The requirements and their effects on schedule &/or cost are tabulated in Table 2.

Table 2: Mapping & Effects of Project Requirements in Contracts

S. No.	*Building Typology*	*No. of Requirements*	*No. & Percentage of Requirements in Contracts and their Effects on*			*No. of Documents in which Requirements are Mapped*
			Schedule	*Direct Cost*	*Indirect Cost*	
1.	Institutional	14	7 (50%)	5 (36%)	7 (50%)	4
2.	Hospital	17	7 (41%)	6 (35%)	7 (41%)	4
3.	Residential	7	2 (29%)	2 (29%)	5 (71%)	2

Lesser number of project requirements indicates that a more number of requirements affecting schedule &/or cost are included in Price Bid documents.

Also, the lesser percentage of requirements affecting schedule & direct cost and more percentage of requirements affecting indirect cost indicates that the project requirements are explicitly worked out in a better way.

A lesser number of documents (except Price Bid documents) in which the requirements are mapped indicates that the contractors can easily access and understand the requirements of the owner for which he has to quote.

ISBN: 978-93-89934-68-7

Requirements Related to Schedule & Cost

An inquiry related to the inclusion of a bar chart/mile stone chart, incentives related to milestones, work packages, follow-up meetings, early warning meetings, pre-qualification clauses, and mode of measurement is done by reading all three contracts carefully. The inclusion of these requirements and their probable effects on project delivery is tabulated in Table 3.

Table 3: Mapping of Requirements Related to Schedule & Cost

S. No.	*Requirements*	*Inclusion*	*Remarks*
1.	Milestone or Bar-chart	2	It is a pre-qualification criterion for the bidder
2.	Incentives related to milestones	0	Nil
3.	Work Breakdown Structure	0	Nil
4.	Follow-up meetings	2	Nil
5.	Early warning meetings	0	Contractor's responsibility mentioned in a single contract
6.	Pre-qualification criteria	1	Only the financial capacity of bidders were assessed
7.	Mode of Measurement clauses	2	Nil

Milestone or Bar-chart requirement was added in two contracts as a pre-qualification criterion for the selection of the bidder. Neither any incentive was associated with milestone achievement or failure nor any work breakdown structure expected to control the scheduled activities.

Follow-up meetings are useful in the assessment of completed work and reviewing the planning of future work. Two contracts had mentioned the requirement for follow-up meetings. One of them had mentioned the monthly frequency and the other contract had mentioned reporting on a daily, fortnightly & monthly basis.

Early warning meetings are supposed to be scheduled with planned frequency to identify and assess the probable variation in the baseline. Early identification of variances and/or changes gives sufficient time for assessment, monitoring & controlling of the variations. None of the contracts has a clause related to an early warning meeting. Only a single contract has mentioned under special conditions that it is the contractor's responsibility to warn about variation.

Bidder's financial & infrastructural capacity and experience are assessed through pre-qualification to define their eligibility for the project. However, only a single contract had added a pre-qualification criteria clause just to check the contractor's financial capacity only.

Clarification about the mode of measurements helps in the exact quantification of executed quantities and reduces probable claims related to payments. Those can be either explicitly mentioned or accepted standards like IS 1200 can be refereed for it. Out of three contracts, only two contracts have clarified the mode of measurement.

Data collected from three sample contracts are analyzed to check where and how the project requirements and related conditions are included in the tender/contract documents. The inclusion of requirements and related conditions in a proper format and in a specific document is necessary so that the contractor can perceive those comprehensively and can quote for those requirements with full understanding. This understanding of requirements helps the contractor to control & monitor the schedule & cost of the project at his end also. So mapping of these requirements and related conditions is done in these three contracts to assess the clarity in the identification of requirements at the owner's end and to check the accessibility of those requirements by the bidders.

The specific conditions of the contract, which are the project requirements, affecting schedule & cost are also mapped to analyze their inclusion in the tender/contract document. Their inclusion can prove useful for monitoring & controlling project execution for successful implementation.

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5. INFERENCE

As inferred from the literature review, though the use of any explicit form of contract for all construction projects is prone to disputes then also we cannot ignore the importance of contract as a tool that is useful for responsive construction practices in today's construction environment. Irrespective of the various types of project delivery methods in the building construction industry, most of the procurement is done through a third-party contractor. And if we accept that the best value model is useful for building construction projects then the contract becomes an inevitable part of the construction project as it rightly allocates the risk to the most appropriate stakeholder. In such cases, the contractor can team up with the owner & his consultants for successful project delivery.

The contracts analyzed for this research were designed for item rate basis tenders and for a design-bid-build type of project delivery. The tender/contract documents were studied and analyzed within a broad conceptual framework of processes suggested in the PMBOK guide. As suggested in the PMBOK guide it is good practice to consider the scope & requirement management plan, cost baseline & project schedule as input for procurements. So the inclusion of a performance measurement baseline in the form of relevant processes or activities or documents in contract documents, can be considered useful for successful contract management.

The contracts were analyzed against one of the research conclusions that "the contracts based on the functions (aims) associated with particular conditions are best-suited contracts for the construction Industry (Valentinas P., Sigitas M. & Eva T. 2010)". Apart from many others, the functions related to scope, schedule & cost are considered as a scope of research. It is assumed that the requirements mentioned in tender/contract documents are baselined. So ideally if the requirements with tangible deliverables are explicitly included in Price Bid documents then it will be easy to control & monitor the scope & requirements and their effects on schedule & cost. In analysis, it was found that apart from building element requirements the other project-related requirements are included in Technical Bid documents. Examples of such project related-requirements are demolition of existing structures, temporary site development activities, etc. Even these project requirements were scattered in different documents of Technical Bid. Tracking these scattered requirements becomes a very tedious job while managing the contracts. It is important to segregate the instructions, conditions & requirements explicitly so that the format of the contract should be relational in nature. It will be easier to communicate with bidders about all the project & product requirements along with their attributes. At a later phase of execution, it facilitates the smooth delivery of the project.

While doing research, it was assumed that the drawings & bill of quantities include baselined project requirements. But apart from product (building) requirements, no other requirements having tangible deliverables were found in Price Bid documents. Technical specifications & detailed working drawings give completeness to the building & building elements. One of the contracts was lacking these requirements. The inclusion of these documents will add completeness to the project.

Clauses related to accepted variance in quantities and definition of extra items should establish explicit communication with the contractor. It clarifies what exactly is to be delivered and in what quantity. This clarity is practically required to monitor & control the schedule & cost of the project. Clarity about these conditions should help in obtaining the best value for the project which is a key characteristic of liberal contracts.

For successful project delivery, the contracts should be seen beyond their legal aspect. The relation between functions & conditions should be prominently established. Through data analysis of conditions related to schedule & cost, it is observed that delivery/success measures should be proactively added by the consultants while preparing the tender documents. Only in a single contract, the condition related to the preparation of milestone/ bar-chart was included as a pre-qualification criterion. None of the contracts mentioned any incentive related to the achievement of milestones.

Communication is a key activity in managing the project. It is a key characteristic of relational contracts also. Various types of meetings are important aspects of communication. Follow-up meetings & early warning meetings should be essential conditions of any contract to ensure that project is on track. The frequency of these meetings with reporting system should be elaborately mentioned in the contract conditions. However, in data analysis, it is observed that the requirements related to meetings and reporting are included in a non-structured way. However, the contracts are lacking in clauses related to meeting management. Structured meeting management ensures that the intended objectives of meetings are achieved effectively & efficiently.

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6. CONCLUSION

This research is done as a part of a research project on tailoring of construction contracts between the owner & the general contractor. The scope of the research was to explore the inclusion of performance measurement baseline in the form of related activities & documents. Through research, it is recommended that the project requirements should be segregated between product (building) requirements and requirements other than product (building) requirements. Further, the other requirements should be segregated between requirements affecting direct cost & indirect cost. The project requirements, other than product (building) requirements, which affect the direct cost and which expect tangible deliverables should be appropriately added in Price Bid documents. The guidelines for tailoring contracts with reference to the inclusion of performance measurement baseline are as follows.

Inputs for tailoring of contracts:

1. Segregated project requirements (including product requirements) between requirements affecting direct cost and requirements affecting indirect cost.
2. Project requirements that affect direct cost & which expect tangible deliverables are to be added in Price Bid documents. E.g. building requirements, temporary requirements related to site development like barricading, site office, etc., use of special technology or tests, etc.
3. Other project requirements which affect indirect cost & which expect intangible services are to be added in the Technical Bid document as a sub-section of special conditions. E.g. site staff requirements, labour law compliances, insurance & policies, etc. For this sub-section, specific instruction is to be given to adding the cost incurred for fulfilling these requirements is to be considered as overhead cost while quoting for Price Bid items.

Tools & Techniques and definitions to be included as a project requirement while tailoring the contracts:

1. Milestone or Bar-chart with incentives related to achieved or failed milestones.
2. Clauses related to meeting management.
3. Mode of measurements with appropriate standards.
4. Explicit clarification on the definition of the extra item and accepted variance in quantities.

The research can be further extended by:

1. Exploring the inclusion of other baseline requirements in tender/contract documents, and experts' views on the inclusion of the baseline requirements.
2. Exploring the bifurcation of requirements related to the project and the product.
3. Exploring the requirements affecting the direct and the indirect cost.
4. Such tailored contracts can be further evaluated for their usefulness through experimental research.

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Proposal of a Tool for Efficient Planning of Material Delivery Schedule Based on the Traffic for Buildings Undergoing Redevelopment in Mumbai City

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ABSTRACT: Traffic comprises pedestrians, vehicles, ridden or herded animals, and other conveyances that use public roads for travel and transportation. Traffic congestion occurs when travel demand exceeds the existing road system capacity.

Mumbai, the financial capital of India has many sky high towers, but simultaneously it is densely packed with old structures in the city. The government is promoting the down falling building infrastructure industry by various policy changes. There are also growing traffic related issues & the city is continuously ranked in the top 5 most congested cities in the world since the past 5 years. The research will provide a tool to efficiently create & manage the delivery schedule, on the basis of a traffic management plan/data matrix, for the ongoing building infrastructure projects. The methodology is divided into 3 parts, one which includes the study of daily traffic routine in a particular area, second being the study of the proposed project schedule & the delivery schedule, & the final being a proposed matrix stating the average low/high traffic in the particular area & the mean traffic data. This could help construction planners and site managers to better plan and manage the delivery schedule & therefore the construction activities to minimise the impact on the surrounding roads and minimise unnecessary problems in terms of traffic. The basic aim is to provide for a safe, orderly and efficient movement of all categories of vehicles and to protect adjacent traffic facilities in accordance to the existing road infrastructure.

Keywords: *Traffic Congestion, Redevelopment Projects, Delivery Schedule, Delivery Plan/Management, Project Schedule Congested Sites.*

1. INTRODUCTION

The construction industry constitutes to approximately 7.60% weightage in the Indian GDP (statisticstimes.com/economy/country/india-gdp). It is also one of the largest industries, employing the major part of the labour sector of the country. This industry needs organisation in certain aspects, one of which is delivery management & scheduling as per the traffic trend around the concerned site. The standalone under construction buildings sometimes create nodes for the traffic congestion unintentionally due to the site constraints.

1. The basic aim of this research is to propose a tool for efficient planning of delivery schedule for the construction building stakeholders based on the trend analysis of the traffic near the target site.
2. The objectives of the research are:
   - To manage the traffic congestion caused due to buildings undergoing redevelopment/reconstruction in Mumbai city.
   - To propose a plan & helpful tool for efficiently scheduling of the project's material delivery, thereby helping in regulating the flow of the traffic around the site by not creating the nodes for congestion.
   - To reduce the congestion issues faced by the general public/traffic movements caused due to the undergoing building construction activities.
3. The limitations of this research are:
   - The building undergoing redevelopment/reconstruction must be abutted by at least 2 roads with a minimum width of 6 meters each.
   - The plot area of the building undergoing redevelopment/reconstruction shall be not more than 1500 sq. mtr.
   - The building undergoing redevelopment/reconstruction should be located within the city limits of the of the Mumbai city.

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2. LITERATURE REVIEW

2.1 Congestion in Mumbai City

Article by TomTom, dated 11-02-2022 in the Economic Times newspaper.

Mumbai was India's most and the world's fifth-most congested city in the year 2021, according to the latest TomTom Traffic Index based on a study of 404 cities across 58 nations. The metropolitan city (Mumbai) was the second most congested city in the world after Moscow a year earlier, Hindustan Times had reported.

Mumbai's congestion level was 53% in 2021 followed by Bengaluru and New Delhi (48%) each and Pune (42%). The peak traffic went down from 75% to 69% in the city. In 2019, it was 91%. There was a 22% reduction in peak traffic in 2021 compared to pre-COVID-19 pandemic years.

Courtesy: https://www.tomtom.com

2.2 Changes in the FSI Norms by the Government

Article dated 28-02-2022 in the Economic Times newspaper.

Eyeing more real estate investments in Maharashtra's emerging cities and towns, the prevailing government, considerably hiked the bulk Floor Space Index (FSI) levels – known internationally as floor area ratio – for construction activities in these regions.

The additional FSI has been linked to the width of the front road, which means the FSI will be available on plots that have roads with a minimum width of 9 m and more. And the plan to increase this includes removal of encroachment.

https://economictimes.indiatimes.com

2.3 Conclusions from the News

- There has been a rise in the vehicular density per sq. km. in major cities of India. Mumbai has been recorded as one of the top 10 most congested city in the world since the last 5 years.
- Since Mumbai is the financial capital & one of the major cities in the country, there is a surge in the urban infrastructure. The government of Maharashtra & MCGM are promoting the construction industry through some changes in regulations & policies.
- As there is a support from the government, the construction industry has started to take some pace, also through the reports of the last 5 years about Mumbai's traffic situations it can be concluded that there has to be a system to monitor/regulate/manage the traffic congestion around the construction site.

3. METHODOLOGY

(a) Identification of the problem through the relevant news & articles.
(b) Reference Case study documentation – 2 proposals under construction on the V.P. road in Girgaon area of the Mumbai city.
  - Reviewing & documenting the project schedule & the delivery schedule.
  - Reviewing the existing road infrastructure & other related context around the site.
  - Collecting the data of the traffic on the V.P. road for 3 days in a week (2 working days & 1 non-working day).
  - Trend Analysis of the traffic around the targeted proposals.

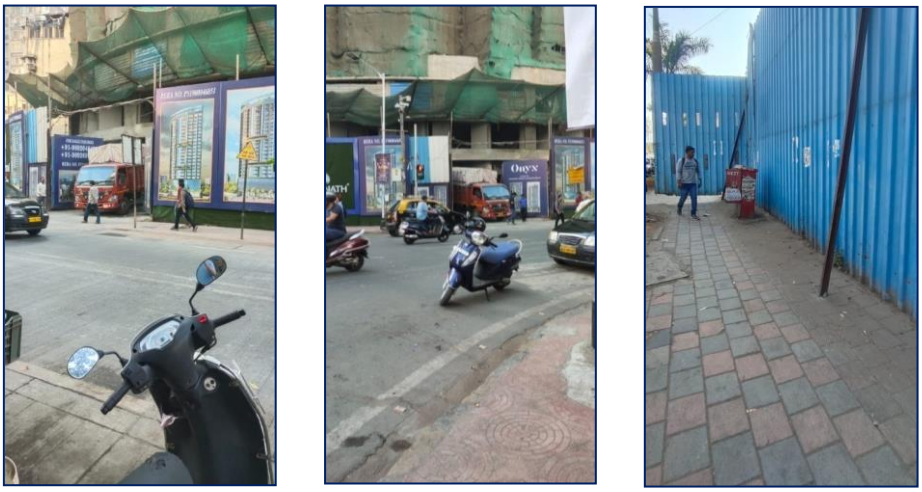
(c) Proposal of matrix to track the mean traffic data of the V.P. road, and provision of the traffic around the site.
(d) The re-scheduling or re-planning of the delivery schedule as per the traffic data collected.

3.1 Case Study 01: Proposed Redevelopment of building at the Junction of V.P. road & the Raja Ram Mohan Roy road.

- Developer _____ Erectors & Developers LLP.
- Architect – Ar. Vijay K.

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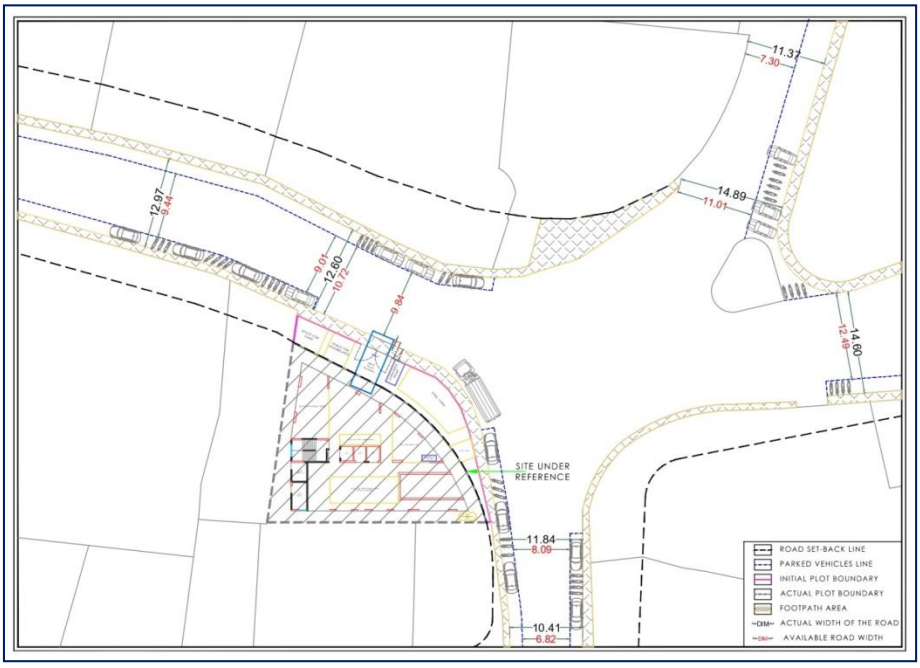
- Site Supervisor – Mr. S. Saha
- Total Permissible BUA – 7065.02 sq. mt.
- Total Proposed BUA – 6055.30 sq. mt.
- Total Gross Construction Area – 8665.00 sq. mt.



Case Study 01: Reference Images about Site Practices

Project Constraints

- Lack of proper project plan/scheduling & implementation of the same.
- The job layout was not effectively planned for the project, the materials were not well organised on the site.
- Lack of responsibility for the delivery management.
- Unorganized material delivery schedule & plan.
- Improper site management.
- No dedicated place for parking of any kind of construction vehicles due to the site constraints.



Case Study 01: Plan Stating the Actual & Effective Width of the Road

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3.2 Traffic Data Collection

Sr. No.	*Time*	*Route*	*4 Wheelers*			*2 Wheelers*		*Heavy Vehicles*		*PCU*
			Taxi	*Car*	*Mini Tempo*	*Motorcycles*	*Bicycles*	*Buses*	*Trucks*	
	PCU Factor		1.0	1.0	1.5	0.5	0.5	3.0	4.5	
1.	6.00 – 8.00 AM	Up	300	400	40	540	80	40	60	1460
		Down	200	240	20	660	100	60	40	1210
2.	9.00 – 11.00 AM	Up	520	220	80	1340	120	20	40	1830
		Down	340	220	60	1180	80	20	20	1430
3.	12.00 – 2.00 PM	Up	920	600	100	1400	60	60	80	2940
		Down	800	200	80	1700	80	100	80	2670
4.	3.00 – 5.00 PM	Up	960	480	100	1520	40	40	20	2580
		Down	440	440	60	1940	80	100	40	2460
5.	6.00 – 8.00 PM	Up	1060	620	120	2140	60	60	40	3320
		Down	840	720	60	2180	40	80	40	3180
6.	9.00 – 11.00 PM	Up	860	520	80	1960	100	40	40	2830
		Down	640	440	60	2100	80	60	40	2620

The above data is calculated manually through video recordings of the traffic movements at the given time slots. The videos were captured for 6 minutes & later multiplied in accordance to the total time in the particular slots.

4. THE PROPOSED MATRIX

5. CONCLUSION

REFERENCES

[1] Prof. Umesh Mallya, Prof. Kalyani Salvi, Prof. Dhaval Ghare, Prof. Shweta of CTES college of Architecture for helping me throughout the research.

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Rethinking the Use of Excavated Soil in Mumbai

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ABSTRACT: As the city center advances, a lot of amenities and infrastructural growth happen with the demand for development. The need for development puts an immense load on infrastructure. It also demands revision of the existing regulations to accommodate the need, making the cities transform into high-rise structures from low or medium-rise structures.

High-rise buildings tend to provide below-ground construction either to accommodate parking requirements or for services and structural purposes which leads to a lot of excavations. In such cases, on average, 75 percent of the soil excavated is dumped out of the site which actually is a great resource. Apart from this, there are several cost-related, schedule-related, environmental, and social issues associated with the dumping of this excavated material out of the site.

This study aims at the use of excavated soil in construction practice. The study showcases the amount of excavated soil available along with the available soil construction techniques that can be incorporated to use the soil back in construction. The study comprises of comparing different soils in Mumbai for analyzing the soil properties, deriving the design mix, and calculating the percentage of soil that can be utilized for construction purposes.

The study revealed several significant findings including a rise in demand for below-ground construction in high-rise buildings, usable content of soil available in Mumbai, appropriateness of CSEB amongst other soil techniques, etc.

The scope of the study remains beneficial towards the sustainable interest of the construction sector and is limited to large constructions in urban areas since a large amount of excavated soil is available.

Keywords: *Urban Development, Excavated Soil, Construction Techniques, Resource.*

1. INTRODUCTION

India has been among the fastest-growing economies in the world for close to two decades. In 2047, in the 100th year of its Independence, it aspires to be among the top three largest economies in the world. Executive summary of Niti Aayog in May 2022 mentioned that cities of India constitute only about 3% of the country's land, but contribute to over 70% of the Gross Domestic Product (GDP) indicating a high level of economic productivity that they offer. With this contribution, cities demand a lot of infrastructural facilities to smoothen their growth.

Mumbai, the capital city of the state of Maharashtra is 4th most populous city in the world. Mumbai's 2023 population is now estimated at 27,342,820 which has grown by 562,956 in the last year. This represents a 2.10% annual growth of population. Mumbai being the fastest-growing city, requires a continuous supply of infrastructural facilities such as transport, communications, power supplies, and buildings. To address this, the draft Development Plan of Development Control and Promotion Regulation-2034 suggests up to 50% increase in FSI for different regions in Mumbai.

In spite of the increase in construction cost, the Indian construction industry is expected to register an average annual growth of 6.1% between 2023 and 2026, including investment in transport, electricity, and housing projects. In October 2021, India announced the Pradhan Mantri Gati Shakti Master Plan for building holistic infrastructural facilities for driving economic growth over the coming 25 years.

All these demands for developing the nation are constantly increasing the opportunities in the construction sector. In case of any construction, be it commercial, residential, or infrastructural projects, the soil is excavated and dumped out of the site. In smaller projects, the soil gets used in refilling or landscaping work. But in the case of larger projects, generally, the soil is disposed of off-site either on the prescribed land by authority or illegally in the nearby areas.

The excavated soil and its disposal is a concern in many urban areas. In this whole procedure, the wastage of soil also happens as well as the area where the soil is dumped, also changes its character. Many times, this dumping is illegal,

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leaving behind many other connected issues such as. The builder/developer needs to make special efforts to take the excavated soil out of the site and need permission to dump it in the outskirts of the urban areas. This whole activity requires special attention for scheduling and also demands certain costs. In large-scale projects, almost 2% of project cost is spent on the disposal of the soil.

Currently, this process of excavating soil, taking it off-site, and dumping it is a very linear process and doesn't have any checks on the amount of soil and the region where it gets dumped.



Figure 1: Linear Process of Soil Dumping

The linear cycle of soil disposal needs to be rethought. Many other countries are rethinking the circular economy where this resource is used and not thrown out as a waste.



Figure 2: The Circular Process of Taking the Soil Back in Process

2. LITERATURE REVIEW

Excavation is the process of moving earth, rock, or other materials with tools, equipment, or explosives. It includes cut and fill excavations, trench or footing excavations, basement excavations, bridge excavations, road excavations, etc. Excavation has a number of important applications including exploration, environmental restoration, mining, and construction.

The soil that we get out of the excavation has been used historically in various techniques. All these techniques are been explored by several contemporary architectural practices worldwide but have personalized interests in using the material.

2.1 Different Soil Techniques Explored Worldwide

Cob Technique

Cob is an earth-building technique based on a mixture of clay, sand, straw, and water. The mixture is kneaded with hands, feet, or simple tools, subsequently, lumps are made, that are then compressed together and shaped by hand forming foundations and walls.

Adobe Technique

The adobe, or sun-dried brick, is one of the oldest and most common building materials known to man. Traditionally, adobe bricks were never kiln-fired. Unbaked adobe bricks consisted of sand, sometimes gravel, clay, water, and often straw or grass mixed together by hand, formed in wooden molds, and dried by the sun.

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Rammed Earth Technique

Rammed earth walls are constructed by ramming a mixture of selected aggregates, including gravel, sand, silt, and a small amount of clay, into place between flat panels called formwork. Traditional technology repeatedly rammed the end of a wooden pole into the earth mixture to compress it.

Compressed Stabilized Earth Blocks

Compressed Stabilized Earth Blocks (CSEB), commonly called, pressed Earth Blocks, are construction materials made using damp soil under high amounts of pressure to form blocks.

The adaptability of these techniques is compared in the table below.

Table 1: Comparison of Different Soil Techniques

Sr. No.		*Cob Construction*	*Adobe Construction*	*Rammed Earth Construction*	*CSEB*
Min. Thk. of the wall	Internal	24”	10”	24”	6”
	External	24”	14”		9”
Appearance					
Visual aspect					
Time for construction					
Labour required					
Diversification in form					
Strength					
Mass production					

Poor Average Best

2.2 The Resource and the Waste

The construction in urban areas produces huge amounts of soil as excavated material which is thrown out of the site and consumes a lot of energy for dumping it on suggested areas by authority.

The below diagram showcases the number of basements for the ongoing residential projects in Mumbai.

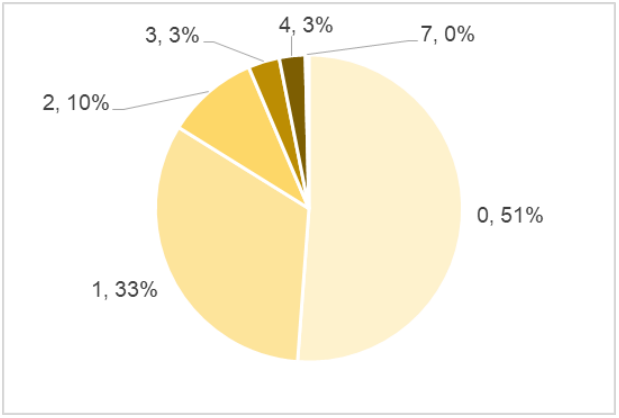


Figure 3: Circular Process of Taking the Soil Back in the Process

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The above diagram suggests that 49 percent of ongoing projects have basements and the remaining even if not considering basements, excavate on an average of 7.6 meters below ground. Adding to this, 6.5 million Cubic meters of soil is getting dumped out of only residential projects in Mumbai and the suburban area.

This can be considered as raw material for the CSEB technique.

3. MATERIAL AND METHODOLOGY

Through literature, the quantity of soil available in Mumbai and the appropriate technique were discussed. It is further required to examine whether the soil quality is appropriate for making CSEB. Soil samples were collected from 3 different locations in Mumbai as primary data. Also, secondary data for 6 locations in Mumbai was compiled. Soil test results for these 9 locations were compiled to formulate respective design mix for making CSEB.

The following diagram showcases the methodology adapted.

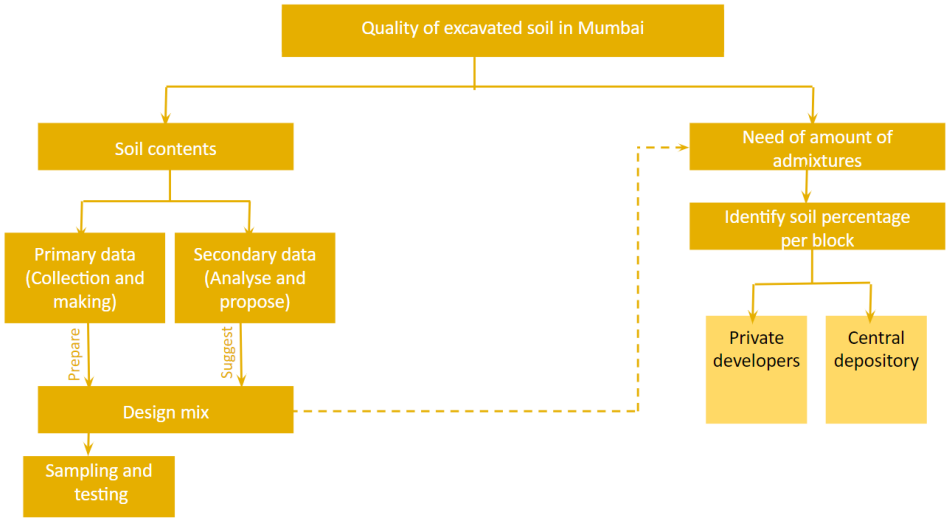


Figure 4: Methodology and Further Scope

The following diagram suggests the composition of soil samples (primary data and secondary data) and the percentage of silt, clay, and sand which are the main constituents for deriving the design mix.

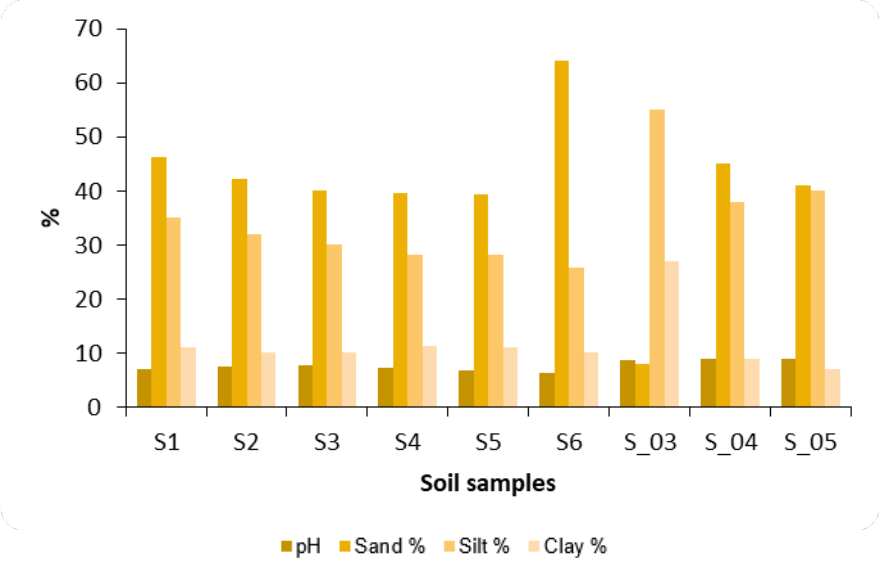


Figure 5: Comparative Graph of Soil Properties of Selected Sol Samples

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It is predominantly seen that in Mumbai city and suburbs, two types of soil are observed. One type with more sand content and the other type with more clay content.

4. RESULTS AND DISCUSSION

After comparing all techniques, it is observed that Compressed Stabilized Earth blocks have advantages over other soil construction techniques in terms of:

1. A better finish can be achieved, so can be used for exposed work.
2. In order to achieve various forms, multiple molds can be worked out as per requirement
3. Since it can be mass-produced using certain machines, industrialization of the technique is possible.
4. Though the time required for overall making and associated labor are more as compared to other techniques, it can be well planned within the project schedule.

It is prominently seen that in urban areas, techniques like CSEB can be adopted if well-planned.

Also with reference to Figure 5, the following design mix composition is suggested indicating that in one block of CSEB, cement content can be reduced below 10 percent.

The following table indicates the soil percentage that can be achieved in the selected soil samples. It is observed that in the unit block, a maximum amount of excavated soil can be used with the help of a certain percentage of admixtures into it.

Table 2: Soil Percentage which can be Achieved

	Soil (in %)	*Admixtures (in %)*		
		Cement	*Fly ash*	*Sand*
S_01	80	9	10	0
S_02	80	9	10	0
S_03	46	9	0	46
S_04	91	9	0	0
S_05	75	10	15	0

5. CONCLUSION

The available soil after excavation in urban areas is huge. Observing the scenario in Mumbai city and suburb region, where a lot of projects are coming up and taking out excavated soil, techniques like CSEB can be very well used.

The resource can be used instead of wasting it. The research gives further scope to identify a centralized system where the technique and the material can have a better place to mold into.

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The Impact of Different Cultures Across Countries: An Explorative Study with Courtyards

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ABSTRACT: Architecture is a product of culture. Architecture of city reflects culture of society. In other words, it can be described as a city's identity is expressed through architecture of that city. Architecture is more than a built environment. Architectural character is developed with the attributes and characteristics of an individual. Culture is a way of living of different societies which passed down from generation to generation. Spaces are created according to lifestyle of community and lifestyle reflects through way of living, rituals of society and climatic condition of particular region. There are transitional spaces that promote cultural identity of a region such as – *chabutra, otla, chowk, aangan, nukkad*, courtyards etc.

Courtyard is one of the traditional forms of building. It is considered as an architectural feature which is most commonly seen in residential buildings. The research provides a qualitative study on courtyard buildings as a multi-dimensional concept which includes dimensions such as economic, social and environmental. This paper analyses case studies of four different cultures addressing different areas of concern such as Climate, Spatial organization, socio-cultural factors, religious aspects, formal impact, orientation of building and cultural activities. The research investigates relation between designed courtyards of four different cultures and different aspects associated with it. Aspects like social behaviour of community, traditional values, and environmentally responsible are included in the studies conducted in this paper. The aim is to explore the relationship of culture and architectural character of the region. The possible outcome from the research is expected to reveal that community in a particular context has a cultural identity which can be expressed through architecture.

Keywords: *Architecture, Culture, Courtyards, Architectural Character, Courtyard-House.*

1. INTRODUCTION

1.1 Culture—A Way of Life

Culture majorly characterizes as ideas, perceptions, beliefs, way of living of different societies which passed down from generation to generation. According to Samuel Koenig, "Culture may be defined as the sum-total of man's efforts to adjust himself to his environment and to improve his modes of living." Lundberg defines, "Culture refers to the social mechanisms of behaviour and to the physical and symbolic products of these behaviours."

Architecture is a product of culture. It is best presented by architectural spaces of different regions. People belongs to different cultures and values have different type of shelter to live in. There is an association between spatial organisation and way of living of community. Design of a house or any designed space reflects the behaviour of habitat living in the same.

Architecture of city reflects culture of society. There are transitional spaces that promote cultural identity such as – CHABUTRA, OTLA, CHOWK, AANGAN, NUKKAD, COURTYARDS etc. Architecture is more than a built environment. The attributes of culture in architecture are:

1. Shapes, forms, styles and spatial organisation of building.
2. Design principles with context
3. Material and technology for construction. [i]

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1.2 Courtyards

Courtyard is an area where an open space designed in house often surrounded by walls from three sides in center of building and open to sky. It is one of the elements of architecture used to design as building feature. Courtyards in architecture functions and act as in many ways like Traditional form of building, a transitional space, A semi outdoor space surrounded by walls, colonnades, built block, space where one can experience dynamic changes in micro climate, Space for social interaction, Central space which connects other areas of entire building, Act as central design feature and so on.

Courtyard Houses: Type of dwelling where main part of building is disposed by courtyard in centre. In earlier times courtyard houses were meant to be very appropriate due to numerous benefits. Influences of modern way of living brought change in housing typology which led to fade away of traditional courtyard house. Courtyards are existed in all over the world long time ago. The data collected through research papers and literature study that over 40 countries in the world have identified with having traditional courtyard houses.

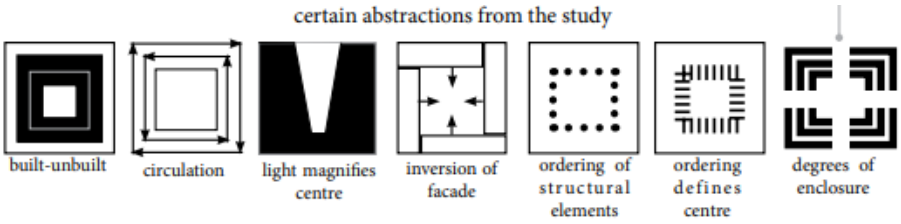


Figure 1: Shows How Courtyard as an Architectural Feature is Associated with Multiple Attributes Of Culture

1.3 Architectural Character

Architecture is part of identity of each community and carries the message, a concept and characteristics attributed to the community where it was born. Therefore, it depends on the geography, traditions, manners, insights and knowledge of the community as well as its history. [ii]

Architectural identity refers to manifestation of existence of a society. It usually considers as uniqueness in urban fabric which differs from region to region.

1.4 Research Question

“How Does Culture Define the Architectural Character of A Region?”

1.5 Aim of the Study

This research report aims to manifest ways to understand culture in different regions by collecting and studying series of courtyard houses as case studies. The case studies represent four different cultures to explore the relationship of culture with the architecture of the region. The aim of the study is to explore the relationship between culture and the architectural character of region.

1.6 Scope of the Study

From literature study of courtyard buildings in four different cultures, architectural character can be drawn out. The paper focuses on cultural impact of building on architectural identity of a society.

1.7 Limitation of the Study

In order to limit within the time frame research is limited to considering courtyard buildings in the following four different cultures:

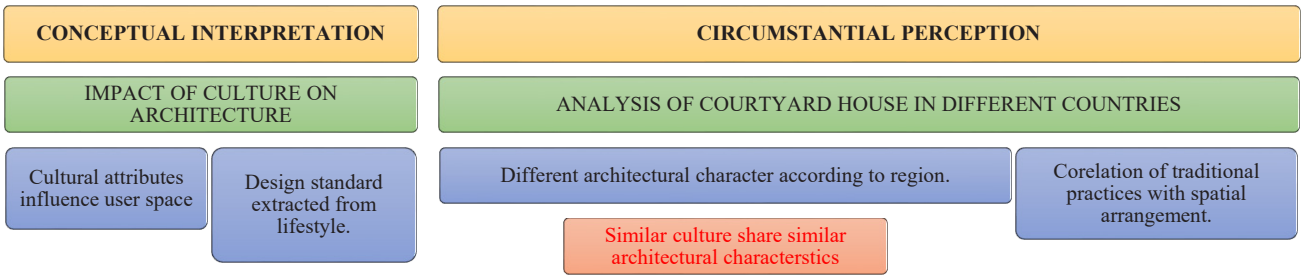
1. Middle east (Islamic) – Sharjah City UAE (houses & Museums)
2. East Asian (Chinese culture) - Siheyuan
3. European (Greco Roman) – Prostas & Pastas (Greek)
4. Indian – Nalukettu (Kerala)

ISBN: 978-93-89934-68-7

2. LITERATURE STUDY

Literature study has been conducted in two broad areas:

1. Conceptual interpretation – role of culture in architecture.
2. Circumstantial perception – explorative study of courtyard spaces.



Flowchart 1: Framework of Literature Study

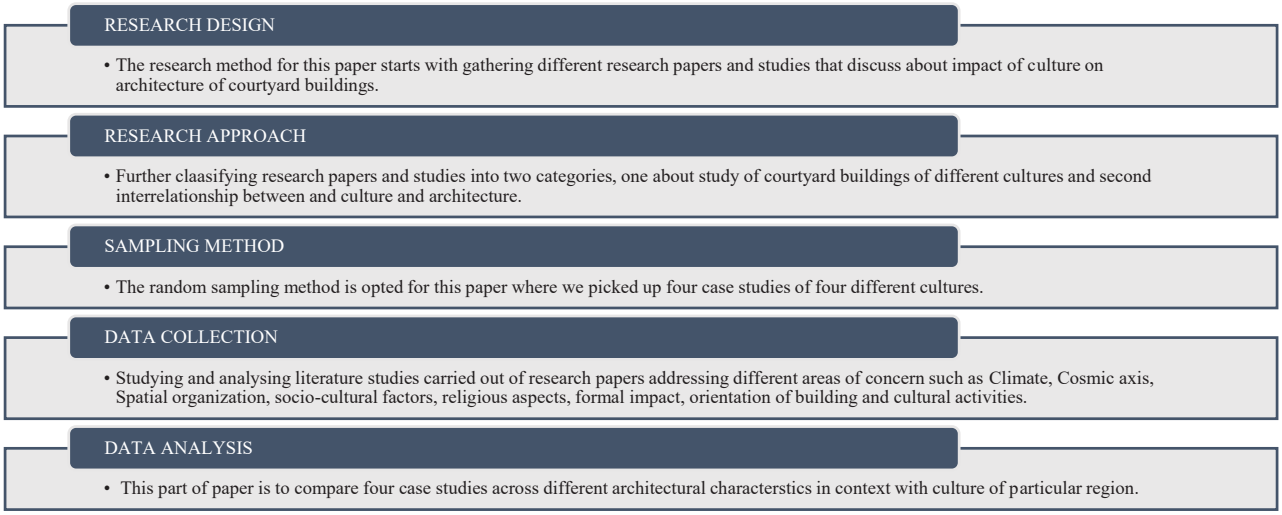
Conceptual Interpretation: Theoretical understanding of the relationship between architecture and scope of culture. Structural framework under which architecture and culture can be categorized – Functional, Conceptual, Functional & conceptual and Perceptual.

The Impact of Culture on Architecture: Culture promotes architectural identity through several factors like Behavioral laws and values, religious context includes shapes, forms and styles, Spatial understanding with different functions, Traditions, Materials and Technology, Visual identity, social structure and Climatic analysis. Culture is about social (human values), aesthetics and psychology (Ideas & Beliefs).

Circumstantial Perception: Contextual understanding of different courtyards and courtyard houses in different countries, different region, different climate and different people. Three major parameters for the courtyard design – Spatial Design, Environmental aspects and Behavioral values.

Descriptive Analysis of Courtyard Houses in Different Countries: The findings from different research papers and case studies shows varied attributes of courtyards in different regions such as Unidentical shapes and forms, orientation and scale, Typical layout and zoning of spaces of dwellings according to region, Aesthetical values, Vernacular Material and technology, social organization, Climatic benefits, Occupancy rate and Cultural attribute.

3. METHODOLOGY



Flowchart 2: Process Adopted in Research Paper

ISBN: 978-93-89934-68-7

4. CASE STUDIES

4.1 Case Study 01: Sharjah City

City in UAE. Famous for its vernacular architecture. Courtyards in Sharjah has influence of Islamic religion. Their style of construction was more concerned with fundamentals they have in Islamic religion.



Figure 2: The Courtyard House in Sharjah: (a) Traditional Old Courtyard House in Sharjah; (b) Inner View for the Courtyard House; (c) Urban Formed Courtyard between several Houses [iii]

Old houses in Sharjah turned into museums to strengthen the communication roots between history associated with the city and new generation. Various activities are carrying out in Courtyards of museums (Used to be courtyards of houses earlier) such as display rooms for social interaction for the people living around, communities and tourists. All the Events, programs, family functions, meetings and community gatherings are hosted by museums. [iii] The climate of Sharjah comes under hot arid zones. Due to this climatic zone, the space which becomes an essential architectural feature is courtyard to be incorporated in city fabric. Courtyards improves indoor environment due to natural ventilation and less humidity. City has also been planned accordingly. Narrow streets and low-rise building were the mandatory part of city planning. Longer sides of courtyards were positioned parallel to roads. Courtyards brings thermal comfort for the people inside the houses. Main leading reason of courtyard was privacy principles of people living in Sharjah. Two domains have been proposed inside the house before spatial planning. One is public domain and second is private domain. Separation between both the domains were their priority.

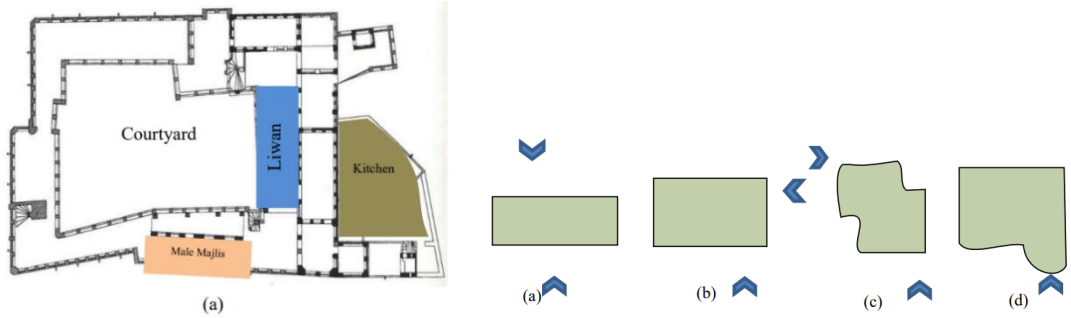


Figure 3: Left Side Image Indicates—This is Bait Al Naboudah in Sharjah, UAE. (a) Plan drawing [20]. Right Side Image Indicates. This is Various Types of Traditional Houses in UAE. (a) Wadi Al Sham Courtyard House; (b) Al Shamel House with Entrance Leads to Male Majlis; (c) Rams House with Two Opposite Entrances; (d) Ras Al Khaima House with Courtyard Screen Division. [iii]

In most cases courtyards are rectangular in shape to receive enough amount of light and shade. Floors in courtyard designed as non-reflective to avoid heat. Courtyard is well recognized design feature for typology of houses in Sharjah city. Through above case study it is concluded that there are following factors which affects the courtyard as an essential design feature are Environmental impact, social values and privacy principles.

4.2 Case Study 02

Siheyuan: Type of residence found in China, most commonly in Beijing.

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Siheyuan is basically a Chinese quadrangle. Building formed by four houses around a quadrangle courtyard.



Figure 4: Birds Eye View [iv]

Influence of Chinese traditional philosophies and values were reflected on this typology siheyuan. Many forces, such as feudalism, Confucianism, Taoism, clans, cosmology, construction law, and geographic location, have shaped Siheyuan. [v] Fengshui is an ancient traditional practice which provides guidance to the people of Beijing. It helps Beijing residents for the planning of house from ground to execution as selection of site to spatial arrangement of house. There was limitation of height for the houses in the city. No high-rise building can be constructed. These took construction laws also to be followed by the people of the city. Chinese philosophers had one saying MEN WORK OUTSIDE, WOMEN WORKS AT HOME. Keeping this in mind courtyards were the part of necessary design feature while constructing a house. From siheyuan sizes to gate sizes were varied depending on owner's status.

4.3 Case Study 03

Greek Houses – Prostas and Pastas

Study of these two Greek houses *prostas and pastas* is based on architectural evidences from archaeological ruins. Prostas and pastas are the names given for semi open space between courtyards and living room.

Meaning of prostas – standing in front
Meaning of pastas – standing in between



Figure 5: Prostas House in Priene and Pastas House in Olynthus

The courtyard as the prominent and characteristic feature of the dwelling and a semi open portico that was planned in association with the courtyard is used to establish a classification of house plans. Accordingly set types are coined with the

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names given to the portico: prostas-courtyard and pastas-courtyard. These schemes also formed a common spatial language to describe the architecture of houses. [vi]

Local customs and traditions of Greek culture are more influential in formation of these type of courtyard houses. Doorways are mostly preferable for opening instead of natural openings. Prostas and pastas houses were featured in Anatolia and Greece in classical period. Prostas are usually placed on north side of the house. For good circulation, adequate separation and local traditional values were highlighted factors responsible for construction of this typology.

4.4 Case Study 04

Kerala Houses – Nalukettu

Courtyard is a common typology in India. Nalukettu is traditional residential architecture. This typology of house was influenced by MANDALA. Mandala represents a cosmos within the universe. They are framed in forms of symbol and a representation. Abstract of grid iron mandalas guides configuration of nalukettu.



Figure 1a Mandala Scheme | Figure 1b Typical of House Plan | Figure 1c Marmam and Principle

Figure 6: Geometrical Orientation Principles of Nalukettu [28]

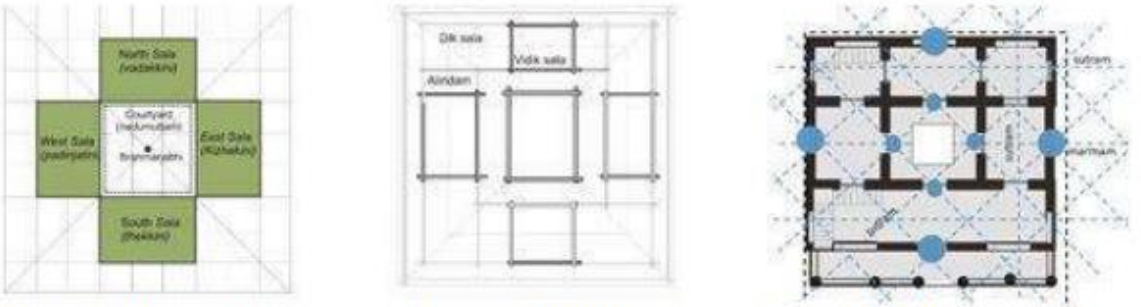


Figure 2a Four Sala Principle | Figure 2b Vidiksala Principle | Figure 2c Illustration of a design and the Superimposed Principles

Figure 7: Structural Principles of Nalukettu [vii]

These principles mentioned above in two figures is a part of their philosophy which states that there will be no built form in centre. Diagonal hierarchical orientation leads to placement of rooms. Courtyard in nalukettu is called anakanam. Each community has its courtyard style. However, some common characters prevail. They are: 1) the courtyard dimension is generally small and generally varies from 1.8 m to 5 m spans; 2) courtyard-house has outer wall and tend to have at least one hall opened; 3) regardless of religion and communities, most of the houses give importance to kitchen, well, and orientation toward river; and 4) most courtyard-houses has a walled wooden hall containing raised granary in the middle (ara), semi basement storage pedestal or nilavara for storing utensils and farming tools, and one or two supporting rooms (kalavara) next to ara. [vii]

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Tropical monsoon climate ensures the two features of kerala courtyard house – Outward slanting roof and treatment of wood and timber.

5. ANALYSIS

The typological analysis of these four case studies brings us to following discussions:

- Philosophy of religion are most influential factor in shaping culture of a region.
- Climatic conditions of region refine a region in a more confined way.
- Social values of society develop an identity.
- Hierarchical structure of a city from king off dynasty to servant of a house leads to spatial arrangement of house.

Together all these factors become a culture of society/community or region.

5. OBSERVATION

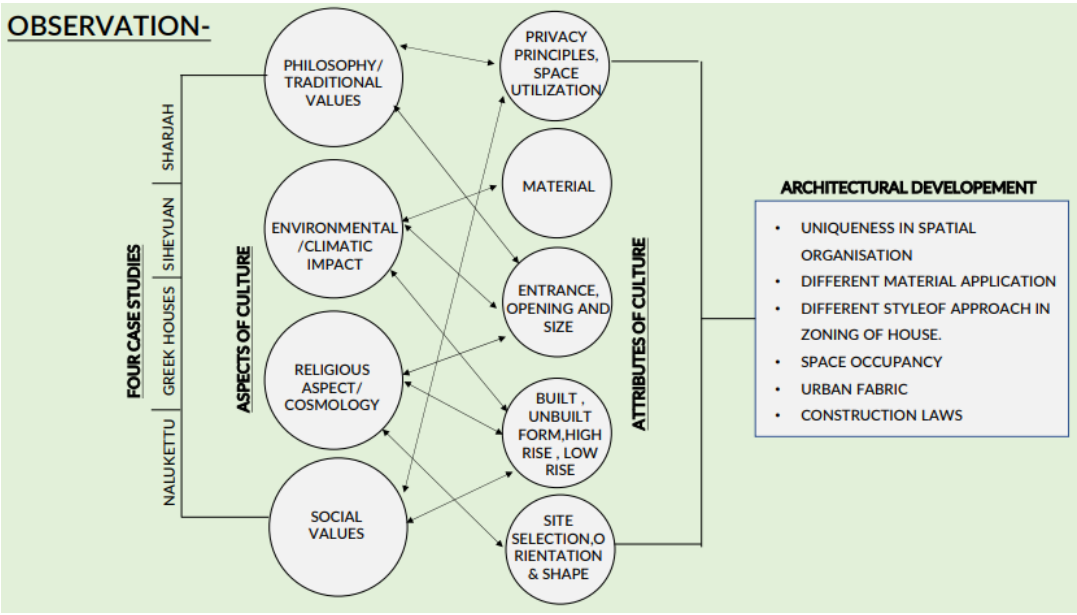


Figure 8: Figure Shows Cross Cultural Analysis of Courtyards with Four Case Studies

6. DISCUSSION

Each and every region or country has their own style of designing their city, buildings or urban fabric. Factors which influence any region's design is their population's lifestyle which involves from social aspects to environmental factor, from climate comfort to ritual understanding.

The intent of this study has been to explore courtyard buildings in different regions which has had a continuity, flow or progression in its architectural styles and expressions over the years. The design of courtyard space formed has been impacted by numerous factors concisely mentioned in this paper. These hooks of variables communicate qualities and gestures to the architecture and also results in a spatial expression which turns into relevant and specific to the particular region. Basic architectural type of the region has been sorted out through time and still keep the historical roots for coming generations in its purest simplest form.

From the base study on the four cases in this paper, factors such as geography, socio-political structure, environmental impact, religion, belief systems, traditional values, materials and resources etc are found to largely influence the basis of the architectural character and style of the respective region and time.

ISBN: 978-93-89934-68-7

7. CONCLUSION

The conclusion has been made by studying above discussed cases that cultural implication of the society/community formed the architectural body. People living in a community produce architecture with identity through their way of living life. The previous studies as mentioned in literature reviews indicate various factors are found to influence the space.

Architecture with identity was due to the reflection of unique architectural character in buildings which varies from region to region. This uniqueness in architecture is because of different yet essential human values. The culture of the community defines its identity and architecture as a social phenomenon originated from the culture and influenced it.

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Formulating Architectural Elements for Legislative Assembly Complex: Case of Pondicherry

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ABSTRACT: India is thought to be one of the world's most democratic countries. As a result, the smooth operation of those democratic systems needs efficient venues to house its institutions. From Parliament House of India to the Palace of Westminster, London, and from Washington's capitol to ancient Roman Pnyx, these spaces have traditionally been designed as iconic structures and are often seen as symbols of larger political ideas of national identity, pride, and power. Hence, the need has been understood to study and formulate architectural elements for legislative assembly complex. The goal of the comparative examination of the buildings was to examine and comprehend the relationship between political culture and architecture. It also helps us to analyze how these structures symbolize the state they're inbuilt, reflect the culture of the people and become their identity. This article also examines the interaction between built and unbuilt areas, as well as the security measures implemented to ensure the safety of these buildings. This paper also aims to grasp how some architectural elements such as aisles, spatial relationships with the opposite surrounding legislative structures, seating arrangement, and chambers help to shape and manifest the political culture of the place it is in-built. As a result, the author was able to develop the architectural components required to support the final year architectural design through descriptive and analytical research in context with Pondicherry.

Keywords: *Political Culture; Democracy; Architectural Elements.*

1. INTRODUCTION

Democracy today is a phrase used to describe a form of popularly elected governance. The constitution upholds law and order, defends citizen rights, and places restrictions on government bureaucracy. Therefore, in a democracy, the people have the real power. According to Abraham Lincoln, the government of the people, by the people, for the people – cultivates a crucial interaction between bureaucracy and democracy by employing people as a connecting means.

In the past, government buildings were constructed in a way to demonstrate their might and authority. There is a need for change in the shape and structure of administrative buildings, nevertheless, given the shifting times and the nature of government Administrative and civic spaces must be inclusive while also reflecting the dignity of the government that occupies them. Such places must be welcoming and open to everyone, not exude an intimidating aura.

The other issue is that the context isn't taken into account; most government buildings are the same regardless of the location's geography, climate, or history and culture. It is safe to argue that the majority of governmental structures situated in hills would not appear odd if they were suddenly moved to lowlands. Such is the disregard for the situation's context.

Leaders construct buildings as major symbols of vision and, in the modern era, democracy, to portray, in whatever ways are possible, the local heritage and culture. They do this through regulating architectural symbols and influencing the structure used to see the world. This includes utilising the latest technology, environmental practises, and new ideas available in the modern world while preserving the innate beauty of the local culture and heritage.

As an ideal for all public places, a democratic public space is one that is publicly owned, universally accessible from all points of view and at all stages of design, allows for a variety of voices and users, permits flexibility of use, is freely accessible to all people, and promotes the right to free speech.

2. LITERATURE REVIEW

The pure beauty of politics itself has been instrumental in bringing civilisation to this point. It is about using power, authority, and effective administration for the benefit of humanity.

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Politics has a lot of different facets. Many political regimes use symbols, especially a strong physical environment, in addition to the power demonstrated by a charismatic figure, an unstoppable military presence, an entrenched bureaucracy, or the enforcement of the system of laws and statues. All groups, institutions, and societies engage in politics on some level. All interactions, institutions, and structures that are involved in the production and reproduction of things are affected by it.

It manifests itself in all cooperative, adversarial, and competitive efforts to consume, produce, and distribute resources. The development is focused on the state of our entire political and social lives. These are tools for bringing about social transformation and conflict resolution. The art of finding a voice has always been important in politics.

Architecture's history parallels that of man. Each structure tells a unique story about the social, political, and economic circumstances of the eras that influenced its construction without using words. Since art is a component of life, not the total, and can never exist on its own, the history of architecture cannot be separated from the history of man.

3. METHODOLOGY

The paper combines the articles and conference proceedings by searching the keywords and the original content and data from official websites. The research paper illustrates the theoretical foundation i.e. knowledge of the legislative process and its relationship to the capitals. Study of the governmental structures in the world's largest capital cities and research on india's most recent complex legislative ideas. The primary data is collected through interviews by preparing a questionnaire, case studies where as the secondary data is collected by referring similar research papers and books.

4. RESULTS AND DISCUSSION

4.1 Symbolism in Architecture

The power of a copy has always been symbolised by architecture, which has always played a crucial and dominant role. For instance, the Rashtrapati Bhawan in Delhi, the parliament building in Dhaka, or the Kremlin in Russia all have recognisable shapes that convey the strength of the nation both literally and figuratively. Earlier, such plutonic levels of representation were reached by buildings that were directly connected to the government.

National emblems are also buildings that exemplify the spirit of development and progress. Civic symbols like the Supreme Court building, the embassy complex, etc. further represent the state's ideas and culture. They represent the dynamics of the area through their architectural configuration. Form, material, structure, and landscape are some factors that significantly aid in the development of a theme that projects the required aesthetic qualities.

4.2 Scale in Context

The simplest way to communicate the most fundamental concepts, such as power or weakness, is through scale. Buildings' scale reveals the order of importance in a given situation:

- *Sizes (volume and area):* Greater size equates to greater power.
- *Height:* Greater authority is indicated by taller objects.
- *Weight:* More mass equals greater stability and dominance.
- *Compatibility with surroundings:* greater contrast results in greater distance and oddity.

4.3 Official form and Expression

These basic definitions of scale are elevated to a greater level of expression in buildings through formal form and formal vocabulary, such as a massive A dictatorial, neoclassical structure that attempts to pass itself off as preserving an old ideal.

- *Symbolic representation:* More decoration indicates that it is being glorified symbolically.
- *Visibility and Transparency:* More opacity equates to greater mystique.
- *Complexity:* Less clarity equates to higher abstraction.
- *Space organisation:* Is employed to censor the current social order.
- *Accessibility and invitation:* A clear invitation results in increased segregation.
- *Complexity:* Greater complexity equals greater security.
- *Flow:* Formal flow implies greater control.

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"There is a strong requirement for symbolism, thus the building must contain elements that touch people's hearts".....Tange Kenzo.

"State symbols provide permanence and strength over time……." Christopher Charles Benninger (January 2009 issue of Architecture + Design Symbols of State).

When an image permanently fuses with "a meaning system" in the public's imagination, it becomes a symbol.

The parliament is more than simply a structure; it is a place of order and chaos, drama and inaction, passionate debates, and outbursts of emptiness. Within the confines of the assembly region, it establishes the political and historical status of a country.

The setting in which democratic debates actually occur can be understood as a physical manifestation of how people relate to democratic concepts. The concept of public engagement in democratic architecture originated in ancient Rome. Since this is no longer the case, public places' importance as a setting for fostering democracy has diminished, turning these civic institutions into little more than ornamentation.

1. **Active Areas:** Encourage people to take part in the democratic process by developing transparent structures that are open to the public to symbolise democracy.
2. **Spatial Attributes:** In order to create a more engaging public architecture, it is important to pique people's interest in a structure, particularly through the contrast of light and shadow, hard and soft, new and ancient, transparent and opaque.
3. **Context:** The structure should be in conversation with the surrounding environment and sit lightly on the site instead of imposing itself as a stern memorial.
4. **Urban:** By promoting public engagement in the democratic process, the assembly building, which is accessible to the general public, symbolises democracy via the art of interaction.
5. **Spatial Awareness:** The Capitol Assembly gives a sensory experience through a variety of vistas by using circulation patterns as a form of narrative trip.

6. CONCLUSION

History demonstrates that when a country develops and gains riches, its municipal structures take on a pompous, almost totalitarian appearance, with expansive landscape gardens, high walls, and steep setbacks.

The Gothic Palace AWN Pugin designed in Westminster, as well as the imposing dome of the U.S. Capitol, personify the spirit of the citizens we exist to serve. Amphitheatres from the classical civilization and Viking outdoor meetings also serve as examples of this. Numerous buildings, ambitious utopian visions, and the reconstruction of recent history in Brasilia, Chandigarh, and Dhaka have been built in the service of democratic values.

There are several examples of undemocratically planned urban architecture with palace-like features in India today. These structures give off an ominous vibe, and their size and architectural design may have a negative effect on the populace and the government. "We mould our structures, and also they take on their final form,," as Winston Churchill famously stated. Before the public loses interest in its city or architecture and a society that just doesn't come together and isn't worth caring about is created, architects must understand the value of democratic spatial relationships.

Among the most democratic rights is the right to participate in public life since it is impossible to comprehend public life and space without acknowledging their political aspect. Therefore, the users' fundamental needs, their spatial rights, and the meaning they seek should all be taken into consideration while designing and managing public places.

As areas and functions alter, so do meanings. A space must be deeply ingrained in its setting in order to possess a greater and more lasting value. The fundamental setting is the natural environment of the site. The secondary context is provided by the history of the area and the location. Additionally, a space's democratic management greatly contributes to people's feelings of pride, ownership, and connection to the space.

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I would like to express my deep sense of gratitude from the bottom of my heart to my guide Prof. Shubhashree Upasani, and interviewees during this process of research, guidance helped me to complete the study of the topic Formulating

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Evaluating Architectural Features/Elements as per DGS Orders, Circulars and Notices Related to Maritime Training

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ABSTRACT: India is effective in developing awareness and sincerity among the officers towards their duties and responsibilities on ships. Maritime education and training are important in achieving the objectives. Training of maritime personnel has the highest priority of the Government of India. These qualities and skills are necessary for the safe and efficient operation of ships during sailing. The DGS (Director General of Shipping) circular serves as a guide to obtaining the approval for courses in pre-sea training for Merchant Navy and is updated to enhance and thus provide the cadets with optimum resources and spaces required to become efficient sailors. The circular guides the institutions about the administration, staff, equipment/facilities, and the conduct of the course. Along with the circular guidelines, architectural features, and elements also play a vital role as architecture not only contributes to physical health through people's efficiency in their working environment but also affects users' emotional comfort. The main motive of the research paper is to evaluate and formulate the palette concerning the architectural features required in any maritime institute. Some objectives of the research are to understand the aesthetic and psychological aspects focusing on the aspects related to enhancing the space concerning the psychological comfort for the cadets, thus helping them to cope with the mental and physical stress caused by staying away from home and becoming efficient seafarers. To study the architectural and landscape design aspects, summarize the physical and aesthetic properties of various elements, considering the required materials, design elements, principles, textures, patterns, colours, etc. for enhancement. To study the psychological aspects by interviewing cadets, referring to research papers, books, official DGS circulars, and discussions. Thus the research will serve as a guide useful in designing maritime training institutes considering the psychological effect of the aesthetic features in architecture.

Keywords: *DGS, Maritime, Aesthetic, Psychological, Palette, Textures.*

1. INTRODUCTION

The main motive of the research paper is to evaluate and formulate the palette concerning the architectural features required in any maritime institute by focusing on the psychological aspects and comfort through interviews, case studies, and books. The research paper deals with the study of architectural and landscape design aspects, and summarizes the physical and aesthetic properties of various elements, considering the required materials, design elements, principles, textures, patterns, colours, etc. for enhancing the environment in the institute. Scientists have said that more than half the brain processes information through visual images. Visual stimulation comes in many forms they help with perception and understanding of space. The human senses and building elements together can have a powerful emotional effect. Specific colours, textures, and natural light influence mood.

Incorporating these to help balance and maintain the psychological and physical aspects of the cadets. Utilizing ideas like biophilic architecture, xeriscaping, or fundamental landscape design to create settings that improve mental fortitude. One cannot overlook the value of natural contact while thinking about mental wellness. This includes combining elements and features of nature—such as water, plants, daylight, and organic materials like wood and stone—into the constructed environment. Another important aspect of biophilic designs is the establishment of visual interactions between light and shadow, as well as the use of more organic shapes and the play of shadows rather than geometric shapes. Many of these design features have also proven beneficial and may contribute to the comfort of members. It should include noise control

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and exposure to natural light and ventilation. Fostering values like interpersonal connection, physical activity, gaining new skills, and mindfulness. Small gazebos, backyards, yards, as well as rooftops, can all include this. The goal is to allow access to outdoor air and the weather. To accomplish the goal, neuroarchitecture should also be taken into consideration. It has been concentrating increasingly on outdoor areas, like charging a battery, which can have a direct impact on the brain. No matter how green they are, outdoor spaces are crucial for taking a break and recharging.

2. LITERATURE REVIEW

As the students in any maritime institute have to leave their homes and stay at the campus for training, it is very important to maintain and look after the mental health of the cadets. It is necessary to develop a strong mind power and physical strength as it goes hand in hand. Thus creating spaces for interaction as well as isolation is essential. Including aspects such as biophilia – which has healing and calming effects of the colour green. Beyond aesthetics, the relationship between urban planning and public health is essential as the importance of trees as public health infrastructure.

Including natural materials with other impactful design elements. Specific colours, textures, and natural light influence mood. Wood feels rich and warm, and bold colours support a positive attitude. As psychological reaction allows one to mentally feel without ever touching, maximum use of basic design principles like balance, proportion, unity, harmony, variety, emphasis, rhythm, movement, etc must be considered.

3. MATERIAL AND METHODOLOGY

The paper combines the articles and conference proceedings by searching the keywords and the original content and data from official websites. The research paper illustrates the issues and tries to give a basic idea of solutions for the same. The primary data is collected through interviews by preparing a questionnaire, and case studies whereas the secondary data are collected by referring to similar research papers, books, and official DGS circulars.

4. RESULTS AND DISCUSSION

- Human psychology is very perceptive when it comes to built settings. Surprisingly, the triggers have been referred to as straight lines and different tones of grey. The human mind has been accustomed to particular landscapes from the beginning of time. These consist of broad swaths of vegetation, lovely bodies of water, hillsides, and valleys. a location that evokes feelings of comfort, security, and safety. However, a building's influence on its users' or tenants' brains is not necessarily detrimental. These frequently show up most overtly in institutional-like settings that are public. People who struggle with anxiety often feel more at ease in solitary settings where they have some degree of solitude and mental control. Natural lighting and ventilation are crucial components that greatly increase human comfort in built spaces. Incorporate as numerous of the natural principles of the location into the design as possible, resembling the environment in the ocean but in return helping the users to cope and get used to the feeling and thoughts of exclusion from their daily routine outside the institute, staying away from their loved ones and get stronger to survive in the career they have chosen.
- Creating spaces using the concepts of Biophilia, Xeriscaping, or Neuroarchitecture and thus have more interactive as well as isolation spaces mostly connected and closer to nature and landscaping to give a soothing effect and get adapted to the peace achieved with going hand in hand with nature.
- Using more sustainable resources. For example at Samudra Institute of Maritime Studies, the whole exterior facade has cladding of photovoltaic cell panels to make use of the maximum natural light and energy and thus have a sustainable approach.

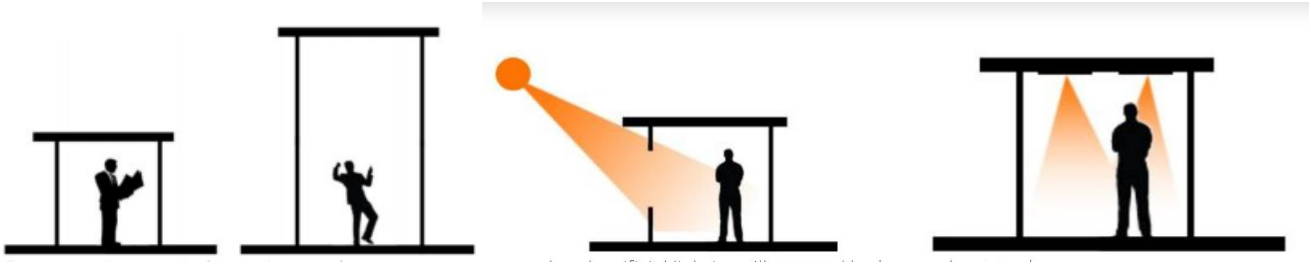
4.1 Mood

- Common Definition It is the temporary state of mind or emotional state that is described as having equivalent either a positive or negative feeling, it is also described as feelings that influence the whole of one's psychological life.
- Items affect Mood in Architecture.
- Ceiling Height.

According to loan Meyers-Levy, 2007 when a person is in a space with a 10-foot ceiling, they will tend to think more freely, more abstractly. They might process more abstract connections between objects in a room, whereas a person in a

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room with an 8-foot ceiling will be more likely to focus on specifics: High ceilings evoke a freedom mood, but low ceilings make a person tend to focus on specifics.



Architectural Definition

Attraction point in a building that the user or perceiver senses. It is the feeling or impression of users when entering a building it depends on how the designer perceives users' needs and reflects them in the design. users' needs may be emotional or psychological, which affects the general emotions users perceive in space.

4.2 Natural And Artificial Lighting

Studies show that adequate sunlight improves students' grades. Having lighting in your home that can change tram day to night will help you not only to stay awake but also to sleep at night.

4.3 Colour

Colour can make an impact on how students behave in class, maintain focus, and retain information. Shades of blue and green can be calming, red and orange can promote productivity, and neutral colours can help with maintaining focus. Different hues can have various physiological, psychological, and emotional effects. Certain hues are relaxing, while others are energizing. Three components must be considered for planning a colour scheme, which are:

(a) **Walls, Floors, and Ceilings:** It is more comfortable when a room has a light ceiling, medium-coloured walls, and dark floors—that symbolize the sky, foliage, and earth, respectively.

(b) **Proportions of the Room:** Using dark colours or complementary colour schemes can overpower the largeness of a room. Meanwhile, if a room is small, using light colours or monochromatic colour schemes can make it appear larger.

(c) ***Balance of Solid and Voids:*** This is determined by the light entering the room. Using dark colours can overpower the lighting effect if it is above the desired comfort level, while light colours can suppress the result if the lighting effect is less than the desired level.



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4.4 Texture

In architecture, texture serves two purposes: it conveys information about the quality of the materials used as well as provides light with a specific quality. Smooth-textured furnishings and interiors are practical to utilize. Overly smooth floors may result in sliding mishaps. For floors that are not slippery, rough textures are required.

For instance, all of these things—driveways, walkways, ramps, etc.—need rough flooring. Buildings with rough external finishes are more beautiful, while interiors with rough textures are more beautiful.

Rough-textured walls and flooring can result in bumps, bruises, and small accidents. Where air quality and dust are issues, coarse textures cannot be employed. This creates a significant cleaning issue.

4.5 Materials

As per the DGS circular, the construction requirements include rules such as there should be no temporary structures in any maritime institute where the main training activities and academic activities are carried out. Other recreational spaces or interactive spaces can have gazebos, sit-outs, etc.

There should be proper and permanent roofing in the institute. For roofing one can explore materials and types of permanent roofing or types of slabs such as waffle slabs, flat slabs, etc. Roofing materials that last longer are concrete, clay, or slate tiles can be incorporated. All the structures should be coloured/painted with resistant paints and they should be treated for protection against termites and other pests.

The flooring must include materials such as modern flooring tile, granite, mosaic tiles, etc. The construction should strictly be pucca using materials such as stone, brick, concrete, cement, timber, etc. The boundary or partition walls in the classrooms must be soundproof.

4.6 Concept

Incorporating concepts such as simplicity, efficiency, and plainness for modern education where research and education are carried out on environmentally friendly grounds. Based on old school boats by adopting its structural principles. Through vision having openings and connectivity to help and make social interaction in different levels and visibility of surrounding.

To adopt sustainability through architectural elements and materials such as providing a kinetic facade for natural light and ventilation which will help the users to keep their minds fresh. Using it as a shading technique and providing vertical and horizontal screening.

A subjective response of interest or refusal is provided by visual comfort in the elements and textures. A smooth texture, for instance, might impart a feeling of peace, whereas a rough or irregular texture can impart a dynamic rhythm.

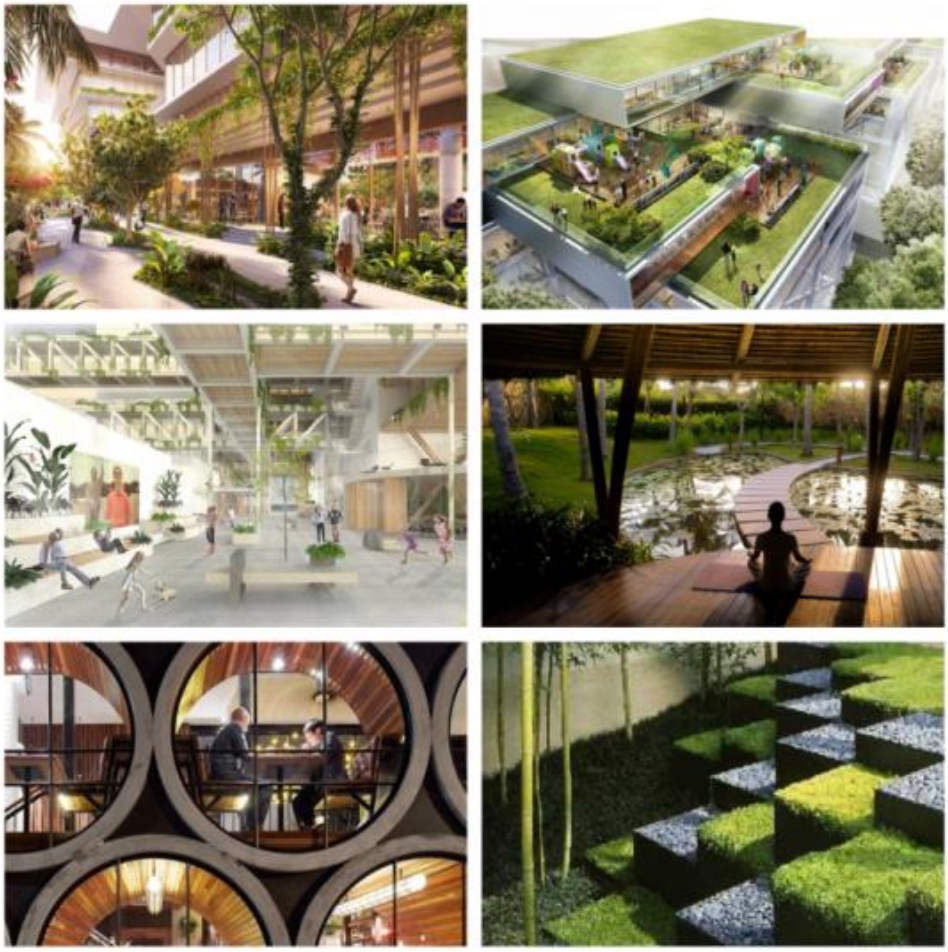
4.7 Landscape

The landscape is an essential part of the urban environment and can have positive effects on the environment, human health, psychosocial well-being, and economic growth. It also uses a lot of water. Landscape design today integrates a wide variety of functional elements. Having a technical environmental approach by providing green roofs, green walls, solar panels, dynamic facades, etc. These can be achieved through biophilia or xeriscaping. Using these concepts can enhance the landscape design factor.

The biophilic architecture includes 6 factors which are environmental features, natural forms and shapes, spaciousness, natural patterns, place-based relationships, and evolved human nature bonds. It includes large openings and thus uses more natural factors also the materials used are mostly naturally based such as flooring of cork, and the glass used is wood/timber glass.

Xeriscaping is the practice of designing landscapes to scale back or eliminate the necessity for irrigation. This means xeriscaping landscapes need little or no water. Xeriscaping’s purpose is to scale back water usage and maintenance by transforming the landscape with native plants rather than using varieties that are not local to your region, which likely needs constant attention and watering to survive. Every type of landscape requires proper maintenance which is achieved but proper planning and designing make it efficient.

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5. CONCLUSION

Human psychology is very perceptive when it comes to built settings. Surprisingly, the triggers have been referred to as straight lines and different tones of grey. The human mind has been accustomed to particular landscapes from the beginning of time. These consist of broad swaths of vegetation, lovely bodies of water, hillsides, and valleys. a location that evokes feelings of comfort, security, and safety. However, a building's influence on its users' or tenants' brains is not necessarily detrimental. These frequently show up most overtly in institutional-like settings that are public. People who struggle with anxiety often feel more at ease in solitary settings where they have some degree of solitude and mental control. Natural lighting and ventilation are crucial components that greatly increase human comfort in built spaces. Incorporate as numerous of the natural principles of the location into the design as possible, resembling the environment in the ocean but in return helping the users to cope and get used to the feeling and thoughts of exclusion from their daily routine outside the institute, staying away from their loved ones and get stronger to survive in the career they have chosen.

Creating spaces using the concepts of Biophilia, Xeriscaping or Neuroarchitectureand thus have more interactive as well as isolation spaces mostly connected and closer to nature and landscaping to give a soothing effect and get adapted to the peace achieved with going hand in hand with nature.

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The Effect of Spatial Quality of Café on Customer Preference

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ABSTRACT: This study explores the effect of ambiance, physical space, and social acceptance characteristics of the cafe environment on customer preference. The interview/survey through Google Forms approach is used in this study and conducted with 81 faculty members and architecture students from different colleges from Pune and Nasik. According to the data from the survey lighting, color, environment, feel, smell, comfort, cleanliness, services, privacy, security, location, and economics (affordability) positively influence customer preference for cafes.

Keywords: *Ambiance, Social Acceptance, Special Quality, Café, Customer Preference.*

1. INTRODUCTION

Today, there's an increasing demand for public places such as cafes. It has become a lifestyle. With this increasing demand, many cafes open every year but not many can sustain in the market by the end of the year. This study focuses on architectural attributes a cafe can offer to sustain itself in this rapidly growing market.

The number of research papers on this subject is very limited. This study aspires to assess the influence of ambiance, physical space, and social acceptance characteristics of cafes. These kinds of public places are not home or work but they help people get through the day. That's why, the physical space, social acceptance, and ambiance characteristics, possessed by the café environment are explored in this study, to find out which characteristics are influential on customers' preference for a café.

Aim

The reaction of the user/customer to the spatial quality of space (in this study, a cafe) is very quick and spontaneous. This reaction can elicit a positive or negative impact on customer preference for cafes.

Therefore, this study aims to understand the effect of the spatial quality of cafes on customer preference.

Objective

To identify the importance of ambiance, spatial quality, and social acceptance in a café environment.

Hypothesis

To achieve the objectives of the study, the following hypotheses are tested:

- Physical space characteristics have a positive effect on the preference of cafés.
- Social acceptance characteristics have a positive effect on the preference of cafés.
- Ambiance characteristics have a positive effect on the preference of cafés Scope.

Limitation

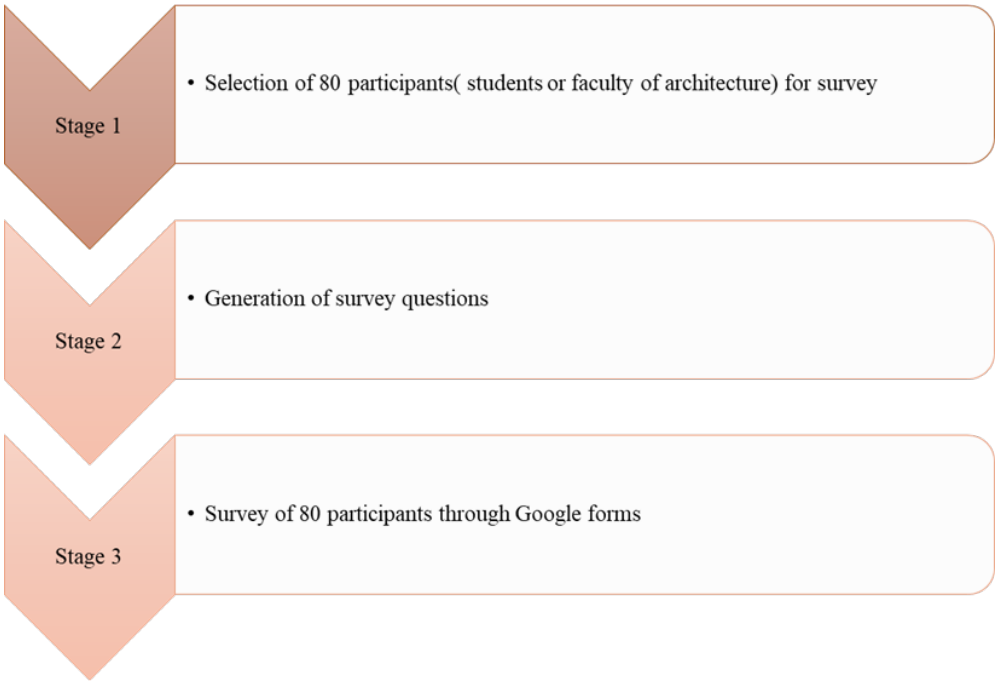
The study is limited to three attributes:

- Physical space
- Social acceptance
- Ambiance

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2. METHODOLOGY

This research was done in three stages.



2.1 Problem Statement

This study is done to understand what characteristics, physical space, social space, and ambiance attract people to a café environment. And what are the characteristics of café are more preferred by its customers?

This study intends to fill the research gaps by investigating the impact of physical space, social space, and ambiance of cafés on preferring as a workplace at these cafés. The objectives of this study are:

- Evaluating the effect of physical space characteristics of cafés on customers' preference for cafés.
- Evaluating the effect of social space characteristics of cafés on customers' preference for cafés.
- Evaluating the effect of ambiance characteristics of cafés on customers' preference for Cafés.
- Identifying the most crucial space characteristics that influence customers' preferences.

2.2 Research Questions

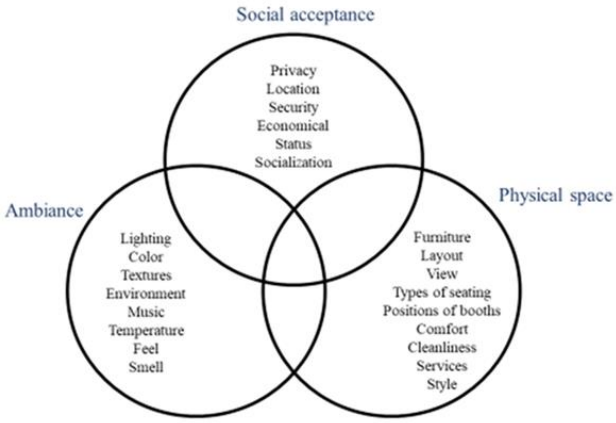
In this study there are two main research questions:

- What characteristics does a café possess to attract its customers?
- What are the characteristics of cafés that are more preferred by its customers than the others?

3. CONCEPTUAL FRAMEWORK OF THE STUDY FROM LITERATURE REVIEW

The research framework of this study takes a few steps toward a more complete picture of how the spaces of cafés influence preference and is taken from a thesis done on the subject by Ebru Özgüner. The conceptual framework is shown in Figure. This study uses a questionnaire in order to measure the impact of these factors on preferring cafés. The conceptual framework is created by three spaces of the place according to the literature review. First one is social acceptance at the core of the framework and includes privacy, location, security, economic, status, and socialization. Secondly, there is physical space which includes furniture, layout, view, types of seating, positions of booths, comfort, cleanliness, services, and style as a space character. Finally, there is ambiance which includes lighting, color, textures, environment, music, temperature, feel, and smell as ambiance characteristics.

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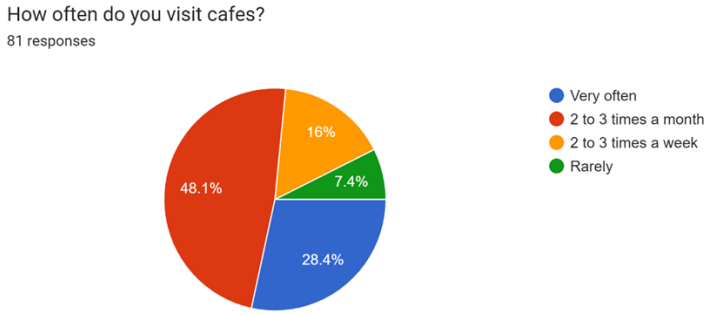
4. DATA ANALYSIS AND RESULT

The first question asked in the survey was, "how often do you visit cafes?''. 81 participants who were students and faculty of architecture responded.

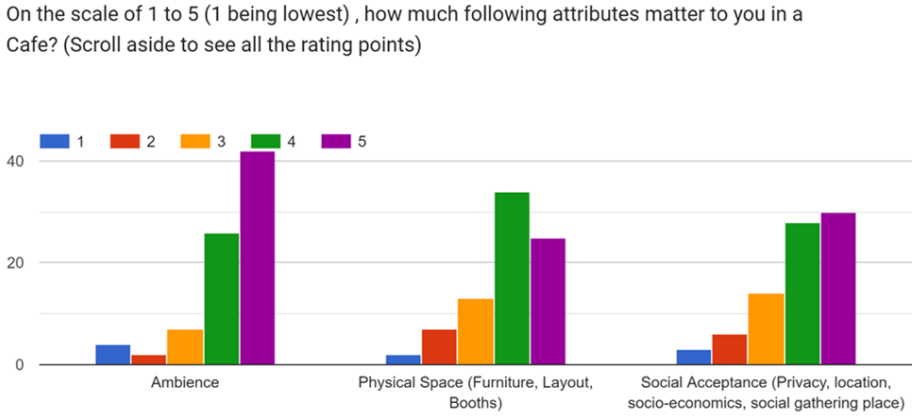
48.1% of participants visit a cafe 2–3 times a month.

28.4% of participants go very often.

16% of participants visit 2–3 times a week. And 7.4% of participants visit rarely.



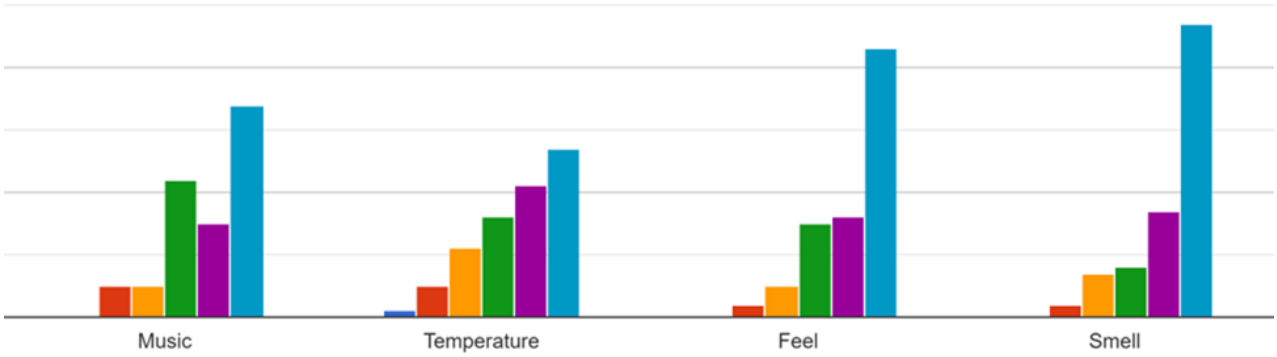
To understand the importance of the three parameters comparatively, participants were asked to rate the three parameters on a scale of 0 to 5. The parameters are Ambiance, Physical Space, and Social Acceptance. According to the responses, the ambiance is given the most importance and prioritized after that comes social acceptance, and then comes physical space i.e., Ambiance > Social Acceptance > Physical Space.

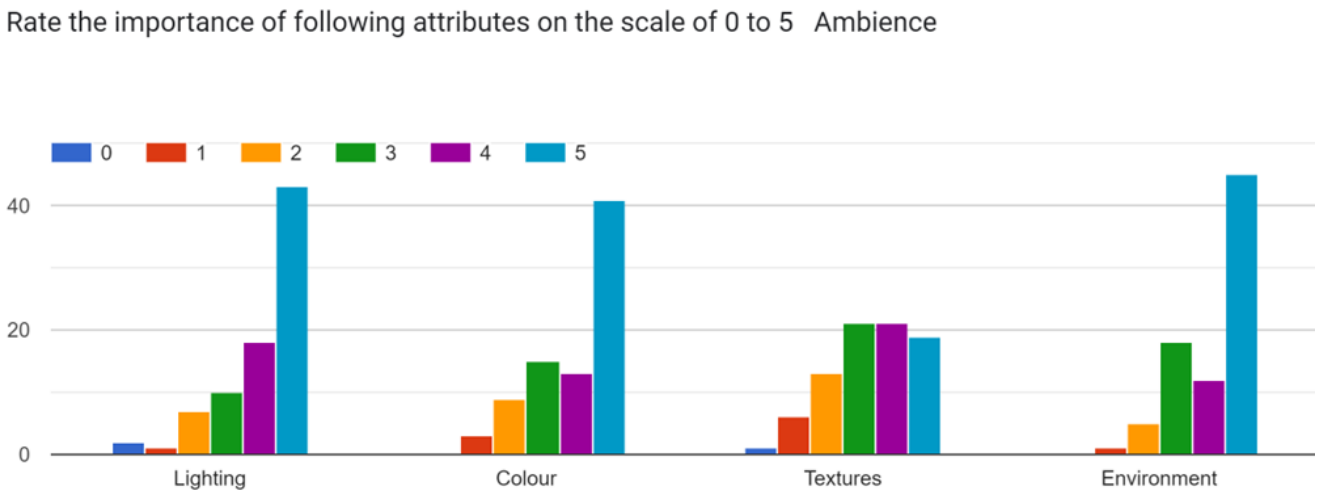


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Participants were asked to rate the significance of attributes under Ambience on a scale of 0 to 5. The attributes are lighting, color, textures, environment, music, temperature, feel, and smell.

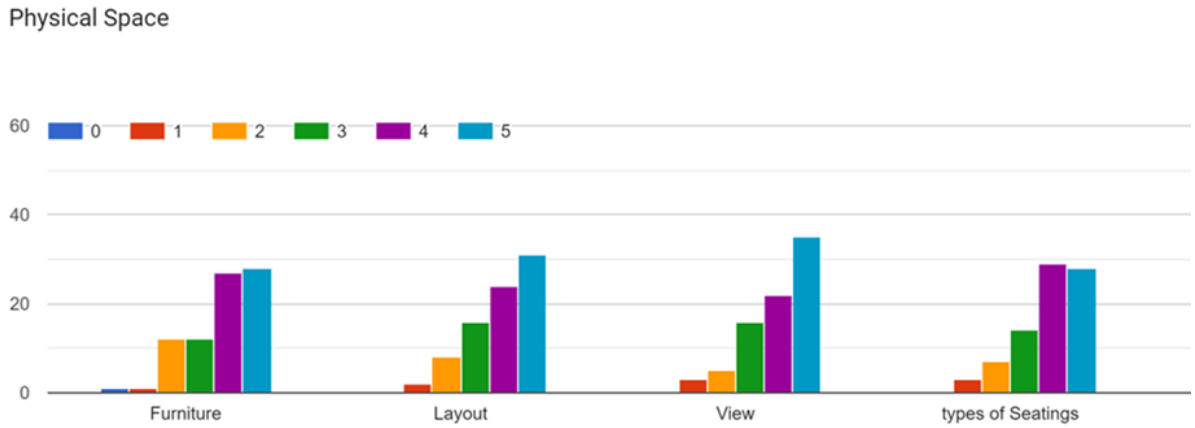
Out of all these attributes that come under Ambiance lighting, color, environment, feel, and smell are considered the most important and prioritized.



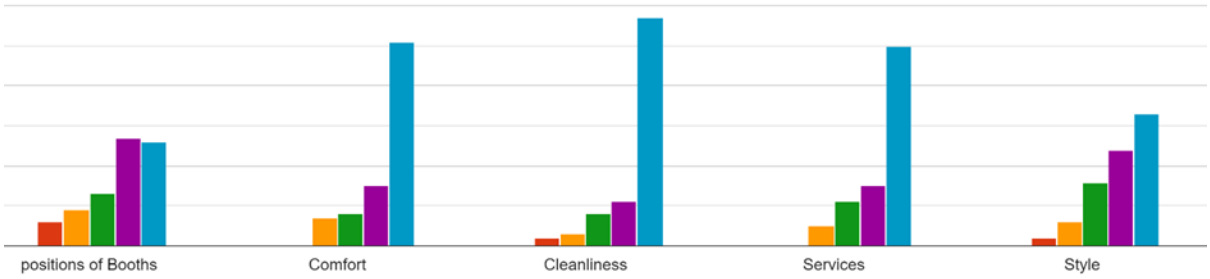


Participants were asked to rate the significance of attributes under Physical Space on a scale of 0 to 5. The attributes are furniture, layout, view, types of seating, the position of booths, comfort, cleanliness, services, and style.

Out of all these attributes that come under physical space comfort, cleanliness, and services are considered the most important and prioritized.

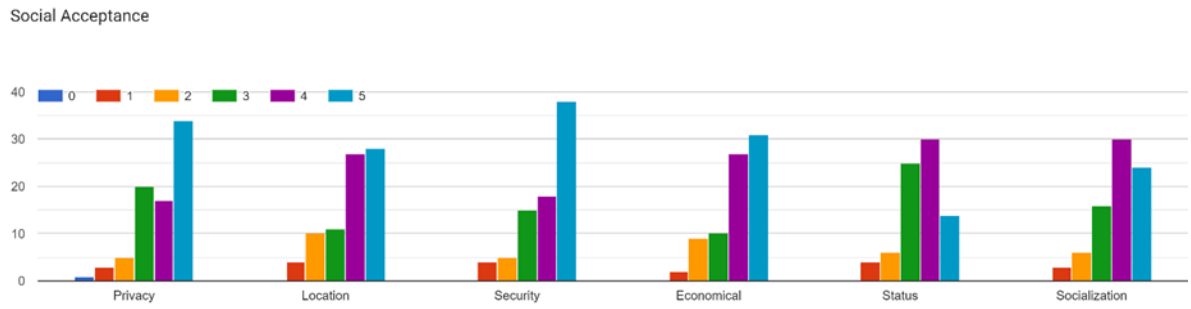


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Participants were asked to rate the significance of attributes under social acceptance on a scale of 0 to 5. The attributes are privacy, location, security, economic, status, and socialization.

Out of all these attributes that come under social acceptance privacy, security, and economics (how much it costs for one person) are considered the most important and prioritized.



5. CONCLUSION

This study intended to evaluate the effect of physical space, social acceptance, and ambiance characteristics of customers' preference for regular café environments.

Findings related to the study indicated that all characteristics, which are physical space, social space, and ambiance, have an influence on people to prefer cafés.

Also, the aim of this study was to explore the significant physical, social, and ambiance space characteristics. According to the results, comfort, cleanliness, and services are the important physical space characteristics for customers. privacy, security, and economics are important social space characteristics for people as well. Also, among ambiance characteristics lighting, color, environment, feel, and smell are important ambiance characteristics for the customers.

ACKNOWLEDGMENT

Before anyone, I would like to thank my advisor Prof. Ar. Priyamvada Chitale for her help and guidance during the completion of this paper. I am also thankful to Assist. Prof. Ar. Manali for reviewing my paper and for her valuable comments.

I dedicate this paper to my mother Shamal Surate for her endless love and encouragement. I would also like to thank my dear friend Vismit Patil for his aid and support during the initial stage of this research paper.

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Investigating Use of Materials in Restaurant Construction in Tier II City from the Point of View of Embodied Energies

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ABSTRACT: This paper examines the use of materials in restaurant construction in Ahmednagar, a rapidly growing tier II city in India, from the perspective of embodied energy. As the construction industry contributes significantly to global greenhouse gas emissions, it is crucial to adopt sustainable practices in the sector. By analyzing the embodied energy of various materials used in selected restaurants, the study identifies environmentally friendly and cost-effective options that can be recommended to architects, engineers, and contractors. The paper highlights the importance of designers in choosing energy-efficient materials to promote sustainability in construction. The findings contribute to the ongoing effort to reduce carbon emissions and promote sustainable practices in tier II cities. Ultimately, the study aims to provide a valuable resource for clients willing to construct green-rated buildings, enabling them to make informed decisions about materials and construction practices.

Keywords: *Building Construction Materials; Embodied Energy; Energy Efficiency; Indicators; Cost Effective.*

1. INTRODUCTION

In response to the global call for energy-efficient buildings, designers have increasingly sought to incorporate sustainable practices into construction. However, a lack of knowledge about energy efficiency requirements and imperfect construction systems, architectural planning, and design have resulted in significant energy consumption. To address this issue, alternative building construction materials, methods, and techniques can be used to reduce environmental impact, embodied energy, and CO_2 emissions. To achieve this, it is essential to consider engineering interdependencies and utilize appropriate building modeling methods to support the design process and less experienced designers. This paper provides a comprehensive review of common construction materials used in the rapidly growing city of Ahmednagar, focusing on their embodied energy. By analyzing the relative contributions of various materials, the study aims to provide designers with the information needed to make informed decisions about construction materials and methods that reduce energy consumption and minimize environmental impact. Through the use of sustainable practices, such as alternative materials and building techniques, designers can contribute to reducing the carbon footprint of buildings and promote more environmentally responsible construction.

2. LITERATURE REVIEW

The literature review explores previous studies related to sustainable construction practices and embodied energy. In a study by Azari Jafari *et al*. (2020), the authors analyzed the embodied energy of construction materials in buildings in the United States, finding that concrete and steel are the primary contributors to embodied energy. Similarly, a study by Li *et al*. (2020) assessed the embodied energy and CO_2 emissions of construction materials in China, finding that cement production and steel manufacture were significant sources of embodied energy and CO_2 emissions.

Another study by Cheung *et al*. (2018) investigated sustainable construction practices in Hong Kong, identifying a lack of awareness among architects and engineers about energy-efficient design and construction. The authors suggested that greater education and training in sustainable practices could help bridge this gap. Similarly, a study by Shen *et al*. (2019) focused on the use of sustainable materials in buildings in China, highlighting the importance of life cycle assessment in evaluating the environmental impact of construction materials.

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The relevance of this literature to the present study lies in its focus on the embodied energy of construction materials and the need for sustainable construction practices. However, while several studies have analyzed embodied energy in buildings, there is a lack of research on specific building typologies in tier II cities, such as restaurants in Ahmednagar. Therefore, the major research gap that this study aims to address is the lack of information on sustainable construction practices in specific building typologies in tier II cities, such as restaurants. By analyzing the embodied energy of construction materials in selected restaurants in Ahmednagar, this study seeks to provide valuable information and insights for designers and engineers seeking to promote sustainable practices in the construction of green-rated buildings.

3. MATERIAL AND METHODOLOGY

The present study focuses on investigating the use of materials in restaurant construction in the tier II city of Ahmednagar from the point of view of embodied energies. The study used a cross-sectional research design, which involved collecting data on the materials used in selected restaurants in Ahmednagar.

The target population of the study included restaurants in Ahmednagar that were constructed or renovated in the last five years. A purposive sampling technique was used to select five restaurants that were representative of the different types of restaurants in the city, such as fast food, casual dining, and fine dining establishments.

Data on the construction materials used in each restaurant were collected using a structured questionnaire administered to the restaurant owners or managers. The questionnaire was designed to gather information on the types and quantities of materials used in the construction of the building envelope, flooring, roofing, openings, structural and non-structural systems.

The embodied energy of each material was determined using published data from sources such as the Inventory of Carbon and Energy (ICE) and the Building Research Establishment (BRE) Environmental Profiles. The embodied energy of each material was expressed in terms of MJ/Kg of building material used.

The data collected were analyzed using descriptive statistics, including means, standard deviations, and ranges. The data were also presented graphically to illustrate the relative contribution of each material to the total embodied energy of the buildings.

In summary, the study collected data on the materials used in five selected restaurants in Ahmednagar and analyzed the embodied energy of these materials. The study used a structured questionnaire to collect data and analyzed the data using descriptive statistics. The results of the study provide valuable insights into the use of sustainable construction materials in restaurant construction in Ahmednagar.

4. RESULTS AND DISCUSSION

Table 1: Materials Used for Flooring

Restaurant Name	*Type of Flooring*	*Embodied Energy Per Unit Weight (EE-MJ/Kg)*	*Embodied Energy Per Unit Volume (EE-MJ/M3)*	*Unit Dimentions (MM)*	*No. of Units Per Cu..M. of Volume*	*No. of Units Per SQ.M. of Area*	*Embodied Energy Per Unit*	*Costing (RS./unit)*	*Costing (RS./ Cu.m)*	*Embodied Energy Per SQ. M*	*Remark*
CASE 1	Stone, Local	0.79	2030	150X150X60	741	44.44	2.7405	12	8889	121.80	Embodied energy of different flooring material; matt vetrified tile < glazed vetrified tile < local stone (20thk) < local stone (60thk) <concrete paver block
	Concrete Paver Block	1.20	2350	100X200X60	833	50.00	2.82	38	31667	141.00	
	Glazed Vetrified Tiles	2.50	5250	600X600X8	347	2.78	15.12	88	30556	42.00	
CASE 2	Concrete Paver Block	1.20	2350	100X200X60	833	50.00	2.82	38	31667	141.00	
	Matt Vetrified Tiles	2.50	4980	600X600X8	347	2.78	14.3424	75	26042	39.84	
CASE 3	Glazed Vetrified Tiles	2.50	5250	600X600X8	347	2.78	15.12	95	32986	42.00	

ISBN: 978-93-89934-68-7

Restaurant Name	Type of Flooring	Embodied Energy Per Unit Weight (EE-MJ/Kg)	Embodied Energy Per Unit Volume (EE-MJ/M3)	Unit Dimentions (MM)	No. of Units Per Cu..M. of Volume	No. of Units Per SQ.M. of Area	Embodied Energy Per Unit	Costing (RS./unit)	Costing (RS./ Cu.m)	Embodied Energy Per SQ. M	Remark
CASE 4	Stone	0.79	2030	450X600x20	154	3.70	13.1544	50	7716	48.72	
CASE 5	Glazed Vetrified Tiles	2.50	5250	600X600X8	347	2.78	15.12	95	32986	42.00	

Materials Used for Non-Structural System

Restaurant Name	Material Used For Non-Structural System	Embodied Energy Per Unit Volume (Ee-Mj/Kg)		Embodied Energy Per Unit Volume (Ee-Mj/M3)	Unit Dimentions Thickness (Mm)	Embodied Energy Per Square Meter of Elevational Area	Costing (Rs./Unit)	Costing (Rs./Cu.M)	Embodied Energy Per 100 Sq. M Elevational Area	Conclusion
Case 1	Plastered Brick Wall	230 Thk Brick Wall	17.136	16100	230	3703.00	–	7400	370300	Gi Sheets Is The Best For The Non Structural System, Second Option Can Be Glass
		Morter	1.11		10		–			
		Plaster	1.11		15		–			
	Gi Sheets	79.6		624860	1	624.86	2400	431750	62486	
Case 2	Glass	26.20		66024	10	660.24	–	570000	66024	
	Plastered Brick Wall	230 Thk Brick Wall	17.136	16100	230	3703.00	–	7400	370300	
		Morter	1.11		10		–			
		Plaster	1.11		15		–			
	Gi Sheets	79.6		624860	1	624.86	2400	431750	62486	
Case 3	Glass	26.20		66024	10	660.24	–	570000	66024	
	Plastered Brick Wall	230 Thk Brick Wall	17.136	16100	230	3703.00	–	7400	370300	
		Morter	1.11		10		–			
		Plaster	1.11		15		–			
Case 4	Plastered Brick Wall	230 Thk Brick Wall	17.136	16100	230	3703.00	–	7400	370300	
		Morter	1.11		10		–			
		Plaster	1.11		15		–			
	Gi Sheets	79.6		624860	1	624.86	2400	431750	62486	
Case 5	Glass	26.20		66024	10	660.24	–	570000	66024	
	Plastered Brick Wall	230 Thk Brick Wall	17.136	16100	230	3703.00	–	7400	370300	
		Morter	1.11		10		–			
		Plaster	1.11		15		–			

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Similarly, calculations and results were obtained for the materials used in the non-structural systems, including openings (doors and windows), as well as for the roofing materials. The results indicates that,
Matt vitrified tile is the optimal choice in terms of embodied energy. The second-best option would be Glazed vitrified tile.

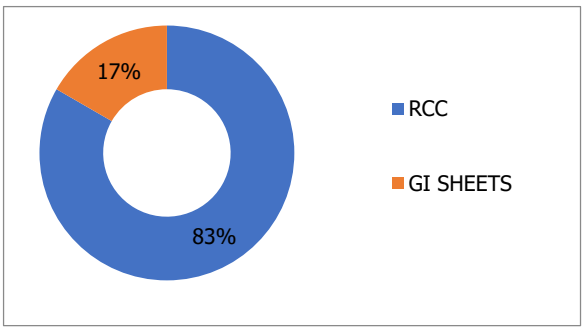
GI sheets was found to be the optimal choice for the non-structural system, followed by the option of Glass.

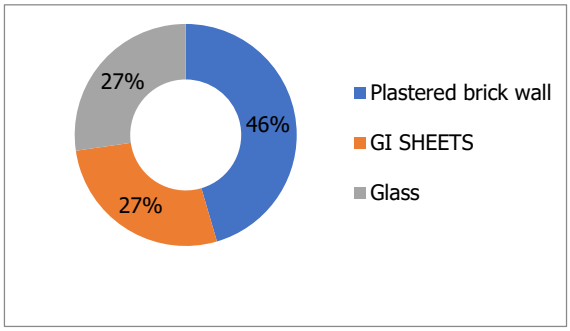
According to the findings, mild steel has an embodied energy approximately 46.5 times higher than concrete. Therefore, if the volumetric quantity of steel required is less than 1/46.5 of the total structural material, then steel can be considered as an optimal option for the structural system. Based on the study's findings, it was determined that GI roofing is a more suitable option for roofing material compared to RCC from the point of view of embodied energy.

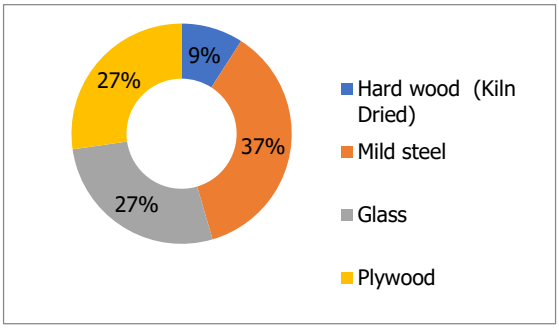
The results of the study showed that the use of construction materials with low embodied energy in restaurant construction in Ahmednagar is still limited. The most significant contributors to embodied energy were reinforced concrete (25-44%), mild steel (13-24%), and glass (8-22%).

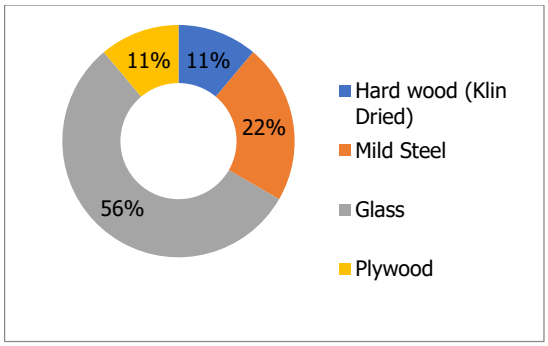
These findings are consistent with previous research that has identified reinforced concrete and mild steel as materials with high embodied energy. However, the use of glass as a significant contributor to embodied energy in restaurant construction is unexpected, and further research is needed to understand this finding.

The pie chart below (Figures 1–4) illustrates the preference of local contractors and architects in the city of Ahmednagar regarding the construction materials used.









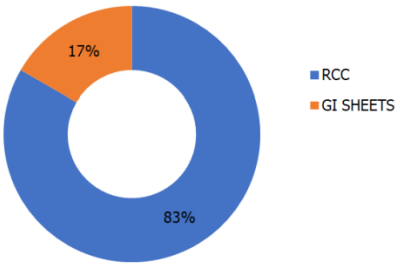


Figure 1: Materials Used for Roofing

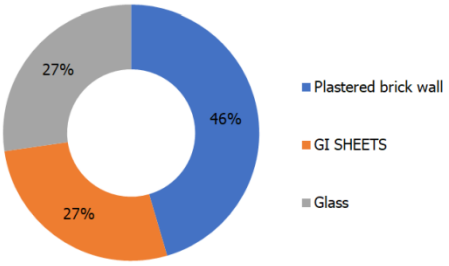


Figure 2: Materials Used for Structural System

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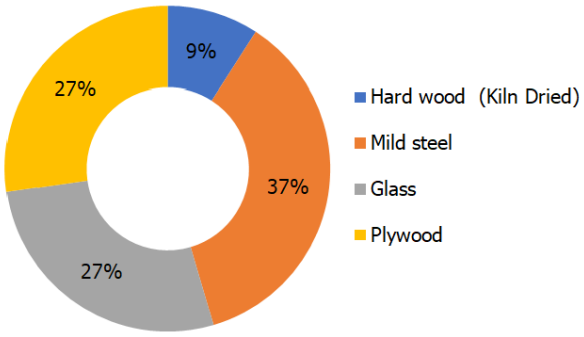


Figure 3: Materials used for Openings (doors)

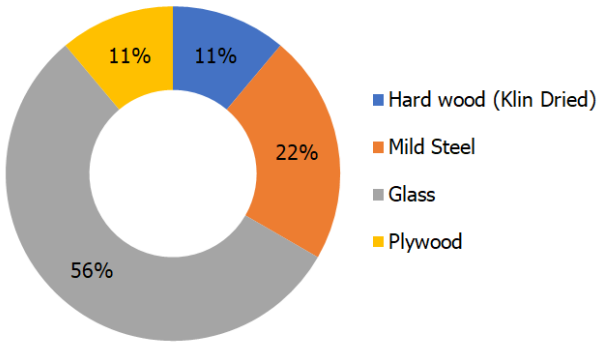


Figure 4: Materials Used for Openings (windows)

The study's findings justify the need for designers, architects, and contractors to consider alternative, sustainable materials in restaurant construction to reduce embodied energy and promote sustainable building practices. The study recommends the utilization of building materials that possess low embodied energy, such as natural wood and stone, along with other environmentally-friendly options like bamboo, straw bale, and rammed earth. These materials have demonstrated their efficacy in sustainable construction initiatives across the globe.

The study's limitations include the small sample size and the focus on only one tier II city. Future research could expand the study's scope to include more cities and a larger sample size to provide a more comprehensive understanding of the use of materials in restaurant construction in tier II cities in India.

In conclusion, the study highlights the need for the adoption of sustainable construction practices in restaurant construction in Ahmednagar and other tier II cities. The study's findings suggest the use of low-embodied-energy materials to reduce carbon emissions and promote sustainable building practices. The study contributes to the ongoing effort to reduce the construction sector's carbon footprint and promote sustainable development in India.

5. CONCLUSION

In conclusion, the study investigated the use of materials in restaurant construction in Ahmednagar from the point of view of embodied energy. The study found that concrete and steel had the highest embodied energy, while Locally available thick natural stones are the optimal choice in terms of embodied energy for construction, followed by concrete paver blocks as a secondary option. The results indicate that designers should consider using alternative materials with lower embodied energy to reduce the environmental impact of construction in Ahmednagar. The study contributes to the ongoing effort to reduce carbon emissions and promote sustainable construction practices in tier II cities.

The strengths of the study include a rigorous methodology that involved collecting data from a representative sample of restaurants in Ahmednagar. However, the study is limited by the sample size, which only includes a small number of restaurants. Future research could involve expanding the sample size to include more restaurants in Ahmednagar and other tier II cities.

The study's findings have practical applications for architects, engineers, and contractors who design and construct buildings in Ahmednagar. The study recommends the use of alternative materials with lower embodied energy in the construction of restaurants and other buildings to promote sustainability.

In conclusion, the study highlights the importance of considering embodied energy in the selection of construction materials in Ahmednagar. The study provides a valuable resource for designers and clients who are interested in constructing sustainable buildings in tier II cities. By reducing the environmental impact of construction, the study's recommendations have the potential to make a significant contribution to mitigating climate change.

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The successful completion of this research would not have been possible without the valuable contributions of numerous individuals and organizations, and we extend our heartfelt gratitude to all. We would like to express our appreciation to the restaurant owners and managers who generously participated in this study, providing us with invaluable insights and information. Our sincere thanks go out to the faculty and staff of the BKPS COA, Pune for their unwavering support and guidance throughout the research process. We would also like to acknowledge and thank the participants who assisted with data collection and analysis. Finally, we extend a special thank you to Prof. Sushma Parashar for her expert guidance and mentorship throughout the research process.

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Gender Construct and Spatial Characteristics: Analysis of Parks in Mumbai

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ABSTRACT: 'Space' is a mental, material and social construct, which is constituted and constructed by all the social interactions within it. Gender is a social construct comprising socially-assigned roles, behaviours, expressions and identities beyond the binaries of gender (World Health Organization, n.d.). Gender and space are interrelated; occupation and production of space are influenced by social factors and gender being a social construct, it influences the spatial characteristics of the built and the unbuilt.

Social hierarchies and norms lead to an imbalance between the usage of public spaces. Very often, it is seen that all public spaces may not be inhabited by all genders or all ages. Some are male-centric or male-dominated in nature due to its accessibility, physical factors, the kind of activities it offers, etc. Within a city like Bombay, where there is a lack of public open spaces in the city, it becomes crucial that the existing spaces need to be accessible by all irrespective of gender, age, class, etc.

Thus, this paper tries to understand how 'gender' as a social construct influences the production and occupation of public places such as parks. In order to study the same, three public parks in Mumbai were mapped and analysed to understand their spatial characteristics with respect to social inclusivity and accessibility. It was found out that there is incidental spatial segregation between genders based on the placement and availability of particular amenities. Certain design features like the edge of the parks, availability of urban furniture etc, also influence the gendered usage of the park. Factors like, perception of safety, gender roles, panoptical locations intense physical activity, prospect-refuge features influenced by intense physical activities appeared to be playing a key role in influencing activity and usage patterns across all genders.

Keywords: *Gender, Public Places, Public Parks, Accessibility, Safety, Democratic.*

1. INTRODUCTION

According to the French sociologist Henri Lefebvre (1974), 'space' is a mental, material and social construct, which is constituted and constructed by all the social interactions within it. Gender is a social construct comprising socially-assigned roles, behaviors, expressions and identities beyond the binaries of gender. (World Health Organization, n.d.) It influences how people perceive themselves and each other and how they act and interact within public and private spheres, including how power and resources are distributed in a society. It can be said that gender and space are interrelated since both, the production of space and its occupation are influenced by all these factors. Within the public realm, where a diverse category of users is present, the need for inclusivity in design becomes essential.

Very often, it is seen that all public spaces may not be inhabited by all genders or all ages. Some are male-centric or male-dominated in nature due to its accessibility, physical factors, the kind of activities it offers, etc. Women, children, and the elderly are designated places where physical safety is not compromised due to intense physical activities in the surroundings or from external threats of violence. It becomes important that spaces are planned for all the sections of the society.

With a growing population, a citizen of Mumbai gets 1.1 square metre of open space per person. Only 6 percent of the total land in the city is made up of open public spaces (Biswas, 2013). With a lack of public open spaces in the city, it becomes crucial that the existing spaces need to be accessible by all.

Aim

The aim of this paper is to understand how 'gender' as a social construct influences the production and occupation of public places such as parks.

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Objectives

In order to fulfil the above-mentioned aim these are the following objectives:

1. To understand what is 'social' space and what is 'gendered' space.
2. To understand how different genders perceive and experience different spaces.
3. To understand the usage patterns of different genders with respect to accessibility, legibility and inclusivity of spaces.
4. To examine the spatial characteristics that reinforce specific gender behavior.

2. LITERATURE REVIEW

As Lefebvre states in his book, *The Production of Space* (1974), along with physical space, there exists space of social interactions called as 'social' space' which is interlinked with 'physical' space. Geographer Doreen Massey (2005), expands the argument that relations of space are experienced differently, and interpreted differently, by people based on their social position. Thus, people experience space differently depending on their respective positions in society. A space that does not support gender equality is a 'gendered' space (Desai, 2007). Feminist research and analyses of the city accept gender as one of the key factors that determine the perception, structure, use and shape of urban spaces. The social ability to access space is a function of status and power. Patriarchal values are reflected in built within the society (Bhasin & Said, 1993). Restricted access to certain spaces, controlling the movement within a space or confining women to private spaces, etc. are the ways in which patriarchal norms are manifested in the usage of spaces (Gopinath S., 2019). In public, men and women undergo diverse urban experiences: they identify with the city differently as they negotiate physical or social or political spaces. Women are far more likely to experience verbal and physical harassment, stalking, molestation and violence (including sexual assault and rape) compared to men which may make them fearful, anxious, insecure and cautious in public spaces.

The gendering of space is seen through the distinction between public and private, in which the public domain is generally perceived as 'male' space and the private as 'female' space (Spain, 1992). Women often feel unwelcome, directly or indirectly and have to anticipate some form of verbal, visual or physical/sexual harassment in public places. In fact, 'The fear and insecurity that women face in accessing public spaces prevents them from availing the benefits of being an urban citizen.' (Vishwanath & Mehrotra, 2007). Ranade (2007) points out that 'When comparing men and women of the same class and community, men have better access to public space at all times of the day. Women have to manufacture an appearance of purpose to legitimately access public space.' Thus, it can be seen that spaces are gendered through the means of segregation and exclusion influenced by patriarchy.

Gender, Space, and Architecture (Rendell, Penner, & Borden, 2000) states that architecture is constituted by its occupation, and that experiential aspects of space are important in the construction of the identity of that place. Behavior patterns in private and public spaces are culturally learned and accepted as a way of life. The use of space is governed by cultural rules, and gender codes that have been frequently internalized by the society (Desai, 2007). To support the claim, Desai states that in Indian society, girls internalize space use and behavior including posture, dressing and speech as they grow up and are taught the norms of feminine modesty. 'Space' for a girl child is fluid till puberty after which there is a turning point that brings about a change in the attitude towards her. Traditionally men have done the most productive (read 'paid') work in the public realm, whilst women have been provided a private sphere of 'reproduction', which is an unpaid, domestic chore and has a significant impact on their risk perception.

Women perceive risk in public places. According to Jane Jacob's (2020) concept of *Eyes on the Street*, women prefer streets with interactive mixed-use elements, such as shops, cafes, etc. as they impart a sense of safety. According to Appleton's theory of Refuge-Prospect (1975), people try to identify elements in an environment which satisfy the biological need for survival by offering an opportunity to observe or to hide People prefer places here they can easily examine their surroundings and, if required, quickly either escape or hide. Environments with both 'prospect' and 'refuge' components are perceived as being safer. According to the prospect-refuge idea, spaces should provide a sense of safety and concealment. Thus, the prospect-refuge theory incites a preference for certain design features in built spaces. Phadke (2007) states that safety is linked directly to the level of claim that one feels to a space. Women, children and senior citizens alike need the assurance of physical safety in order to freely access a public space. Most of the times the lack of physical safety leads to the exclusion of the aforementioned user groups. Thus, physical safety becomes a primary concern while determining the inclusivity of a public space.

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This literature review provides a base for understanding how different genders perceive and experience spaces and how cultural norms affect its usage.

3. MATERIAL AND METHODOLOGY

In order to examine the aspects mentioned above, the study will be conducted through primary and secondary sources. The literature will review the various arguments of gender and space perceptions. The primary study consists of field work where three public parks in Mumbai namely Shivaji Park, Kachrali Lake Promenade, 5 Gardens were mapped and analyzed to understand their spatial characteristics with respect to social inclusivity and accessibility.

4. RESULTS AND DISCUSSION

Parks and promenades are at the heart of the city's open public spaces, and the city's attitude toward them reflects its attitude toward its citizens. The ratio of open space per thousand residents in global city like Mumbai is only 0.03 acres. According to the National Commission on Urbanization (1988), the ideal ratio of open space per 1,000 people is 4 acres. (Ranade, Phadke, Khan, 2009). Only 6% of the city's total land area is dedicated to open public spaces (Das, 2012). Where parks and public open spaces do exist in Mumbai, they are not equally welcoming to all. Public Open spaces were mapped in order to understand the how different genders experience and access spaces.

Three parks were studied as cases with the objective of understanding the usage patterns of different genders with respect to accessibility, legibility, and inclusivity of spaces. (Refer Figure 1) These are: Shivaji Park, Kachrali Park and Five Gardens, which are discussed below. These parks were selected based on their user demographics, population density and their location.



Figure 1: Map of Mumbai Metropolitan Region Showing the Location of Selected Sites

(*Source:* Author based on Google Maps)

ISBN: 978-93-89934-68-7

Case Study 1: Shivaji Park, Dadar

Located at the heart of the city, it is one of the largest parks in the city of Mumbai with historical and cultural value because of the political and social gatherings it has witnessed, both in pre- and post-Independence Mumbai. The park is a huge D-shaped open space abutting Cadell Road which is parallel to the sea (Refer Figure 2[a])

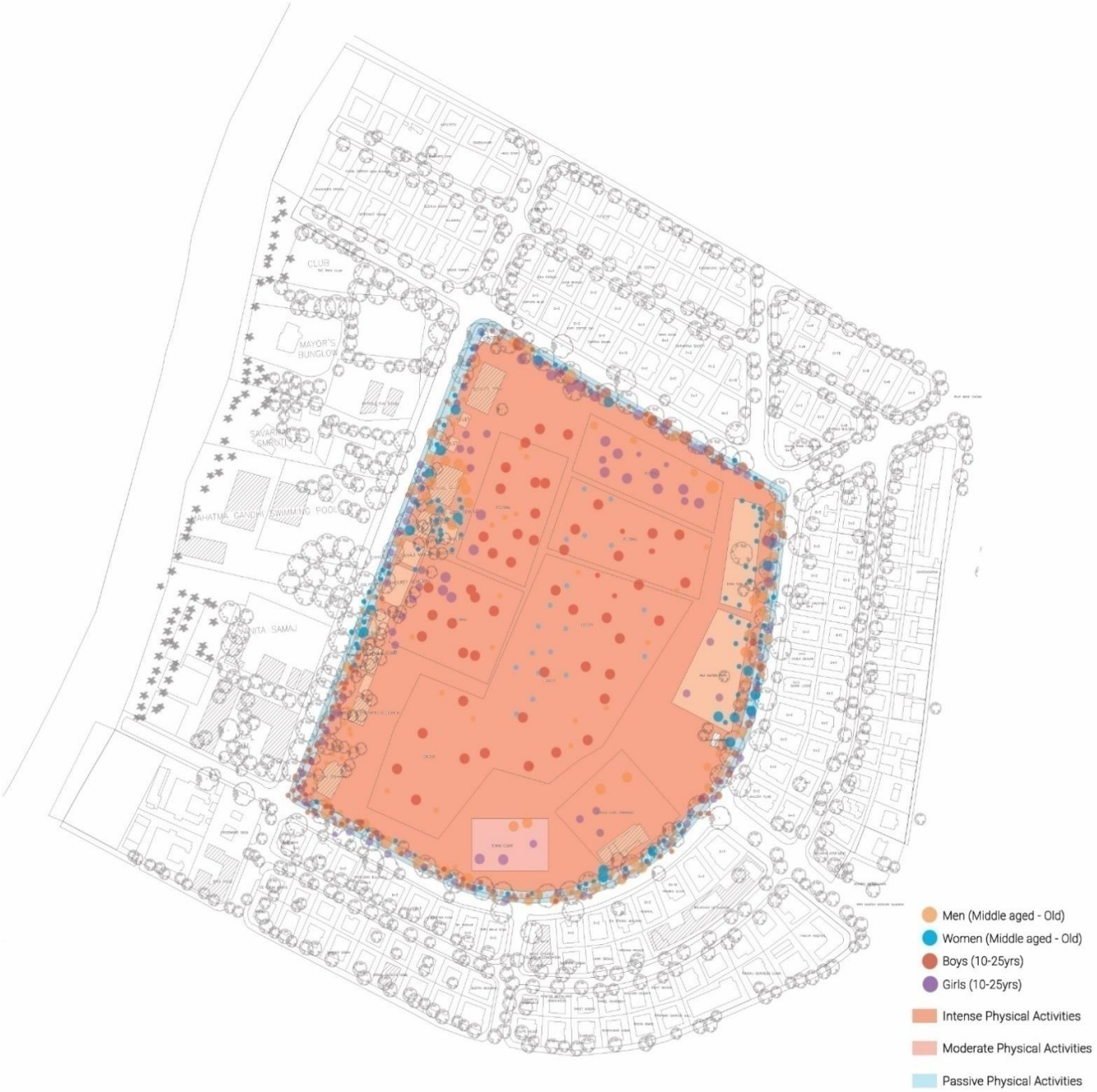


Figure 2(a): Shivaji Park Map Showing the Intensity of Physical Activities

(*Source:* Author, based on Google Maps, using CAD Mapper)

The park is demarcated by a peripheral wall, called the 'katta' which separates the park from the space around it without fully restricting pedestrian access at any point (Refer Figure 2[b]). The katta is about 45 cm in height, low enough for people to sit upon. It imparts a human scale to connect the park and its precinct to its surroundings. Both the wall and the

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pavement outside it are wide enough to allow its regular joggers/walkers and random pedestrians for social encounters. The large trees along the periphery provide shade without blocking vision into and from the park.



Figure 2(b)

(*Source:* Author, based on Google Maps, using CAD Mapper)

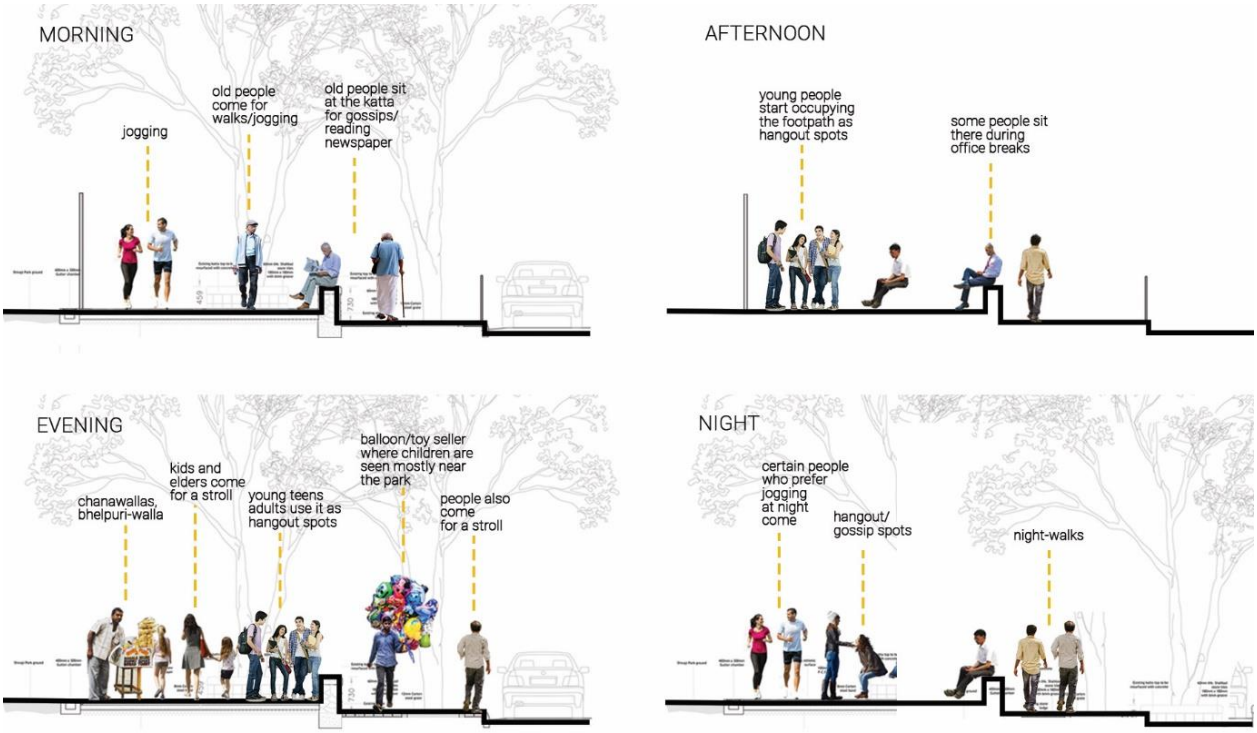


Figure 2(c): Shivaji Park Activities

(*Source:* Author, based on sections by Studio Pomegranate)

Inside, the park is a vast open space with small G or G+1-storeyed structures like The Bengal Club, The Scout Banquet Hall, Shivaji Park Gymkhana, A police chowki, Temples, 4 Public Toilets and Restrooms, Young Maharashtra Cricket club, Balasaheb Thackeray memorial, Meenatai Thackeray statue, Shivaji Maharaj Statue, food stalls, small pocket parks like the Nana-Nani Park, open gymnasium, etc are flanked along the edge of the park thus demarcating the boundary of the park. These clubs, parks, temples bring in multiple types of users throughout the day on a regular basis who then appropriate the park and its periphery in their own ways.

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The maidan supports activities ranging from political rallies attended by tens of thousands to the intimate conversations of couples (Refer Figure 2[c]). The activities in and around the maidan begin before daybreak and carry on late into the night. The multiplicity of activities that the park offers makes it an inclusive space for all types of users. Moreover, the fact that the maidan is open at all times of the day and night, means that it is active until quite late in the night. Along with the constant presence of people at all times, the freedom to occupy the space of this park at a given time of the day makes it feel like a 'safe' space for all genders. Mothers chat on its edges or take a brisk walk while they wait for their children to come from the school which is right across the park, or from the gymkhanas, cricket practices. Old people frequent the park by meeting at the informal clubs and events that take place along the katta, or at the Nana-Nani Park. The young user demographic involves the youth from the neighborhood who use the open space as hangout spots, students from nearby colleges also use this park and its periphery throughout the day as well as during the night time. The young boys and girls who play sports inside the park have a skewed demographic though; more male cricketers are seen using the park compared to women who play sports within the park. The other regular users of the park apart from the ones mentioned above are the caretakers and employees of the Bengal club, Nana-Nani Park, Public restrooms, cricket clubs, etc. They also use the park during their shifts at lunch breaks. Due to the diverse user group of Shivaji Park, there are no rules to its usage thus making Shivaji Park is a democratic space which offers freedom of usage despite security personnel being present around it throughout the day.

It is crucial to note that the park cannot be studied in isolation to its surroundings as the precinct in its entirety; the buildings, the streets and the people give it a character and make the place what it is today. Shivaji Park Heritage Precinct can be described as a set of nearly 200 residential buildings- predominantly two /three storied -built along the curved street patterns which in turn respond to the curved profile of the open ground of Shivaji Park. The streets are covered with the green cover providing shade and comfort. The street width to building height ratio is almost 1:1 and thus is proportionate enough to create a sense of safety by imparting a human scale to the buildings. Unlike the upcoming high-rises with podiums, the majority of the buildings in this precinct have their ground floor occupied thus connecting the street with the buildings. Along with the used ground floor, architectural features such as curved corners/curved balconies, provide a sense of safety through the concept of 'eyes on the street' by Jane Jacobs (2020).

Case Study 2: Kachrali Lake Park, Thane.



Figure 3(a): Activity Mapping at Kachrali Lake

(*Source:* Author, based on Google Earth)

ISBN: 978-93-89934-68-7

Located right at the heart of Thane city, the Kachrali 'Talao' (Lake) was once a slum area, it has transformed due to major cleaning & beautification and has become an attraction for locals who habit its surroundings daily. The area of the lake is roughly 2.0 hectares. It is a Lakefront trail park which attracts many local people because of its jogging tracks, children's play area, and exercise area. There is also a Ganesh Mandir inside the lake premises. It is located within a bustling locality called Panchpakhadi with diverse user groups. (Refer Figure 3[a]).The Thane Municipal Corporation is located right in front of the Kachrali Lake. That is the reason for this lake to have been spruced up and is one of the well-maintained lakes of Thane. A small lake with a path all around and homes all around too, it is a well-visited spot at a bustling locality called Panchpakhadi with diverse user groups. The Khau Galli or the Food Street of Thane is located in the lake's vicinity. Thane being a city of lakes, these lakes have played an important role of being open spaces of recreation for the citizens. Located in a considerably clean, safer locality this lake is a good place to study how it affects its occupation by women.

A small narrow strip (ranging from 4 m to even 20 m at certain places) of land around the lake is developed as Trail Park, which is demarcated by a fence with 4 openings at specific intervals. Next to the trail park is a 3.5 m wide footpath with benches on the trails end and a small fence along the other edge next to the road. (Refer Figure 3[b] and 3[c]).

Women preferred seats that are in open, they seemed to avoid seats below big shadowy trees, partially hidden seats or so (Refer Figure 3[a]). Men preferred seats that have strategic locations from where most part of the park can be watched, that are near most of the amenities such as drinking water, newspaper stand, open gym, etc. Most of the seats at the turns or bends are occupied by men. Women are seen in maximum numbers near children playing areas or near temples where they preferred sitting on lawn or ledges or bund walls even though benches are not available. Women preferred areas with more visual permeability and connectivity.

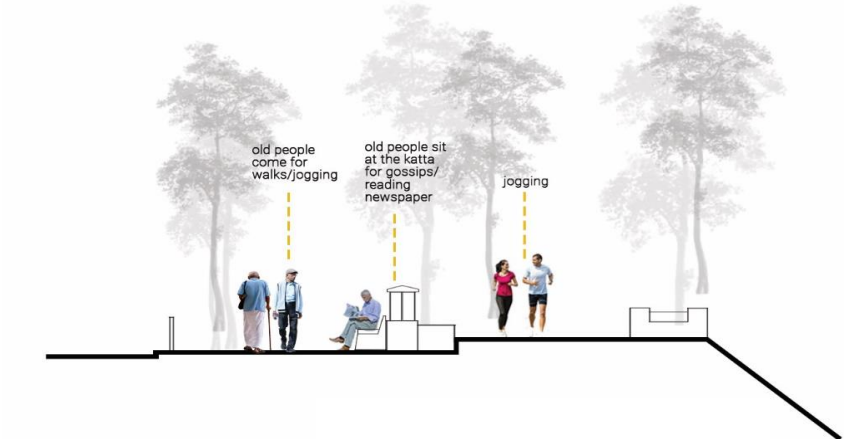


Figure 3(b): Kachrali Lake Footpath

(*Source:* Author)



Figure 3(c): Kachrali Lake Section and Activities

(*Source:* Author)

ISBN: 978-93-89934-68-7

Case Study 3: Five Gardens, Dadar

The Five Gardens covers seven-acres spread the Dadar Parsi Colony precinct. Dadar Parsi Colony was the first planned area of the city where spaces were allocated for residences, green spaces, schools and colleges with proximity to transport infrastructure (Gopinath R., 2013).

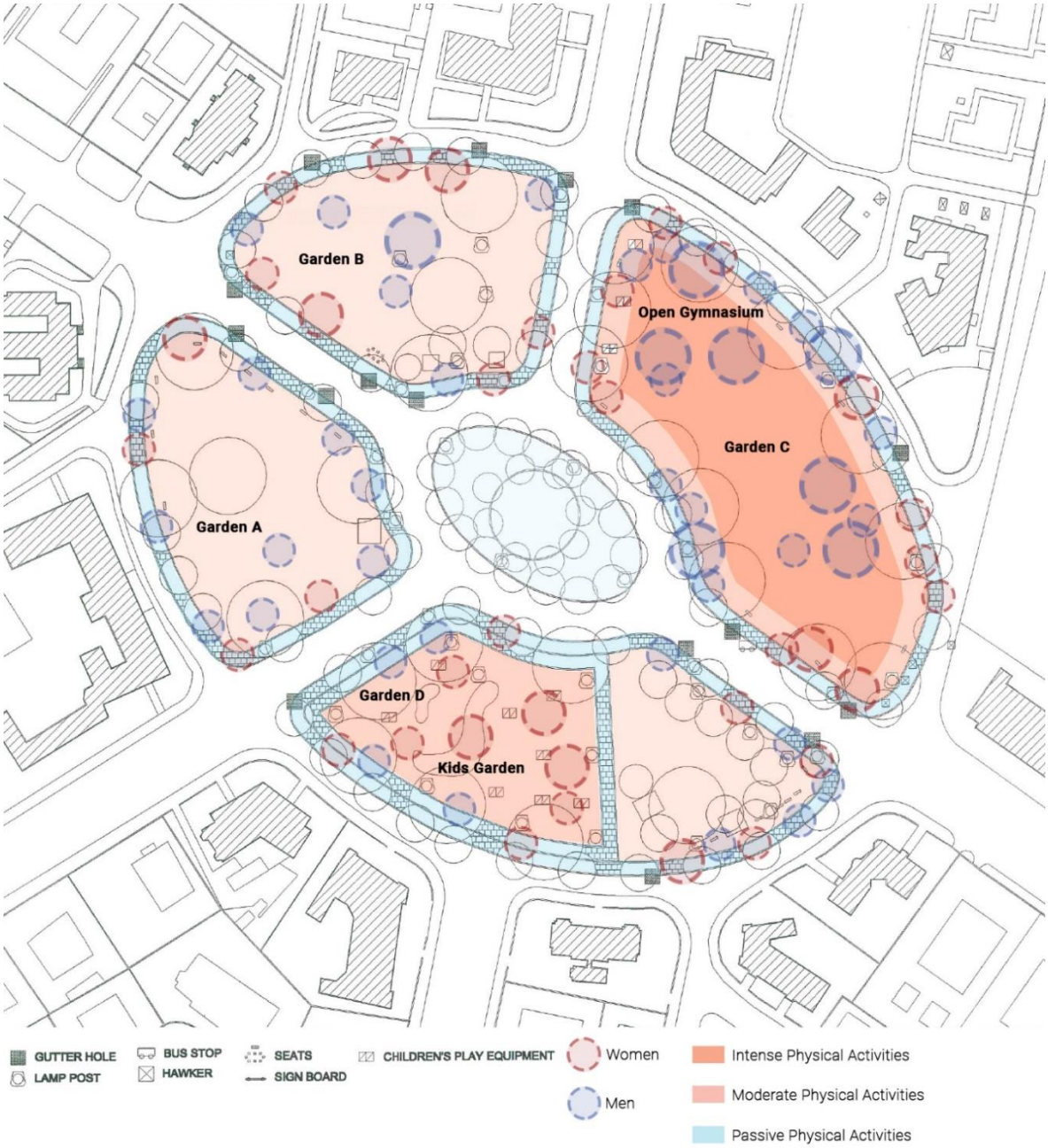


Figure 4(a): Activity Mapping of Five Gardens

(*Source:* Author based on Design Cell, KRVIA)

Since the park is located in a majorly residential locality, the majority of the users in this park are the local residents. As the name states, the park consists of five gardens. There are playgrounds and children's play areas located within the parks. The park is open from 6:00 am until 11:00 pm. In the morning the gardens host laughter clubs, yoga sessions, people are seen jogging and walking. Old people frequent the park by meeting at the informal clubs and while conducting charitable events

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inside the park. The young user demographic involves the youth from the neighborhood who use the open space as hangout spots, students from nearby colleges also use this park and its periphery throughout the day as well as during the night time. The young boys and girls who play sports inside the park have a skewed demographic though; more male cricketers are seen using the park compared to women who play sports within the park.

As shown in Figure 4[b] the park edge is defined by a fence and a footpath alongside the five gardens. Intense physical activities like football, cricket, etc. take place inside the park whereas moderate physical activities like walking, jogging, etc. take place along the periphery. Like Shivaji Park, the multiplicity of activity and the diversity of crowd imparts a sense of belonging and safety to this park.



Figure 4(b): Five Gardens Edge Condition

(*Source:* Google Maps)

Inference

Based on the observations shown in Table 1, it is realized that there is incidental spatial segregation due to the placement and availability of particular amenities. Women prefer spaces that are more open and permeable and are involved in group activities as opposed to men. The majority of the women present were found with children, supporting the fact that those women are there for the duty of taking care of children, thus conforming to their gender role, rather than for their own leisure. Most of the women were in casual attire indicating their residences were nearby and the causal factors may be distance, time, familiarity with the space, and people where both risk perception and gender role are playing key roles in their occupation of that specific space. Women's groups are found in space with open and visually permeable character that supports Jane Jacob's *Eyes on the Street* theory.

Table 1: Mapping

Parameters of Study	***Analysis***		
	Shivaji Park	***Kachrali Lake***	***Five Gardens***
1. Context			
	Mixed use locality with predominantly residential usage. Predominantly Maharashtrian locality with a heavy socio-political influence and rich history.	Set in a mixed-use of commercial, business, and residential areas occupied by higher middle-income groups. Neighboring to it is a Thane Municipal Corporation building, situated between two major roads with lots of traffic.	Mixed use locality with predominantly residential usage. Institutional Buildings are present around.

ISBN: 978-93-89934-68-7

Parameters of Study	***Analysis***		
	Shivaji Park	***Kachrali Lake***	***Five Gardens***
2. Accessibility and Mobility			
a) Availability of public transport	well connected	There's a bus stop located in the vicinity. There are meter auto-rickshaws available at all times.	well connected
b) Pedestrian Access	Katta and Trees along the periphery provide unrestricted pedestrian access.	A 3.5m wide footpath with benches on the trails end and a small fence along the other edge next to the road provides unrestricted pedestrian access.	A 3m wide footpath with benches on the trails end and a small fence along the other edge next to the road provides unrestricted pedestrian access.
c) Timing restrictions	The park is open for all 24 hrs. The park is also free to access; there's no entry fee. Even at night-time, there is a significant mixed crowd which makes it safer for women to access.	The park is closed from 2 pm to 3 pm during the day time and closes late at night.	Open from 6am to 11pm
3. Attractiveness and Safety, of the Built Environment			
a) Multiplicity of activities	The presence of multiple organizations, community clubs, shops, parks, temples bring in multiple types of users throughout the day on a regular basis as they offer the possibility of multiple activities. Frequented by men and women of all types of social groups and age groups as singles and in groups, for jogging, exercising, socializing, eating, picnicking, etc. the place remains active throughout the day.	This lake has a circumference of approximately 500 m. It attracts many people for its jogging tracks, children's play area, and exercise area. There is a temple of Lord Ganesh inside the lake premises which brings in regular users. Laughter and Yoga Clubs take place every morning. The TMC officials and people working in offices nearby also use this spot for recreation during breaks. Thus the user group of this trail park involves kids playing in the park; their mothers or caretakers, old people using the 'Katta' or visiting the temple, youngsters who hang out in the park for jogging/walking or even for playing with a growing population of cats in the park. Mainly men of all ages are involved in active recreation such as walking gymming, Women are involved only in group activities like walking and sitting	Multiple activities varying from intense physical activities to low-impact physical activities for all age groups and genders are observed.
b) Pattern of Use based on gender	Accessed by all genders	Mainly men of all ages are involved in active recreation such as walking gymming. Women are involved only in group activities like walking and sitting	Accessed by all genders

ISBN: 978-93-89934-68-7

Parameters of Study	Analysis		
	Shivaji Park	Kachrali Lake	Five Gardens
c) Maintenance and Infrastructure (Lighting, Places to sit, urban Furniture, Toilets, etc.) theory	There are four public toilets out of which two are in very good condition with access to changing rooms. Although, there is no separate toilet or the non-binary genders. There are multiple food chains and restaurants around the area whose toilets can be freely used. Thus the space is easily used by women of all kinds throughout the day. There are sufficient seating arrangements along the Shivaji park periphery which are shaded yet visible to everyone.	There are benches around the lake as well as benches inside the park are provided for seating there is an exclusive jogging trail, there are boating activities available there are food stalls in the vicinity there is also a newspaper booth in the vicinity where magazines and newspapers are kept for public reading. There is also a public toilet located nearby.	The are benches, lamp posts, signages in sufficient number and are in a usable condition. Gym and Kids' Play equipment are available and are in a good condition.
d) Social factors	Women are almost not seen or seen in less numbers at spots dominated by men. But women are also seen sitting alone at the park for longer periods in comfortable positions during daytime. The park offers a vast open space for multiple activities to unfold or the users without having any social or monetary restrictions.	Women tend to come here only during early mornings and evenings; at noon there aren't any women loitering around except for the pedestrians using the footpath for commuting.	Women are seen frequenting the children's park and Garden A, B and D more often compared to the Garden C where major sports activities take place.
Visibility, Lighting, Openness	There is sufficient lighting inside the park and along its periphery. Even the precinct is well-lighted which leads to ensuring a perception of safety of women.	There is sufficient lighting inside the park and along its periphery.	There is sufficient lighting inside the park and along its periphery.
Refuge prospect	Low katta, population, mixed activities ensure the factor of safety.	Most of the seats at the turns or bends are occupied by men. Women are seen in maximum numbers near children playing areas or near temples where they preferred sitting on lawn or ledges or bund walls even though benches are not available. Most of the women were in casual attire indicating their residences nearby and the causal factors may be distance, time, familiarity with the space and people where both risk perception and gender role are playing key roles.	Women preferred areas with more visual permeability and connectivity. Women preferred seats that are in open, they seemed to avoid seats below big shadowy trees, partially hidden seats or so. Men preferred seats that have strategic locations from where most part of the park can be watched, that are near most of the amenities such as drinking water, newspaper stand, open gym, etc.

(*Source:* Compiled by Author)

The examples studied above show that a place which is perceived as safe for old people, will almost always be safe for all females and vice-versa. There is incidental spatial segregation observed due to the placement and availability of particular

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amenities. Women prefer spaces that are more open and permeable and are involved in group activities as opposed to men. Women, even when they are alone, are found in areas where more women are present which imparts sense of security to that space. Whereas men are found at the strategic panoptical positions from where maximum view is available.

5. CONCLUSION

Social constructs influence the spatial characteristics of a space. Gender being one of the social constructs influences how a space is used and produced; whereas spatial factors reinforce certain gender roles. At the same time the built features like low edge walls which facilitate unrestricted access make these public spaces conducive for all genders to inhabit the space freely and safely. The possibility of multiplicity of activities unfolding within these parks and open spaces makes them accessible by all. Thus, spaces need to be democratic in nature to impart a sense of belonging to everyone which in turn imparts a sense of safety. This study shows that a place which is perceived as safe for any one compromised category, will almost always be safe for all others.

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The Healing Anatomy of Design Need for Provision of Psychiatric Rehabilitation Centers

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ABSTRACT: The presented research is directed towards the re-introduction of the individuals recovering from mental illnesses and psychiatric conditions to the society with the assistance of Psychiatric Rehabilitation Centers.

Mental illnesses, being one of the most commonly diagnosed disorders lately, are yet clenched to the societal stigma that persists in the common population. Steadily increasing amongst people, especially in the countries with a high GDP rate; mental illnesses have been altering relationships and families; hence negatively affecting the community. Despite the threats that these conditions pose to the society, a person with psychiatric vulnerabilities often finds it difficult to abide by their fellow mates due to the stigma and unacceptance in the community.

Research shows that approximately 14.3% of the deaths worldwide, around 8 million deaths per year, are attributable to mental disorders. In India, 1% of the population suffers from serious mental health issues, while 5% to 10% of the population is affected by moderate disorders. Irrespective of the statistics, a fine breach still exists between the society and the psychiatric healthcare system.

In their journey towards recovery, patients are often associated with various corroborant service providers such as primary health-care centers, psychiatric clinics, residential facilities and more. Regardless of the requisite role that a Psychiatric Rehabilitation Center plays in this process, it is often not perceived as a juncture that requires distinct facilities and a holistic approach.

The purpose of this research is to emphasize the need for the provision of Psychiatric Rehabilitation Facilities and hence define the role of architecture and landscape in the process of psychiatric recovery. This research would extend a comprehensive approach towards mental health and rehabilitation; therefore making an effort to alleviate the gap between the patients in recovery and the community.

Keywords: *Psychiatric Rehabilitation Center, Healthcare, Mental Disorders, Psychology etc.*

1. AIM OF THE RESEARCH

To study the impact of architecture and landscape on the psychology of individuals who have been diagnosed with psychiatric disorders. To address the potential of architecture in designing comprehensive spaces that would combine psychiatric rehabilitation with complementary approaches.

2. SCOPE AND LIMITATIONS

The research is intended to assist people suffering from mental disorders, chronic stress and concerns related to psychological wellbeing, hence aims towards reclaiming their active position in the society.

The paper attempts to scrutinize the issue of discrimination and stigma that is held against the individuals suffering with mental disorders; therefore voicing the need for provision of psychiatric health-care facilities such as rehabilitation centers which will help the society to overcome the ignominy around mental illnesses.

This paper promotes the concept of rehabilitation of patients in the phase of recovery from their diagnosed psychiatric disorders by providing them with a space that operates based on a community-centered perspective as opposed to the scorned hospitale chambers. The research adheres to the fact that medication, when accompanied by therapeutic and positive environment, is sufficient for most of the patients to get back to a functional life. Rehabilitation being one of the most essential steps in the process, this paper accentuates the significance of the same.

ISBN: 978-93-89934-68-7

The research is restricted to the patients who would be considered in the aftercare phase of their recovery. The study would be limited to the patients diagnosed with psychological illnesses.

3. METHODOLOGY

Based on the research-for-design methodology, the paper initially studies research articles in order to establish a background of psychological illnesses; especially focusing on treatment and the rehabilitation process. The collected information has been further utilized to record evidence-based findings concerning the design approach towards psychiatric institutions. The research has been concluded by issuing a brief set of guidelines for the design of psychiatric rehabilitation centers which may benefit the planning of mental health-care institutions, thus supporting psychiatric well-being and recovery.

4. INTRODUCTION

4.1 Mental Health and Psychiatric Disorders

Generally defined as the state of well-being of an individual, mental health plays a vital role in shaping a person's character. Mental health controls an individual's frame of mind, emotions and feelings, temper, personality along with their emotional as well as social behaviour. The World Health Organisation construes mental health as

> *"A state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community." (WHO 2001a, p. 1)*

Being one of the prominent components to shape sole personalities, relationships, families and communities; mental health also plays a crucial role in the socio-economic development of the society. Though it is agreed to be of intense recognition today, psychiatric illnesses continue to be one of the leading causes of disabilities and deaths in the society. Individuals dealing with extreme psychiatric conditions also have to deal with depression due to the communal discrimination, stigma and the lack of treatment which eventually lead to escalated suicide rates. Despite the fact that multiple psychiatric conditions are curable in the initial stage of diagnosis, the gap between the treatment facilities and the patients diagnosed with the condition remains unaffected.

A mental disorder is characterized by a significant change in an individual's sentiments, social behaviours and response. Mental disorders can be diagnosed when the areas of the brain that serve a specific purpose are found to be functioning in an impaired manner. Though psychiatric illnesses can be of various types, according to the World Health Organisation, the most commonly diagnosed conditions are depression and anxiety, which are classified as common mental disorders; while bipolar disorder, post-traumatic stress disorder, eating disorders and neurodevelopmental disorders that identify as severe mental illnesses also contribute to the ever-increasing number of people diagnosed with psychiatric conditions.

4.2 Health Systems and Social Support

The rapidly escalating mental health issues and the rising number of individuals diagnosed with psychiatric illnesses have been negatively affecting the society. Being a major cause for numerous physical problems such as strokes, heart diseases, diabetes and other chronic illnesses, psychiatric disorders are also one of the leading causes culpable for the surging suicide rates.

This being the case, health systems have not been developed enough yet in order to effectively aid the recovery and rehabilitation of the patients battling against these mental illnesses. Along with medical care, individuals also need to be provided with social support including personal, household and communal acceptance. In addition to particular facilities, patients may need an introduction to various educational programs, employment activities and other necessary tasks conducive to promote a self-sustaining lifestyle post rehabilitation.

4.3 Psychiatric Rehabilitation

Emphasizing on an independent lifestyle for the people dealing with mental health issues, rehabilitation encourages them to actively participate in several aspects of life such as education, employment, social interaction and more. Psychiatric rehabilitation can be defined as a process that inspires the personal as well as social development of an individual by guiding them through numerous psychological, behavioural, educational and management skills that facilitate a self-reliant lifestyle.

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Empirical research based models for psychiatric rehabilitation have been developed in the past few years. The primary focus of these models is to promote an independent lifestyle for the patients. Appertaining to cognitive rehabilitation, social education, self-management skills, physical activity training and supported employment, the paradigm for psychiatric rehabilitation will further be used as a reference to formulate the guidelines for designing a psychiatric rehabilitation centre.

5. DESIGNING FOR PSYCHIATRIC REHABILITATION

Some of the principal features essential for the planning and design of a psychiatric rehabilitation center are supportive environment, interactive spaces, constructive atmosphere and qualitative treatment. The design elements that foster the application of these features are ambience of the space, lighting, air quality, acoustics, interior of the space, furniture, finishing of the surfaces, color palette, architectural features, planning layout, sizes and orientation of the space, association of the spaces with open environment, maintenance and cleanliness as well as defined personal and public spaces.

5.1 Health Promotive Architecture

Health promotion can be defined as:

"The process of enabling people to increase control over and to improve their health." (WHO 1986, p. 5)

It has been evinced several times through earlier studies that architecture has a significant impact on the overall well-being of the community. Architecture influences the physical, mental, social as well as spiritual comfort of an individual. Since composition of a space plays an important role in the recovery of patients from any given psychiatric condition, even miniscule elements might create unusual repercussions, either positive or negative. Considering the effects that architecture and planning can have on the health of the society, the concept of health promotive architecture has been developed.

One of the primary emphasis of health promotive architecture is to establish a supportive and interactive environment for an individual and the community; the concept takes into consideration the provision for opportunities of empowerment for the residents. Due to this approach, health promotive architecture has been an effective notion in the planning of various spaces.

Likewise, the planning and design of healthcare facilities, in this case a psychiatric rehabilitation centre, can appertain to the concept of health promotive architecture.

5.2 Characteristics of Health Promotive Architecture

The hypothesis of health promotive design is determined from six components that accentuate its distinctiveness.

- The concept is assisted by a holistic approach that attempts to incorporate the physical, mental and emotional needs of an individual within the built environment.
- The concept promotes inclusion of social interaction since the community is equally responsible for the solace of oneself.
- The concept focuses on establishing health rather than considering the illness as the base of the design.
- The concept emphasizes accessibility in design for the individuals with particular needs.
- The concept encourages the participation of individuals in socio-cultural activities, thus empowering the collaborative skills of the ones involved.
- The concept consolidates various environments, thus developing an associative design as compared to an institutionalized built environment.

Architect and researcher Elke Miedema proposed a model that interprets multiple aspects of design that should be considered while planning in accordance with health promotive strategies. Herein, any given space is analyzed from the perspective of four factors namely the patient, the user, the community and the environment. The model focuses on conditioning the design according to a salutogenic approach rather than a pathogenic one.

5.3 Salutogenic Approach in Design

The term 'salutogenesis' was introduced by sociologist Aaron Antonovsky which means 'health origins'. Verbatim to its definition, a salutogenic design focuses on the origin of health and improvisation in preference to planning the spaces centered on the illness or injury. The theory states that better results in recovery can be concluded from a mind with a better sense of coherence.

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According to Antonovsky, salutogenesis can be considered as a balanced approach that establishes a link between architecture and psychiatry. It provides guidelines for the planning of various mental health facilities, thus improvising the recovery outcomes. Salutogenic approach towards designing of spaces reiterates the inclusion of comprehensibility in the structure. This can be done by managing areas and the orientation, construing the relationship between the outdoor and the indoor environment as well as by adopting appropriate set of materials and textures. The manageability of spaces plays a vital role in this process too. The complexity of the design, order of the built environment, aesthetic features, provision of light and ventilation are few of the crucial factors necessary for setting up a sense of coherence. The design should be convenient for the users, visitors and the patients.

5.4 Biophilic Design

Biophilic design focuses on the intuitive connection of the human mind and the natural environment. It is an elementary approach that intervenes nature with built spaces in order to contrive a healthy working and living environ. It has been proven to reduce stress, improve cognitive functions and creativity and provide a better sense of coherence for the users. A biophilic approach contemplates nature, science and the built environment by introducing fourteen strategies in design. These patterns provide research-based design applications that enhance the health and well-being of an individual and the society.

The fourteen patterns of biophilic design are categorized into three subdivisions, each of them providing a thoughtful association of nature in the built space. Nature in space pattern represents visual connection with nature, non-visual connection with nature, non-rhythmic sensory stimuli, thermal and air flow variability, presence of water, dynamic and diffuse light and a connection with natural systems; nature analogues pattern illustrates biomorphic forms and patterns, material connection with nature, complexity and order; while nature of the space pattern constitutes of prospect, refuge, mystery, risk and peril. These patterns of biophilic design have an extensive scope of application in the planning of the interior, exterior, landscape as well as the overall layout of the designed spaces; thus complementing the features of the built form. Nature in space pattern emphasizes on the direct physical relationship that a space develops with natural elements like breeze, scents and sounds; nature analogues pattern focuses on the organic non-living elements such as objects, materials, colors and textures while nature of the space pattern explains the spatial configurations in nature that include the surroundings, views and the presentation of the space.

Research has proven that biophilic design heightens the mind-body systems which include cognitive functionality, psychological well-being and physiological health, therefore explaining how the surroundings are a salubrious fragment in the design of any space, especially in case of health-care centers.

5.5 Effects of Light and Color on Human Psychology

Much as the development of the surroundings is an essential part in designing for a center for psychiatric rehabilitation, one cannot obliterate the efficacy of light and color in recovery. Elements such as lighting conditions, perceivable sounds, color palettes and textures mobilize the subconscious mind and stimulate the process of recovery.

The availability of light in a space causes a significant impact on how an individual comprehends the area. Appreciably lit and bright rooms evoke the feelings of happiness and enthusiasm as compared to the rooms with dull lighting, which often can be discouraging. The presence of light in a space enhances mood, workability and the insight of the occupant thereby encouraging better health, performance and recovery. Higher luminance levels are proven to reduce depression amongst the patients, improve the quality of sleep and promote an optimistic environment. This effect is not only restricted to the benefit of the convalescent but also improves the functionality of the employees, thus creating a positive atmosphere that ultimately fosters the healing process. It is essential to state that the availability of natural light in a space has been studied to be more enjoyable and inspiring in contrary to the provision of artificial light.

Similar to the effects that the availability of light produces on the human psychology, the color and textures of the surroundings remarkably condition the emotions, mood and behavior of an individual. Chromology establishes strong links between the human emotions and the color palette of the surrounding environment. However as the impression of chromology of a space differs from eye to eye; the psychological response of each individual to the same environment varies. To generalize though, from his book *Light, Color and Environment*, 1982, author Faber Birren professes that warm and bright colors are suitable for an active working environment whereas cooler colors fit the activities that require higher levels of concentration. It has been stated in his study that luminous colors stimulate general alertness, outward attention and activities, while in contrast cooler hues inspire inward orientation.

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6. RESEARCH ANALYSIS

A healthful neighborhood establishes and maintains an appropriate balance between human experiences and life. In designing for psychiatric health concerns, one must consider the impacts that an active community has on the mental well-being of the convalescent. As the rehabilitation center primarily focuses on recuperating the operative position of its occupants in the society, the scope of experiences that the center must endeavor to meet is vast.

In accordance with the book *Identity and Life Cycle* authored by Erik Erikson, it is evident that each phase in life is defined by a specific developmental task. These tasks, when deciphered by the individual, assist them towards the succeeding phase of their life. To prepare the patients admitted in the designed psychiatric rehabilitation center for the same, personal behaviorism has been studied. Conductive to starting recovery, determining the type of treatment an individual would receive and guiding them through the rehabilitation process, a batch of assessments has been extended through which the patients should be contemplated.

- **Trust versus mistrust:** It has been observed that the patients suffering with mental disorders often find it challenging to trust people around them. However there is always a possibility that different individuals affected by the identical conditions may or may not be affected by the stated mannerism. The design must be able to ingrain a sense of credence.
- **Autonomy versus shame and doubt:** Complying mostly to the individuals with an anxious temperament, shame and doubt come complementary to personal opinions, self-interests or one's capacity of self-control. The environment around these individuals must be fabricated in a way that feels encouraging in order to eliminate the guilt following their actions.
- **Initiative versus guilt:** Consecutive to the thought of performing a task or display of opinions, the probity of one's acts can be hampered by the fear and guilt of their own actions. Hence, it is important to provide a reassuring environment to the occupants of a psychiatric rehabilitation center that would motivate them to function irrespective of the guilt which may or may not follow.
- **Industry versus inferiority:** Other frequently observed traits among the patients recovering from psychiatric disorders are low self-esteem, self-doubt and inferiority complex. These suspicions may affect the patient's relationship with the neighborhood and their sense of belonging which may contract their active participation in the society. Past experiences of failure may also result in developing a perception of inadequacy among the patients. Therefore, the design must focus on establishing an optimistic denotation which would deliver the occupants with an implication that things would work out for better.
- **Identity versus identity diffusion:** In cases wherein the convalescent occurs to have drifted from their relationship with the peers due to escalating self-doubt, it is a mandatory measure to restore their self-assurance. Provision of interactive spaces or communal areas may facilitate in acquiring the intention by stimulating conversations between the occupants.
- **Intimacy versus isolation:** Relative to identity diffusion, patients may at times find it arduous to commit to relationships. This may result into social avoidance. Areas that trigger social collaboration would be fit to assist individuals battling against such circumstances. Here, the consideration for patients diagnosed with social anxiety and separation anxiety must be examined.
- **Generativity versus stagnation:** Recessive behaviorism has been observed among the patients diagnosed with depression and low functioning anxiety. At times, it may also be strenuous for these individuals to make decisions. Thus, unguided functions must be avoided. The space should be designed in a way that unintentionally prompts a flow of controlled movement.
- **Integrity versus despair:** Depression can oftentimes result into distress and a desire to surrender. To amend a sense of passion among the occupants, the space must be designed in a manner that devises enthusiasm.

7. DESIGN STRATEGIES

Beneficial to the recovery and rehabilitation process actualized at the psychiatric rehabilitation center, following design strategies have been proposed. It is adhered that planning in accordance with these approaches, the space erected would expedite proceedings.

- **Symmetrical planning of spaces:** Symmetry, being one of the key principles of design, creates balance in the layout of any structure and delivers harmony and order. Research confirms that symmetrical approaches towards design add up

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to a sense of entirety to the space. Adopting a symmetric pattern in design would also establish a predictable environment for the patients and hence develop a probability for better focus and a sense of safety.

- **Bridging with the surroundings:** Nature compliments an ever-changing array of patterns that capture the human attention. These patterns influence the human brain to respond in harmony with nature. Combining architecture with nature can create a link between the occupants of the space and the natural elements around them hence devising a positive atmosphere.
- **Interactive environment:** The design emphasizes on framing a setting of the psychiatric rehabilitation center in a de-institutionalized manner, therefore providing the occupants with a calm, friendly surrounding that would deliver a perception of comfort and relief. Planning of associative spaces would aid in reducing the social stigma around mental illnesses.
- **Provision of a therapeutic ambience:** Research shows that a salutary environment encourages patients to be more receptive to the treatment that is being offered to them. To integrate this positive character in any space, the primary goal of the designer should be to assemble a non-threatening ambience that imparts a feeling of serenity, calmness and comfort among the patients.
- **Patient safety considerations:** Although the design is concerned with the development of an outpatient psychiatric health-care center, the possibility of the patient's intentions to self-harm cannot be neglected. To prevent such occurrences and subside the rate of self-harm, the degree of privacy provided to a patient in the unit must be considered.

8. GENERAL GUIDELINES FOR THE DESIGN OF A PSYCHIATRIC REHABILITATION CENTER

8.1 Health Center

The design must comply with the physical, mental and emotional needs of the patients and promote physical activities, thus supporting a healthy behavior. It should focus on establishing health and take the emphasis away from the illness. The design should be formulated in a manner that establishes a connection between physical health, family life and emotional welfare. A blend of recreational areas would provide the design with this fuse element.

8.2 Degree of Publicness

Suitably, three types of living quarters should be designed – nearest to the activity nodes, half-way in between and completely isolated. A major factor to contemplate upon while designing for accommodation would be the privacy offered to the residents. Additionally, the number of occupants per room must be taken into consideration too. Providing double-bedded rooms would lower the degree of aloneness that an individual prone to self-harm and depression might experience in a single-bedded room. However this does not imply that single-occupancy rooms should not be integrated in the design. The number of rooms with the preferred occupancy would differ as per the number of patients who benefit from a particular type of arrangement. This being stated, for rooms with single-occupancy, a space with utmost simplicity may be designed. It has been observed that a direct and compact spaces profit the convalescent with a sense of self-sufficiency. Whereas in the case of double-occupancy rooms, each occupant must have a moment of solitude. It might be rather challenging to design spaces wherein the patients would function together while still maintaining their individuality. The space should imbibe a sense of togetherness but also, from time to time, elucidate the comfort and dignity of solitude. Spaces such as corners, window seats, areas screened off with half walls can help with establishing the private territories.

The design must signify a relationship between public and private spaces. The built structure must be arranged in a manner that organizes a sequence corresponding to the degree of privacy. Individuals should be given the liberty to adopt their position as per the retirement they desire. Spaces must form a pattern from most public areas to private domains. Nonetheless, it is crucial to have the private rooms placed tangentially to the activity nodes in order to avoid desolation. Common powder rooms or toilets must be placed in semi-private zones.

8.3 Positive Open Spaces

Open spaces can be segregated into two types – positive spaces and negative spaces. Positive spaces are well-defined areas that assist in exhibiting a sense of comfort, closure and a feeling of security. While designing for psychiatric rehabilitation, one of the primary focuses should be the integration of positive spaces and indoor open areas. Not only would this provide

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an optimistic environment for the inhabitants but it would also facilitate a wider visual observation of the patients by the working facility. It is of common practice that indoor open spaces often are left unused by the occupants. This might endorse a dismissive perception of the space. To avoid this, the open areas must be treated as an ambiguous realm between various spaces.

8.4 Activity Nodes

It is evident that any type of connect between the members of a community, be it formal or informal, is a vital element for the persistence of the group. To encourage the development of healthy behaviors and to support the participation of every individual in social activities, areas which stimulate the social engagement of an individual, must be incorporated in the design. In accordance with the same, specific nodes must be developed that would merge correlated facilities. These activity junctions must be evenly distributed along the campus conductive to refining the contrast between busy and quiet areas, thus avoiding any dead spaces. To establish a link between these focal points, the layout of the circulation must be modified accordingly.

8.5 The Flow through Rooms

Advisably, the design must put emphasis on increasing the social interaction of the convalescents. Movement, being one of the factors that cause a considerable shift in sociability, must be planned attentively. It is essential to make the occupants feel free to explore their surroundings according to their judgment and hence acquire a sense of freedom of action. A building with generous movement would allow each person's instinct and intuition to play. Circulation must be plotted in a manner that maintains the social fabric.

8.6 Tapestry of Light and Dark

According to R.G. Hopkinson in his book *Architectural Physics – Lighting*, it is articulated that a space with profuse natural light is commonly perceived as more agreeable in comparison with areas adopting artificial luminance. It is esteemed that people tend to be in an exceedingly positive state of mind when in a room with natural light contrary to the ones without gleam. Since humans are phototropic by nature, the provision of natural light and ventilation over mechanical lighting fixtures is incontrovertible.

8.7 Connection to the Earth

It is essential for the indoor areas of a psychiatric rehabilitation center to merge with the outdoors. This would develop a sense of connection with nature. Intermediate spaces which serve as transition grounds between the intramural and outer domains should be assessed. The structure must not diverge from its rootedness.

8.8 Furniture and Fitting Arrangements

The fittings provided in a psychiatric unit must be finished with smooth edges, covered with soft upholstery in still colors and preferably anchored in place. The doors of a resident room must be out-swinging in operation so as to prevent the patient from barricading the entrance in case of emergency. The material used for window panels must not produce sharp shards when broken; the use of tempered glass or polycarbonate sheets may be considered. Grab bars must be provided in certain number of washrooms in order to design for general accessibility. All mirrors should be worked with tempered glass and security films with tamper-resistant frames.

9. CONCLUSION

Despite the frequent diagnosis; psychiatric illnesses, analysis and treatment are some of the most unarticulated issues in the society. This paper aims to study the impact created by the architectural setting of a space on the process of recovery of the individuals diagnosed with various mental health conditions and specifies a set of guidelines that would benefit the design of a psychiatric rehabilitation center.

It has been studied that community-based, interactive spaces provide a nourishing environment for psychiatric recuperation. Such spaces portray the significance of mental well-being and play a crucial role in reducing the stigma around psychiatric

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disorders. Incorporating a health promotive approach in design, developing a salutogenic perspective and biophilic intervention may stimulate the process of recovery and improve health outcomes. Inclusion of nature in design effectuates positivity and may create a significant impact on the physical as well as mental health of the patient. Needless to say, sustainable design approaches should invariably be adopted in any design process as it helps to conserve the environment and maintain ecological balance.

Besides focusing on the development of a community-based rehabilitation, which is certainly favorable for a more desirable recovery, this paper studies various design approaches and effects caused by the setting of the surroundings on the psychology of the patient thereby promoting sustainable development while discussing multiple design strategies for the same.

Designing for psychiatric rehabilitation unveils a distinctive set of challenges, thus forging a safe environment that associates with medical facilities. The design approaches suggested in this research facilitate in amplifying the process of rehabilitation of the patients. Nonetheless, the design decisions should be discussed with the concerned personnel before implementation.

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A Study on Factors Influencing Quality of Indian Public Spaces

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ABSTRACT: Public spaces in India such as Chowks, Baghs, and Plazas have always served as congregation spaces for celebrating community life. As population density in urban centres, increased, public spaces were encroached, misused and started shrinking or disappearing. The need and importance of public spaces were further ignored by civic authorities as general population increased their time spent with digitised lifestyles amongst dense buildings thereby making need for public spaces secondary. Whatever small patches of land left was either quickly filled up by garbage or taken over by street vendors and parking lots.

Observing the loss of public life and fall in quality of community life, a survey was designed to elicit responses and attitudes to public spaces from the general population. A questionnaire was administered to 102 randomly approached respondents covering five parameters hypothised by the authors. The analysis of the respondents revealed the hierarchy of influence of these parameters on the perception and usefulness of Public spaces in contemporary urban India. These findings can aid Architects and Public space Designers to understand the influence of underlying factors in designing better, more impactful and beneficial public spaces.

Keywords: *Urban Public Space, Social Interaction, Psychological Benefit, Economical Benefit, Environmental, Health Benefit.*

1. INTRODUCTION

Public spaces are the life of the city and have been considered the highlight of the cities since ancient times be it Europe or Indian towns. In India, people congregated in *Chowks, Baghs, Ghats*, and *Bazaars* of Indian cities to celebrate festivals and life. These spaces reflected the Indian heritage and displayed the city's culture. One can easily recognize the city by looking at its street life. Urban public spaces in the 19th century were the core of the cities. People came together to eat and dance and exchange views on the social and political issues concerning the city. New ideas and inspirations were generated by people being together. People sat under the shade of trees or gathered on the verandah to interact, socialize or to just sit and observe the life around them. Children used to play outside in groups that helped them socialize and interact. These meaningful attractions are necessary for the inhabitants of any city not only to keep them updated with the surrounding world but also to enhance their experience. "Living cities" where the population associate with one another, are always energizing in comparison to the "dead cities" that do not encourage any social interaction.

The character of the city vanished after the development of automobiles and electronic communication. The city became vehicle-dominated, transforming the city's whole look right from its streets to its public spaces. Electronic communication such as telephones, television, and computers replaced direct and active meetings in public spaces. Industrialization reshaped the "living cities" into "lifeless, dull, and monotonous cities". The need and importance of public spaces are being ignored by the people who now dream of a utopian digitalized place filled with tall buildings, automobiles, and instant high-speed wireless communications. Dream like spaces exists only in screen devices. The city that once reflected the local culture now looks like a wild heard of moving cars and disconnected human beings making them lifeless and isolated from their surroundings. The public spaces are beginning to perish and the essence of the city as a habitable cultural community is being lost. This research paper deals with the study of Urban Public Spaces in the Indian context and identify underlying factors affecting the quality of the Public Spaces as perceived by city dwellers. The paper dwells on the strategies to revive the Urban Public Spaces of the city. (Ref i)

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1.1 Aim of the Study

This study aims to find out the present attitude and awareness of public spaces amongst city dwellers. It intends to identify and study perception factors influencing quality of Indian Public Places. It aims at to identify the hierarchy of underlying influencing factors that affect the quality of Indian Public Places so that Architects and Designers can design better, more impactful and beneficial public spaces.

1.2 Research Objectives

With the objectives as outlined below, the outcome of this study intends aiding Architects and Public space urban Designers to understand underlying factors the public perceives as critical in designing better, more impactful and beneficial public spaces.

(a) Study and compare the past and present scenarios of Public Places.
(b) Acknowledge the benefits of the urban public space on the quality of life of the people.
(c) Recognize the necessity of quality public spaces in cities.
(d) Conduct a Survey through a questionnaire and analyze the responses to understand the view of the general public on the quality of public spaces.

2. LITERATURE REVIEW

2.1 What are Public Spaces?

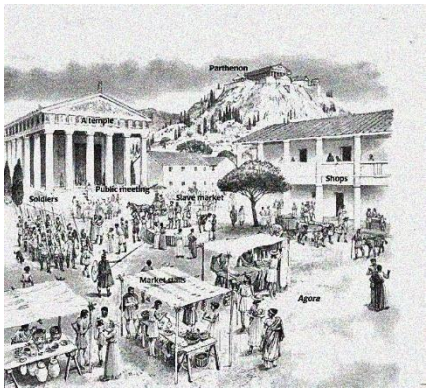
Public spaces are open spaces constituting both softscape and hardscapes and are accessible to the public. These spaces are the image of a city and contribute to its character. They serve as gathering areas and can encourage action, political mobilization, and crime reduction. They provide spaces for conversation and idea sharing that influence the urban environment's quality. Public places also benefit people's physical and mental health since they make them feel better and encourage them to be more active. Streets, boulevards, and avenues act as communication channels within the city. As the name implies, the word "Public Spaces" refers to an area without social distinctions that offer a platform for dialogue between individuals from various backgrounds. It is a setting where the diversity and complexity of the society can coexist peacefully. An open square or a street acts as a social node that embodies an identity. A Public Space reflects the culture of the cities. It can be viewed as the representation of a neighborhood. A functioning city must include public spaces because they promote a sense of belonging, social life, civic identity, commercial growth, health, and wellness.

2.2 Evolution of Public Spaces in History

The classification of Public Spaces as implied in History (Ref ii) gives us the following categories:

2.2.1 *The Greek Agora*

The classical Greeks of the 6th century created an open space used for their daily religious, political, social, and commercial activities known as Agora. Agora was located in the middle of the city where people assembled to exchange views on daily



Source: www.qfiles.com (as accessed on 14/11/22)

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matters. It constituted Colonnades, statues, altars, trees, and fountains. During the 5th and 4th centuries, two Agoras, namely Archaic and Ionic, existed. One of the examples of Archaic Agora is the Agora of Ellis. Buildings were not coordinated and the complex looked disordered. An example of Ionic Agora is the Agora of Athens. It is more symmetrical than the Archaic Agora and colonnades combined to build three sides of rectangles or regular squares.

2.2.2 *The Roman Forum*

The Greek Agora influenced the development of the Roman Forum in Rome. Just like Agora in Greece, the Roman Forum was the center of the city with shops and open-air markets. It was originally a marketplace and later held public gatherings, trials, elections, and gladiatorial combats. It was a nerve center for the Romans incorporating impressive temples, basilicas, statues, arches and exuberant public spaces. The narrow streets had markets and shops lined up. The Roman Forum, being full of life, became a huge part of every individual's daily life. Over the years, the function of the forum transformed drastically from being the "bazaar of the city" to a political site holding public speeches and meetings, elections, criminal trials, educational and religious ceremonies.

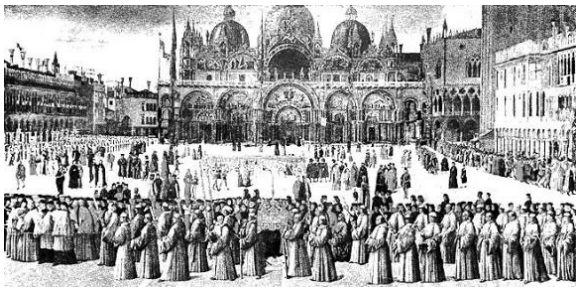
After the fall of the Roman Empire, the Forum Romanum went to rack and ruin and gradually deteriorate into a grassland.



Source: www.wikipedia.org (as accessed on 13/09/22)

2.2.3 *Renaissance Plaza*

Piazza San Marco, known as St Mark's Square located in the city of Venice, Italy, constituted of plaza and squares surrounded by buildings such as cathedrals and town halls. The public gathered to celebrate, and attend plays and stage proceedings. The Piazza, the square, along with its extension known as Piazzetta were the social, religious and political hub of the city. People of Venice enjoyed the vibrant open spaces with arcades, cafes and shops along with architectural masterpieces such as museums, library etc.



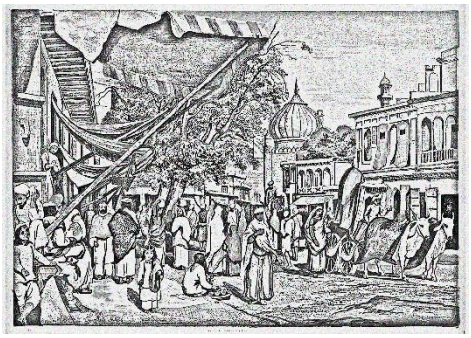
Source: www.wikipedia.org(as accessed on 14/11/22)

2.2.4 Indian Chowks

Chowks were the life of the city promoting interaction among the people and being a center for various activities. They encouraged pedestrian movements and social and physical activity. These aspects made the city lively and happening. The urban public space such as a 'Chowk' enhances the image of the city. They were designed parallel to the local context and the city's heritage. Hence, the people of the city felt a close connection with these public spaces. The streets of the city reflected its culture and enriched the experience of anyone walking through it. With the introduction of automobiles, people

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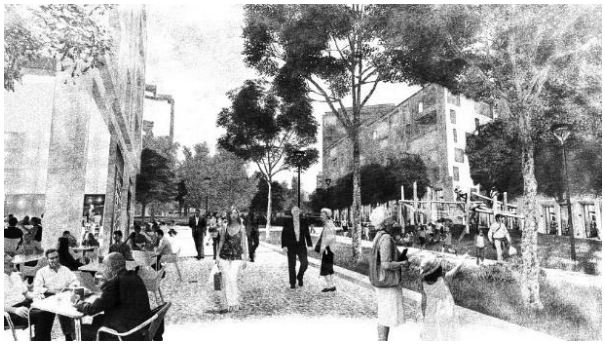
began to use the new inventions extensively and the urban public space which was once the "life of the city" turned crowded vehicle-oriented, and socially disconnected.



Source: www.theheritagelab.in(as accessed on 14/11/22)

Status of Contemporary Public Spaces

Industrialization and globalization brought changes in the way public spaces around the world were designed. Due to the increased demand for automobiles and built-up structures, the open spaces in the cities started to diminish. New forms of public spaces evolved such as shopping malls, arcades, and department stores that were enclosed, and pedestrian-dominated with several facilities. The current public realms are more focused on skywalks, metro stations, open air theatres, transitional centers, automobile parking and sidewalks. Moreover, the modern design of buildings has shrunk the socio-cultural aspect of the Public Spaces due to the security and privacy. The segregation restricts the social interaction among the public and brings down the whole motive of the design of urban public realms.



Source: www.wikipedia.org (as accessed on 14/11/22)

2.3 Role of Public Spaces

"The role of the public realm is to illuminate human events by providing a space of appearances, a space of visibility, in which men and women can be seen, heard, and reveal, through word and action, who they are. For them, appearance constitutes reality, and its possibility depends on a public sphere in which things can come out of a dark and sheltered existence"

– Fina Birulés

The function of public areas can be divided into several categories. (Ref iii)

2.3.1 *Psychological*

Individuals feel relaxed and less anxious in a Public Space. Public Spaces have been observed to decrease despondency and improve mental health and emotional wellness. Studies from Pennsylvania hospital have shown patients who had a view of lush trees from their bedside windows not only healed, on an average, a day faster but also needed notably fewer pain relieving medications than the ones who looked at a brick wall. According to numerous studies, looking for even three to five minutes at a scene that is dominated by trees, flowers, water, animals, or people can lessen angst, worry, and pain while

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also promoting relaxation. Spending time in nature and interactives will not cure one's cancer or heal a burned part of the body, but it can surely reduce the level of pain and stress boosting the immune system that allows one's body to heal.

2.3.2 *Physical*

Urban public spaces can encourage people to engage in different physical activities. People are motivated to use well-designed open gyms, jogging tracks, bicycle paths, or sports playgrounds which lead to increase in physical movements. In some parts of the world, squares and streets are used to practice dance, inline skating, streetball, and many more activities. Public spaces can help fight obesity and other illness.

2.3.3 *Social*

The major role of the public space is to enhance the lifestyle of the Public by holding social engagements. By creating a multicultural heterogeneous society, public spaces can bridge the gap between people from various cultures and let them learn about each other. Public spaces can reconnect people that are socially isolated by creating shared spaces. They unite neighborhoods, offer gathering spots, and encourage social bonds of the kind that have been diminishing in many urban areas.

2.3.4 *Economical*

Public spaces increase the overall economy of a city by supporting local markets. A well-designed public space promotes tourism that attracts people from all over the world. The housing prices near well-maintained parks or attractive squares are high which leads to an increase in the economy of the area.

2.4 Analysis of Public Spaces in the Indian Context

2.4.1 *Public Spaces of the Past (Ref. iv)*

In the past, people used streets and nodes for social interaction, to talk about their daily schedules, and for a variety of other everyday activities. Children could be seen playing together in front of their homes and in the surrounding open spaces, making the city streets a lively place to be. Old people gathered in groups on the porches to watch the younger generation play while remembering earlier times. The front of the house was utilized by women to cut vegetables and dry spices while interacting with one another. People congregated under the mango trees in the evenings to socialize and eat mangoes. Since there were no clearly designated parks and playgrounds, kids used to play a variety of outdoor games in wide-open spaces and splash around in puddles when it rained. There were scarcely any illnesses present, and everyone was in good health. During the times of festivals, the entire city used to frolic, generating a lively environment all around. People gathered throughout festival seasons to celebrate, express gratitude, and spend quality time with one another. Every festival was centered around fairs, traditional street markets, and public spaces throughout the area.

Streets and public areas facilitated human interaction, spread love and happiness, and connected individuals. Only pedestrians used the brick-paved roads and the earthen streets, and bicycles were a rarity. Courtyards were alive with the sounds of families conversing, children playing, and household members going about their everyday activities. The cities were full of life and people moving within had an enriched experience. Before leaving for work and during breaks, people flocked to the *chai* and *paan* stalls, filling them up. Chowks were majorly used by people to interact as a part of their recreation. The presence of trees around provided a cozy environment for interaction. The social interaction that was fostered by temples and street marketplaces eventually led to better living conditions. Men used to sit, talk and observe the people around them. Crime rates were minimized as they were the "eyes of the community". A sense of security and affinity was created within the fabrics of the Indian city. People of the older decade were more interactional and community-oriented as compared to today's generation. Huge *maidans* in the villages used to be packed with children's roars and laughter at any given time. The small food and market stalls which were lined up in the city's street were a focal point of all the members of the society. The local fair, commonly known as *Mela*, held up in the villages pulled the villagers out of their daily monotonous routines to a happening and lively zone where they can spend quality time with their families and relatives. Public spaces of the past created no boundaries among the people and provided a common platform for gatherings, interaction and socio-cultural activities. These spaces were the life and soul of the area and helped to create a strong bond among people, nature and the society.

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2.4.2 *Public Spaces of the Present, the Decline of Public Spaces*

The demand for **automobiles**, the increase in urban population, and the development of technological devices altered how cities were perceived. Since then, social connections between individuals have weakened and tall, glass structures have replaced the once-open areas. In contrast to the past, when streets and intersections served as places for social interaction, they now only function as means of mobility. Since the street sellers are compelled to leave, the area becomes bland and lifeless. In modern homes, porches are slowly loosing importance mainly due to shortage of space. People of today desire a glamorous house that emphasizes privacy more than social interaction.

Technology has made a drastic change in the lives of people. The social meet-ups which once happened outdoors are now being replaced by a screen. People now tend to remain in their homes in front of gadgets instead of exploring the outside world. The most prevalent problem that results from a lack of human touch is social isolation. The population living in a society and the family members sharing a home are disconnected from one another. This is creating a gap that was not present in ancient times. The above-stated reasons cause several behavioral and health issues. Due to the lack of physical activity and social connection, children are getting obese and losing confidence. Anxiety, low self-esteem, anger, and depression are common effects of being socially isolated. Due to the stress of today's competitive environment, the working class hardly has time for anyone and constantly rushes in and out of their houses and workplace. Hence, they prioritize the comfort of their homes over spending time in open public spaces.

Space constraint is a huge issue in the modern era. Open spaces are constantly being utilized to create residential and commercial complexes. In a city like Mumbai where per capita open space is less than 2 square meters (Ref v), people have been left with no place to interact, play and connect socially. Studies show that due to the lack of open spaces in the vicinity, parents are forced to take their children out to the mall and multiplexes and allow them to be virtually entertained. Playgrounds in Schools are being replaced by additional academic buildings, leading to children being physically inactive and socially isolated. Prof. Srivathsan, urban designer and academic director of CEPT says, (Ref vi) "In Chennai, in the last two decades, we have not really created new public places, though the potential to do so is huge. We've had a number of malls coming up, but a mall, though it pretends to be a public place is actually a consumptive private place" There are limited public spaces in Chennai and people only remember Marina Beach as a public space.

3. METHODOLOGY

A survey to understand and analyze the influence of the underlying factors on different Public Spaces in the Indian urban context was conducted. The survey questionnaire extracted responses to the individual benefits of listed six types of Public Spaces namely Private Gardens, Neighborhood Parks, Playgrounds, Streets, Plazas, and Communal open spaces. The people were asked to choose what they felt evoked the responses listed below each question. The features were listed as benefits expected post-implementation of the same. A total of 102 responses were obtained that helped the researcher to derive the benefits in each space. Demographic details below show the conclusion derived from the conducted survey.

4. ANALYSIS

4.1 Individual Benefits

The below data represents the analysis of the survey of each of the six identified Public Spaces using the five identified influencing factors namely Social interaction, Health benefits, Environmental benefits, Economical benefits and Psychological benefits.

4.1.1 *Private gardens*

Based on the analysis from Table 1 hierarchy of factors influencing 'Private Gardens' are as follows:

1. Health benefits
2. Psychological benefits
3. Environmental benefits
4. Social interaction
5. Economic benefits

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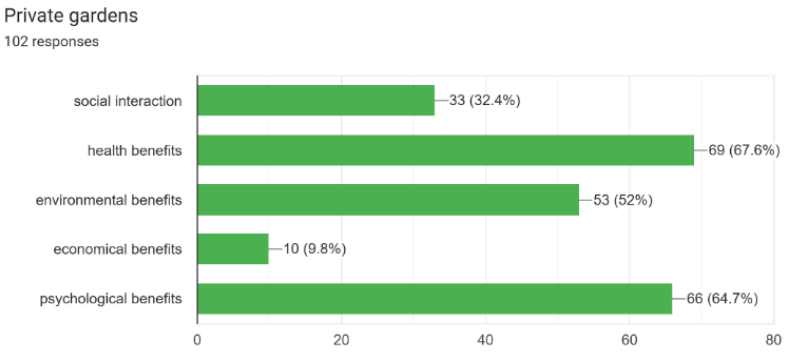


Figure 1

4.1.2 *Neighbourhood Parks*

Based on the analysis from Table 2 hierarchy of factors influencing 'Neighbourhood Parks' are as follows:

1. Social interaction
2. Health benefits
3. Environmental benefits
4. Psychological benefits
5. Economic benefits

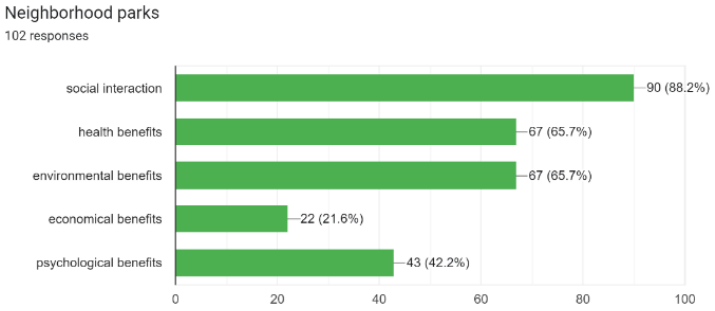
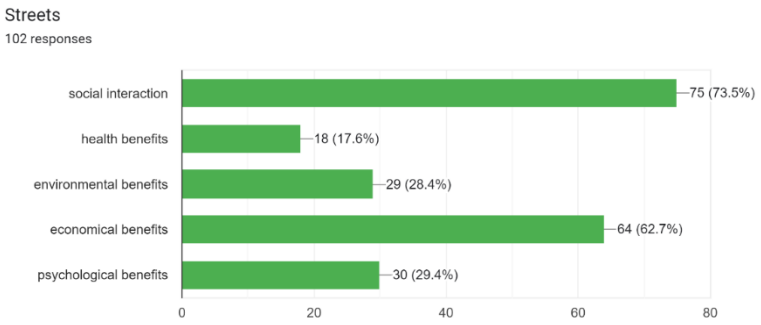


Figure 2

4.1.3 *Streets*

Based on the analysis from Table 3 hierarchy of factors influencing 'Streets' are as follows:

1. Social interaction
2. Economic benefits
3. Psychological benefits
4. Environmental benefits
5. Health benefits



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Figure 3

4.1.4 *Plazas*

Based on the analysis from Table 4 hierarchy of factors influencing 'Plazas' are as follows:

1. Economic benefits
2. Social interaction
3. Psychological benefits
4. Environmental benefits
5. Health benefits

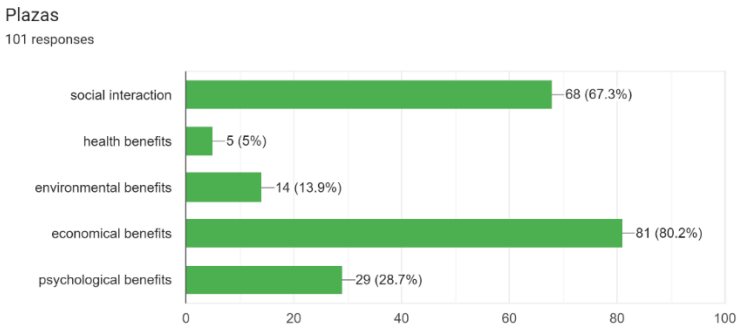


Figure 4

4.1.5 *Playgrounds*

Based on the analysis from Table 5 hierarchy of factors influencing 'Playgrounds' are as follows:

1. Health benefits
2. Social interaction
3. Psychological benefits
4. Environmental benefits
5. Economic benefits

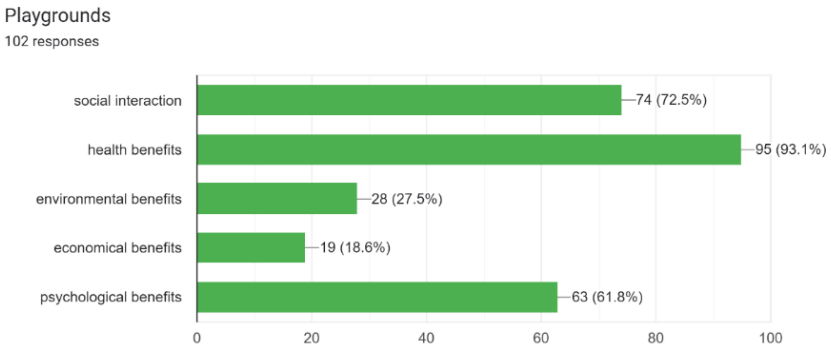


Figure 5

4.1.6 *Communal Open Space*

Based on the analysis from Table 6 hierarchy of factors influencing 'Communal Open Space' are as follows:

1. Social interaction
2. Psychological benefits
3. Health benefits
4. Environmental benefits
5. Economic benefits

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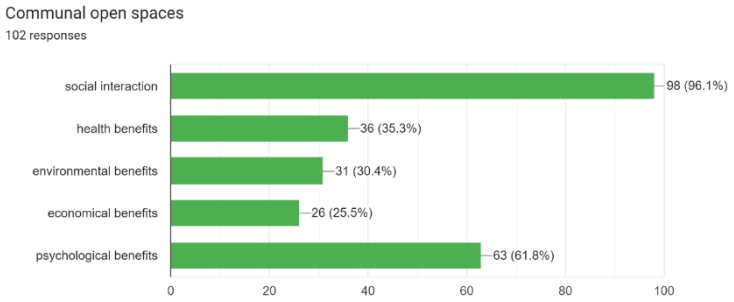


Figure 6

4.2 Average Benefits of the Public Spaces

Based on survey, average of the benefits was summated as observed in Table 7. The hierarchy of the underlying factors influencing all the six Public Spaces is as follows:

1. Social interaction
2. Psychological benefits
3. Health benefits
4. Economic benefits
5. Environmental benefits

	Social interaction	Health benefits	Environmental benefits	Economic benefits	Psychological benefits
Private Garden	32.40%	67.60%	52.00%	9.80%	64.70%
Neighbourhood parks	88.20%	65.70%	65.70%	21.60%	42.20%
Streets	73.50%	17.60%	28.40%	62.70%	29.40%
Plazas	67%	5.00%	13.90%	80.20%	28.70%
Playgrounds	72.50%	93.10%	27.50%	18.60%	61.80%
Communal open space	96.10%	35.30%	30.40%	25.50%	61.80%
AVERAGE	71.67%	47.38%	36.32%	36.40%	48.10%

Figure 7

5. INFERENCES

Based on the analysis of the collated data, the consolidated inference that can be drawn is as depicted in the below Table 9. It depicts the hierarchy of the wishes of Public towards benefits of usage of various types of Public Spaces that they wish to be incorporated. This table can also be used for further study when treated as a matrix.

Table 9

From Table No	*Type of Public Space*	*Perception hierarchy of type of usage of Public Space*				
		Rank 1	*Rank 2*	*Rank 3*	*Rank 4*	*Rank 5*
4.1.1	**Private Gardens**	Health benefits	Psychological benefits	Environmental benefits	Social interaction	Economic benefits
4.1.2	**Neighbourhood Parks**	Social interaction	Health benefits	Environmental benefits	Psychological benefits	Economic benefits
4.1.3	**Streets**	Social interaction	Economic benefits	Psychological benefits	Environmental benefits	Health benefits
4.1.4	**Plazas**	Economic benefits	Social interaction	Psychological benefits	Environmental benefits	Health benefits

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From Table No	*Type of Public Space*	*Perception hierarchy of type of usage of Public Space*				
		Rank 1	*Rank 2*	*Rank 3*	*Rank 4*	*Rank 5*
4.1.5	**Playgrounds**	Health benefits	Social interaction	Psychological benefits	Environmental benefits	Economic benefits
4.1.6	**Communal Open Space**	Social interaction	Psychological benefits	Health benefits	Environmental benefits	Economic benefits

6. CONCLUSION

The paper aimed to identify the factors influencing the perception of quality of Public Spaces. It discussed the need and importance of urban public spaces in an Indian context. A literature study describing the evolution of public spaces and how industrialization has changed the concept of public spaces is documented was presented. The lack of public spaces in some parts of the country has caused cities to lose their cultural identity and people to become socially isolated. The analysis of the role of public spaces has helped the researcher to conclude the impact of these open interactive spaces on the lifestyle of individuals. The results of the analysis of the study conducted can help Architects and Designers in designing better Public Spaces in India.

Based on the survey conducted, it can be concluded that private gardens and playgrounds promote health benefits the most, neighborhood parks and streets induce social interaction while the plazas have the most economic benefits. All underlying factors being considered, social interaction is the most important factor to be considered while creating a quality 'Public Space'. Also, Psychological factors are of equal importance as health benefits. The economic factor and environmental factor are also almost equal influencing factors in the design of a Public Space.

ACKNOWLEDGEMENT

I would like to thank the people without whose guidance and valuable inputs, this research would not have been possible. First of all, I would like to thank my mentor and guide, Dr. Ar. Anita P. Yammiyavar, for her time, efforts and consistent encouragement throughout the project. As this is my first research paper, I am really appreciative for all of her advice and blessings along the way.

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Lastly, I would like to thank all the people, who helped me with the survey, for their co-operation and time.

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Raipur's Designation as Capital City, Its Impact on Educational Institutional Campus of Nit Raipur

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ABSTRACT: Why is a city designated as a capital? Chhattisgarh, which was once a part of Madhya Pradesh, became a separate state on November 1st, 2000, with Raipur as its capital. Before it became the capital, Raipur had its own significance. However, once it attained that status, the city's growth skyrocketed. With the change in Raipur's status, GCET (Government College of Engineering and Technology) became NIT (National Institute of Technology), going from a state level institute to a national level institute.

Similar to how Raipur GCET was a typical state-level institution before NIT took control of its campus, the campus has undergone a number of adjustments to reflect its new status. In just 22 years, Raipur City has undergone a number of changes as well befitting the title.

This paper tries to identify and document the changes in the campus after its change from a state level college's campus (GCET Raipur) to a national level college campus (NIT Raipur campus).

Keywords: *Capital City, Raipur, National Institute of Technology Raipur, Government College of Engineering and Technology Raipur, Changes in a City.*

1. INTRODUCTION

Although it is a young capital city, Raipur city is an old city. It has a long history and is developing quickly in every field, whether it be residential, commercial, industrial, or educational.

My research focus is on the city's history, its significance, and what makes it a capital city. Importance of the city to the state and the importance of the state to the nation. Raipur became a capital city on 1st November 2000 when Chhattisgarh was declared as a state which set in motion a series of changes in the whole city in each and every field. The city's infrastructure, including the buildings and roadways, has undergone tremendous development.

Then utilising an educational institution as a lens to examine changes in the city before and after 2000 in the form of the change in GCET's (Government College of Engineering and Technology, Raipur) campus being given to NIT (National Institute of Technology, Raipur). The campus at Raipur GCET has undergone a variety of changes to reflect its new status, much like how it was a typical state-level university before NIT gained control of it and became a national level institute.

2. LITERATURE REVIEW

The state of Chhattisgarh is centred at Raipur. Prior to Chhattisgarh's formation on November 1st of 2000, it was formerly a part of Madhya Pradesh. Along with its capital city, this 22-year-old state has made significant progress. According to the Swachh Survekshan 2021 survey, it is the sixth cleanest city overall. It was placed seventh in the 2019 ease of living index and seventh in the 2020 municipal performance index by the Union Ministry of Housing and Urban Affairs.

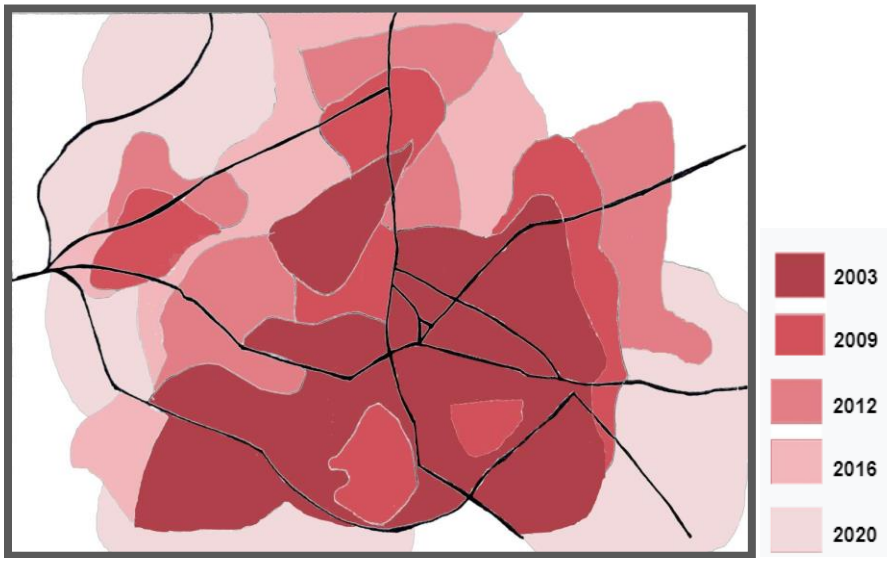
Raipur experiences more organic growth than well planned expansion.

The various aspects of a city, such as its industrial, commercial, residential, road and transportation, and educational sectors, can be observed.

The type of growth, whether allowed or not, must be taken into consideration.

A city expands because of demand, and whether the growth is intentional or natural, wherever there is a need there will be buildings for commercial, residential, institutional, and educational purposes.

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Map 1: Tentative Map of Raipur Representing Growth of City over the Years

3. URBAN LAND USE PATTERNS IN RAIPUR CITY ARE CHANGING

Land use patterns, which describe the right distribution of activity, determine the urban form of a city. The functional effectiveness of a city is greatly influenced by the pattern of urban land use. Changes in the urban land use pattern are considered an essential component in studies of urban morphology because they are a result of a dynamic physical growth process that has been occurring through time and space. The fastest-growing urban population and urban sprawl are the outcomes of the interaction of socioeconomic and environmental variables in a particular city at a certain time and place; Raipur in the state of Chhattisgarh is the best illustration of the aforementioned phenomenon. One of the most noticeable effects of an expanding urban population is on arable land, which declines as a result of commercial, institutional, residential, and industrial activity as well as urban infrastructural activity. The city of Raipur is distinctive because of place and circumstance, geographic location, patterns of past population growth, and demographics. These elements collectively influence the formation and future progress of urban land use change.

The area of study of the capital and largest city in the state of Chhattisgarh, Raipur is also a significant administrative, commercial, and educational hub. It is situated in the Raipur district of the state. Atal Nagar is the name of the state of Chhattisgarh's future capital, Naya Raipur. The recognised Bhilai steel plant nearby has greatly accelerated its growth.

Bhubaneswar, Kolkata, Bhopal, Ahmadabad, Visakhapatnam, Indore, and this nodal area of the city have contributed to it becoming more significant.

The main objectives:

- To analyse between 1976 and 2011, Raipur's city's urban land use pattern changed.
- To learn about the changes in Raipur's urban land usage.
- Comparative comparison of the research area's various urban land use classifications.

Urban land use change in Raipur city is influenced by the interaction of socioeconomic and environmental factors at a certain time and place through the rapidly growing urban population. Raipur city is the result of the physical growth process. Between the chosen research years of 1976 and 2011 by the research article, urban land usage in the study area showed substantial shifting variances. Residential areas have increased by 64.51% as a result of the rapid growth in the population, commercial areas by 6.45% as a result of Raipur's status as the state's capital, industrial areas by 5.18% as a result of the lack of industrial sites and pollution in the urban areas, public and semi-public areas have increased by 8.42% as a result of the lack of a well-planned distribution of public and semi-public facilities, and recreational areas have increased by 2.73% as a result of. (Jana & Sinha, 2019)

The objective of Raipur's master plan policy is to design the urban land use plan for the best use of developable land via thorough surveys and research on a city's current state and its potential for future growth.

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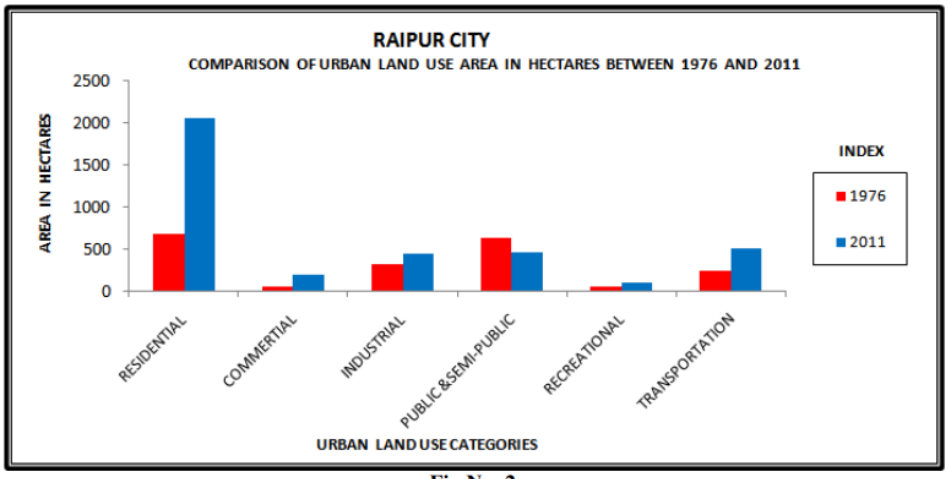
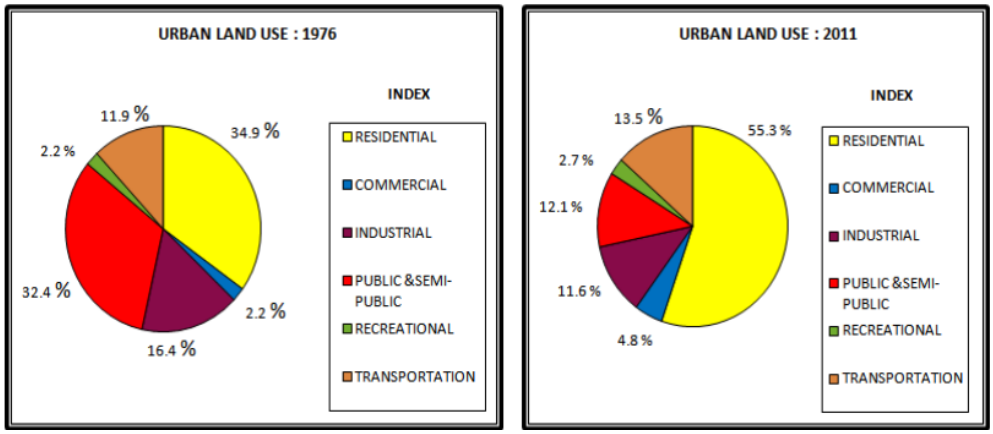


Fig No. 2



Graph 1&2: Bar graph and Pie Graph Showing Comparison of Land Use between 1976 and 2011 in Raipur City
(Jana & Sinha, 2019)

The graphs from the IOSR journal of humanities and social science reveal that while understanding the distribution of various spaces in a city is vital, it is equally crucial to take note of how those spaces have changed over time.

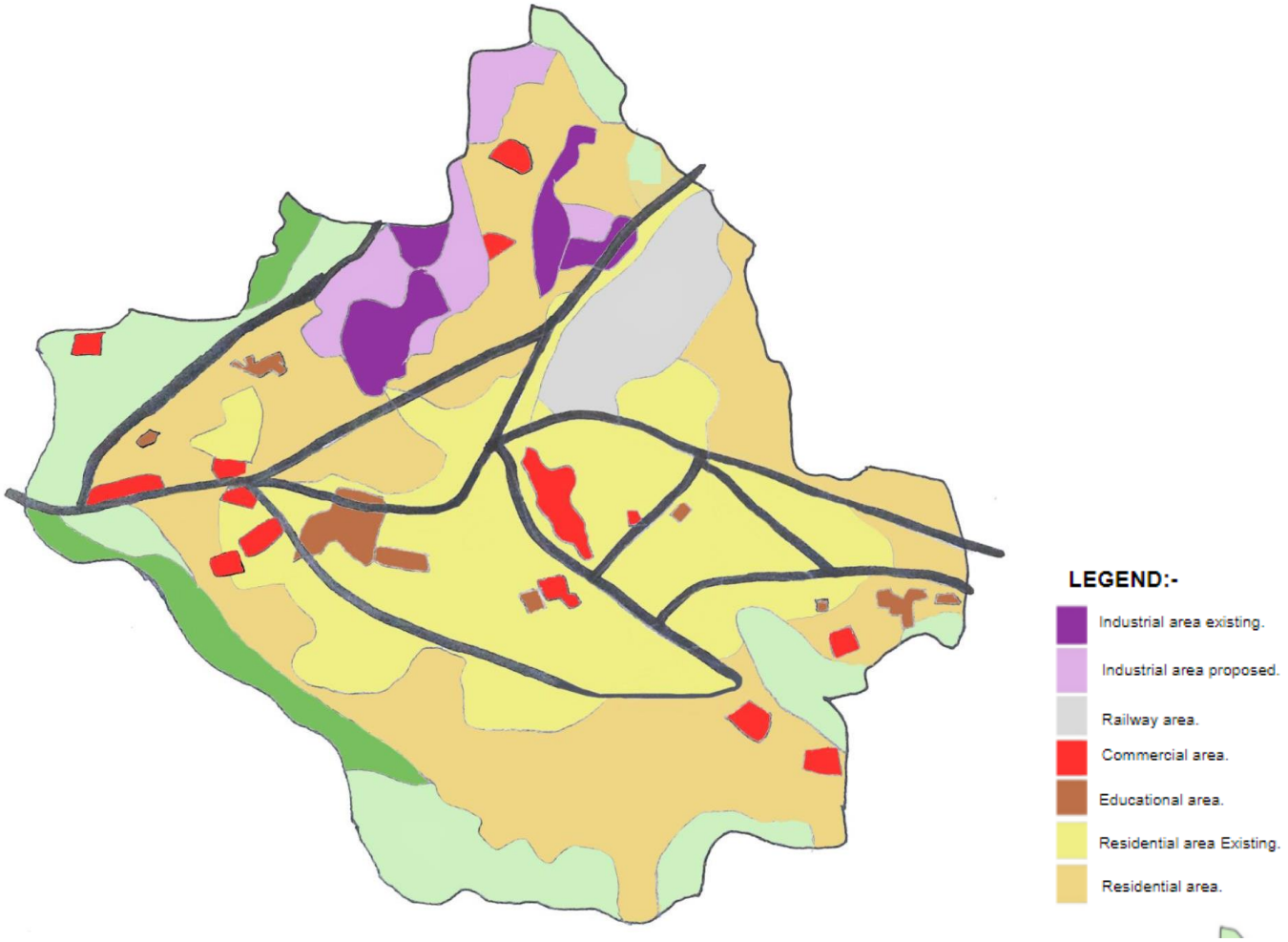
The bar graph compares Raipur before and after it became the capital of India. It demonstrates the rising demand for residential spaces, which nearly tripled between 1976 and 2011 while also increasing three times in terms of commercial activity. The only area that has dropped is public and semi-public; recreational, transportation, and industrial areas have all doubled. Intriguingly, the percentage of land use has also changed significantly. The percentage of residential land use has increased significantly, while the amount of public and semi-public land use has decreased. This pie graph makes it easier to grasp how the usage of various typologies relates to the city's natural expansion.

As seen, purple areas are predominantly in the northern part of Raipur near the railway area. This increase in industrial area hence industries has resulted in a lot of air pollution in Raipur, The capital of Chhattisgarh, Raipur, was recently named the most polluted city in the nation by the Central Pollution Control Board (CPCB).

Red colour denotes commercial areas but almost everywhere in the residential areas there are some commercial shops for daily need but in this map red actually denotes areas with a large no. of commercial spaces.

A huge chunk of the educational area denoted with brown can be seen slightly to the western part. This area includes National Institute of technology Raipur, AIIMS Raipur, Science college, Engineering College, Ayurvedic amongst many more.

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Map 2: Tentative Development Plan of Raipur City

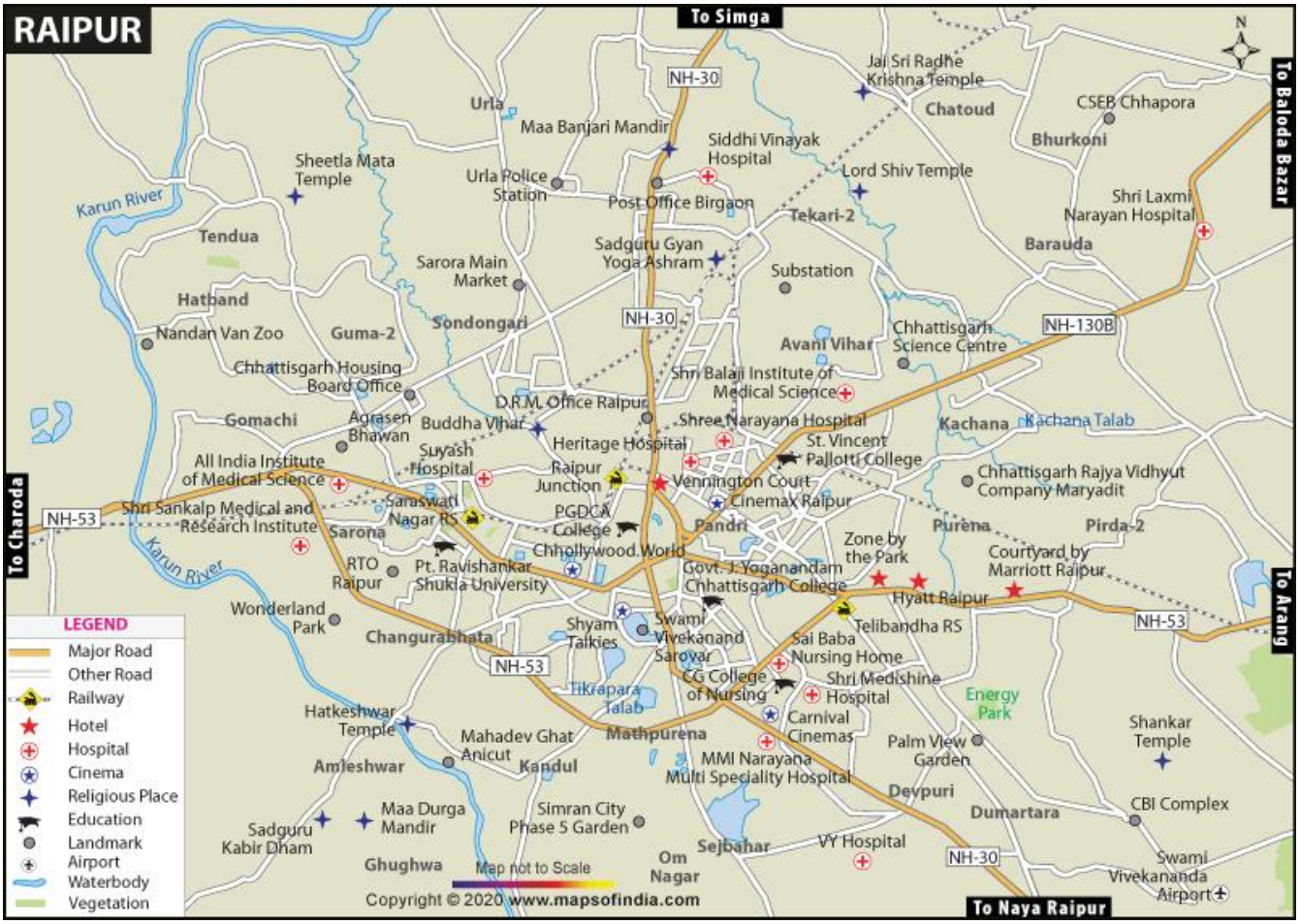
4. ROAD ACCESSIBILITY AND PROXIMITY TO RAIPUR'S CITY LIMITS IN CHHATTISGARH

Road transportation is more rapid, practical, and adaptable. It can be customised to meet particular needs.

Door-to-door pickup and delivery are only feasible when using a road. Roads are a crucial complement to other modes of transportation like rail, water, and air. Passengers are transported by feeder highways to railroad terminals, ports, and airports. The top elements affecting an area's socioeconomic development are its density, connection, and transportation infrastructure. Reduced expenses for vehicle operation and maintenance, quicker transit of perishable goods, less fuel consumption, and safer travel are all made possible by a robust road network infrastructure.

In the case of Raipur's periphery, the extension of roads (NH, SH, district road, village road) has aided in developmental activities, assisted people in overcoming loneliness and isolation, and assisted in socioeconomic, cultural, and political integration. Roadways in Raipur City measure 3501.44 km in length, including the surrounding area. The distance between the roadways in the city and the suburbs is 2409.65 km compared to 1091.79 km in the city. It varies from the major fringe to the secondary fringe, but the average road density in Raipur City's fringe region is 2154.75 metres per square kilometre.

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Map 3: Transportational Networks in Raipur City

(Raipur City Map, Chhattisgarh, 2020)

5. MAJOR ROADWAYS IN RAIPUR

G.E. Road is one of the most important roads in Raipur spinal cord of sorts and acts as a major growth corridor.

G.E. road is not only important in Raipur but also in intrastate travel as Raipur became the capital and traffic increased to divert the trucks and large vehicle:

Ring road 1 was constructed from Tatibandh Chowk to Telibandha Chowk to deal with heavy traffic.

Ring road 2 is from Tatibandh Chowk via Bhanpuri towards Bilaspur.

Ring road 3 is from Mandirhasaud via Vidhan Sabha passing through siltara industrial area to aarung road.

Ring road 4 is in progress.

Airways

Raipur has a domestic Airport- Swami Vivekanand Airport, which is planning to go international.

Two other small airports near Tida and Jamul are Private.

Railways

Raipur has a major Railway junction. It is one of the few Indian railway stations to have been accorded the rating “A-1” by the Indian Railways and one of the busiest and most profitable in the country.

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5. RESEARCH METHODS

First, conducted a review of previous studies on Raipur City as the basis for my research.

Studying the history of Chhattisgarh and Raipur. Understanding why they are important. Reasons for it becoming a state capital. Changes in the city after it became a capital. Mapping the changes in the city, whether it be physical growth or the development plan of different sectors. through which we try to understand the growth pattern. analyse the changes in urban land use. All these could be understood by many research articles like:

Road connectivity and proximity of fringe of Raipur city, Chhattisgarh. (Mukherjee, 2016, #)

Trends in urban land expansion, density, and land transitions from 1970 to 2010: a global synthesis (Güneralp *et al.,* 2020, #)

Effects of urbanisation expansion on landscape pattern and regional ecological risk in chinese coastal city: A case study of Yantai city. (Shao, 2014, #)

Functions of the capital city in the political and territorial structure of the state. (Okunev, n.d., #)

The growth of the city: An introduction to a research project. (Burgess, 1925, #)

Changing pattern of urban land use in Raipur city (Chhattisgarh State, India): 1976–2011

After analysing all the aspects of understanding a city we need to understand city with Raipur as a lens so we need words of wisdom of different experts so i did interviews of different source persons.

Interviews to understand city:

- Anuja Joshi - Urban Designer.
- Amey Wadegaonkar - Urban Designer.
- Satyaprakash Mishra - City Planner.

These interviews basically were about what a city is, how we look at a city, City's growth, physical expansion along different sectors like residential, commerstial, industrial, Educational and transportational, planned growth *vs.* the organic growth seen in a city, Growth corridors, Raipur city's importance, reasons for designation as the capital city, Growth since 2000 in residential commercial sectors i.e. changing patterns in urban land use, Raipur city's transportation systems, Road networks and connectivity, Raipur's organic growth, demand and supply chain.

Understanding the capital city Raipur becomes a vast never ending research so we need to define our Research's scopes and limitation.

Scope and Limitation

We try to focus on the designation of Capital city and we try to measure its impact on educational institutes with the case of NIT campus. As a City's designation changes due to which it experience a lot of changes we can see after the designation of Raipur as a capital city in November 2000 the former Government college of Engineering and technology, Raipur a local state college's campus was given to National Institute of Technology, Raipur in 2005 with this change is status to the campus there were a lot of changes. To understand those changes another series of interviews with experts in this topic was conducted.

Interviews to understand National Institute of Technology, Raipur

- Dr. Debashis Sanyal—Architecture Professor at National Institute of Technology, Raipur.
- Dr. Abir Bandyopadhyay—Architecture Professor at National Institute of Technology, Raipur.
- Sameer Bajpai—Civil Engineering Professor at National Institute of Technology, Raipur.

After having a conversation with them I tried nothing but all the changes, analysing them through tables and maps.

Not only in this stage but maps are a crucial tool in analysing material in my research so now we need to note down all the maps used in the research.

Mapes needed for the study:

- Map showing the growth of Raipur in the interval of a few years.

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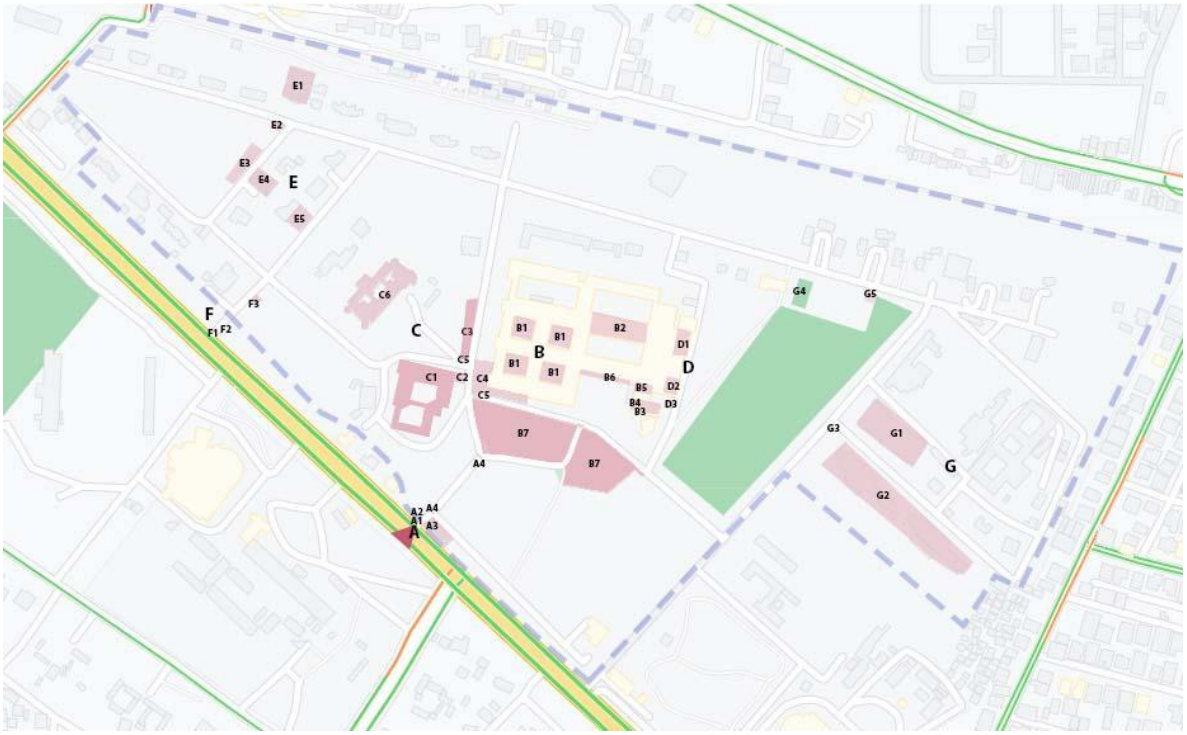
- Map showing roads of Raipur, growth corridors, and maybe the relationship between roads and settlement can be seen.
- Map Showing changes in urban land use.
- Maps showing Changes in the campus of NIT after 2000 and after 2005.

6. ANALYSIS, RESULTS AND DISCUSSION

Changes in any city have a huge impact on every sector in one way or another, with a huge impact like the designation as capital city inherently brings with it a lot of changes. Before we go right to the changes we first learnt a brief background of Raipur city Through analysis of different study material already available. After that we understood it is nearly impossible to understand a complete city in one research article so we defined our research's scope and limitations as mentioned above. With all that in the background we start to analyse the campus of National Institute of Technology, Raipur.

But from where to start understanding a whole working of a campus of an institute as NIT in itself is a multidisciplinary study so we again focus on changes in the campus after 2000 when the Raipur city was made the capital city of Chhattisgarh, and changes after 2005 when the Government college of Engineering and technology, Raipur's campus was given to National Institute of Technology, Raipur.

These changes can be again distinguished between changes in the main building, its surroundings and changes in the whole campus.



Map 4: National Institute of Raipur's Campus with Changes along the Years Mapped

NIT's campus is divided into 8 zones/categories for better understanding of the campus:-

- A - Main entrance area
- B - Main building.
- C - Architectural block and its surrounding.
- D - Adjoining building to main building.
- E - West residential area.
- F - Side Entrance.
- G - East residential area.
- H - Common Facilities all over the campus.

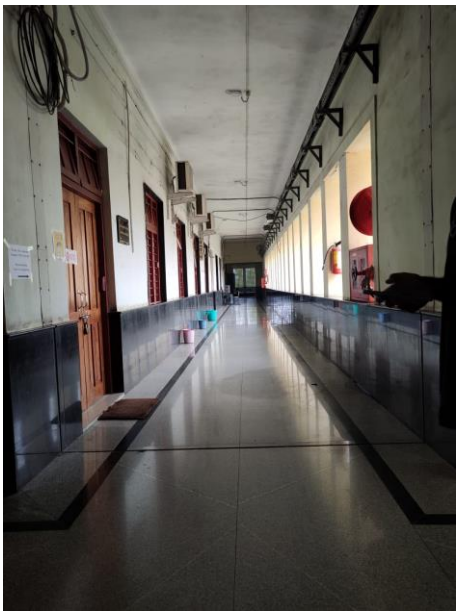
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Table 1: Changes in Zone A-Main Entrance Area

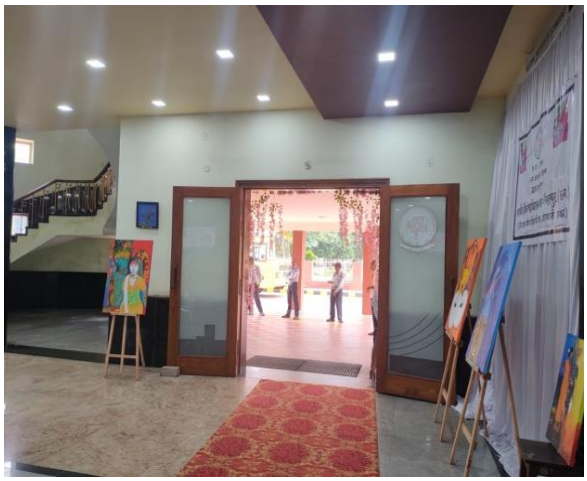
S. No.	***Name of the Change***	***Photos***
A1	*Main Entrance with Security:* A landmark for navigating the region, NIT's Major Gate is located on the main road (G.E. road).	
A2	*Guard stations:* Security was loose initially, even after it became NIT's campus, but it has become stricter over time.	
A3	*Parking:* Informal parking near the main building for visitors. It is mostly active during any events in the college.	
A4	Barricade: Barricades and speed breakers provide an extra layer of security.	

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Table 2: Changes in Zone B-Main Building

S. No.	*Name of the Change*	*Photos*
B1	*Main Building's interior courtyards:* Main Building has total 4 courtyard designed in different ways to provide a breathing area in the main building.	 
B2	*Corridor:* Few corridors are renovated and added few facilities related to fire fighting, electrical and artificial ventilation.	

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S. No.	***Name of the Change***	***Photos***
B3	*Entrance gate from outside:* Entrance to the main building is from a semi covered porch.	
B4	*Entrance gate from inside:* Entrance lobby's tiling and ceiling has been renovated.	
B5	*Lobby:* As soon as we enter we see this display on the right showing students work live as well as on the screen.	

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S. No.	Name of the Change	Photos
B6	*Parking in shed:* Semi-open parking shed next to the main building for faculty and non- faculty staff.	
B7	*Landscaping:* NIT's campus has always been a luscious green campus and the last few years it has been even more well maintained and planned.	 
B8	*On 2nd Floor 3–4 more classrooms:* With an increase in intake of students, the need for an increase in the number of classrooms was seen.	-
B9	*Workshop area (susceptible for further growth):* Workshop area was created for students to create a better hands on working experience.	-
B10	*6 Audio Visual Classrooms:* With change in time and technology the campus also needed to upgrade its technology with 6 audio visual classrooms.	
B11	*Inter NIT classroom, Knowledge network Sharing:* With this college building being a NIT building, few facilities are needed as an institute.	

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Table 3: Changes in Zone C-Architectural Block and Its Surrounding

S. No.	***Name of the Change***	***Photos***
C1	*In 2003 Architecture Building:* Being a national level college it also needed to upgrade its courses as well which didn't fit in the main building so a separate building was constructed for architecture.	
C2	*ATM machine:* ATM machine is present in between the main building and architectural block for the ease of students.	
C3	*Parking:* Parking next to the architectural block is provided for students.	

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S. No.	Name of the Change	Photos
C4	*Parking open:* Parking in between the main building and architectural block is provided for students.	
C5	*Barricade:* Barricades are present on the road leading to the main gate to make sure no vehicles go through this road as it is strictly pedestrian.	
C6	*Girls Hostel:* Campus being changed from a state level college to a national level college with the change in sheer number of participants it is also observed a change in type i.e. students coming from different regions creating need of accommodation provided by this girls hostel.	–

Table 4: Changes in Zone D-Adjoining Building to Main Building

S. No	Name of the Change	Photos
D1	*Central Computer Centre:* To keep up with changing time and technology the need of this building arised.	

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S. No	*Name of the Change*	*Photos*
D2	*Canteen:* Every institute needs a canteen with a change in number of students. The canteen needs to be bigger so a new building just for the canteen.	
D3	*Tree sitting near canteen:* For providing an informal sitting a platform under the tree is provided.	

Table 5: Changes in Zone E-West Residential Area

S. No.	*Name of the Change*	*Photos*
E1	1no. G+6 buildings for Faculty and non-faculty staff on east. With increase in student intake, increase in faculty is also seen with their need for accommodation.	

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E2	Overhead Water Tanks	
E3	Gym Facility-	
E4	Type D Quarter renovated to medical dispensary-with the need of in-house medical assistance one of the quarters was renovated to a medical dispensary.	

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E5	*Type D Quarters renovated to Girls hostel:* As mentioned in C6 to keep up with the out of state students a Quarter was converted into a girls hostel.	

Table 6: Changes in Zone F-Side Entrance

S. No.	***Name of the Change***	***Photos***
F1	*Side Entry with guards:* The side entrance in the west provides a connection of the west side residential area to the main road.	
F2 & F3	Guard stations	

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Table 7: Changes in Zone G-East Residential Area

S. No.	*Name of the Change*	*Photos*
G1	*G+6 Mega boys Hostel:* Campus being changed from a state level college to a national level college with the change in sheer number of participants it is also observed a change in type i.e. students coming from different regions creating need of accommodation which is satisfied by this G+6 boys Hostel.	
G2	*2 no. G+6 buildings for Faculty and non-faculty staff on west:* With increase in student intake, increase in faculty is also seen with their need for accommodation given on the east with 2 G+6 buildings.	
G3	Guard stations	

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S. No.	***Name of the Change***	***Photos***
G4	Souvenir Garden	
G5	Water Tanks	

ISBN: 978-93-89934-68-7

Table 8: Changes in Zone H- Common Facilities All over the Campus

S. No.	*Name of the Change*	*Photos*
H1	Road networks: Road networks were upgraded along the years.	 
H2	Signages: For easy navigation in the campus many signages were introduced.	  
H3	Side Drainage System: One of the big servies changes in recent years is the change in the new drainage system.	

All the above changes can be found out to be in a direct response to one of these factors which promoted these changes:

- Admission procedure, with the campus changes from a state institute's campus to a national institute's campus the student intake both in terms of sheer numbers and the places they are from. Which impacts the residential component of a campus.
- Another factor for the changes in residential components is the staff, for a larger and diverse intake of students a larger and diverse faculty and non-faculty staff is needed.
- With the intake of students and staff there is a change in the main academic curriculum of the institute which again promotes many changes in the campus.
- Apart from academics there are many facets to college life like co-curricular activities and which in turn will require another type of space.

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- Along with all this we should not forget the main reason for all these changes i.e. the status of the institute with that status it also brings a lot of changes to reflect that status.

Now the question arises if all these changes in a single campus are possible and will those changes in a small campus of 90 acres reflect the status of national level institutes' campus which brings us to the institute's vision 2030 which will incorporate another campus of approximately 209 acres, which is located 27 km away from existing campus in Naya Raipur.

What is the need of a second campus? All the needs of an institute are taken care of by the existing campus in one way or another but for now it is taken care of. Vision 2030 talks about eventual intake and lifestyle of students in future which won't be sufficiently fulfilled by this existing campus. Also the National Institute of Technology's campus is always self-sufficient whereas this campus is dependent on surroundings which is fine for the time being as it is located in the city near to many institutes like Science college, Engineering College, Ayurvedic college and many more.

To put it all together, the need for a second campus could be explained by the constant increase in the student and staff intake along with the standard of living, to fulfil the need of a self-sufficient campus.

7. INFERENCE/CONCLUSION

We saw that a lot of changes can happen by just the change in designation whether it be a change in designation of city like from Raipur city to capital city of Chhattisgarh or it be a status change of campus of GCET to an NIT campus changes comes with the territory of change in status hence resulting in changes in physical structure.

Another crucial thing to note is that after loading a change in status of it be a city or campus a boost is seen in infrastructural development which results in the initial area becoming smaller and smaller to fulfil the need. So in case of a city the city boundary keeps changing which can be easily seen in case of Raipur city also when the boundary can not be changed like in case of NIT's campus a new campus's need arises.

In many respects, we may argue that changing the designation of a city, a campus, a building, etc. causes several changes that flow like dominoes.

ACKNOWLEDGEMENT

This study of Raipur as a capital city is the result of several talks on this multifaceted subject. It is my goal that the information in this post will stimulate more conversation on the fascinating state of Chhattisgarh and its many intriguing cities, including its capital city Raipur. It is transdisciplinary in nature to study a city. I value my guide's insightful comments and on-going encouragement. He looked through my transcriptions and patiently answered my questions. I want to convey my appreciation to the numerous experts who served as my resources and gave me their wise judgments and assistance in understanding the topic. I also like to thank my colleagues for their kind comments. Everyone's generosity and expertise have greatly aided this study and kept me from making many errors; the ones that are inevitably still present are all my responsibility.

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Resource Persons

[8] Anuja Joshi - Urban Designer.
[9] Amey Wadegaonkar - Urban Designer.
[10] Satyaprakash Mishra - City Planner.
[11] Dr. Debashis Sanyal - Architecture Professor at National Institute of Technology, Raipur.
[12] Dr. Abir Bandyopadhyay - Architecture Professor at National Institute of Technology, Raipur.
[13] Sameer Bajpai - Civil Engineering Professor at National Institute of Technology, Raipur.

APPENDIX

Graphics

- **Map 1:** Tentative map of Raipur representing Growth of city over the years**. Page no. 4**
- **Map 2:** Tentative Development Plan of Raipur city**. Page no. 8**
- **Map 3:** Transportational networks in Raipur city. **Page no. 9**
- (*Raipur City Map, Chhattisgarh*, 2020)
- **Map 4:** National Institute of Raipur's campus with changes along the years mapped**..**
- **Page no. 13**
- **Table 1:** Changes in Zone A - Main entrance area**. Page no. 14**
- **Table 2:** Changes in Zone B - Main Building**. Page no. 15**
- **Table 3:** Changes in Zone C - Architectural block and its surrounding. **Page no. 18**
- **Table 4:** Changes in Zone D - Adjoining building to main building...**. Page no. 20**
- **Table 5:** Changes in Zone E - West residential area. **Page no. 21**
- **Table 6:** Changes in Zone F - Side Entrance. **Page no. 23**
- **Table 7:** Changes in Zone G - East residential area. **Page no. 23**
- **Table 8:** Changes in Zone H - Common Facilities all over the campus. **Page no. 25**
- **Graph 1&2:** Bar graph and Pie graph showing comparison of land use between 1976 and 2011 in Raipur city. **Page no. 7** (Jana & Sinha, 2019, #)

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Institute for MSME and Entrepreneurship Development: Necessity and Learning Environment

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ABSTRACT: The Indian economy needs the development of new, fresh, creative, innovative, enthusiastic, and passionate entrepreneurs,and education plays a significant role in helping people develop their entrepreneurial skills. India is a young nation with an average of 63% of the population currently in the working age range of 15 to 59 years. According to studies, the age groups of 25 to 34 have the highest incidence rates of entrepreneurship. But if the young person is unable to acquire the necessary abilities, such as entrepreneurial skills, and is unaware of the importance of entrepreneurship then this advantage could turn into a disadvantage. Educational institution helps to develop new entrepreneurs and small and micro enterprises.

After the economic reformation in 1991, India opened its economy to the world, providing a new direction to the Indian market in which more focus has been given to entrepreneurship. The government made numerous attempts at various levels to promote entrepreneurship among individuals. Unfortunately, the Indian education system fails to prepare individuals as job providers. Instead, the curriculum is designed in a way where importance is given to job seekers. Entrepreneurship is the need ofthe hour and educational institutions play a vital role to fuel entrepreneurship in the youth.

This paper aims at explaining the importance and need of entrepreneurial education institutes in India as it nurtures the entrepreneurial competencies in the youth, and the role of architecture in inspiring creativity in such innovative educational institutes as it helps an individual to improve their problem-solving skills, creative skills, and motivate them to come and learn in.Setting up the right environment with creative art, innovation, and design will help students to focus on their studies and make theenvironment more optimum for learning.

Keywords: *Entrepreneurship, Entrepreneurship Development Institutions, Youth, Innovation, Creativity, Optimum Learning Environment.*

1. INTRODUCTION

India is one of the most populous countries on earth with a population of 1.393 billion. In India, the population is made up ofroughly 63.6 percent of people between the ages of 15 and 64 (World Population Review, 2021). Because of its huge working population, India has got an unique advantage over all other countries in the world in terms of the "demographic dividend" (economic growth brought on by a change in a country's population structure). However, the demographic dividend can be gained only if India can provide its population with adequate employment opportunities. On the other hand, unemployment and underemployment are a growing global phenomenon, and virtually every country in the world is struggling to deal with it. Even if India's Gross Domestic Product rate is increasing impressively, India still lags in job creation. The growing unemployment rate became one of the major issues in India. The employment opportunities in the public sector are not increasing at the same rate at which the number of unemployed persons is increasing. However, Entrepreneurship can play a key role in creating job opportunities and boosting the Indian economy at the same time. Promoting innovative MSMEs can help to solve the issue of unemployment and underemployment in India.

The learning environment in MSME institutes comprises a set of elements that influence students' learning experiences, including the physical environment, teaching methods, curriculum, resources, and social interactions. A conducive learning environment can enhance students' motivation, engagement, and learning outcomes, while a non-conducive learning environmentcan hinder their progress and success.

1.1 Identification of Research Questions

- What is the role of institutional factors in Entrepreneurship Development?
- What are the initiatives taken by government for promoting entrepreneurship?

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- How EDI psychologically helps students and entrepreneurs?
- How Architecture is correlated with the educational process
- What is the role of architecture in inspiring creativity in learning spaces?

1.2 Aim of the Study

The research paper aims to study the need of Institute for MSME and Entrepreneurship Development and to investigate the learning environment and their impact on the development of entrepreneurial skills among students in such institutes.

1.3 Objectives of the Study

- To take an overall review of entrepreneurship development in India.
- To find out the major hindrances to entrepreneurship development.
- To study existing institutes for MSME and entrepreneurship development institutes.
- To study the impact of innovative design in entrepreneurship development institute.

1.4 Scope of the Study

The scope of the study is limited to the need for Institute for MSME and Entrepreneurship Development Institute in a city/district with the potential to create an entrepreneurial ecosystem for promoting entrepreneurship development in the region.

2. LITERATURE REVIEW

The present chapter reviews the relevant literature related to the importance of entrepreneurship in society and the need for innovation and entrepreneurship opportunities, education, and an entrepreneurial ecosystem in the Country. A thorough search was made to find a literature review on the topic through secondary sources published in different books, reports, newspaper articles, journals, and thesis research.

Mitzkus (2022) explains the concept and the definition of Innovation and Entrepreneurship and their relationship. He defines innovation as the process of creating something unique and in great innovations, entrepreneurship spots the opportunities, seizes them, adds value, and maintains the value by rising over time. Entrepreneurs in business require innovation to stay relevantin the face of growing competition in all facets of human endeavour. He highlights the importance of innovative entrepreneurship, which always enhances the creativity level and the design thinking process helps organizations to understand future market trends,and also come up with innovative solutions to grow business.

Ramanan *et al.* (2021) have found in their study that India has been lacking in comprehensive innovation and an entrepreneurial environment that fosters Inspiration, Imagination, and Innovation in our schools, universities, and enterprises. Access to an innovative and entrepreneurial ecosystem will boost the development of entrepreneurship in India and will motivate youth to take entrepreneurship as their career choice. They further added, with over 10500 engineering and related colleges, and approximately 39000 colleges in India, it is estimated that 150 million youth of India will enter the workforce in the next few years and must realize their entrepreneurial potential through world-class innovation and entrepreneurial education. India, a country of billion people has thousands of challenges, but it also offers thousands of chances for creative, enterprising enterprisesto prosper and possibly have an impact on the world.

Sachin Gupta (2021) opinions that experience-based and practical learning studies should be introduced in higher education to deal with real-world work environments. He added the industry criticizes the institutions for their UG and PG programs for lack of practical training in their respective field. According to the eighth edition of the Indian Skills Report, more than half of graduates are unemployable due lack of their professional skill set. The development of entrepreneurship in India has given the Indian economy a tremendous growth outlook. But the biggest obstacle to India's economic progress is the potential fora skills gap. He suggested that educational institutes must encourage students to learn outside of the classroom and embrace self-directed learning. This will help students to uncover practical entrepreneurial prospects and focus their time on developing and implementing a business plan and exploring entrepreneurial opportunities.

Jordi Canals' (2015) through his study highlights the desire to start his own individual business is growing stronger day by day among youth today. Therefore, the importance of project-based teaching and promoting entrepreneurial initiatives in

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college itself should be realized. It will motivate students strongly and will develop entrepreneurial spirit among them. In addition to focus-based teaching, Colleges, and universities should also focus on new and innovative products and services in order not to end up learning and managing future dead branches. He suggested that colleges and universities should launch 'Leadership and Entrepreneurship Development Programs' that aim to improve students' management knowledge and skills as well as their ability to contribute to the good and sustainable growth of society.

Most of the studies have identified the importance of entrepreneurship, the role of innovation in entrepreneurship, and the need for an entrepreneurial ecosystem to boost the development of entrepreneurship in India. However, even though India is 3rd largest entrepreneurial hub in the world, it lags in terms of innovation-based start-ups and access to an innovative and entrepreneurial ecosystem. This results in the failure of scaling up the enterprises from micro to small, small to medium, and medium to large. Inadequate formal mentoring, bad business ethics, and replication and copying of ideas are also other causes of failures, that's why universities and colleges should recognize the importance of entrepreneurship education on the entrepreneurship behaviour of college students and should promote entrepreneurial culture in the college itself. To improve the current status of entrepreneurship in India by promoting entrepreneurship development programs, promoting entrepreneurial initiatives in colleges, and developing institutes for entrepreneurship development can play a key role in promoting entrepreneurship in India.

3. RESEARCH METHODOLOGY

3.1 Research Design

Research design is an outlay of what and how to perform the research work before starting it. It helps to do work more systematically. Thus, it explains the methods of data collection and the research process adopted for carrying out the research. This research is carried out using both primary and secondary data, highlighting the importance of awareness of entrepreneurship and entrepreneurship development institutes. The research also included the study on major issues obstructing the economic growth of the country and government initiatives to tackle the same. A descriptive research design has been used to carry out the research including a series of interviews, secondary surveys, observation methods, and secondary data obtained from journals, articles, websites, and annual reports.

3.2 Methods of Data Collection

3.2.1 *Collection of Primary Data*

Most of the information is collected from primary sources. The primary data have been collected through structured questionnaire and by approaching the entrepreneurs, students, officials and non-officials and other experts in the institutes and field. The information is collected directly from the entrepreneurs, and faculties from entrepreneurship development institutes through questionnaires and personal interviews.

3.2.2 *Collection of Secondary Data*

Apart from the primary information collected as above secondary data was drawn from books, secondary surveys, journals, articles, office files, pamphlets, annual reports, published and non-published thesis works and dissertations.

4.3 Results and Discussions

4.3.1 *Government Initiatives for Promoting Entrepreneurship*

The Indian government is doing a lot more efforts to promote innovation and entrepreneurship in the nation. Because of the importance of innovation and entrepreneurship for economic growth, deliberate efforts are being made to promote them. The unemployment issue is a major challenge looming in front of us. However, with a demographic dividend on our side, we have tremendous potential to create jobs by nurturing entrepreneurship and innovation. The government has also given special attention to ensuring that all policy initiatives aimed at providing equal opportunities to women as economic participation of women and women entrepreneurship are important drivers of a country's growth. The goal of the government is to support female entrepreneurs by facilitating their access to loans, training, and other resources.

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4.3.2 *Role of Institutional Factors in Entrepreneurship Development*

The analysis done by Dr. Shashi Kant in his report shows that support from the institute of entrepreneurship development is the most important factor in promoting entrepreneurship. The institute provides other facilities like mentorship, training, and workshops for students as well as entrepreneurs, education, sponsors them and provides linkage with Industries and experts. A total of 400 students and entrepreneurs responded to the survey. The data shows that along with the support from EDI, training, workshops, and Mentorship are also the top most important factors. Hence the maximum number of institutes should be establishedfor the promotion of entrepreneurship development.

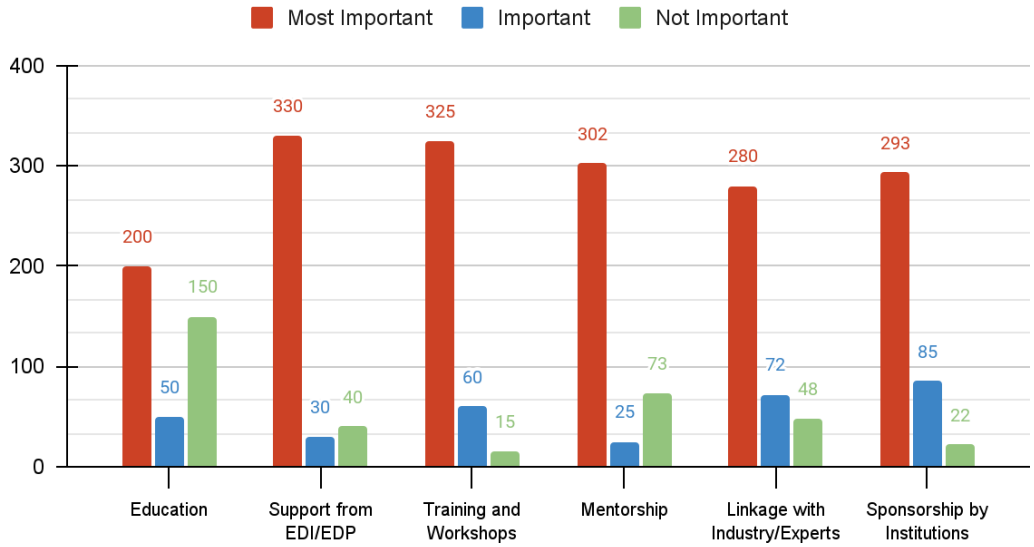


Figure 1: Role of Institutional Factors in Entrepreneurship Development

(*Source:* Research Paper - Role of EDI in promoting Entrepreneurial culture in India)

4.3.3 *Role of Psychological Factors in Entrepreneurship Development*

The development of entrepreneurship is influenced by a variety of psychological factors. These are related to the willingnessto take risks, need satisfaction and achievement, job dissatisfaction, etc. The result of the response about these psychological factors from respondents is presented below:

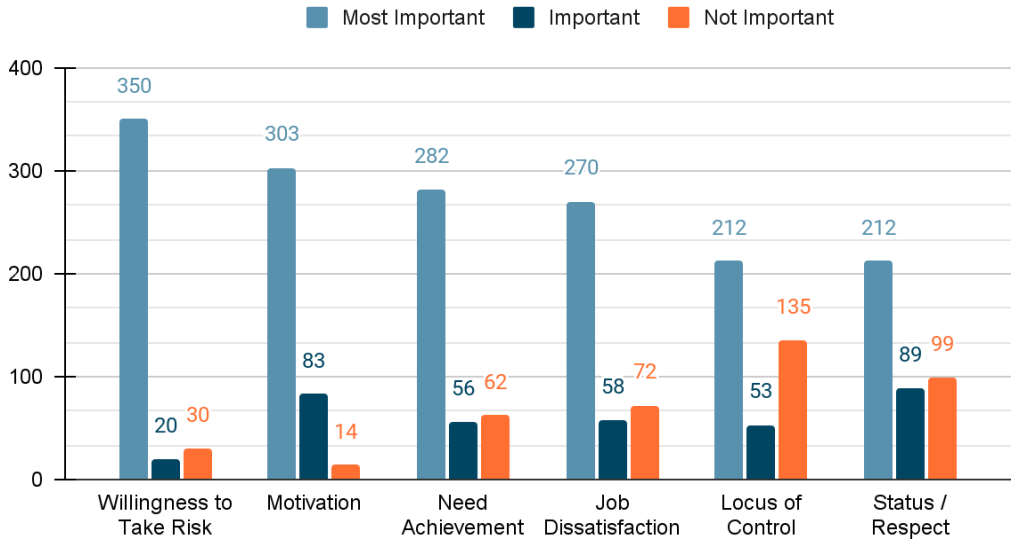


Figure 2: Role of Psychological Factors in Entrepreneurship Development

(*Source:* Research Paper - Study of institutional promoted entrepreneurship development in India)

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The data shows that 87.5% of total respondents consider willingness to take risks as the most important psychological factor, followed by motivation (75.75%), need achievement (70.50%), job dissatisfaction (67.5%), locus of control (53%) and status/respect (53%). Willingness to take risks, motivation, and the need for achievement are the top three psychological factors for entrepreneurship development. Hence the role of entrepreneurship development institutes becomes crucial to keep students and entrepreneurs motivated. The institutional environment will be a perfect ecosystem for nurturing students and entrepreneurs and keeping them motivated for securing their goals.

The institute of entrepreneurship development achieved these psychological factors by organizing management training based on risk-taking ability, self-motivation, need achievement, etc. This management training help students tackle difficulties psychologically and help them to become successful entrepreneur. Hence educational institute training gives more promising results than online teaching and courses.

4.3.4 Architecture and its Correlation with Educational Spaces:

Architecture is deeply interrelated with educational institutes and plays a huge role in making the educational environment effective for learning. Architects can design functional and beautiful education centres with innovation and creativity that will motivate students to learn more and more.

Creative learning spaces always help students to improve their problem-solving skills, intellectual risk-taking skills, openness to new ideas, curiosity, collaboration, and interpersonal contact among staff, faculties, and students. The architecture ofthe learning and educational spaces has a huge impact to motivate students to come and learn in. Setting up the right environmentwith creative art, innovation, and design will help students to focus on their studies.

The Best Learning Environment is a space where one can interact with everyone and one that caters to the needs of the learner. The Best Learning Environment can be made by providing psychological needs to feel welcome which includes: Environment Comfort, Social Interaction, Structure and meaningfulness, and Control and choice over the learning process. The classroom environment is important to create the best learning environment for students. It can either make or break the students. If not designed properly, it will distract students from focusing and will indirectly affect their mental health and academic performance. A good learning environment can be created by focusing on natural light, sound, colours, furniture, etc.

The classroom is the most important space in any educational centre or institute. Therefore, designing a classroom with innovation and the best learning experience will impact students' behaviour. Designing classroom layouts is just not only about creating aesthetically pleasing space but also about creating a comfortable and functional environment along with a proper arrangement of furniture layout that will motivate students to learn. Proper light ventilation should be in classrooms and they mustbe free from clutter for free movement in the space.

Many Studies have shown the environment of learning space can have a significant effect on student attention and engagement. The factors affecting the classroom environment are the colour of the space, furniture layout, acoustics level, light ventilation, and temperature. While designing a classroom these factors should be put into consideration to enhance students' concentration in the learning process.

From kindergarten to a higher level of education, the importance of group projects cannot be understated. Thus, designing collaborative workspaces that will create suitable environments for group participation and teaching will prove effective to motivate students to participate in group projects. These collaborative workspaces open up teaching possibilities such as teachingthrough debate and discussion as well as learning by doing.

5. CONCLUSION

Entrepreneurship Development Institutes are the breeding pool for entrepreneurs and thus one cannot neglect the role of these education centres. India still has a low level of entrepreneurial awareness and knowledge due to a various reason. People still prefer job seeking over beginning their own business. This is due to the fact that our educational system is set up in a way that discourages creativity and innovation. Along with the entrepreneurship development institutes, higher educational institutes must also be focused more on fostering the creativity and innovation. Inspite of all the training and aid provided by the government,it has been observed during the interview and interaction with the students and first-generation entrepreneurs who have started their own enterprises, that during their initial phase, they need constant guidance and supervision for running their business as one cannot cover all training aspects in short time. The role of entrepreneur

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development institute become crucial when it comes to support and mentorship from faculty. Such type of support is necessary for all first generation and micro entrepreneurs.

The learning environment in an institute for MSME (Micro, Small and Medium Enterprises) and entrepreneurship development is critical to the success of its students and their ventures. It encourages creativity and innovation. A conducive learning environment stimulates creativity and innovation in individuals. It promotes the exchange of ideas, encourages collaboration, and fosters an atmosphere of experimentation. In conclusion, the learning environment in an institute for MSME and entrepreneurship development is crucial for the success of its students. It provides a platform for individuals to learn, grow, and thrive as entrepreneurs, creating a positive impact in the economy.

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The Kashi Vishwanath Temple: The Heart of Moksha Nagari

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ABSTRACT: India is a country that glorifies spirituality & is a motherland for numerous pilgrims. Among these, Kashi is believed to be the supreme *teerth sthan*. The Kashi Vishwanath Temple is rooted on the spiritual edge of the river Ganga. The main deity of the temple is Lord Vishwanath (lord Shiva) which is also called Kashi Vishweshwar & means "LORD OF THE UNIVERSE."

Past few generations of our ancestors say that the darshan of any such supreme deities is very difficult due to its topography & geographic constraints. Hence people used to proceed for such yaatras only after handling all the worldly responsibilities of the new generations. But in the past few years, transportation, tourism & infrastructural development has changed this scenario. As a result of the same, due to the development of Kashi Corridor, the number of visitors has increased from 5000 to 1 lakh visitors every day. But why do such a huge number of people urge to visit The Kashi Vishwanath Temple, is the temple maintaining its spiritual quality, or has become a center of commercialization? The answer is as old as history. This study seeks answers to such questions & also provides brief imagery of the temple, its history & spirituality as well as its religious significance amid urbanization. There are various tangible factors and intangible factors involved that make the Kashi Vishwanath Temple supreme among pilgrimages. Based on the study and observations, it can be concluded that the Kashi Vishwanath Temple is indeed a supreme spiritual center in India. It is not only furnishing a place of deification to the devotees but also a living illustration of India's spiritual history.

Keywords: *Kashi Vishwanath Temple, Spirituality, Lord Shiva, Devotees.*

1. INTRODUCTION

Kashi Vishwanath is one of the jyotirlingas and supreme among all 12 jyotirlingas in India. It is considered as Holiest among all the temples of Shiva. The temple is situated on the Lalita ghat of the holy river Ganga; adjoining the Manikarnika ghat. Recognized in the year 1490, the Kashi Vishwanath Temple is in existence since the commencement of history in the 10th century BCE. (Greaves, 1909) It is also mentioned in Skanda Purana hence; it can be said to be an Indian



Figure 1: Kashi Vishwanath Temple

(*Source:* https://utsavapp.in)

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temple that is as old as history. It has witnessed many ancient dynasties from the Aryans to the Maurya empire to the Mughals & Marathas. The temple was originally constructed by King Vikramaditya. It was demolished by the Mughal invaders three major times. Akbar being a promotor of secularism permitted the construction of the original temple during his rule but over time, Mughal emperor Aurangzeb destroyed it. He constructed the Gyan Vapi mosque on the site adjacent to the temple. He even tried destroying the Nandi statue of the Kashi Vishwanath Temple. But strangely, nobody from his army could succeed in the destruction of the Nandi neither they succeeded to move the Nandi from its position. They defeatedly left Nandi in its place and left. The present-day structure of the temple was then reconstructed by Ahilyabai Holkar who was a Maratha monarch from Madhya Pradesh, in 1780. She gave back the real glory of the temple. Later, Baizabai Scindhiya built a peristyle near the temple where Nandi is currently been kept.

2. PERSEVERANCE OF THE KASHI VISHWANATH TEMPLE'S MYTHOLOGY

Lord Shiva is one of the trinities of Hindu Puranas that represent the three forms of ultimate reality- Lord Brahma is considered to be the creator, Lord Vishnu stands as the guardian and Lord Shiva acts as a destroyer. Among these, Lord Shiva resides in Kashi in the form of Lord Vishwanath. Lord Vishwanath is considered as reigning deity of Varanasi & King of all the deities. (Callewaert, 2000) It is said that Lord Vishwanath stays here for a time.

Many Hindus believe that the important stages on the liberation path are Ganga snan & Kashi Vishwanath's darshan. The belief is that Lord Shiva himself drives a mantra of freedom in the ears of the one who dies or decides to end his life at the temple. (Sherring, 1868)



Figure 2: Gyanwyapi well and Nandi

(*Source:* https://collections.carli.illinois.edu)

The mythology behind this linkage of Kashi Vishwanath & salvation is as follows: Once an ideological war happened between lord Brahma & Lord Vishnu upon their supremacy. Lord Shiva then created an infinite pillar of light (later became known as jyotirlinga) and asked both of them to find its top & bottom respectively. Incapable to find it so, lord Vishnu admitted his defeat but; lord Brahma lied about finding it. Being angry about Brahma's self-pride, lord Shiva beheaded lord Brahma's fifth head. Brahma realized his actions & apologized to lord Shiva & lord Vishnu. But due to Lord Shiva's actions, lord Shiva got accounted for brahmahatya. In search of a way of washing this sin, lord Shiva reached Kashi where he got freed from the sin. Henceforth, a part of Shiva settled in Kashi in the form of Vishwanath, to wash off the sins of its visitors & devotees.

Generally, being the form of a destroyer, Lord Shiva is often perceived as the one who ends lives to maintain the balance of creation and destruction or the one who can bring the apocalypse (*pralaya*) to restore the living quality of the earth. Amid this perception; his form of Kashi Vishwanath is looked at positively and is worshipped. That is because; Kashi Vishwanath is seen in the form that not only destroys the souls but also purifies them and aware them of cosmic reality and then frees the soul from the materialistic world causing salvation. (Roche, 2016) Kashi Vishwanath is the rarest of the deities that bring out the positive even in the concept that people fear the most i.e., death.

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3. SPIRITUAL AND RELIGIOUS PRACTICES ASSOCIATED WITH THE KASHI VISHWANATH TEMPLE

There are numerous religious practices followed at the Kashi Vishwanath temple. Various festivals are also celebrated on a large scale inside the temple. Around 5000 devotees visit the temple all day. The number increases up to 100000 on special occasions.



Figure 3: Ganga aarti

(*Source:* Author)

Jalabhishek is being performed inside the temple by priests for more than 90 years now. Various visitors and devotees also perform the abhisheka in the temple out of devotion for Kashi Vishwanath and for the wellbeing of their families, on daily basis. Priests of the temple guide these people during the abhisheka. Saptarishi aarti is also performed every year at the Kashi Vishwanath temple. It is said that these Saptarishi are the originals of Hindu gotras. Hence, sages from each gotra together perform the aarti in the Kashi Vishwanath temple on this occasion. Ganga aarti is also performed on the Dashashwamedh ghat adjoining the temple. (Tiwari, 2021)

Phalguna Shukla Ekadashi or Rangabhari Ekadashi is one of the magnificent Hindu events that are celebrated at the temple. Numerous Damroos resonate with the temple on this occasion. This tradition is in performance for more than 200 years. Baba's Tilak is a native ritual that is performed on Basant Panchami. Shivaratri and Shiv-Parvati's marriage is also celebrated on a huge scale every year.

On every Shivratri, Kashi Naresh performs *mahapuja* at the temple. Nobody is allowed inside the temple till the worship ends.

4. THE ARCHITECTURAL SIGNIFICANCE OF THE KASHI VISHWANATH TEMPLE

Nagara style of Hindu Temple Architecture is prominent in the planning of The Kashi Vishwanath temple. Vishnu temple, Vinayaka temple, Kaalbhairav temple, Avimukteshwara temple, and Virupaksh Gauri & Sankatmochan temple are a few other temples that are also located on the premises of the temple & in its nearby area (gullies).

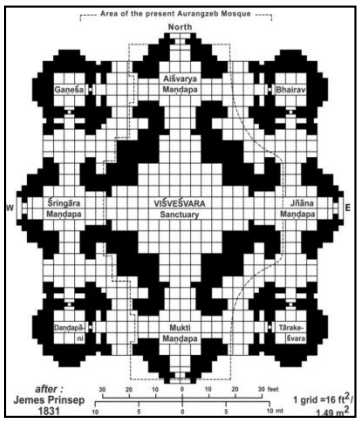


Figure 4: Vedic Plan of Temple

Source: Sir James Prinsep.

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The planning of the main temple is quadrangle in shape. The temple splits into three portions- The spire, a golden dome and thirdly, and the gold spire on the peak of the Garbha Griha. The spire holds a trident & a flag. The Sikh Maharaja Ranjit Singh (also known as Punjab Kesari), donated the gold that was used to cover the domes of the temple. (Doron, 2006)

The inner Garbha Griha of the temple is led by a Sabha Griha. Inside the temple, there is a hidden compound behind a wall accessible only to Hindus. There are numerous smaller *lingas* clustered around the principal Jyotirlinga here.

The main jyotirlinga which is said to be last among 12 incarnations of the jyotirlingas of Lord Shiva is made up of the smooth black stone that stands 2 feet high and 3 feet in circumference and is fixed on a silver altar.

The temple is surrounded by Nagara-styled temples of other gods. A series of shrines, with more lingas and goddess images, can be found in the courtyard. Exquisitely carved ornamentation is observed on the columns, beams, and walls of the temple. A peristyle to the north showcases the Gyan Vapi Well whose mouth is now covered with a cloth. Amid this, it is worshiped by many pilgrims & devotees. The Gyan Vapi well is situated between the temple & the mosque today.

5. GYAN VAPI WELL SITUATED IN THE PREMISE OF THE KASHI VISHWANATH TEMPLE

Gyanwyapi well (well of wisdom) is also an important landmark of the temple. Vapi means well & Gyan means knowledge. The scriptures believe that this well was created by Shiva using the Trishul to obtain water for puja. The sermon was delivered by him consequently to Maa Parvati. That is how the well emerged as Gyan Vapi. It is a tale that the principal saint of the temple dived into the well along with the jyotirlinga. To protect the Linga from invaders, he sacrificed his own life.

There is a belief that if the wish is made by looking at the chatra of the temple, it is fulfilled by Lord Shiva (Vishwanath). The Gyan Vapi well is constructed in sandstones carved in beautiful and intricate Jaali patterns.

6. THE KASHI VISHWANATH CORRIDOR

A corridor has been recently developed around the Kashi Vishwanath Temple by the Indian government in collaboration with Ar. Bimal Patel. It is currently being managed by Uttar Pradesh Government. Made with a budget of 800 crore rupees, The Kashi Vishwanath Corridor is an ambitious project of the Indian government. Phase 1 of the project was inaugurated on 13th Dec 2021. (Ministry of Urban Development, 2015)

The development project was proposed to provide pilgrims and travelers with amenities such as wider and cleaner roads and lanes, clean drinking water, and better lighting with bright street lights. The project has 23 buildings including a tourist facilitation center, Vedic Kendra, Mumukshu Bhavan, Bhogshala, city museum, viewing gallery, and food court among others. Ganga Cruises have also been planned for tourists as a part of the project. This Kashi Vishwanath temple corridor project will help boost tourism.



Figure 5: Kashi Corridor front façade

(*Source:* Author)

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This corridor consists of modern infrastructural development such as the installation of escalators for specially-abled people and senior citizens for ease of circulation. It also consists of souvenir shops and *maha prasad* shops. The temple has more strict security systems than before that include the allocation of police at each gate and on the premises, security checking points, and proper barriers for organized traffic flow. Steps are installed on Lalita ghat in the circulation path from the river Ganga to the temple. This development is carried out in such a manner that it states to have no threat to the temple from the flood. 5 tall light poles are also installed in front of the gateway from the ghat to highlight the corridor space. A complete black marble statue of Adi-guru Shankaracharya is installed in the corridor premise. A white marble statue of Bharat Mata is also installed near the entrance of the corridor to depict the nation's unity and patriotism. The gazebos and seating are also installed in the corridor in the direction of the Nepali temple. It is made up of sandstone.

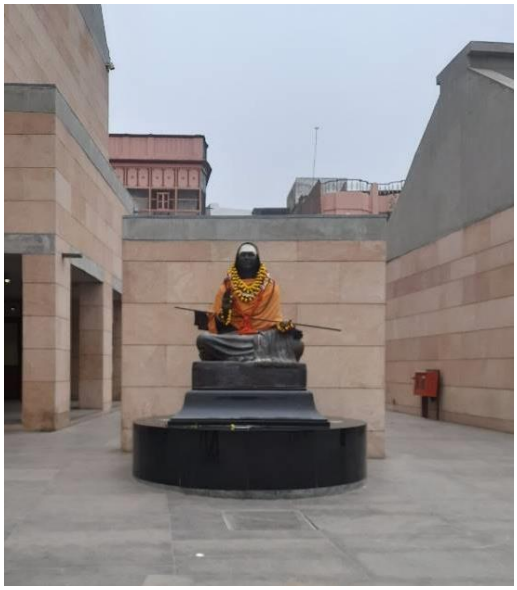


Figure 6: Statue of Adi Shankaracharya

(*Source:* Author)

The new construction is made up of RCC and cladding of sandstone that resembles and blends perfectly with the original structures near the temple. All the designs of the façade are inspired by the architectural style of adjoining structures to maintain the uniqueness of the place. Along with this recent intervention, about 40 ancient temples were preserved that were discovered in the process of the project. These temples were restored in respect of maintaining their originality & individuality. As a step forward towards sustainability, the flowers used inside the temple are converted into incense by the startup 'phool' that recycles biomaterials.

It is said that during ancient times, the Kashi Vishwanath jyotirlinga used to get anointing from the holy water of the river Ganga. This natural phenomenon got discontinued due to a reduction in the depth of Ganga's river bank. During the construction of the Kashi Vishwanath Corridor, a connection was provided for water supply between the river Ganga and the jyotirlinga so that; the jyotirlinga will again keep on anointing with gangajal.

7. PERSONAL INTERPRETATION BASED UPON EXPERIENTIAL QUALITY THE KASHI VISHWANATH TEMPLE

The Kashi Vishwanath Temple is a sacred complex positioned on the swash river banks of the Ganges and is an eyewitness of Indian history. It has witnessed the rise and fall of colorful conglomerates. Through battles, religious wars, and raiders, what still shines is the golden *shikhara* of the tabernacle. Indian heritage & prosperity holds a eulogized part of this temple that calculates on the faith of multitudinous believers of Lord Shiva. Throughout the ages, the Vishwanath Temple is keeping the existence & beliefs of its devotees alive. It is showing a path of light to its callers & pilgrims who visit Kashi in the hunt for peace and emancipation, for many years.

ISBN: 978-93-89934-68-7

It is an eternal piece of ancient Indian architecture. (Kanungo, 2022) The tabernacle's decoration is itself a guide to Indian mythology & history. Its route for darshan is deputized in such a way which that it starts from Ganga snan which symbolizes purification of the soul, then darshan which symbolizes devotion to the god & then leads towards salvation.

It indeed is an eternal source of chastity, knowledge, devotion & path of emancipation.



Figure 7: Architectural Elements of the Temple

(*Source:* Author)

8. FORESIGHT & CONCLUSION

Rehabilitation of residers & shopkeepers from the area covered under The Kashi Vishwanath corridor is a study material for civic intervention. The Kashi Vishwanath corridor which is a recent development is done with so much intricacy. All the urban design factors taken under consideration make the project more wholesome.

In the epilogue, we can say that the people visiting Kashi in search of spirituality, are connected by the common belief that- beyond the concepts of life and death, there lies a divine eternity that leads to salvation and The Kashi Vishwanath serves as a gateway to it.

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Study of Existing Living Conditions of Construction Labourers Settlement in Pune

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ABSTRACT: The construction labourers community in India faces a lot of problems in which a major problem is inhabitable living conditions specifically for migrant construction labourers. This problem not only affects the lives of labourers but also their family's lives; children do not get proper education; individual labourers have to stay away from their families.

When compared to developed countries' construction labourers, conditions in India are very down and out. Pune is one of the major developing cities in India with its construction sector growing rapidly thus becoming a focal point for migrant construction labourers. Some come along with their families and during construction, living conditions are inhabitable which leads to an increase in health problems in adults & children, the growth of slum areas etc.

Also taking into consideration recent events of the COVID-19 pandemic it would be better to start resettling the labourers in a cleaner, more habitable way to prevent the spread of any diseases like dengue, malaria etc. or to prevent the rise of a new pandemic.

Keywords: *Homelessness, Migrant, Construction Labourers, Developing City, Habitable.*

1. METHODOLOGY

The data collected is of two types, both qualitative and quantitative:

- Primary data in terms of interviews taken at different construction sites in Pune; the interviewee included engineers on site, project managers, safety officers, construction labourers on site and their families.
- Secondary data collected is in terms of online case studies of foldable housing modules developed across the world.

2. INTRODUCTION

A construction project takes an average time of about 3–5 years in India due to which the construction labourers community keeps shifting from one place to another from time to time in search of work. During these 3–5 years the construction site acts as a home to labourers and after the construction process is over labourers have to leave the site this contributes to a larger problem in India which is homelessness. Construction workers have now become what we can call modern nomads i.e., they move from one place to another once that space cannot shelter them.

Since their job has no regularity in work or location it makes it difficult for the labourers to stay at their native place or with their complete family. Some move alone for work while some move along with their families. The families get affected a lot in this process primarily by homelessness and then different members are affected differently; the children do not get proper education which might lead them to follow up their parent's profession, and the women who do not work as construction workers unwillingly end up taking care of the household if the site, they live at the time does not provide with any women welfare schemes. Many welfare schemes for the upliftment of this community are introduced by official authorities but a lot of problems are faced during their proper implementation on the site or in some cases the construction authorities do not introduce these schemes to labourers.

The most difficult problem seems to be inhabitable living conditions and in addition, it is difficult to keep a track of proper standards of living conditions. Another problem common among this community is that they lack a sense of communal hygiene which leads to a lot of health problems. Due to this even if some sites provide them with proper standards of living conditions, improper maintenance by labourers leads to inhabitable living conditions. It is critical now to change these conditions for the betterment of this community to better society as a whole.

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Pune is a large education hub of central India and is now a growing sector for the construction sector with the emergence of large construction groups regularly. This has increased the inflow of migrant labourers in the city in recent years. Since Pune has become a focal point for migrant construction labourers it will act as an appropriate location to conduct this study. If compared to developed cities modern solutions are being used to accommodate construction workers on site which has resulted in better living conditions.

With the recent events of the COVID-19 pandemic, the importance to provide a cleaner healthier environment is much more important. To prevent the spread of any other diseases in future it is crucial to act now and start redeveloping these labourers settlements on site.

This research aims at studying the existing living conditions of labourers settlements on construction sites in Pune. Labourers, their families and officials/specialists working on site are interviewed to collect data and numerous subjects of matter were discussed during these interviews in particular hygiene, basic services such as electricity/water/waste disposal, type of settlement made and problems faced due to it, whether any communal spaces are provided, which govt. policies are implemented and few others vary from site to site.

Micro foldable housing is a newly evolving concept of housing solutions which is affordable and is being used in many developed countries to reduce homelessness. This research discusses whether the construction community is up to accepting this solution for labourers settlements and how it will help in reducing the problems discovered through site visits and observations and interviews taken at the time.

3. LITERATURE REVIEW

1. How micro foldable housing has helped in reducing homelessness:

   According to Rinchon Norchu; Jullia Joson; Mohammed Hassan Awwad -

   The articles discuss how micro-foldable housing can be used to reduce homelessness. The study in all these articles is done in some of the largest cities around the globe and all of them are targeted at how this compact housing solution helps in reducing homelessness. These articles establish the relationship between how the reduction of homelessness is linked to the usage of foldable homes.
2. Why are people preferring compact/tiny housing over conventional ones.

   According to Beverley D'Silva; Alice Elizabeth Wilson

   The articles aim at analyzing tiny housing solutions and why people are preferring them over conventional housing solutions. This article helps in studying the viability of foldable housing and why is it preferable to be used in different conditions such as weather, terrain, locality etc.
3. Conditions of migrant labourers in India

   According to Subhomay Saha

   The article talks about the downtrodden conditions of migrant labourers in India and the difficulties they face with comparisons from different states of India and the welfare schemes provided for them.

4. DISCUSSION AND ANALYSIS

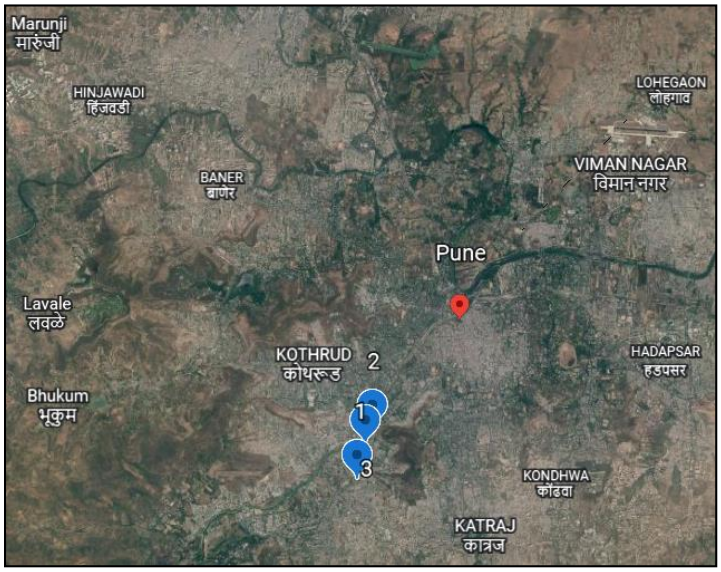
The primary research of studying the existing living conditions of labourers is executed by visiting labourers settlements in construction sites in Pune. A total of 3 construction sites are visited, all of which are located on Sinhgad road in Pune. The sites are:

1. Optima 2.0
2. Venkatesh Skydale
3. Monte Rosa

This information collected during these site visits was done in two forms:

1. Observation of the labourers settlement on the site
2. Interviews of labourers, labourers families and professionals on the site.

ISBN: 978-93-89934-68-7



Map 1: Location of Sites

The observation was done about these parameters on the site:

1. Hygiene in and around the labourers settlement.
2. Government policies implemented and followed.
3. Basic services – electricity, water etc.
4. Type of materials used for making the settlement.
5. Other facilities if provided.

Site 1: Optima 2.0

This site is a high-rise building construction with a total labourers strength of 50 out of which 6 are local labourers and the rest 44 are migrant labourers. The ratio of migrants to local labourers makes it quite evident that a labourers settlement is required over the site. Other than the working force some labourers live along with their couple in the settlement. There were no children present along with any of the labourers.

Since the labourers community on this site is comprised of only two types which are individuals and couples all the schemes, facilities and spaces provided in the settlement are concerned with the needs of these typologies.

Location of labourers settlement – this site has its settlement constructed at two locations, one on the construction site where 35 labourers live and the rest live in a labourers camp in that locality. We will be focusing on the settlement present on the site as the majority of labourers live there:

1. Hygiene in and around the labourers settlement:

   This site has poor hygiene facilities as all the waste is dumped around the housing units of labourers. It has an irregular waste disposal system; the individual units are not planned well and have no or very poor ventilation.
2. Government policies implemented and followed:

   The only government policy which is properly implemented on this site is the BOCW (Building and other construction workers) health insurance for the workers working on site and their families who stay with them there. No other policies were being followed even if implemented by the construction authority.
3. Basic services:

   Services were not laid out properly in terms of wastewater removal, and waste disposal systems. The workers are provided with a 24x7 electricity supply and drinking water facility from the municipal corporation and in case of water shortage water tanks are provided. Even though these less-than-basic services (electricity and water) are provided some other services which are important for a healthier safer environment are not provided.
4. Type of materials used for making the settlement:

ISBN: 978-93-89934-68-7

Metal corrugated sheets were used in making the settlement but most of it was worn out broken at the edges and not maintained and in case of any accidents these worn-out sheets would result in injuries.

5. Other facilities:

   No other facility was provided in specific.

Site 2: Venkatesh Skydale

This site is a high-rise building construction with a total labourers strength of 250 out of which 50 are local labourers and the rest 200 are migrant labourers. The ratio of migrants to local labourers makes it quite evident that a labourers settlement is required over the site. Other than the working force some labourers live along with their couple in the settlement. Some of them live as individuals while some have come along with their families.

Since the labourers community on this site is comprised of three types which are individuals, couples and families all the schemes, facilities and spaces provided in the settlement are concerned with the needs of these typologies.

Location of labourers settlement – this site has its settlement constructed at two locations, one in the open on the construction site where around 50 labourers live and the rest 200 live in a labourers camp built in the basement of the building being constructed. We will be focusing on the settlement present in the basement as the majority of labourers live there.

1. Hygiene in and around the labourers settlement

   This site had average hygiene conditions waste wasn't dumped on the site washing areas had water channels to remove water and proper toilet units are provided. Since most of the settlement is built in the basement the lobbies were dark and stingy and no proper daylight was available.

2. Government policies implemented and followed

   Many government policies are followed on this site which are

   - Atal yojana for 2 meals a day.
   - Schools provided for labourers's children on site
   - BOCW Health Insurance provided
   - Govt. Medical camp organised regularly

3. Basic Services

   Services are provided in a habitable way to some extent that is the toilets are provided by the ratio of the labourers count and are separate for men and women. The workers are provided with a 24x7 electricity supply and drinking water facility from the municipal corporation and in case of water shortage water tanks are provided. Other than this separate washing and bathing area are provided but are not clean and leading to a detrimental environment. The bathing spaces are open thus it becomes difficult for people to bathe.

4. Type of materials used for making the settlement

   On this site complete settlement is made using metal corrugated sheets. The sheets used are of good quality keeping in with the concern of injuries.

5. Other facilities

   Two other facilities provided on this site are the provision of a school for the children of labourers and the creation of communal spaces for gatherings or celebration of festivals.

Site 3: Monte Rosa

This site is a high-rise building construction with a total labourers strength of 100 out of which 12 are local labourers and the rest 88 are migrant labourers. The ratio of migrants to local labourers makes it quite evident that a labourers settlement is required over the site. Other than the working force some labourers live along with their couple in the settlement. Some of them live as individuals while some have come along with their families.

Since the labourers community on this site is comprised of three types which are individuals, couples, and families all the schemes, facilities and spaces provided in the settlement are concerned with the needs of these typologies.

Location of labourers settlement – this site has its settlement constructed in the open on the construction site for all the labourers.

ISBN: 978-93-89934-68-7

1. Hygiene in and around the labourers settlement

   This site has poor hygiene facilities as all the waste is dumped around the housing units of labourers. It has an irregular waste disposal system; the clusters formed are in close proximity making the common areas/lobbies dark and stingy even when the settlement is in the open.
2. Government policies implemented and followed

   The only government policy which is properly implemented on this site is the BOCW (Building and other construction workers) health insurance for the workers working on site and their families who stay with them there. No other policies were being followed even if implemented by the construction authority.
3. Basic services

   Services were not laid out properly in terms of wastewater removal, and waste disposal systems. The workers are provided with a 24x7 electricity supply and drinking water facility from the municipal corporation and in case of water shortage water tanks are provided. Even though these less-than-basic services (electricity and water) are provided some other services which are important for a healthier safer environment are not provided.
4. Type of materials used for making the settlement

   Metal corrugated sheets were used in making the settlement but most of it was worn out broken at the edges and not maintained and in case of any accidents these worn-out sheets would result in injuries.
5. Other facilities

   No other facility was provided in specific.

   Comparative analysis of all three sites:

Table 1: Comparative Analysis of all Three Sites

SITE	***Site 1***	***Site 2***	***Site 3***
Number of labourers & Typology			
	The common trend followed in all the sites is a large number of migrant labourers working there compared to local labourers		
Labourers community	Individuals Couples	Families Individuals Couples	Families Individuals Couples
	Services and facilities of the sites changes based on the type of community formed. Ex–site 2 has children therefore they have provided schools on site		
Location of settlement	Away from the site In the building	On-sites In the building	On-sites
	The location of settlement varies from inside the building to onsite open spaces and sometimes away from the site. When away from the site labourers commute by public transport		
Govt. Policies	BOCW Health Insurance provided	Atal yojana for 2 meals a day Schools provided for labourers's children on site BOCW Health Insurance provided Govt. Medical camp organised once in a while	BOCW Health Insurance provided

ISBN: 978-93-89934-68-7

SITE	*Site 1*	*Site 2*	*Site 3*
	It is mandatory to provide workers with the welfare schemes provided by govt. for them. Based on the above trend we can see sites are only providing the basic health insurance facility whereas other important things like schools for children, food policies etc. are not provided. The bitter part is that the workers are not aware of their rights and hence don't question any services provided.		
Type of settlement made and materials used	Metal corrugated sheets houses Unhygienic surroundings No Waste disposal system	Metal corrugated sheets used Hygienic comparatively to others No waste disposal	Some permanent structures and some metal corrugated sheets Unhygienic living conditions No waste disposal system
Services	Electricity – 24x7 availability Water – Corporation water + tanker facility Toilets – separate toilets provided but not hygienic	Electricity – 24x7 availability Water – Corporation water + tanker facility Toilets – separate toilets for male and female Waste disposal- collection truck visits 3 times a week.	Electricity – 24x7 availability Water – Corporation water + tanker facility Toilets – separate toilets provided but not hygienic
	It is important to provide these basic services properly to prevent health issues among labourers, improper arrangement/disposal might lead to the breeding of insects leading to diseases. On site 2 because of improper disposal of water 2 families were infected with dengue		

Based on interviews of professionals over site (Ex. Engineer, project manager, safety officer) –

Table 2: Interviews of Professionals over Site

Site	*1*	*2*	*3*
Do you know about foldable housing	yes	yes	yes
What are your views about labourers land living conditions in India w.r.t. developed countries?	Very poor comparatively, unhygienic and not humanely habitable	The living conditions are not safe and need to be improved	It is inadequate but also the labourers need to be taught some hygienic lifestyle
Do you think labourers housing should be developed?	yes	yes	yes
Would you prefer to use foldable housing in your projects? Why?	Yes, if any such model is introduced it will be of help to both the labour contractors and the labourers as it is a one-time investment	Yes definitely, it will save time on site and increase productivity and labourers energy	Yes, we would like to use it but the unit should be fire-resistant and must follow all the design parameters

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Table 3: Live Pictures Taken during the Visit

Site 1	 **Image 1** Less secure *Source:* Author.	 **Image 2** Improper Organization *Source:* Author.	 **Image 3** Unhygienic Surroundings *Source:* Author.	 **Image 4** No ventilation *Source:* Author.
Site 2	 **Image 5** Dark lobby *Source:* Author.	 **Image 6** School *Source:* Author.	 **Image 7** Common Kitchen *Source:* Author.	 **Image 8** Communal spaces *Source:* Author.
Site 3	 **Image 5** Dark Lobby 2 *Source:* Author.	 **Image 6** Non Communicable Spaces *Source:* Author.	 **Image 7** Unhygienic Surroundings *Source:* Author.	

4. CONCLUSION

The above analysis shows that the conditions of construction labourers community in India is inhabitable and needs improvements. The way in which the settlement is laid out is quite dangerous and unhealthy. This communtiy's major drawback is that the labourers are not aware of their own rights and thus are not able to ask for the basic needs in clean and

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a habitable living according to basic human needs. Labourers also need to be taught about healthy living habits for improvement and maintenance of their settlements.

This solution of micro foldable housing is fairly successful in some western countries. It may bring a major change in their community's upbringing. It will help in improving their living standards and thus reducing health hazards among the community. In a more wholesome way it will contribute in making the society cleaner, healthier and more accommodating of healthy lifestyle.

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Formulating Design Factors of 5 Star Rated Resort with Sustainable Approach

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ABSTRACT: The Tourism sector is transforming into the mainstream sector of the economy of India. When it comes to the development of our natural settings, sustainability is a hot topic. It has become clear that the sustainability and longevity of innovations must be taken into account as the tourism sector continues to grow, especially in developing countries. Individuals experience a lot of stress in their daily lives. The research's objective was to examine current approaches to evaluating the sustainability of resort area growth as well as their effects on that development. primary data generated through site visits and secondary data through the study of various scholarly articles and research papers have helped the author to do the critical analysisand draw the conclusion also by taking the 5-star resort norms natural and eco-friendly environment for the visitors any things artificial or materials that will be harmful to the environment and human beings main output of this research is to highlight the various applications of sustainable materials and promote their use in Architecture and construction Awareness is necessary aboutthe applications of using sustainable materials and exploring their potential for innovative and sustainable architectural solutions the aesthetic features and approach of sustainable products and the challenges involved in using them are also discussed in this paper. There are various building products available in the market that are manufactured from recycled materials such as wood, bamboo, straw bales, and recycled steel. Products reduce carbon footprint and provide sustainability reducing risk in several ways.

Keywords: *Industrial, Sustainable Development, Employment, Infrastructure.*

1. INTRODUCTION

The World Conservation Strategy (WCS), issued by the International Union for Conservation of Nature (IUCN) in 1980, is where the phrase "sustainable development" first gained popularity. It is not a recent realization that most conventional, modernarchitecture is not long-term sustainable. One might unwind and have fun at a resort to liven up downtime while on vacation. A resort is an area that is often utilized for holidays, recreation, or other purposes. One can go there to organize an overnight stay, have lunch, pass the time, swim in the resort, and kindle a campfire. Also, they can finish their novels, create poems, work on their portraits, or simply have a pleasant stay. A resort may function as a gym, a restaurant, a conference center, a meeting room, and other amenities. Here is the aim to formulate the design factors by understanding space requirements and guidelines and analyzing the energy use a sustainable resort will bring guests and tourists near nature. A Resort can be said tobe an accommodation facility using the surrounding natural resources to the maximum & providing tourists with ample recreation. A Resort should essentially be a place developed for the sojourn of tourists, providing not just lodging but also catering for their leisure & recreation. Any Resort should give the tourist a sense of prolonged luxury & comfort & entertainment should always be in the air. Among the earliest forms of hotels, resorts trace their lineage to spas each bath of ancient Greek & Rome.

Sustainable by-products can be used as resources that will reduce the utilization of finite resources for socio-economic benefits sustainable materials and promoting sustainable constructions are important steps toward a more sustainable environment also to develop aesthetic spaces in a resort that make perfect living meeting and recreation spaces for the people who come there. To analyze and give solutions to problems in the city and also assess the potential benefits or adverse impact of development projects on surrounding near that and the facilities and amenities at a 5-star resort which could serve the people most functionally and also create the perfect ambiance there so people tend to come more and more there The fundamentalprinciple of the resort's sustainable development concepts is progressive growth, which aims to raise living standards without endangering the environment. Environmental management makes it feasible to implement the sustainable design. The reduction of waste in buildings and the use of resources less frequently present the biggest challenges. However, these are not very cost- effective. Successful ecological management can assist develop the utilization

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of sunlight, optimal temperature ranges, the use of alternative energy sources, and well-planned environmental design. With the aid of sustainable design, it is possible to save 80% of the energy used.

2. LITERATURE REVIEW

One of the most important issues facing humanity in the twenty-first century, according to intellectuals, is how to achieve an acceptable standard of living that respects constraints and is compatible with the best use of energy resources. Owing to this idea, on the verge of the third millennium, achieving the objectives of sustainable development to deal with environmental crises, cost-effective energy usage, and establishing sustainable economies have shifted to the basis of planning and managing in many nations.The research's findings are presented in the form of designing environmentally friendly resorts and tourist complexes such that the methods suggested for use in the areas under investigation would be the most widely used methods for providing environmentally friendly cooling for building comfort. Based on the expansion of resort areas (Famagusta, North Cyprus, January2011) between 30 and 40% of the energy used in buildings harms global warming. Buildings quickly account for 50% of all national carbon dioxide emissions in industrialized countries. On the other hand, 35–40% of the total trash produced each year inthese nations is tied to the construction industry. It is essential to develop in concert with other elements of the global system as aresult. Sustainable development will be necessary for future advancement. The effective recycling of construction and demolitionwaste reduces the requirement for gravel, sand, and other minerals needed in the production of building materials. Removing particular components from waste can result in secondary raw materials that can be applied repeatedly during the building process.

3. MATERIALS AND METHODOLOGIES

In the procedure of data collection for this analytical type of research and to get refer references and also a better understandingof different types of sustainable materials and their use and other structures which are already built by using a sustainable approach Sustainable resorts are buildings that are constructed in a way that protects the environment by making the best use of materials, reducing the usage of resources, and assuring the health and well-being of both present-day residents and the localbuilt environment as well as future generations. When developing a new ecologically friendly resort, a few LEED-related issues should be taken into consideration. I have also visited some places which hold some presence of sustainability some places which I have visited are kondhan resort, garden villa resort data was collected by visiting nearby locations. The researchaims to explore the various methods of using sustainable products/materials in Architecture the primary data generated throughsite visits and the concerned authorities and secondary data through the study of various scholarly articles and research papershave helped the author to do the critical analysis and draw the conclusion also by taking the 5-star resort norms.

4. RESULTS AND DISCUSSION

Worldwide, the tourism industry is expanding quickly. This affects the surroundings of construction sites in the natural world. The detrimental effects of these efforts must be kept to a minimum. Hotels and other lodging facilities must undergo routine maintenance, including decorating. Buildings may be constructed attractively, operation and maintenance costs can be reduced, and minimal environmental consequences can be achieved with the aid of sustainable design. While studying the entire subject ofsustainable material, I came across many facts and different ways of using waste material in various ways in architecture We understand that there is a wealth of knowledge available, even in this day and age, about anything and everything, including the things our forefathers and culture have taught us. In addition to learning about various sustainable material use techniques, I also learned about numerous resources that might be used to create sustainable materials. Earthlings have a responsibility to pay for unsustainable constructions. Employees are compelled to work in filthy offices where they risk becoming sick. Reduce any harmful effects on the built and natural environments as much as possible by over a structure's whole life cycle, sustainable building design and material selections must be considered. Its life cycle can be divided into these five phases: feasibility, design, building, operation, and demolition. Materials are used during a structure's development and operation, which includes building maintenance. The building's materials and components will keep getting replaced, renewed, and upgraded up until the end of its service life. Essentially, using better materials will help a building perform better overall and achieve the industry goal of sustainable construction. The possible acceptance of sustainable materials as replacements for contemporary technological materials, whose production depends on the consumption of non-renewable resources like oil, coal, or natural gas, presents a global issue. Ecological resources provide

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a compelling framework for reinterpreting and, in some circumstances, streamlining modern manufacturing while also making it sustainable it is widely acknowledged that the tourism industry, like agriculture, insurance, energy, and transportation, is very climate-sensitive. It is clear from Figure 1 that by producing emissions to house tourists, plays a significant role in climate change. Building construction is being accelerated by the tourism industry. The beauty and integrity of landscapes, which are typically employed for the construction of hotels and tourism facilities, may be negativelyimpacted by this.

• Standalone concierge staff available at least 16 hours a day
• A high staff-to-room ratio—ideally above 2.5 • Multilingual staff
• 24-hour reception, room service, valet parking, butler, doorman • Nightly turndown
• Easy communication with hotel staff - even via text or app • Daily housekeeping that is also available upon request at any time
• Guest elevators separate from staff elevators • Medical Team and resources on call • Luggage storage in which bags are out of guest view
• Fine dining restaurant(s) and a standalone lounge and/or bar • Transfers and executive or house car
• Childcare options including vetted babysitting service • Pre-check-in registration and preferences • Local products and services, especially for dining

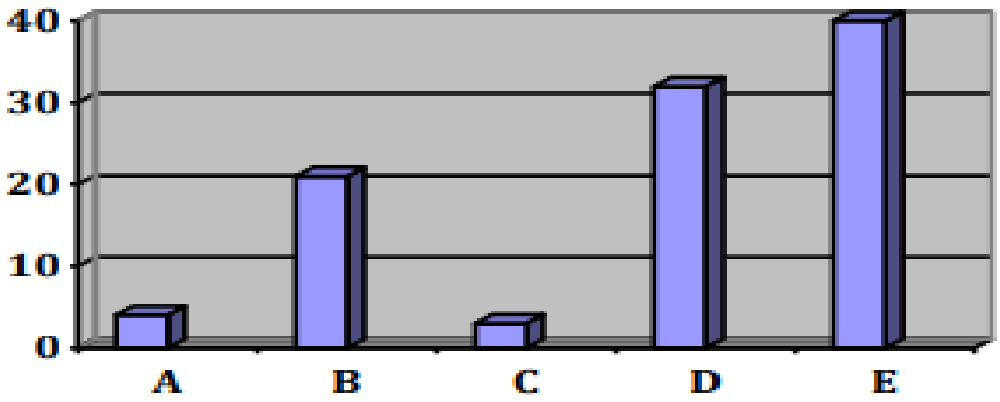


Figure 1: Five Phases and Board Requirements for 5 Star

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Factors

Passive Solar Designs

With the aid of this design, a cozy, energy-efficient interior environment may be produced by utilizing natural sunlight and air circulation. This aids in the hotel's placement, shapes, openings, lighting, direction, and heating and cooling system optimization. In chilly weather, it's critical to increase body heat. More sensitive regions to the heat can look at the southern section of the resort if it is situated on a west-east axis. Placement of less heat-sensitive zones is possible in the resort's northern section. Passive design and the use of prevailing winds have cooling benefits on the building during the hot months. The location of the resort must be perpendicular to the direction of the wind.

The Daytime

Day lighting is made simple by the presence of large windows, glass panels, atriums, and light-colored furniture.

Sustainable Energy Used

Solar water heating, photovoltaic PV cells, small and micro hydropower systems, wind power, biomass.

Sustainable Construction of the Resort

Architectural and construction techniques can be used to describe this capital. Most of this is a civil engineering issue. But from the standpoint of sustainability, there are some suggestions for hotel construction On the construction site, separate locations must be designed for hazardous and poisonous products. Construction, food, and packaging waste recycling stationsmust be established. Safety gear and clothing must be available.

Considering the Outer Wall's Environment

Windows are crucial for controlling humidity, airflow, and lighting. There have been significant advancements in window design. They have low-emission coatings on some of them. These permit low-wave radiation from the sun to enter while blocking long-wave infrared radiation from the outside. The correct windows must be chosen based on the resort's direction. To reduce heat loss, insulation is also crucial. Stronger and more enduring than conventional building materials is green alternatives. Some windows are triple and double-glazed. Utilizing locally produced resources is crucial.

Using Technology that is Resource-Efficient during Operations

Technologies relating to water include water-saving fixtures like low-flow showerheads and faucets, low-flush and vacuum toilets, waterless urinals, and alternate sewage treatment methods. Heating and cooling equipment: renewable energy systems, solar-powered fans, freezers, and space heaters; heat recovery; building management; combined heat and power systems. Energy-efficient lighting: low-energy lighting fixtures, photoelectric cell-based control systems, and solar-powered outside lighting. Composting toilets, composting containers, and paper and plastic compactors are examples of waste management strategies.

Landscaping

One crucial component of a hotel's sustainable design is its landscaping. The following is a summary of the landscaping requirements for hotels: Original vegetation must be protected while work is underway. Native species must be chosen, and maintaining ecosystem balance is crucial. With the aid of permanent culture, various fruit trees must be tested.

Factors Related to Resort Infrasture, Materials

With less tourism circuit promotion, and solid agricultural practices The value of tourism has not been realised for the districts beyond sporadic visitor arrivals that remain unplanned and unregulated, despite efforts by tourism industry operators inside and outside the area to draw local and foreign tourists. The tourism business has been hampered by the lack of essential services such as a wide variety of hotels and restaurants, in addition to relevant water and sanitation, public transportation, and dependable energy services. Additionally, there are few tourist operators, limited signage and tourist

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information, and poor financial services available to visitors items exist despite having good natural sites and those that have been partially developed;their potential has not been properly realized. On the other hand, a rush of tourists may occur in some places. places, however,there are issues with parking, local traffic, and hygienic management. This results in missed possibilities for Local People to Benefit from Tourism. Greater operators strive to harness the potential in places like Goa and Karnataka because locals have received little exposure to and training in tourist promotion and management. In order to control particular places and advance local interests in tourism, local biodiversity conservation committees might be established and put into operation. Despite stating that this is a Government-run tourism district available money for infrastructure development and tourism promotion has been well below what is necessary to fully utilize the district's potential. Despite plans these weren't given enough fundingor attention when they were being put into action.

Example of the Aria Resort and Spa, Nashik

The company standards for this resort include a unique sustainability strategy, making it one of the few resort groups in the world to do so. The following is a summary of them. Following this, it will be quickly discussed as to whether it satisfies the standards outlined above. Aria is dedicated to minimizing the detrimental consequences of its operations on the environment and society. Some of its obligations are listed below:

This resort organization makes an effort to contribute to a better environment and community with the aid of its financial andhuman resources. The hotel seeks to blend in with its natural and cultural surroundings.



Figure 2: View of Resort

This hotel chain lowers its emission of greenhouse gases by using energy-efficient equipment, raising host awareness of energysaving, and switching to renewable energy sources. It is possible to lower the resort's freshwater use thanks to water-saving devices and guest awareness. Unused resources are accepted as waste. Reducing, reusing, and recycling waste is how the system operates. Eco takes care to use as few raw materials, such as paper products, as possible. It protects the ecosystem's biodiversity and natural heritage. On a local, national, and international level, social and environmental projects are supported.The resort group continuously evaluates and enhances its efforts to conserve natural resources and lessen its detrimental environmental effects. Resort adheres to both national and international laws. By issuing an annual sustainability report by theGlobal Reporting Initiative standards, they promote transparency. These standards created by the hotel give us a glimpse intothe company's sustainability strategy. As can be seen online, this location made a commitment to sustainability both during and after the construction period. After construction, most of these components comply with environmental management standards. Nevertheless, resort pre-construction is the only time during which environmental management requirements can be prepared. This resort satisfies the requirements for sustainable design and construction as a result of a thorough examination.While studying it was noticed that there are various factors and facilities that it lacks, but

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with the resources that it provides, itcould benefit in many different ways if its resources are used wisely. Establishing a resort like this will help the tourist with various issues like lack of open space or amphitheater, community halls for recreational activities, etc. Providing accommodations for tourists that will allow the tourists to make a stay of a day or two will help the tourist to prosper and addup to their economic status.

5. CONCLUSION

Respecting natural and cultural resources both before and after building is essential. To build up local capability, local resources and technology must be utilised during building. Utilizing efficient environmental management in hotels to reduce the gap betweenstated criteria and actual inconsistencies. The resort's design should accommodate those with disabilities. This is one of the key sustainability concerns facing the travel and tourist industry. For challenges relating to sustainable design and construction, therehas to be more collaboration between national academics. There should be taken some of the sustainability norms under consideration. Awareness is necessary about the various applications of using sustainable products and exploring their potential for innovative and sustainable architectural solutions. Any design of architecture must always reflect the sense and context that produced it. Architecture is more than merely providing shelter to someone or something.

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Revival of Municipal Marketplaces in Mumbai

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ABSTRACT: Public markets have always been the centre for social, economic, and cultural exchanges. They played a major role in shaping the cities and provided ties to connect the rural and the urban economies. The aim of this paper is to understand the s`trategies for change that can be brought in to the revive the municipal marketplaces in Mumbai. The paper reviews the various aspects regarding the infrastructural and experiential qualities of the shopkeepers and customers. Three marketplaces have been studies to understand their current conditions through onsite documentation and interviews of people: the Hemant Manjrekar Market at Sion and the Mahatma Jyotiba Phule Market (previously known as Crawford Market), both at Mumbai, as primary case-studies; and the Koyambedu Market in Chennai, and Panaji Municipal Market in Goa as secondary case studies. The discussion further carries onto studying the different Pyscho-socio-economic aspects within a marketplace. By comparing the aspects of different case studies, qualities of successful and unsuccessful markets can be drawn. Municipal markets in Mumbai have seen a major decline in the footfall of people and are in the need for revival.

Keywords: *Municipal Markets, Mumbai, Public Place, Redevelopment, Infrastructure, Customers, Successful.*

1. INTRODUCTION

Public markets have always been the centre for social, economic, and cultural exchanges. They played a major role in shaping the cities and provided ties to connect the rural and the urban economies. The concept of marketplaces developed around 3000 BCE in Greece and over the time it has evolved into many forms namely agora in Greece, souqs in the Middle East and bazaars in Asia. The recorded chronology of Indian markets can be dated back to the pre-Mauryan period when there was evolution of urban centres in the Gangetic plains. A 'public' market includes covered markets, open air markets, flea markets, permanent market halls, market districts, supermarkets and even informal markets and street vendors.

Aim

The aim of this paper is to understand the strategies for change that can be brought in to the revive the municipal marketplaces in Mumbai.

Objectives

To achieve the above-mentioned aim, the following are the objectives:

1. To analyze the current municipal markets in Mumbai with respect to vehicular and pedestrian circulation, waste management and infrastructural conditions.
2. To understand the importance of a marketplace at a neighborhood level.
3. To understand the vendors' requirements.
4. To understand the customer experience while shopping.

2. LITERATURE REVIEW

The current situation of municipal markets in Mumbai can be understood through the newspaper reports highlighting this situation. One such example is the Mahatma Phule Market, earlier known as Crawford Market, a Grade 1 heritage building. Phadke (2011) has written about the dilapidated condition and the need to redevelop it so that it can keep up with the new mall culture. On the other hand, according to the reports by Comptroller and Auditor General of India (CAG) the municipal markets are being under-utilised by the vendors who occupy the streets. This congests the roads for vehicular transportation (Pinto, 2022).

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The factors that make a successful marketplace have been discussed by Verel (2010) along with the various challenges involved. Some of these are the economic background of the surrounding neighbourhood which determines the type of produce for selling; proper management and facilities for the users to ensure enough footfall. It is also essential to keep in mind the cultural changes with upcoming malls and supermarkets.

The vendors are an important component of the marketplace. *The Retail Markets Planning Guide* (Tracey-White, 2019), has categorized the requirements of vendors into ventilation, storage facilities, water supply and drainage facilities, garbage collection, electricity, requirement of parking areas, loading/unloading zones, and other additional equipment necessary in a shop. The *Guide* also discusses the facilities necessary for a comfortable experience for users. Some of these are the width of the walkways, sanitation facilities, proper separation of veg and non-veg produce and provision of adjoining public spaces.

The above literature has provided a base for understanding how market places can be assessed in order to derive the strategies to revive the municipal marketplaces in Mumbai.

3. MATERIAL AND METHODOLOGY

In order to examine the aspects mentioned above, the study will be conducted through primary and secondary sources. The literature reviews the various aspects regarding the infrastructural and experiential qualities of the shopkeepers and customers. Three marketplaces have been studies to understand their current conditions through onsite documentation and interviews of people: the Hemant Manjrekar Market at Sion and the Mahatma Jyotiba Phule Market (previously known as Crawford Market), both at Mumbai, as primary case-studies; and the Koyambedu Market in Chennai, and Panaji Municipal Market in Goa as secondary case studies.

4. RESULTS AND DISCUSSION

Public markets have always remained an arena for trade and commerce by bringing people together and being socially an important place.

The discussion regarding market places is under the following three categories:

4.1 Planning of Markets with Respect to Psycho-Socio-Economic Aspects

Along with the aspects of physical planning, the psychology, and the economic status of the customers play an important role in determining the planning and the type of market to be proposed, whether a retail shop, supermarket, hypermarket or mall. Sommer, et al's research, *The Behavioural Ecology of Supermarkets and Farmer's Markets* (1981) compares the behaviour of customers in a supermarket and at a farmer's market. The study implied that there is a decline in the opportunities of human interpersonal encounters especially in the supermarkets which intentionally prioritizes traffic flow eliminating space to hold conversations.

The preferences of people have changed over time. The younger generation prefer supermarkets with air-conditioned environments while the older generation still prefers to visit a street or a municipal marketplace in the neighborhood. Street markets and hawkers are preferred as they provide service at convenient locations which saves time, especially in the context of a busy Mumbai. Though they usually encroach the areas near bus or train stations, it is these very locations which make it convenient for customers to access. There are also negative effects of such hawking that arise, like the nuisance and congestion created on roads and waste generated which is seldom disposed of properly. Therefore, having a municipal market in the neighborhood becomes essential which can be easily accessed by the neighborhood, and which can support vendors who cannot afford expensive shops and which can be monitored by the municipality on a regular basis.

In the paper, *Determinants of Shopping Mall Attractiveness: The Indian Context* (Mittal & Jhamb, 2015), the parameters of a shopping mall which attract Indian customers were described. The service attributes like the parking facility, adequate dressing rooms, in-store promotions, pleasant ambience, and children play areas were some of the factors which determine the attraction of customers towards a shopping mall rather than a traditional market.

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4.2 Case Studies of Successful and Unsuccessful Markets

Mumbai as a city has a history of municipal markets that dates to the 19th century. Some of the early markets developed in the city were the Crawford Market now known as Mahatma Jyotiba Phule Market, Dadar Flower Market, Chor Bazaar and Zaveri Bazaar to name some. There has been little to no scope of development since then because of space constraints, and the markets have remained the same. The problems, such as lack of regular maintenance, cleanliness and shortage of storage spaces, have eventually dilapidated these into unusable spaces. Coupled with this, unforeseen population growth has not been taken into consideration due to which there have been spillovers onto the adjacent streets and roads, hampering pedestrian movement and unregulated garbage accumulation. Hence, customers are seen to tend towards malls and supermarkets for a more 'fun' and palatable experience. The following are the cases of existing municipal markets which have been examined for this study:

Case study 1: Major Hemant Manjrekar Market at Sion (E) in Mumbai

This is a municipal market built in the 1950s.It consists of a vegetable market, a fish market, and boutiques with some other miscellaneous shops. Due to improper maintenance and infrastructure facilities (see Figure 1a), it has dilapidated over time. This has had an adverse effect on the customer footfall and hence the sales in the market. This led to most shopkeepers selling their shops or converting them to godowns (see Figure 1b). The vegetable vendors also moved onto the streets, resulting in congestion. The mapping of this market by the *International Collective in Support of Fishworkers* (2014) shows that there was a lack of basic facilities such as adequate lighting in the evenings and waste management systems. This further prevented customers (see Figure 1c & 1d). Since the vendors are mostly from the non-fishing community, so they buy the fish from the wholesale market at the Bhaucha Dhakka dock at South Mumbai in the mornings. Many of these vendors were now forced to roam informally to sell fish to earn their livelihood.



Figure 1(a): Dilapidated Vegetable Shops

(*Source:* Author)



Figure 1(b): Shops Converted into Godowns

(*Source:* Author)



Figure 1(c): Insufficient Lighting on Streets at Night

(*Source:* Author)



Figure 1(d): Improper Garbage Disposal

(*Source:* Author)

Figure 1: Hemant Manjrekar Market, Sion(E), Mumbai

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Case Study 2: Mahatma Jyotiba Phule Mandai at Dhobi Talao in Mumbai

This market, previously known as Crawford Market was built in 1896 by the first Municipal Commissioner of Bombay, Arthur Crawford. It is one of the oldest planned markets in the city. The market has not been maintained regularly and being in one of the most congested areas of Mumbai, the vehicular and pedestrian circulation intermingles without separation (see Figure 2b). The shopkeepers keep their produce in the corridors which in turn reduces walking space for the customers (see Figure 2a). There have been many plans for its redevelopment till date which have not materialized.



Figure 2(a): Encroachment in the Corridors

(*Source:* Shrivastava, 2022)



Figure 2(b): Congestion on Roads

(*Source:* Kale, 2019)

Figure 2: Mahatma Jyotiba Phule Market, Dhobi Talao, Mumbai

These two cases are examples of dilapidated markets. On the other hand, there are several examples of successful marketplaces built by the local municipalities in India. Two of these are described below:

Case study 3: Koyambedu at Chennai, Tami Nadu, India

Koyambedu Market located in Chennai is said to be one of the first architecturally 'planned market space' in India. It covers an area of 67 acres being the largest market in Asia with multiple types of produce like vegetables, fruits, and flowers in wholesale as well as retail setting. The ease of distribution of the variety of goods is facilitated by the planning of its dedicated circulation for vehicles as well as pedestrians (see Figure 4b). The loading-unloading area is separated from the pedestrian zones for visitors. The shops are divided on the ground and first floors connected by ramps (see Figure 4a). The market is characteristic design which uses hierarchy of spaces for various functions in degrees of enclosure. The outermost entrance court acts as an open space which helps in the division of the large number of people visiting the market. This space is followed by the central semi-open space used as the main market shed. Here, the vegetable and fruit stalls are arranged linearly with adjacent storage facilities for each shop for ease of access and security. After this are the godowns beside it which are the enclosed area for purpose of storage (see Figure 4d).

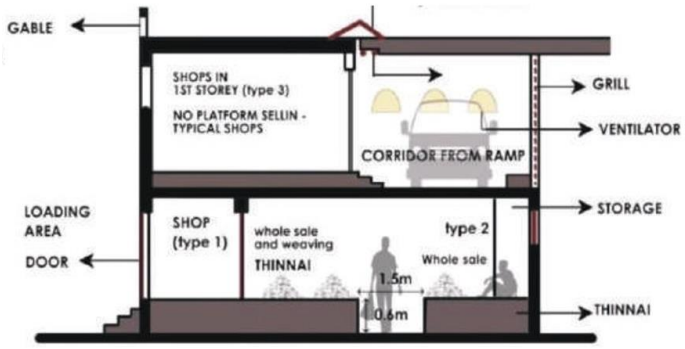


Figure 3(a): Section of Koyambedu Market

ISBN: 978-93-89934-68-7

(*Source:* Kathiravan, 2021)



Figure 3(b): Plan of the Vegetable Market Showing Vertical Circulation at Koyambedu

(*Source:* Kathiravan, 2021)

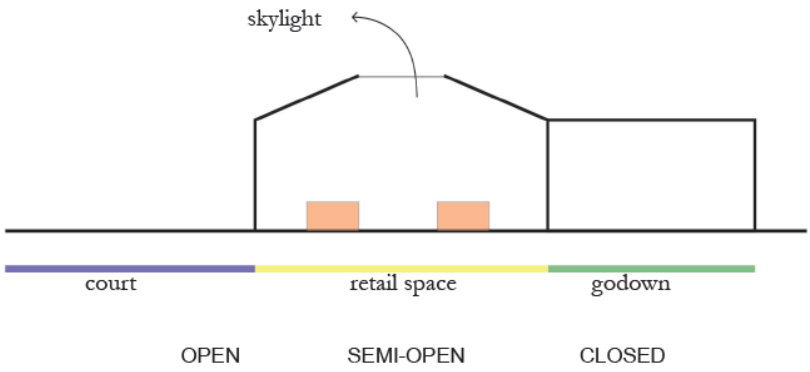


Figure 3(c): Hierarchy in Degrees of Enclosure

(*Source:* Author)

Figure 3: Koyambedu Market, Chennai

Case Study 4: Panaji Municipal Market at Goa

Panaji Municipal market in Goa is a recently redeveloped market which has become a destination for the local people for their daily needs of vegetables and fish. The redevelopment project has completed its two phases and the third phase which is the fish market is yet to be completed according to the plan of Goa State Infrastructure Development Corporation Limited (GSIDC) (2020). It consists of a basement for parking, the ground floor has a spacious hall for vegetables and fruit vendors, the mezzanine and the first floor consist of shops for domestic retailers. It has a central atrium space with which allows natural sunlight to enter the structure (see Figure 4a). The counters for the vendors are designed such that it is a common platform with partitions and storage below them (see Figure 4b). The mezzanine and the ground floor is connected with a central staircase which allows visual interaction from the upper level (see Figure 4c). The pedestrian circulation is well planned with wide corridors and demarcated space for the vendors. The division of floors is such that the perishable goods are on the ground level while the non-perishable are on the upper levels for effective garbage disposal.

ISBN: 978-93-89934-68-7



Figure 4(a): Central Atrium of the Market

(*Source:* Stall in panjim market Stock Photos and Images, 2023)



Figure 4(b) Counters for Vendors

Source: (Goa State Infrastructure Development Corporation Limited (GSIDC), 2020)



Figure 4(c): Central Staircase Connecting Ground and Mezzanine Floors

(*Source:* Goa State Infrastructure Development Corporation Limited (GSIDC), 2020)

Figure 4: Panaji Municipal Market, Panaji, Goa

It can be seen from the above case studies that correct segregations for circulation, ease of access, with use of ramps and escalators along with proper separation of programs both in horizontal and vertical settings can help plan a successful market.

4.3 Redevelopment of Markets

The redevelopment plans of some markets have been floating around but the delay in their execution has an adverse effect on the business of the vendors. The state government has directed the BMC to allow development/redevelopment of all municipal markets in the city and suburbs with an FSI (floor space index) of 4." (Lewis, 2007) Crawford Market has been taken up as a case while there are around 500 such markets in the city and similar redevelopment plans are being proposed for bazaars all over the city. As the city officials propose redevelopment plans the markets streets and bazaars are clearly being looked upon as spaces of consumption and not as the public ground.

Many older markets have plans to be redeveloped. Mhamunkar (2022) has discussed the redevelopment plans for municipal markets of Jogeshwari and Borivali were proposed by the Government after knowing the various concerns of the existing vendors such as poor ventilation and improper separation of vegetarian and non-vegetarian produce. These plans proposed multiple floors instead of only a ground floor as has been prevalent in the original municipal mandis. Since all the vendors wanted the ground floor for their business therefore there was a need for bifurcation. The new designs proposed a dedicated floor for each type of produce with fish market on the ground floor and a separate entrance (ibid). That this has not worked in all places, is evident from the newer market places built at Dadar and CST. Hence it is evident that all stakeholders have to be considered while planning for redevelopment of public places like markets.

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In the study carried out by *International Collective in Support of Fishworkers* (2014), it was highlighted that the MCGM should take care while planning fish markets to ensure that fish can be sold while it is fresh, especially since it is a perishable commodity. Hence, it is essential that vendors are provided proper water facilities and waste management to keep the premises clean, odour-free, and functional. Most of the fish vendors are women and basic facilities of toilets are not made available for them at various locations in Mumbai.

There have been instances where marketplaces have failed due to several reasons. These reasons can be attributed due to the lack of certain amenities and infrastructure. A comparison between the different case studies mentioned above gives an overview of the various problems attributed to the marketplaces in Mumbai (Refer Table 1). The lack of parking spaces for shopkeepers and visitors, no dedicated space for loading and unloading of the produce. In addition, the dilapidated infrastructure of the shops has and lack of frequent sanitation facilities. Furthermore, the shopkeepers have encroached on the walking corridors of the market to keep their produce which in turn decreases the space for the pedestrians to walk. Finally, insufficient electricity in the market complex at night has left the space unsafe and vulnerable.

Table 1: Comparison of the Above Case Studies

Parameters	*Hemant Manjrekar Market*	*Crawford Market*	*Koyambedu Market*	*Panaji Municipal Market*
Parking space for pedestrians	×	×	×	✓
Parking space for Loading/Unloading vehicles	×	×	✓	✓
Storage facilities for vendors	×	✓	✓	✓
Timely Cleaning	✓	✓	✓	✓
Solid waste disposal system	×	×	✓	×
Public facilities like toilets	✓	✓	✓	✓
Cold storage for fish vendors	×	×	✓	----
Uncluttered Pedestrian circulation	✓	×	✓	✓
Sufficient lighting on streets at night	×	✓	✓	✓
Water supply for vendors	✓	✓	✓	✓

(*Source:* Compiled by Author)

On the other hand, successful marketplaces have certain characteristics which contribute to their success. These include proper parking areas for vendors and visitors, a dedicated space for loading/unloading of the produce, maintained infrastructure of the shops with frequent sanitation facilities. In addition to that, design considerations such as width of the corridors, proper light and ventilation inside the shops, sufficient electricity at night and storage facilities have also been provided. By incorporating these characteristics, a marketplace can ensure its success and can attract more vendors and customers. (Refer Table 2).

Table 2: Comparison between the Parameters of Successful and Unsuccessful Marketplace

Parameters	***Unsuccessful Markets***	***Successful Markets***
Vehicular Circulation	Congested	Organized
Parking space for pedestrians	No separate parking provided	Visitors parking provided
Parking space for Loading/Unloading	No separate zone provided	Available
Storage facilities for vendors	Available	Available
Sanitation	Once per day	2 times per day
Solid waste disposal system	No separate system available	Available

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Parameters	*Unsuccessful Markets*	*Successful Markets*
Infrastructure	Not regularly maintained	Regularly maintained
Public facilities (Toilets)	Not available especially for women	Available
Cold storage for fish vendors	Personally brought by the vendors	Given by the municipality
Adjacent Public space	NA	Is created or existing
People Influx	High	High
Electricity	Not sufficient at night	Sufficient
Water supply for vendors	Available by municipality	Available by municipality

(*Source:* Compiled by Author)

It can be seen that redevelopment of municipal markets in Mumbai is necessary for several reasons of improper infrastructure and maintenance. Furthermore, is important to ensure that they remain competitive and relevant in the modern retail landscape. This can help to improve the shopping experience for the customers and provide better business opportunities for the vendors, which can lead to greater economic growth and development for the city.

5. CONCLUSION

Municipal markets have always served as a place for retail and public interaction on the neighborhood level. The increase in the development of malls and supermarkets has brought about a culture change in the surroundings which has decreased the interpersonal interactions among the people. These new typologies of retail like supermarkets are planned such that it prioritizes the traffic flow of people instead of providing spaces for conversations. The informality of traditional markets has been lost in these spaces. Municipal markets in Mumbai have seen a major decline in the footfall of people and are in the need for revival with respect to its infrastructure, proper separation of produce, light and ventilation, garbage disposal and circulation. Though the redevelopment plans for some of them has been proposed, it does not take into consideration the problems such as vertical circulation, frequent sanitation, and retail benefits on the upper floors.

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Study of Equitable Distribution of an Urban Space Affects User Satisfaction

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ABSTRACT: Transportation equity is a way to frame distributive justice concerns in relation to how social, economic, and government institutions shape the distribution of transportation benefits and burdens in society. It focuses on the evaluative standards used to judge the outcomes of policies and plans, asking who benefits from and is burdened by them and to what extent (Karlin-Resnick, 2013). The study was conducted to understand user satisfaction of the equity provisions made by the Pune Municipal Corporation for Jangli Maharaj Road. The Parameters considered were Cycle Tracks, Footpaths, Road Width, Parking, Street Furniture, and Accessibility. Further research was conducted to understand the avoidance of cyclists towards the provided cycle tracks. Surveys through questionnaires, Interviews, and Visual mapping were done for documenting and conducting research. The paper concludes with an emphasis on the social, cultural, and user requirement study before the actual provision of transport equity.

Keywords: *Transportation, Equity, User Satisfaction, Cycle Tracks, Bollards, Parking.*

"Planners, architects of city design, and those they have led along with them in their beliefs are not consciously disdainful of the importance of knowing how things work."

—Jane Jacobs (Death and Life of Great American Cities)

1. INTRODUCTION

Equitable Distribution of Transport or 'Transportation Equity' came into existence as Planners and Architects laid the foundations of car-centric transport infrastructure and policies than NMTs or Non-motorised transport users and Pedestrians. In the past, transportation system performance was evaluated based primarily on travel speeds, which favoured faster but more expensive and resource-intensive modes, such as driving, over slower but more affordable, inclusive, and efficient modes such as walking, bicycling, and public transit (Litman, 2005). Cars or private vehicles are the dominant modes of transportation in trips and miles travelled, leading to negative externalities such as pollution, congestion, and the exacerbation of health and income. Increasing car ownership, usage and dependency is a significant, and increasing global issue that presents one of the main challenges to sustainable development. Reducing the need to travel, particularly by car, and promoting more energy-efficient modes of travel (for example, walking, cycling, and public transport), are key objectives in sustainable development policy. To achieve sustainable transport, in particular, Banister notes that equity, in addition to the environment and efficiency, are the three target areas to be addressed (S. Rock *et al*., 2014)

Transportation Equity has been defined by many scholars in various ways. For the following paper, transport equity has been defined as the measures and decisions contemplating extensive studies of the social, cultural, and economic aspects and surroundings to cater to the issues of the users and provide them with equity.

India is one of the fastest-growing economies in the world. (PIB Delhi, 2022) Pune is the 9th populous city in India and in modern times, emerged out as a new start-up hub in Western India with many IT start-ups establishing new offices and providing job opportunities in Pune. Pune has topped in rankings amongst Indian cities in Mercer's 21st quality of living (Mercer, 2019). Pune even though one of the most liveable cities in India, but does not lead any of the categories. (Jadhav, 2021). In terms of traffic and congestion, Pune is ranked 6th globally in the list of slowest cities of the world with an average of 249 hours are spent in rush hours in a year (Tom Tom, 2022).

Jangli Maharaj Road (J.M. Road) is one of the major arterial roads in the heart of Pune City and connects Shivajinagar to Deccan. It has varieties Food joints, Parks, Theatres, Shopping areas, Restaurants, etc. Due to the following reasons, it

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attracts crowds in very large numbers. Considering this aspect, it was equitably distributed for transport i.e., NMTs (Non-motorised transport), Pedestrians, Handicapped people, Elderly people, etc. have been given defined area demarcations which will promote their commute time and provide safety. Urban Street Design Guidelines (USDG, 2016) by Pune Municipal Corporation were followed to design these road provisions.

The following research paper examines the provided provisions, with the provisions mentioned in USDG. Further, it studies the satisfaction levels of NMTs users and pedestrians, etc. on these provided provisions. While conducting the user satisfaction research, a general observation was made about the cyclists avoiding the provided cycle provisions or the cycle tracks. An interview was conducted with 5 cyclists to understand their problems and explore the reasons for the consequent avoidance.

The paper concludes with observations and proposes a pre-study of user requirements, and various social and cultural aspects of the proposed urban space while following the guidelines provided by PMC i.e., Urban Street Design Guidelines.

2. LITERATURE REVIEW

Various scholars have defined 'Equitable Distribution of Transport' or 'Transport equity' in various ways. The common observations made in them were overall study of the area and social as well as cultural aspects and the study of actual user requirements. The transport literature usually focuses on four types of transport-related benefits and burdens that are related to people's well-being: transport resources, mobility as in observed travel behaviour, accessibility levels, and transport externalities (Karlin-Resnick, 2013). Transportation leaders emphasized that equitable decisions should use data that incorporate a metro region's specific needs and questions. Acknowledging varied needs across the region: Options are important, but recognizing constraints can help transportation decision-makers create realistic, flexible, and equitable solutions that work for residents across the region (Stacy *et al*., 2020).

Further papers were read to understand the methods that were used to measure user satisfaction in any urban space and in conclusion the adopted method was 3 points Likert Scale.(Eboli & Mazzulla, 2009) The 'Urban Design Street Design Guidelines (USDG)' by Pune Municipal Corporation were studied to understand what measures and how were the policies adopted for different roads in Pune City.

3. METHODOLOGY

3.1 Study Area

Pune is located in the western part of Maharashtra State with a estimated population of 6.9million which includes Pune Municipal Corporation and Pimpri Chinchwad Municipal Corporation. The city is one of the major economic hubs and is known for educational institutes and upcoming IT industry. The city has various major arterials road some of them being Jangli Maharaj Road, Ferguson College Road, Karve Road, Paud Road, Tilak Road, Satara Road, etc. The road selected for the following research paper is Jangli Maharaj Road.

Jangli Maharaj Road is one of the major arterial roads of Pune which connects the Sancheti hospital intersection at Shivajinagar and heads straight up to the Deccan Gymkhana where it ends at the Garware bridge. It is named after Sadguru Jangli Maharaj, and a temple named after him is situated on this road. It is the first 80 feet tarred road in the city. Patleshwar Cave temple is one of the oldest structures built in the 8th century and is a single rock-cut temple situated towards the northern part of the road. World-known food joints like Pizza Hut, KFC, Mcdonalds', etc. have their outlets on JM Road. Woodland, Wills Lifestyle, Van Heusen, Fab India, Sketchers, and Adidas are some of the fashion brands that have their showrooms on this road which attract youth in very large numbers. Sambhaji Park is a place that observes a large number of people and is heavily crowded in the evenings. Another enticing feature is the restaurants on this road. Panchali, Barbeque Nation, and 360 Revolving Restaurant are some of them. Balgandharva Rangamandir, a renowned performing auditorium, is located at a junction on JM Road.

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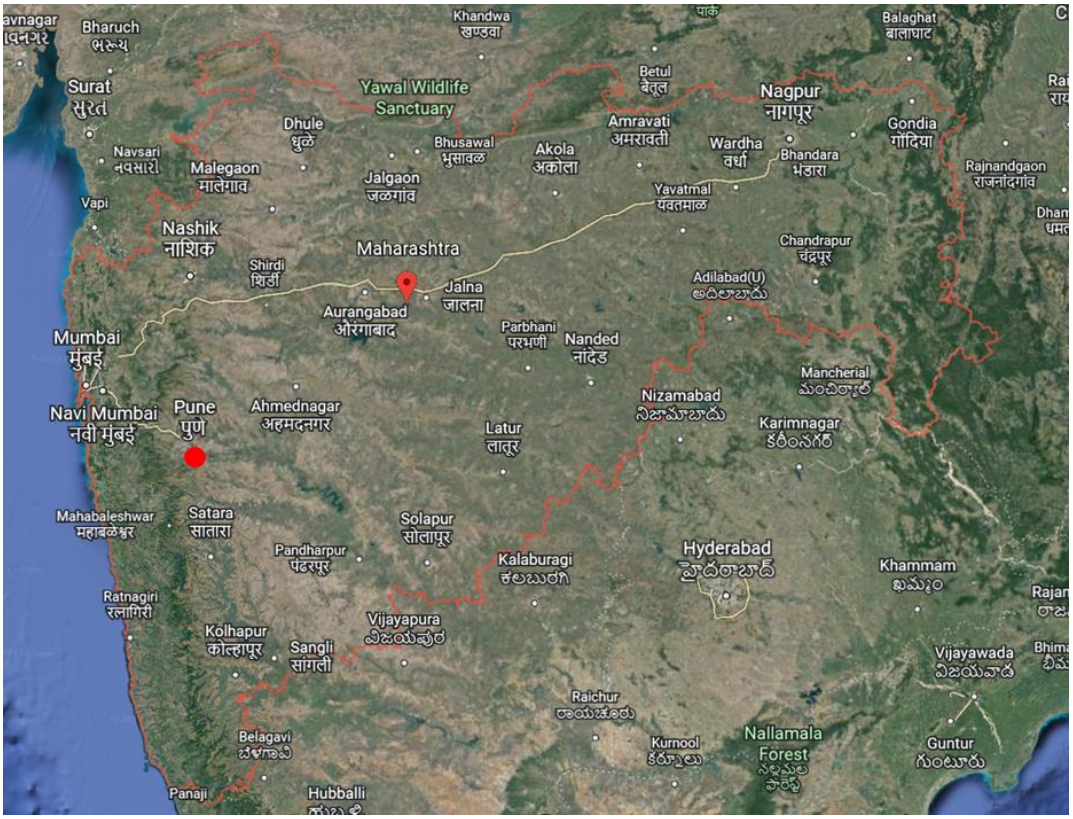


Figure 1: Location of Pune (marked by red circle) on Map of Maharashtra (Image Courtesy: https://earth.google.com/web)



Figure 2: Location of J.M. Road (marked in Green) in PMC Limits (Image Courtesy: https://earth.google.com/web)

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3.2 Identifying Sample and the Sample size and Interviews

The Research was restricted to the Age group of 18–25 years and Non-Motorised Transport (NMT) users along with pedestrians were considered for the above surveys. A total of 48 responses were recorded with further 5 interviews.

The Study included Multiple choice close-ended questions with an option to provide a short answer to the question asked. This study was conducted using an online platform for an easier and faster way for the respondents to answer. The answers to the questionnaire were obtained through https://www.google.com/forms/ which also helped in better and faster analysis. The Satisfaction was conducted with the help of a 3-point Likert scale of satisfaction which included options of Satisfied, Neutral, and Not Satisfied. Questions were asked to the respondents regarding the selected parameters which were Cycle tracks, Footpaths, Carriageway (Road Width), Parking, Street Furniture, and Accessibility. Further study on provisions of Garbage Containers, Public Toilets, and Pedestrian Crossings and whether were they maintained regularly. During the study, an observation was made that the cycle tracks were not utilised and were neglected by the cyclist. This observation was recorded by photographic mapping as well as by interviewing 5 cyclists to understand the reason behind the subsequent avoidance of people to use the cycle tracks.

Photographic observations were made to visually map various aspects while conducting the study. Current existing conditions were documented with the help of Photos which help in better explanation. Behavioural patterns were also recorded with help of Photo documentation.

4. OBSERVATIONS AND DATA ANALYSIS

4.1 Current Provisions

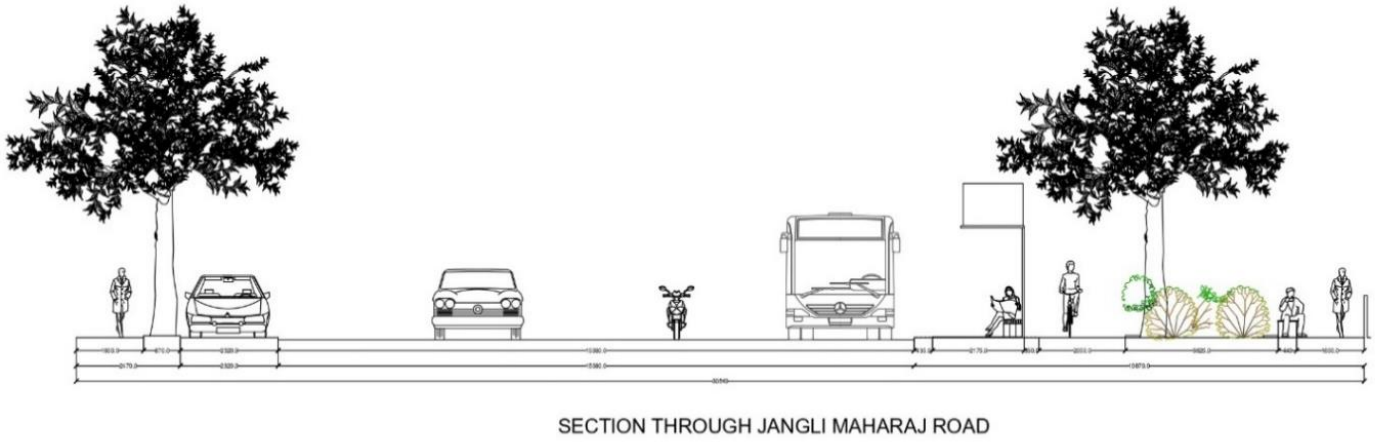


Figure 3: Section Explaining the Current Provisions on JM Road

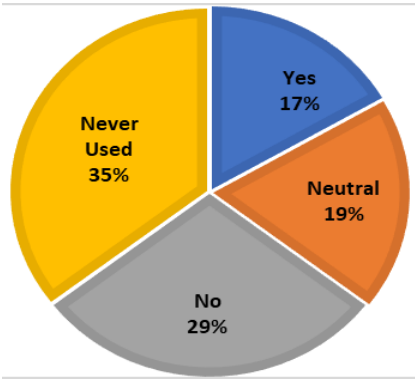
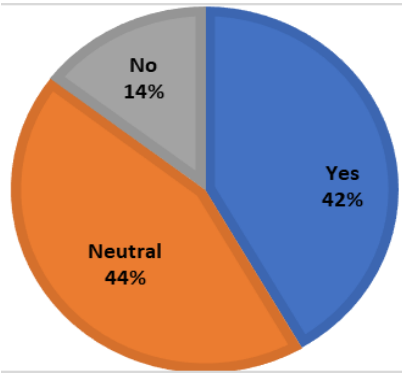
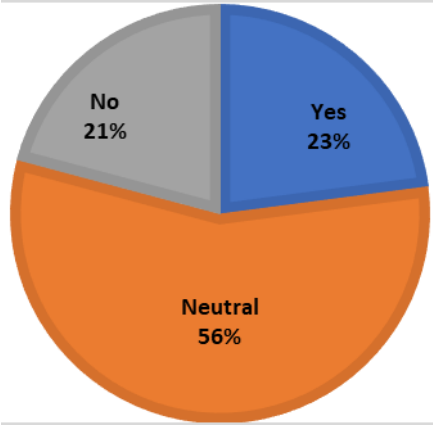
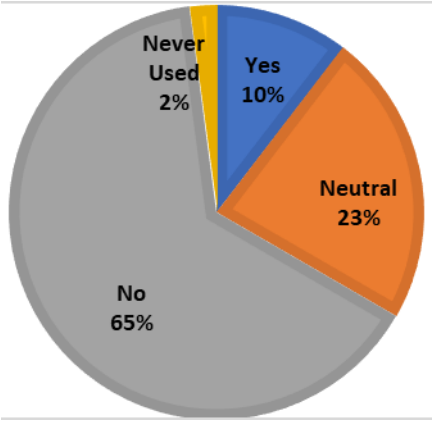
The study collected a total of 48 responses from people aged between 18–25. The 3-point Likert Scale was used to understand the overall satisfaction for each parameter considered.

4.1 Satisfaction Levels on Existing Conditions

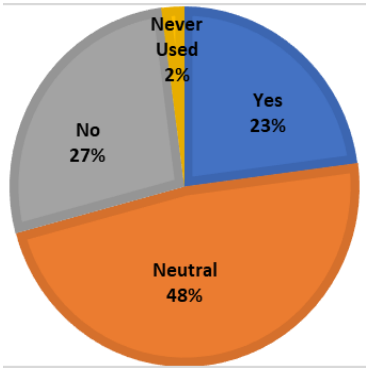
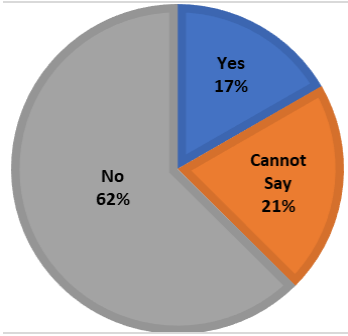
Satisfaction levels were studied on various parameters which were selected after the study of satisfaction-affecting parameters.

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Table 1: Recorded Satisfaction Levels

Question	*Results*	*Inferences*
Are you satisfied with the existing cycling track?		17 respondents out of 48 never used the cycle track for commuting. The remaining 31 respondents had used cycle tracks, with 14 in the Not Satisfied category. The major response out of all was Not satisfied.
Are you satisfied with the existing footpath?		20 Respondents were in the Satisfied category. 7 respondents were Not satisfied with the current footpath provisions. A major share was held by Neutral which had 21 respondents.
Are you satisfied with the existing Road provisions?		Most of the respondents were neutral about the current provision of roads (27). 10 respondents were not satisfied with the road. 11 respondents marked satisfied.
Are you satisfied with the existing Parking provisions?		An interesting result was observed when most of the respondents were in the Not satisfied category (31). 5 respondents felt satisfied with the existing parking provisions.

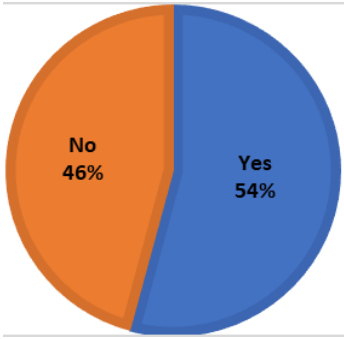
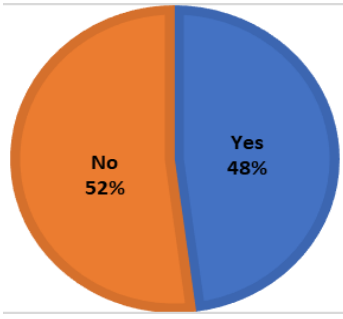
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Question	*Results*	*Inferences*
Are you satisfied with the existing Street Furniture provisions?		The majority of respondents were in the category of Neutral (23). 13 were not satisfied whereas 11 were satisfied.
Do you think the current footpath is accessible so that people like the visually impaired or handicapped can use it comfortably without any external help?		The majority of the respondents thought that the provisions were not useful for handicapped or visually impaired people. 8 of the respondents chose the option of cannot say

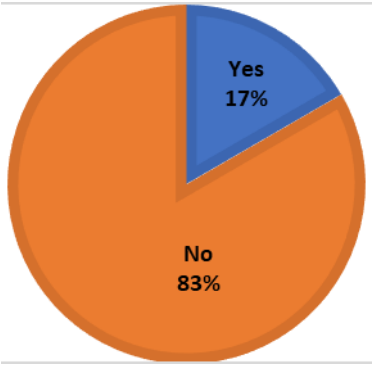
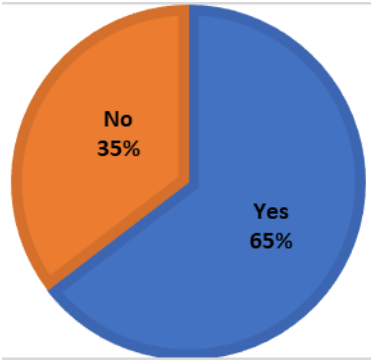
4.2 Study of Existing Provisions

Existing provisions like pedestrian crossing which can be a very important aspect of user satisfaction were considered for the following study.

Table 2: Recorded Responses to the Questions

Question	*Result*	*Inferences*
Do you think there are enough pedestrian crossings?		Overall, an equal weightage was observed for both the No and Yes options but 4 more respondents (26) felt that there were enough pedestrian crossings across the road.
Do you think there are enough garbage containers?		25 respondents felt that there weren't enough garbage containers whereas 23 respondents felt there were enough garbage containers.

ISBN: 978-93-89934-68-7

Question	*Result*	*Inferences*
Do you think there are enough Public Toilets?		40 respondents thought there were not enough public toilet provisions whereas 8 felt enough public toilets were provided.
Are the current provisions like plants, cycle tracks, and garbage containers maintained?		Out of 48 respondents, 31 respondents felt there was proper maintenance of the provisions whereas 17 felt that they were not maintained.

4.3 Cycle Tracks and Interviews

During conducting the studies, an observation was made. The majority of the cyclists were observed using the main road or carriageway which has been designated for motorized transport. For understanding the reasons behind this, an interview was conducted with 5 cyclists which used JM Road on a regular basis. The results were as follows:

Table 3: Responses to Interviews

	Are you satisfied with the current cycle track provisions on JM Road?	***Where will you prefer to cycle on the road or provided cycle tracks?***	***What was the overall experience of the currently provided cycle tracks on JM Road?***	***A general observation was made that people used the road for cycling rather than the provided cycle tracks. Do you agree with this observation? If agree, what do you think is the main reason for this?***	***Overall the cycling tracks in Pune are not considered successful, can you specify any specific reason for this to occur?***
Person 1	No	Road	Too many bollards	Bollards and hawkers and pedestrains using the cycling track	Not maintained and a lot of obstacles on the way
Person 2	No	Road	Occupied by hawkers and has no proper connection with the main road	Occupied by hawkers. No maintenance	The number of people using cycles as a means of transport is less in Pune.
Person 3	No	Track	Not proper	No	Because they have bollards.
Person 4	No	Road	Many obstacles like hawkers or pedestrains walking	Agreed	Improper infrastructure and planning
Person 5	No	Road	Bad	Less space between the bollards	Lack of commitment from people

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4.3.1 *Inference from Interviews*

Only the 3rd respondent preferred using the cycle track as their way of commuting while all the other 4 respondents preferred the main road for commuting. None of them was satisfied with the provision of cycle tracks.

5. DISCUSSION AND RESULTS

5.1 Understanding the Satisfaction Levels of Users and Takeaways

The study was conducted using a 3-point Likert Scale. The levels of satisfaction namely Satisfied, Neutral, and Not-Satisfied were converted to numeric values which were- **Satisfied-3, Neutral-2, Not-Satisfied-1.**

Further, a Range was decided to Interpret the results and understand which level of satisfaction the result comes under. This helped in understanding the individual as well as cumulative satisfaction levels.

Table 4: Range Levels for Measuring Satisfaction

Satisfaction Level	*Numeric Value*	*Range*
Not-Satisfied	1	1–1.66
Neutral	2	1.67–2.32
Satisfied	3	2.33–3

5.1.1 *Interpreting Individual Level of Satisfaction*

Table 5: Analysis of Recorded Responses

	Cycle	*Footpath*	*Road*	*Parking*	*Furniture*	*Individual Satisfaction Level*
1.	Never Used	3	3	1	1	2
2.	2	3	3	1	1	2
3.	Never Used	2	2	1	2	1.75
4.	3	3	2	1	2	2.2
5.	3	3	3	3	3	3
6.	3	2	3	2	2	2.4
7.	1	2	2	2	2	1.8
8.	2	2	2	1	2	1.8
9.	Never Used	2	2	1	2	1.75
10.	3	2	2	1	1	1.8
11.	Never Used	3	2	2	2	2.25
12.	Never Used	2	2	1	2	1.75
13.	Never Used	3	3	3	3	3
14.	3	3	3	2	3	2.8
15.	2	3	2	2	2	2.2
16.	1	1	2	3	1	1.6
17.	Never Used	3	2	1	2	2
18.	2	3	1	1	2	1.8
19.	1	2	1	1	2	1.4
20.	Never Used	2	3	1	2	2

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	Cycle	*Footpath*	*Road*	*Parking*	*Furniture*	*Individual Satisfaction Level*
21.	1	3	3	1	2	2
22.	1	3	2	Never Used	Never Used	2
23.	Never Used	3	2	1	3	2.25
24.	Never Used	1	2	1	3	1.75

5.1.2 *Inference for First 24 Respondents*

The 24 respondents had a majorly neutral level of satisfaction (marked in yellow). The total number was 19. 1 respondent was Not satisfied (marked in red) with the provisions. The remaining 4 respondents were satisfied (marked in green) with the given provisions.

Table 6: Analysis of Recorded Responses

	Cycle	*Footpath*	*Road*	*Parking*	*Furniture*	*Individual Satisfaction Level*
25.	Never Used	1	1	1	1	1
26.	Never Used	1	2	1	2	1.5
27.	Never Used	3	2	1	3	2.25
28.	1	3	1	2	1	1.6
29.	2	3	1	1	2	1.8
30.	1	1	2	1	1	1.2
31.	1	2	1	1	3	1.6
32.	3	2	2	2	2	2.2
33.	Never Used	3	2	1	1	1.75
34.	1	2	3	3	3	2.4
35.	1	2	2	1	3	1.8
36.	1	2	2	1	2	1.6
37.	3	3	2	1	3	2.4
38.	2	1	1	1	1	1.2
39.	2	2	1	1	1	1.4
40.	2	2	2	2	2	2
41.	Never Used	2	2	1	1	1.5
42.	Never Used	2	2	1	2	1.75
43.	1	1	2	1	1	1.2
44.	3	3	3	2	1	2.4
45.	Never Used	2	3	3	3	2.75
46.	1	2	1	1	2	1.4
47.	1	1	1	2	2	1.4
48.	Never Used	2	2	2	2	2

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5.1.3 *Inference for Remaining 24 Respondents*

The other 24 respondents were observed a majority Not satisfied (marked in red). Half respondents (12) felt they were not satisfied with the provisions. 8 respondents felt neutral (marked in yellow) about the provisions. 4 respondents were Satisfied (marked in green) with the provisions.

The Total recording can be observed in the table below-

Table 7: Final Table of Satisfaction Levels of Respondents

Satisfaction Level	*Not Satisfied*	*Neutral*	*Satisfied*
Respondents	13	27	8

5.2 Understanding Cumulative Satisfaction Levels of Each Parameter

3-point Likert scale interpretation can also be done for each individual parameter using the same technique which was used for individual respondents' satisfaction levels.

Table 8: Cumulative Satisfaction Levels on Each Shortlisted Parameter

	Cycle	*Footpath*	*Road*	*Parking*	*Furniture*
Cumulative	1.80	2.22	2.02	1.44	1.95

Comparing the above values with the Range scale decided the interpretation is:

1. The people were neither satisfied nor unsatisfied with the provisions of Cycle tracks.
2. The people were neither satisfied nor unsatisfied with the provisions of Footpaths.
3. The people were neither satisfied nor unsatisfied with the current provisions of the Road.
4. The people were not satisfied with the current provisions of Parking.
5. The people were neither satisfied nor unsatisfied with the Street furniture.

5.3 Results regarding Road Provisions

1. The Respondents agreed that there were enough pedestrian crossings on JM Road.
2. 25 respondents felt there were not enough garbage bins on JM Road which was analyzed through photo documentation. **There were enough provisions of Dustbins.**
3. The majority of respondents felt the provisions were maintained which included Plants, cycle tracks, and garbage containers. It was confirmed with further observations.



Figure 4: Provided Steel Dustbins



Figure 5: Adar Poonawala Dustbins at Study Area

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4. 83% of the respondents felt there were not enough public toilets on JM Road. This was analyzed to understand the provisions. No provision was made for male toilets. There were provisions made for female toilets but were not maintained and did have any hygiene.



Figure 6: Provision Made Only at One Place, with Toilets Only for Women. No Hygiene or Cleanliness Observed around the Toilets

5.4 Analysis of Interviews Conducted for Cycle Tracks



Figure 7: People Avoiding Use of Cycle Tracks



Figure 8: People Avoiding Use of Cycle Tracks

As seen in the above images people were avoiding the use of cycle tracks even when given provision. The cyclists were interviewed to understand the reasons behind this. The analysis is as follows:

1. None of the interviewed cyclists was satisfied with the provided cycling tracks.
2. Only 1 out of 5 preferred cycle tracks instead of the main road.
3. The common difficulties mentioned by the cyclists were-
   (a) Inadequate distances between bollards.
   (b) People using the cycle tracks for walking.
   (c) Occupied by hawkers.
4. The major point mentioned was no seamless way of commuting and insufficient distance between 2 bollards was mentioned by every respondent.

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Considering the difficulties, a study was made to understand the distance between 2 bollards:

The recorded distance between 2 bollards was 500 mm. The gap between the two bollards should be such that the handle of the cycle can easily pass through it without having to lift the bicycle. (P.M.C., 2016).

It was found that the cyclist did not find this distance to be adequate and was a major difficulty faced by them.

5.4 Analysis of Bollards with Respect to Accessibility

The wheelchair is one of the most commonly used assistive devices for enhancing personal mobility, which is a precondition for enjoying human rights and living in dignity. Wheelchairs assist people with disabilities to become productive members of their communities (WHO, 2010). According to the above results the recorded distance between 2 bollards was 500 mm.

The dimensions of a wheelchair are as follows:

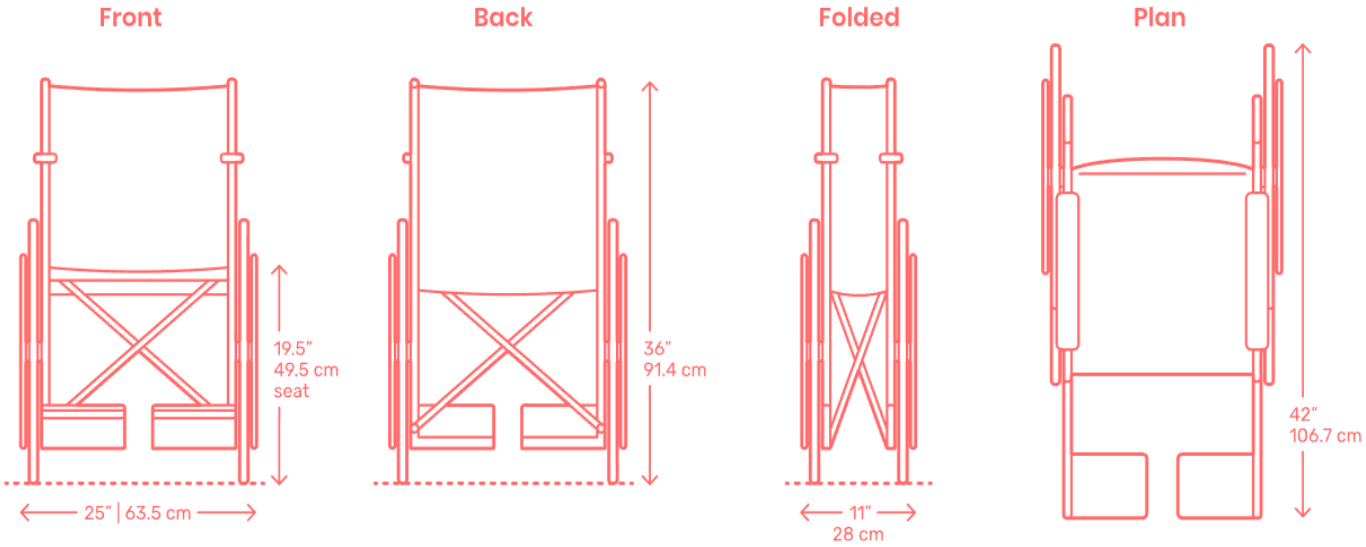


Figure 9: Wheelchair Dimensions

(*Source:* https://www.dimensions.com/element/wheelchairs)

As observed through the diagrams above, the width of a wheelchair is 635mm. This verifies that any wheelchair cannot pass through the bollards (Distance between the bollards-500mm) that are installed at JM Road and there is no way for the users to access the footpaths which is built to provide equity to every user of the road.

6. CONCLUSION AND FUTURE RESEARCH

It can be concluded that there was not enough background study conducted before the equity distribution which can be verified with the user satisfaction data which indicates the people were neutral in 4 categories of Footpath, Cycle track, Road, and Street Furniture, whereas people were not satisfied with the parking provisions. The accessibility aspects were not addressed in the current provisions as the distance between bollards was not adequate. The tiles for the visually impaired were not continuous. The provisions were adequate for some parameters like dustbins, pedestrian crossing, and their maintenance but there was no provision for the toilet for males and the current provision was not adequate, as well as, it was not maintained. Even after providing cycle tracks for cyclists, it was generally avoided due to obstacles like pedestrians, hawkers, etc. The insufficient distance between bollards was a major difficulty faced by all cyclists which was the main reason for avoidance of cycle tracks as analyzed above.

Further research can be conducted on how user satisfaction can be promoted with different provisions. There can also be a detailed study on bollards and the adequate distance between them which can be convenient for cyclists and wheelchair users. An alternative to bollards can also be researched upon.

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Repair & Maintenance of a Building's Façade Element at Dadar Parsi Colony Heritage Precinct

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ABSTRACT: The buildings in a heritage precinct have a distinct value that adds character to the precinct. With the importance of repairs and regular maintenance of a building well known, it has equal importance in the case of heritage buildings and buildings in a precinct. In recent times, the buildings in the precincts have faced the constant threat of redevelopment. Despite the interest and intent of the tenants, the policies have forced the landlords to take little interest in the upkeep of the buildings.

The modest Dadar Parsi Colony is one such heritage precinct currently facing the threat of redevelopment. DPC was demarcated as a Heritage Precinct in the Development Plan by the Govt. of Maharashtra and was developed in the early 20th century by the Bombay Improvement Trust as a part of the Dadar-Matunga-Wadala scheme. The buildings were made to locate the middle-class Parsis in a well-planned, lush green, hygienic locality.

The buildings in the precinct are nearly 85-90 years old and have stood the test of time. This paper aims to do a case study of a building in the precinct to identify the areas of repairs and maintenance required. The study will also aim to analyse whether the repairs done in the building are keeping the original architectural design and features.

The methodology for the study will involve collecting data about the typology of the buildings in the precinct. The study further utilises the expertise of the professionals in the field.

The research paper emphasises correct practices for building repairs in the heritage precinct that protect the rich heritage and character of the precinct.

Keywords: *Repair & Maintenance, Heritage, Conservation, Restoration, Preservation, Precinct.*

1. INTRODUCTION

Dadar Parsi Colony (DPC), is a demarcated Heritage Precinct in the Development Plan by the Govt. of Maharashtra. The precinct was developed as a part of the Dadar-Matunga-Wadala scheme in the year 1899–1900 by the Bombay Development Trust. Heritage precincts such as these have their distinct character adding to the uniqueness of the area and community. By protecting the heritage precincts, we protect and preserve our rich history's character and ambience.

Many buildings at DPC were built during the late 19th and early 20th centuries in the Neo-Classical style with vernacular features incorporated. With time, many of these buildings need regular repairs. The timely repairs of the buildings can increase their life, thus saving a lot of money to be spent by users/landlords/tenants at a later date. One of the main reasons for the deterioration is the lack of funds to maintain the buildings.

Dadar Parsi Colony is one such heritage precinct. Owing to many factors e.g., the lack of funds, awareness, or interest, the streetscape of the precinct is changing slowly. Façade elements are the first point of contact between the environment and the building and hence are affected directly. These elements in the façade are being compromised with alternate elements that are not alike to the original. This affects the characteristics and uniqueness of the precinct. The aim of the study is to understand repair techniques to be used for the façade older buildings at the Dadar Parsi colony.

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Figure 1: Building at Dadar Parsi Colony Precinct

To collate all of the data and find out major contributors in R&M and recommendations for the same.

With the help of a case study of a building in the precinct, it's an attempt to understand if the original features of the building were maintained. The study also aims in identifying the areas of repairs and maintenance required to maintain the building. The scope of the study is limited to one building at Dadar Parsi Colony. This study is done by visual inspection; hence the suggestions are subject to change after doing the structural audit of the building.

2. LITERATURE REVIEW

https://www.re-thinkingthefuture.com/rtf-fresh-perspectives/a1919-the-parsi-colonies-of-mumbai-understanding-the-contrast-in-social-architecture-of-mumbai/

The buildings at the Parsi Colonies across the city are getting rampantly demolished for newer construction.

Preserving the buildings in the precinct helps in maintaining the unique characteristics of the precinct and thus keeping the heritage alive in the small pockets of the city.

https://timesofindia.indiatimes.com/city/mumbai/heritage-precincts-shrink-by-up-to-50-in-20-years/articleshow/60139729.cms

1995 heritage rules do not restrict redevelopment in precincts or Grade III structures (subject to control of the Heritage committee).

1999 redevelopment scheme exempted buildings that pay cess to the state housing board from having to take permission for the redevelopment.

No incentives for repair or conservation.

https://indianexpress.com/article/india/maharashtra-govt-introduces-new-cess-for-redevelopment-of-dilapidated-tenanted-buildings-4458022/ Permissible ceiling limit for carrying out structural repairs is Rs. 2000/ sq. m built-up area of the cessed building. If the cost of repairs >2000 and the users i.e. the tenants or landlords agree to bear the excess cost, then the building repairs can be undertaken.

http://www.mmrhcs.org.in/images/documents/projects/00-Final-report-lll_lV.pdf The report by the MMRCHS section on Ward F North, states that the Hindu and Parsi colony both highlights of this ward are rampantly demolished for high-rise reconstruction under DCR 33 (7).

These reports suggest the lack of timely repairs needed for the buildings in a heritage precinct thus preserving the character of the precincts. The paper is aimed at focussing on the issues and methods of repairs needed for these buildings.

3. MATERIAL AND METHODOLOGY

A visual survey of the precinct was done to understand the typology of the buildings. It was observed that most of the buildings are constructed with either composite or purely load-bearing wall masonry walls.

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The approach followed for the study is as follows:

(a) Observe and photo documentation of the façade elements of the buildings at DPC precinct.
(b) Observe the repair techniques done.
(c) Rules & regulations and guidelines to repair and maintain at heritage precinct and research papers for the same.
(d) Interview the experts in the field.
(e) Current practices and procedures for repair of the façade elements for buildings in a heritage precinct.
(f) Areas that require repair in the case study and suitable solution.

4. RESULTS AND DISCUSSION

The case study done here is of Baliwala building plot no 764 C & D at Mancherji Joshi Road in the DPC precinct. After interviewing the tenants, the following observations were made:

- *Age of the building:* Approx 90 years old
- *Ownership*: Trust owned
- *No. of floors*: G+2

Architectural Typology & features: Vernacular style with basalt plinth, load-bearing brick masonry, sloping roof with terracotta tiles, sloping shade over balconies, balconies with wooden multi-foiled arches with wooden posts, decorative balcony railings, decorative wooden brackets, fixed ventilators at balcony with wooden frame and stain glass (missing at few places), decorative panels and motifs in plaster, string course.

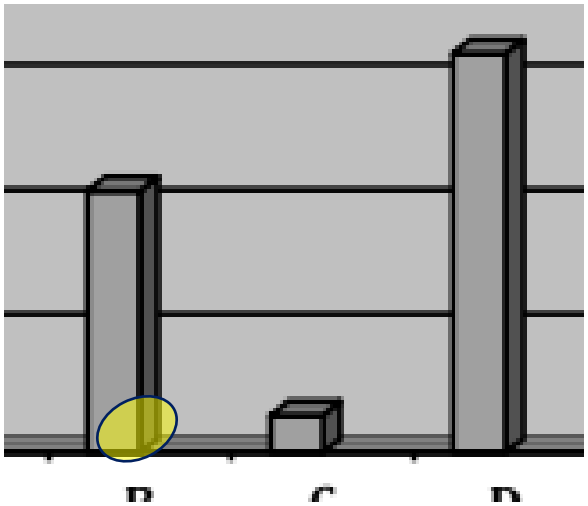


Figure 2: Location of Baliwala Building at Dadar Parsi Colony Precinct on DP Remarks



Figure 3: Baliwala Building Front Elevation

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Figure 4: Baliwala Building Side Elevation



Figure 5: Façade Elements & Features of Baliwala Building

The original load-bearing structure is struggling to keep the original architectural features owing to the lack of funds or lack of intent of the trust and tenants. Though the building seems to be structurally stable after visual inspection of the façade, the facade elements if repaired can help in maintaining the original character of the building and the streetscape of DPC. The façade elements typically amount to 20–25% of the total repair cost of the building.

5. CONCLUSION

The study emphasises the use of like-to-like material that would not only preserve the original character of the buildings but also be within the budget. An economical solution with the latest materials that are true to the aesthetic value of the architectural features of the building or reusing materials from older buildings with similarity is proposed. The identification of the problem in the case study is based on visual inspection only. For a better result, a detailed internal inspection and a structural study need to be done. The study gives a base for future research which can be used for preparing a repair and maintenance manual for the buildings.

ACKNOWLEDGMENT

I cannot express enough gratitude to all those who have extended their exceptional support and guidance in this study. I would like to thank our HOD Prof. Alka Tawari, my mentors Prof. Shweta Parab, and Prof. Kalyani Salvi, the faculties at

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college, Prof. Umesh Mallaya, and Prof. Dhaval Ghare for guiding and helping in improvising my study. I cannot miss the guidance of Mr. Chetan Raikar here. This study would not have been accomplished without the input from the residents of DPC, especially Ms. Kayomi Engineer. My friends Prajakta Ganu and Prajakti Pai have been my constant support throughout.

They have been generous enough to share their expertise to improve this study in many ways and helped me correct many errors; those that inevitably remain are entirely my responsibility.

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Changing Phases of Cities and its Street during Festivals: Understanding the Context of the Nagpur City

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ABSTRACT: Festivals are occasions that promote a city's vitality and provide opportunities for social contact in today's hectic metropolitan environment. Festivals have an impact on how cities and streets function. The local community group primarily celebrates it at home and in public.

The study illustrates the context of Nagpur city, the importance of public spaces, streets. It also understands the culture and festivals celebrated in Nagpur, get aware of the use of public spaces, understands the transformation of these spaces, changes made to shop frontages, added pedestrian movement patterns, study patterns of the local small vendors, hawkers, etc

This essay explores how the peculiar arrangements made during the Ganesh festival for Nagpur cha Raja in the city, have an impact on the dynamics of social life at the local level.

This study's main contribution is to look into how festival goers' playful, subversive, and resistive experiences are influenced by micro-scale physical environments.

Direct field observations are carried in four phases:

1. Month before festival (normal time period)
2. week/5–6 days before festival (preparatory phase)
3. during the time of festival (at the time of ganesh utsav)
4. after the festival (immediately after the festival)

The study tries to map and look at the ideas, planning strategies, activities, movement and planning strategies to develop transitional spaces and make them effective. The comparative analysis of the evolution of each of these phases will be conducted. Mapping makes an effort to comprehend the physical transformation of the street, how foot traffic increases, and various junctions and nodes where activity occurs close to the mandal.

Keywords: *Nagpur, Ganpati Utsav, Streets, Festivals, Transformation, Transitional Space, Activities and Pattern.*

1. INTRODUCTION

Background

Nagpur is a city in the central Indian state of maharashtra. Every celebration is held here with tremendous fanfare, and the locals firmly believe in upholding long-standing traditions. There are areas in different parts of the city that make it more vibrant during festivals. The paper will describe the major festival celebrated by the people and various communities living there.

Festivals have a significant role in life. It reunites people and prosperity. One of them is the Ganesh Festival. The majority of Indian states now commemorate Ganesh Utsav. But **Lokmanya Tilak** established it in 1894. It is one of Maharashtra's biggest festivals, and is celebrated with much enthusiasm. In Nagpur it is a ten-day festival honouring Lord Ganesha's rebirth. The idol is submerged in water on the tenth or eleventh day. The immersion of an idol symbolises release from suffering and evil. People organise a full-fledged parade as the Visarjan approaches. People sing traditional songs and chant mantras. One of the main factors that pulls people together and enables them to celebrate the event is the **dhol Tasha** (Tasha is a musical instrument composed of wood, metal, brass, leather, fabric, and parchment. The dhol is commonly referred to as a mangal vadya (celebratory instrument).

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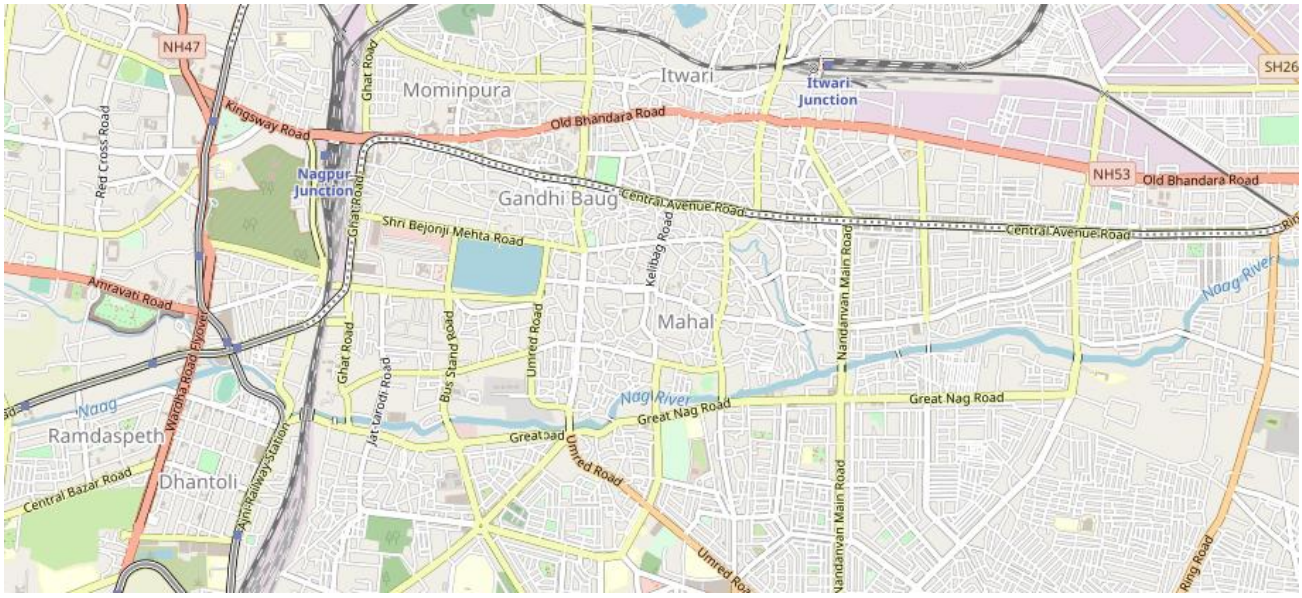
> *The festivals that are observed in Nagpur on a huge scale and with a lot of public participation are ram navami (with a Shobha Yatra that features a lot of floats that depict various scenes from the Ramayana), ambedkar jayanti, and pola marbat (processions-which is one of the tradition in Nagpur which is organised to handle the social evils and throw them out from their localities), ganesh utsav, shivaji jayanti, tajuddin baba's birthday, Eid, janmashtami, diwali, navratri and dussehra.*

A city is a dynamic organism made up of various individuals with various aims and backgrounds. Public areas are always evolving and taking on new definitions, are symbolic of urban life. Festivals improve the city's integrity and offer it a distinct character. Festivals strengthen bonds between individuals and bring them together. Additionally, they aid in the preservation of ethereal cultural assets such as enduring cultural knowledge, one's own image and identity, and the underlying values reflecting certain traditions.

Changing phases of the city in which it gives ideas about the street and festival celebrated by people in Nagpur city. It gives crux about the utilisation of public spaces and streets as an addition of vibrancy enhancing the value, life of it and also how those spaces act as source of empowerment for local business. The area of focus varies from festival to festival happening around the city. There are numerous ways in which people utilise the streets depending on the nearby activities. The main focus will be on how public spaces and streets add vibrancy, enhance the value and quality of life, as well as how those spaces function during Ganesh Utsav.

Significance

The research has been focused on one major celebration, ***Ganesh Utsav***, and in particular the area where *Nagpur cha Raja* is located in Tulsibagh, Mahal, Nagpur. It is well connected to numerous sites such as chowks, market areas, and residential areas. Nagpur Cha Raja is located near Nagnadi bridge near reshimbagh. It is connected to the city's Mahal market area and the famous Chitar Oli region where artisans finish hundreds of idols before transporting them to devotees' homes and pandals of Sarvajanik Mandals for a 10-day earthly journey.



Plan 1: Plan Showing various Parts of Nagpur City

The study will be defined through street mapping and cross sections of streets showing comparative analysis before and during the **Ganesh Utsav**. Various factors make this transformation for the festival possible. This paper tries to understand these factors from the study and time spent on the site. Few factors contribute to the change significantly. Many adjustments are made in shop frontages, streets and footpaths become more alive, and also after the festival ends it returns to normal living. Besides the idols, the pandals are also brightly decorated, cultural activities are held, and people enthusiastically participate. Hundreds of stalls have been put up in every marketplace, road, every nook and cranny of the city, with vendors eagerly expecting worshippers to take home the gorgeous Lord's Idol, decorative items, and souvenirs.

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Street fair also happens near the mandal for 10–15 days to months, attracting more inhabitants to the area, overall these ten days give the city a distinct personality.

It causes a wave of celebrations to sweep the city and makes the streets quite crowded. When taken as a whole, these features show the potential contribution organised festival events can make to neighbourhood places' significance and informal socialisation. For the limited duration of a festival, the administration of the festival's organisers as well as the numerous formal and informal behaviours of all attendees affect the physical reality and the meaning of local neighbourhood areas.

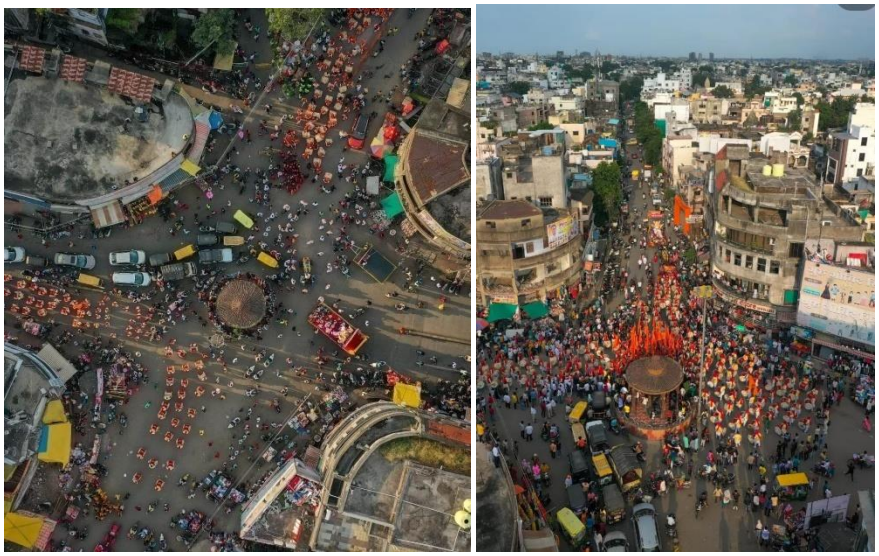


Image 1: Views of the Day of Sthapna Celebrating Utsav with Dhol Tasha



Image 2: View of Riots and Rituals on the Day of Sthapna



Image 3: View of Fair Happening in Reshimbagh Ground

Objective

- To understand ganesh utsav celebrated in Nagpur.
- To understand physical transformation during ganesh utsav for Nagpur cha Raja.
- To map the transformation and analyse enabling factors.
- To understand activity pattern of shopkeepers and vendors.

Research Questions

- Is the Nagpur city altered, influenced, or given a distinct identity as a result of people celebrating ganesh festivals? How does this happen?
- What are the impact of ganesh festivals in empowering the local business and adding life to streets?
- How does the tulsi bagh and reshimbagh street get transformed during, before and after the festival?

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Image 4: An Overview Map from Reshimbagh to the Location of Ganesh Sthapna



Image 5: Map Highlighting the Location and the Nearby Nala and Reshimbagh Ground

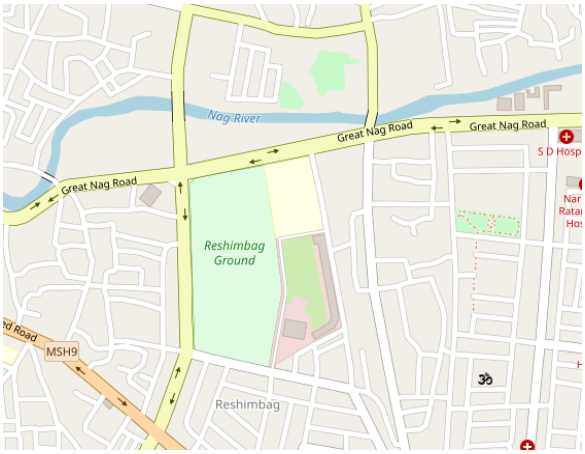


Image 6: An Overview Map from Tulsi Bagh to Reshimbagh Ground Ground

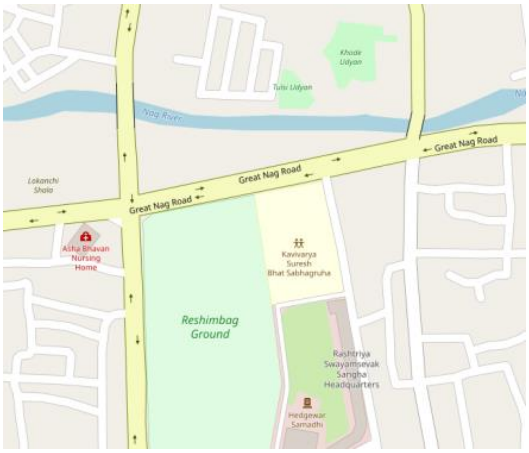


Image 7: Map Highlighting the Location of Nagpur Cha Raja and Ground

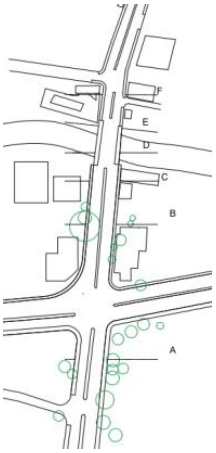


Image 8: Plan of Street in Front of Mandal and Ground

Throughout the year, this location is unremarkable and only utilised for parking, but during the festival season, the site is bustling with activity and the area is illuminated by lights. There is a lot of hustle and bustle on the major road in front, since it is close to a traffic light, and during festivals, pedestrians, as well as local sellers and hawkers, obstruct the street.



Image 9: View of the Nala Adjacent to the Site



Image 10: View of the Site of Ganesh Sthapna



Image 11: View of the Pathway and Road

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Image 12: View of Site before Few Days Utsav



Image 13: View of the Site before a Day of Sthapna



Image 14: View of the Place at Night of Ganpati Visarjan

2. LITERATURE REVIEW

My concern is the transformation of streets and cities during ganesh utsav in Nagpur and specifically nagpur cha raja in detail. Numerous articles, books, and case studies have been used to examine various methodologies and findings. Open Spaces in Mumbai is one of the books I mentioned. It serves as a record of observations taken in 11 public areas of Mumbai. The analysis is supported by observations and presented as pictures and sketches. The key factors including vehicular flow, surrounding context, history, demographics, and street furniture are all examined individually in each case study. They quickly compared the biggest cities of the world, and Mumbai was found to lack open spaces. There are numerous street markets that are constantly crowded with shoppers. An analysis of the Bandra West connection road has been conducted. The study focuses on street shopping locations near the southern part of the stretch, which is connected by stalls and businesses selling clothing, shoes, food, and bags. The usage and activity patterns have been recorded at specific times and intervals of time. Activities' levels of intensity have been classified as high, medium, and low. The following were the study's primary conclusions:

1. Informal stalls are an extension of high end retailers.
2. The market takes up a total of 5m in width.
3. The main activity is shopping.

My research, which explains the social, economic, and spatial linkages between vendors and their location also takes into account these data. (LEAF, 2012)

Streets as Public Spaces: Lessons from Street Vending in Ahmedabad, India, was the other essay mentioned. It is a study of various Ahmedabad streets that includes techniques and significant research findings. There are two primary categories of sellers in Ahmedabad that have been researched. The first is conventional, and the second is modern. They are working to overcome the many design obstacles they face. The study tries to comprehend the various trends, traits, and frequency of these providers.

Between May and July of 2014, they conducted the visits. In the first instance, the algorithm of the suppliers has been examined based on whether they are stationary or mobile. The vendors were also asked about the facilities and infrastructure. The infrastructure, amenities, and calibre of the facility were also inquired about from the providers. The dynamism of the characteristics of places have been explored. (Deore & Lathia, 2019)

The article after that, Inclusive Design for Street Vendors in India, was also mentioned. The study looks at the challenges of policing street vendors in modern India and how inclusive urban planning could promote the use of creative space. The Design Guide employs a "rights-based approach" to development, which is founded on the concept of the right to the city, which advocates a right for all urban residents to utilise the benefits of urban life, including street vendors. The process of design, context analysis, and issues and challenges are all covered in the essay. It also examines design requirements including necessary street space, different display places for commercial activities, and advances in urban architecture. They have investigated a number of markets while taking the aforementioned considerations and prospective development avenues into mind. (CEPT, 2011)

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The article Interrelating Urban Form & Pedestrian Movement shows how urban design affects pedestrian movement in cities through case studies of two streets in Nagpur's Sitabuldi district. By suggesting an appropriate street design to allow pedestrian movement of Sitabuldi Market Street, which is preferred by pedestrians, further steps are taken to improve pedestrian conditions. The existing street design is studied in order to understand the challenges faced by pedestrians. The purpose of this study is to demonstrate the significance of street culture (informal street activities) as a component of urban life, culture, and image, as well as to establish guidelines for keeping these crucial characteristics in mind while enhancing the diversity, depth, richness, and complexity of streets. (A. Kakirde, 2016)

Streets play a significant social and spatial role in urban form. The street wall acts as the exterior of the city and presents a constrained spatial structure. There are two types of street activity in cities: official and informal street activity. In a sense, formal street activities comprise large-scale trading that is legal and formal in nature and happens in the city's private spaces. These activities generally occur inside the buildings on both sides of the street. On the other hand, informal street activities are any activities that occur in the public realm, are informal in nature, and are carried out in accordance with communal and cultural values and objectives. (T. Patel, 2013)

The study's overview and introduction made clear that its purpose is to understand how the current city fabric is forced to evolve in order to accommodate the modern festival's altered scale and mechanics. The four parts of the study are introduction, heterotopias, methodology, and conclusion. The methodological section, which organises the city's activities as local, regional, periodic, or occasional, is the most crucial part of the essay. (R, Badar, 2018)

The Social Life of Small Urban Spaces is a book that explores the social life of small urban spaces. It discusses the city's public spaces in a variety of ways, including the life of plazas, sitting areas, streets, the sun, wind, trees, and water, as well as the tendency for self-congestion and how open spaces can relieve crowded conditions and add to enjoyment. The importance of the street is driven out in this chapter. When using spaces, passersby are given an open feeling and a sense of security by buildings with glass fronts, but walkers are given a dull and uneasy feeling by block buildings. For better street elevations, 50% of the ground level should be used for food and retail purposes. Aspects like sightlines are crucial. People will not use a location if they cannot see it. Barriers include walls, fences, and others.

These studies show that various mapping and documenting techniques are used to conduct a detailed analysis of the chosen location. The case studies have included information on traffic flow, pedestrian movement, neighbouring locations, vendor schedules and shifts, design concepts, road connectivity, open spaces, economy, and interrelationships.

3. RESEARCH METHODS AND METHODOLOGIES

Methods

i) Interviews
ii) Mapping
iii) Comparative Analysis
iv) Photographs

Methodology

Study has been done in four phases:

1. Month before festival (normal time period)
2. Week/5–6 days before festival (preparatory phase)
3. during the time of festival (at the time of ganesh utsav)
4. after the festival (immediately after the festival)

1. Studying physical transformation during Ganesh Utsav in detail.
2. Mapping the vehicular and pedestrian activity pattern on the street.
3. Understanding the use of spaces i.e. streets and footpaths by vendors.
4. Taking a short interview with street vendors.
5. Mapping street activity before, during festival and after the scenes of the Nagpur cha Raja Ganesh mandal.
6. Comparative study through plans and sections at various times showing different activities.

The initial stage of the research involves gathering information by visiting the site, observing, and taking pictures.

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Based on the findings, a specific street is identified and thoroughly examined to produce a comparative and detailed analysis.

According to the data gathered, evenings see a rise in foot traffic. By 4 or 4:30 pm in the evening, street vendors set up shop, and people began to arrive from 6:30 pm.

There are various agencies involved in transformation and celebration, driving forces such as people of that area, people of nagpur, volunteer organisations and few government agencies.

It gives clear ideas about vendors and traffic rerouting, increase in pedestrian footfall, expansion of shop frontages.

After making several visits to the same location on various days throughout the week, it was discovered that the mandal was created five days ahead of Chaturthi. One day before Chaturthi, a dhol Tasha procession brings the Ganesha statue. And is maintained in place with Hindu rituals on Chaturthi. Three site visits per day have been carried out to map the transformation of street sellers and pedestrian foot traffic, and the results have been documented in the form of photos and sections. On-site observations are made, noting the types of vendors and their installation in accordance with the goods they were selling.

4. ANALYSIS, RESULTS & DISCUSSION

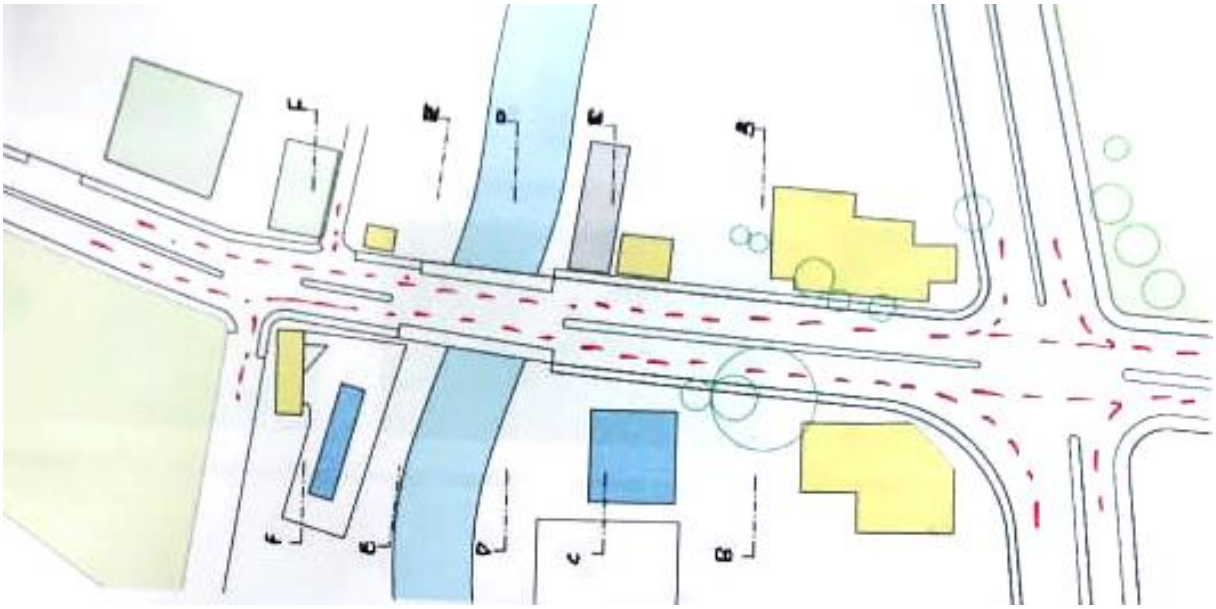
One of the important neighbourhoods in Nagpur city is Tulsibag, Mahal. Due to its historical importance and the presence of the Nag River, it is significant. It is almost in the centre of the city and connects to both the market area and the residential sector. Due to the historic Nagpur Cha Raja taking place here, this region is also well-known for its Ganesh Festival. For the past 26 years, Nagpur Cha Raja Mandal has been there to celebrate Ganesh Utsav. Due to its proximity to the Mahal Market, this region sees a lot of vehicular traffic all year long. It is evident that over the course of the ten-day festival of Ganesh Utsav, the movement and activity patterns alter. The intensity of pedestrian traffic increases throughout the day and after evening as people gather to worship the idol. Visitors to the region are also drawn in by the street hawkers.

A significant part of the area between Reshimbagh Ground and Tulsibagh's mehendi lawns has been researched. The road is 18m wide excluding the 1.5m divider in between. During typical days, it is easy to walk around because of the 3 m wide footpaths that are present on both sides of the road. Vendors make use of the pavement during festival seasons by setting up temporary stalls to sell their goods.



Map 1: Detailed Plan of Street in Front of Mandap and Reshimbagh Ground which has Major Transformation during Ganesh Utsav

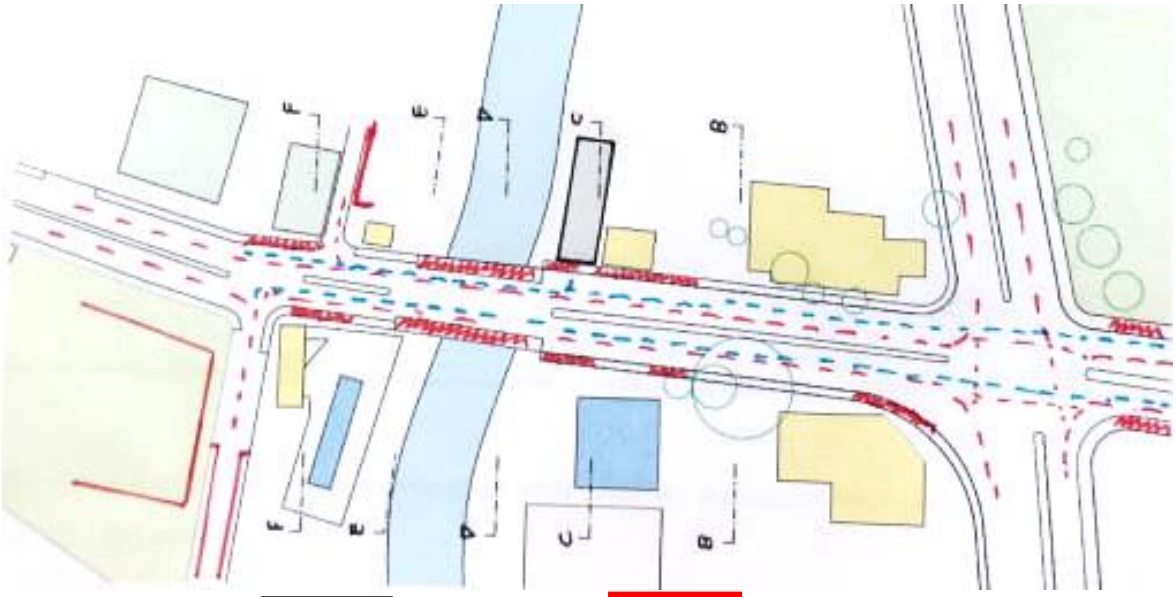
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Legend

- Site of Ganpati
- Commercial Shops
- Institutional Building
- Lawn

Map 2: Detailed Plan of Street in Front of Mandap which is been Most Active during Ganesh Utsav (before festival)



Vendor positions *Parking Areas*

Vehicular Movement *Pedestrian Movement*

Map 3: Detailed Plan of Street in Front of Mandap which is been Most Active during Ganesh Utsav (after festival)

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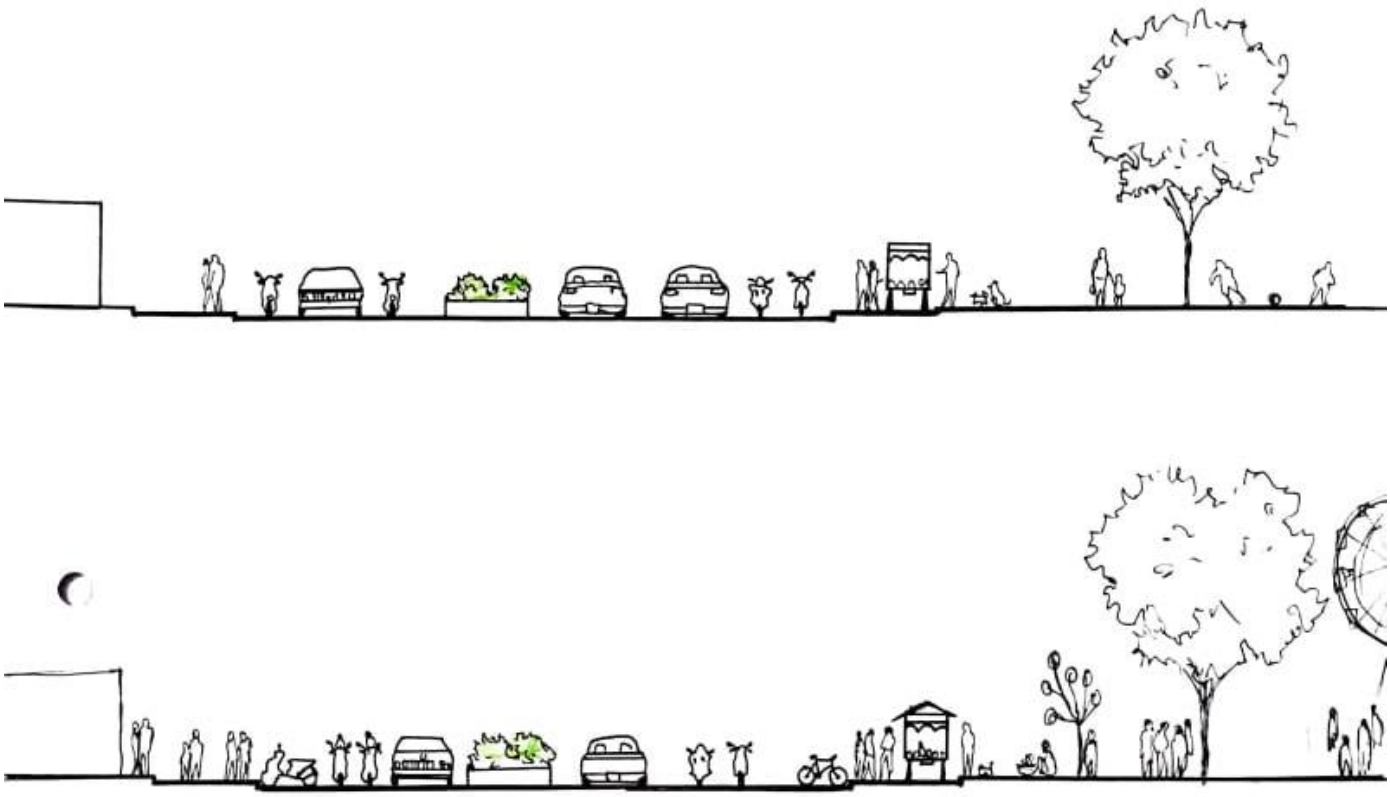
Comparative Analysis through Photographs



Analysis 1: Site of Ganesh Utsav (Analysis during the various phases of festivals through photographs)



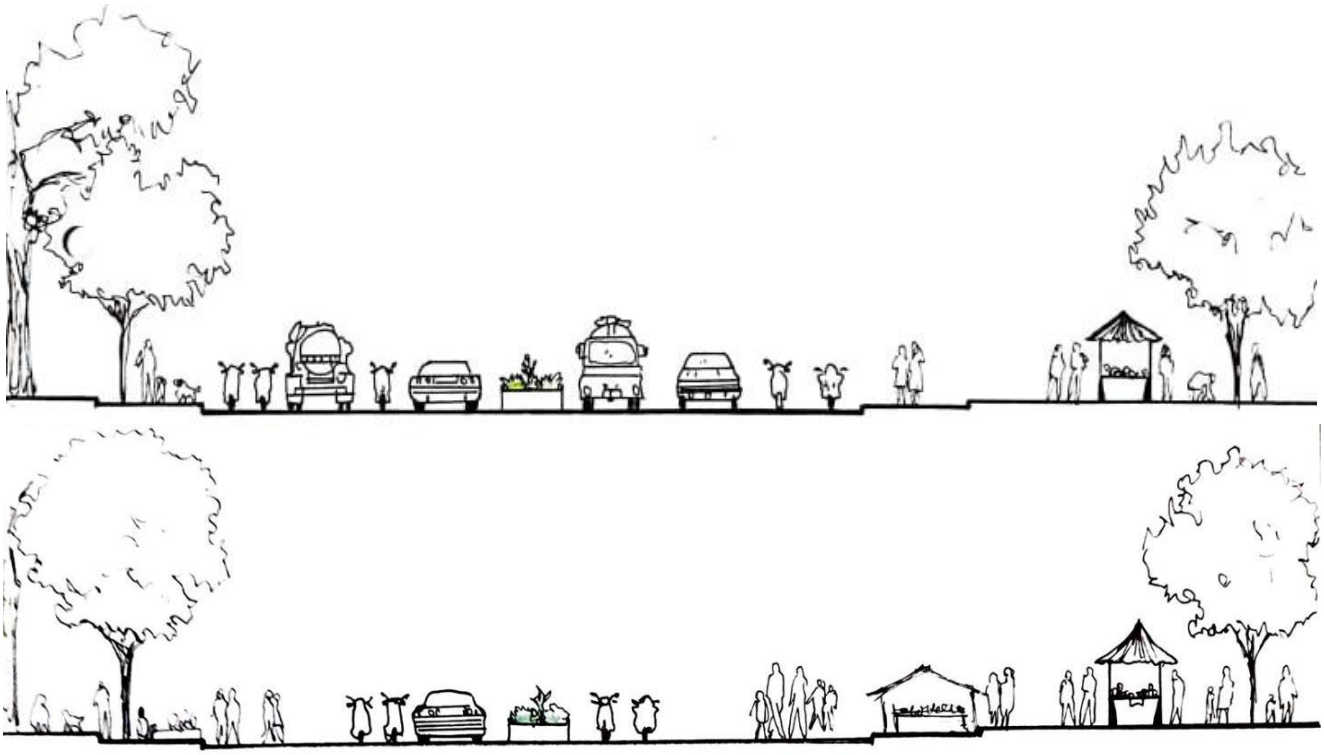
Analysis 2: Fair on Reshimbagh Ground (Analysis of various phases of festivals through photographs)



Section AA: Cutting across Reshimbagh Ground and Showing the Activities and Fair happening

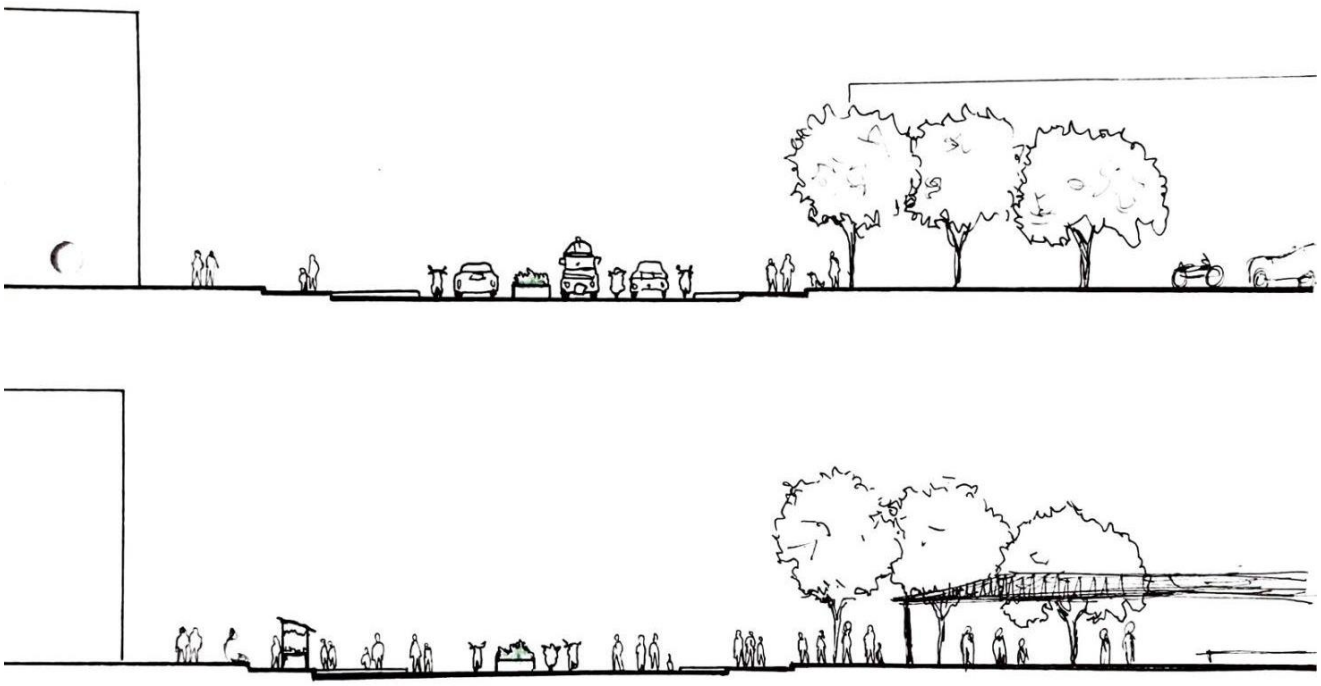
Figure a1: Before the festival.
Figure a2: During the festival.

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Section BB: Cutting across the Area Adjacent to the Site where Ganesh Sthapna is Done

Temporary stalls can be seen on the footpath
Figure b1: Before the festival.
Figure b2: During the festival.

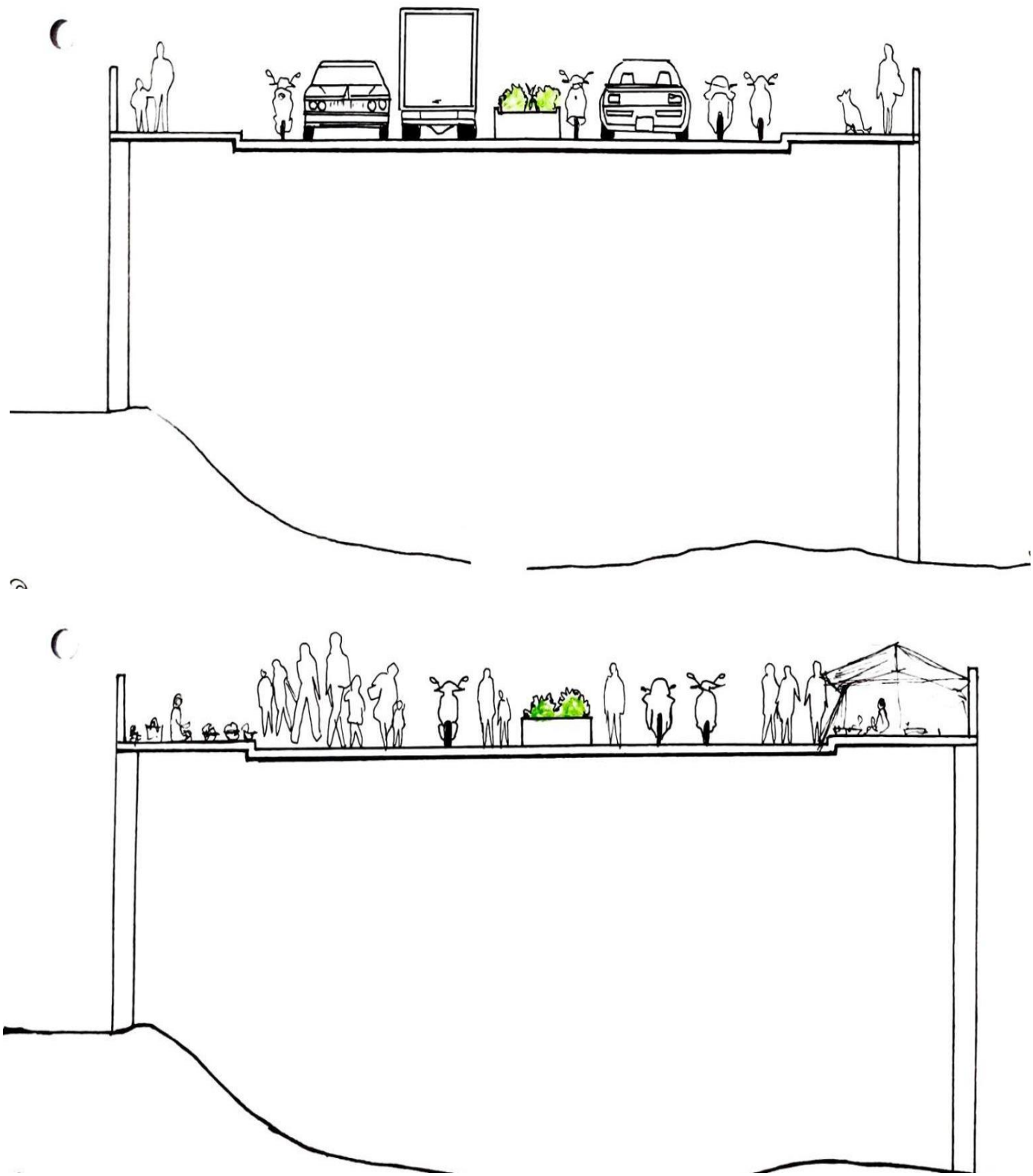


Section CC: Going Through the ganesh Mandap and Showing the Increase in Footfall

Figure c1: Before the festival.

Figure c2: During the festival.

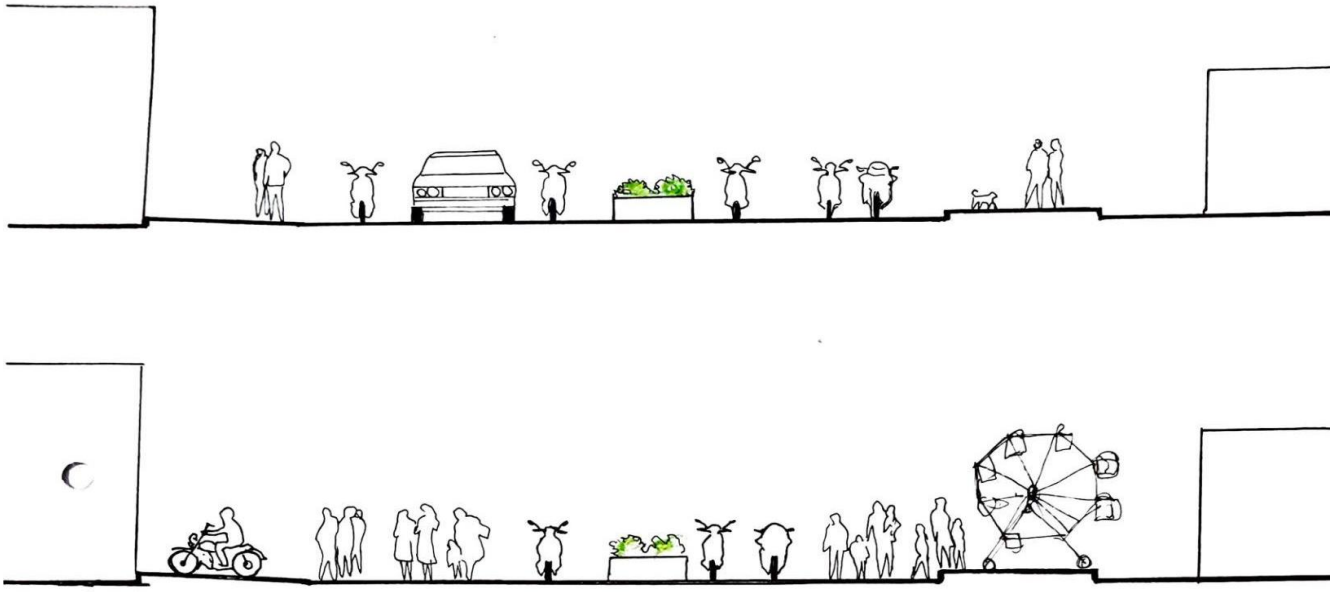
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Section DD: Cutting across a bridge showing the maximum number of activities of vendors happening on footpaths

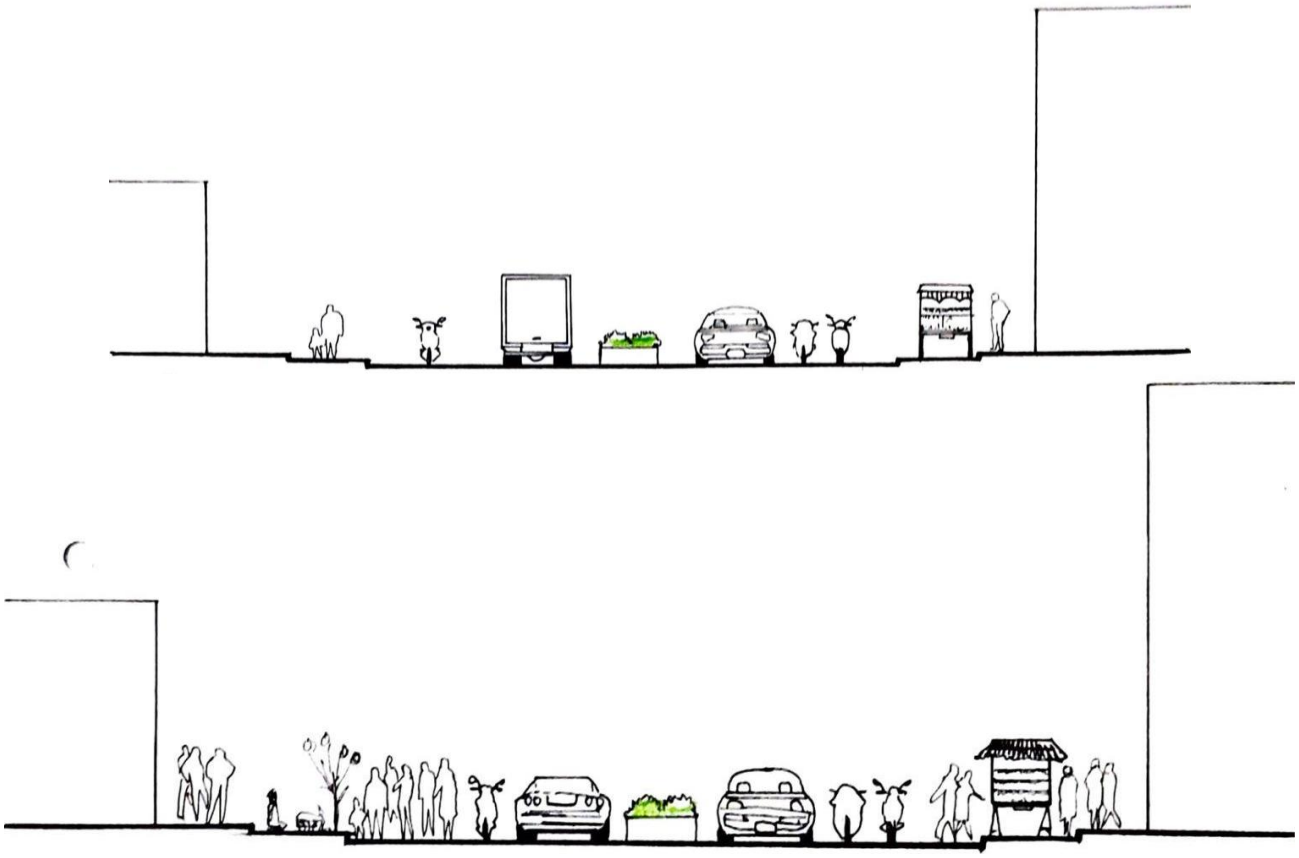
Figure d1: Before the festival.
Figure d2: During the festival.

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Section EE: Going Through the Road Adjacent to Bridge Near Ganesh Mandap and Showing the Increase in Pedestrian

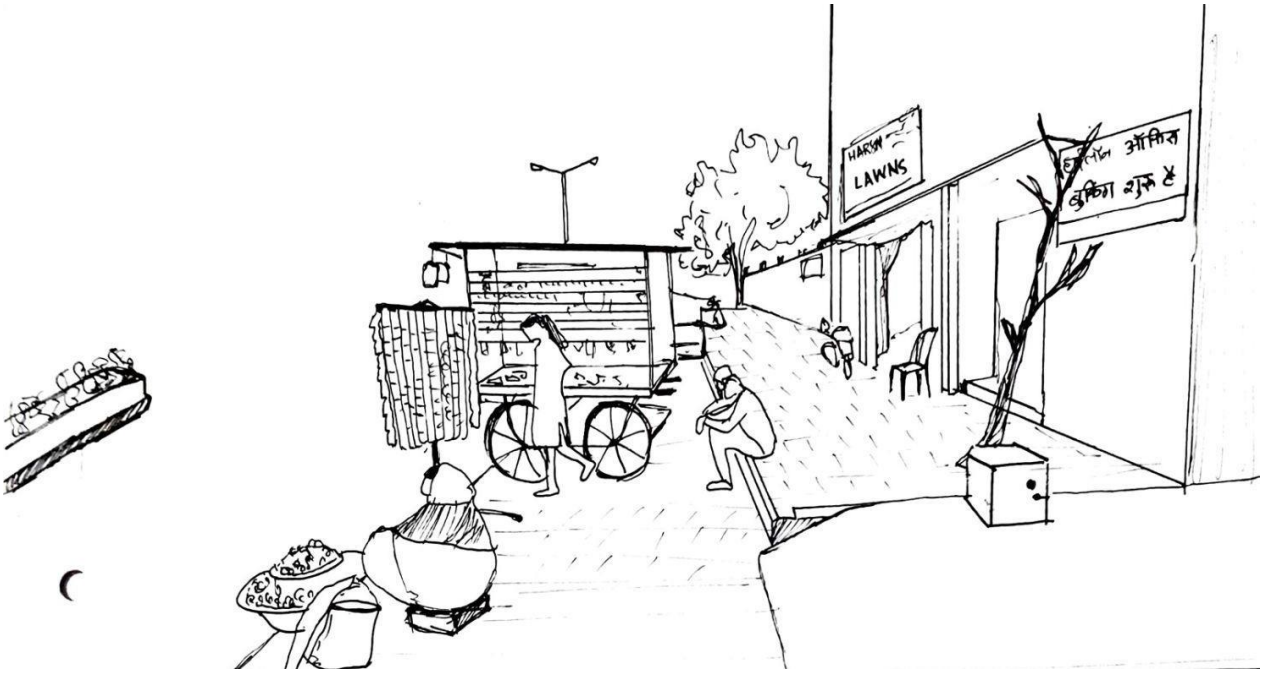
Figure e 1: Before the festival.
Figure e 2: During the festival.



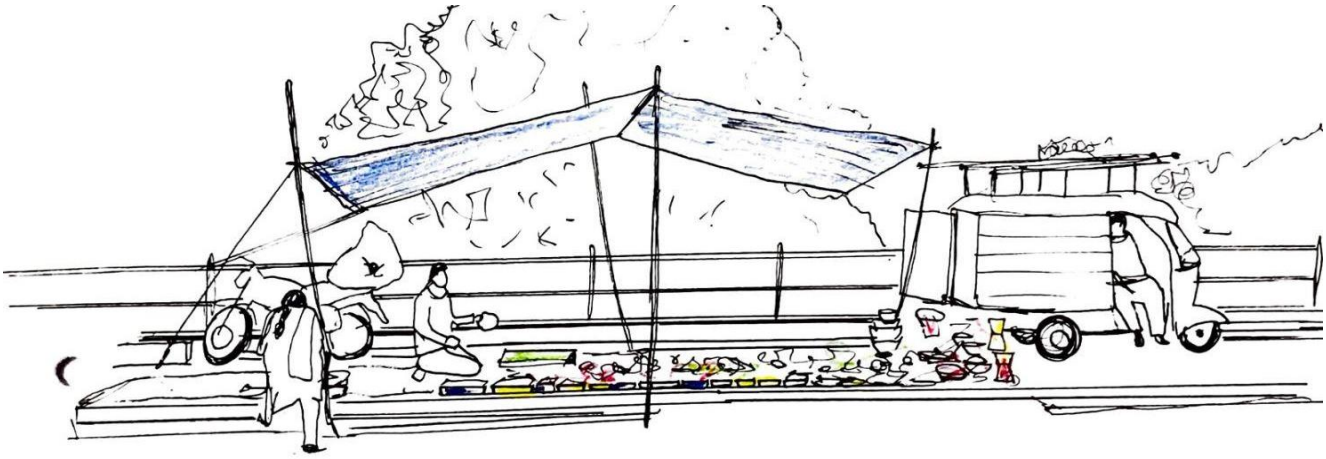
Section FF: Showing the Increase in Pedestrian Footfall

Figure f1: Before the Festival.
Figure f2: During the Festival.

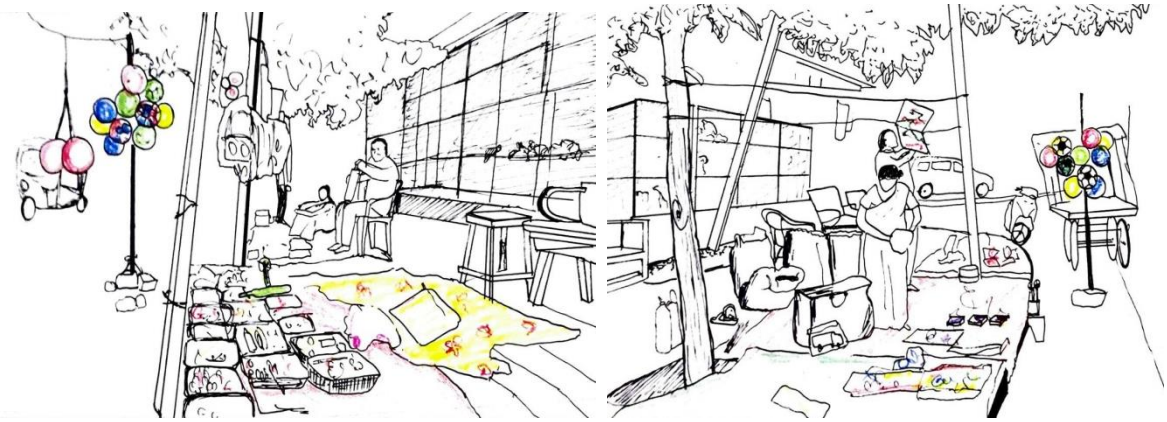
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Sketch 1: Sketch Showing Activity of the Vendors Utilising Footpath

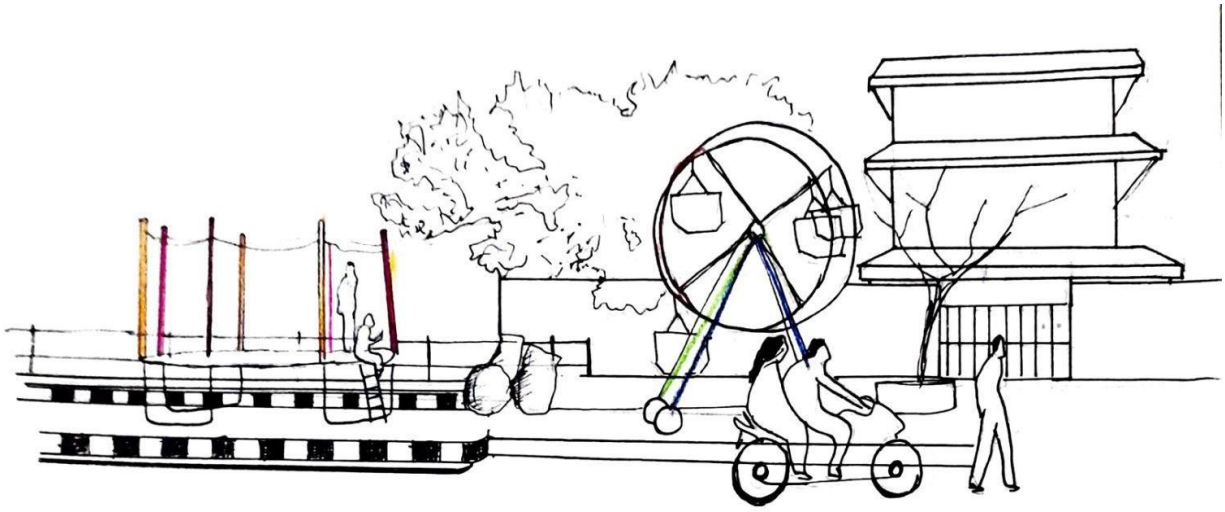


Sketch 2: Sketch Showing Arrangements Made by the Vendor on Footpath



Sketch 3: Sketch Showing the Activity of the Same Vendor Arranging the Items

ISBN: 978-93-89934-68-7



Sketch 4: Sketch Showing the Placement of Trampoline and Ferris Wheel for the Kids Visiting the Place



Sketch 5: Sketch Showing the Arrangement According to the Item which has been Sold during Utsav

5. INFERENCE/CONCLUSION

Festivals have always been an important part of human society, linked to religious beliefs ranging from the most rudimentary to the most powerful religions today. Neighbourhoods formed a ring around a common open space where such an activity may take place. However, as cities have grown, citizens have become more diverse, and festival dynamics have changed, the space requirements have changed.

Street vendors add more vibrancy to the area during festivals. This is not something which happens on its own there are various agencies which are involved like people of the area, organisations and volunteers and have certain understanding. Every shop has provision to expand its shopfronts. Vendors from various areas come and put up their stalls for a certain period of the ganesh festival. Every shop vendor has a different type of arrangement depending upon the type of item they are selling. Each shop vendor has developed a spatial relationship among themselves. Festivals create an informal public gathering place and contribute social integrity to the area of celebration.

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ISBN: 978-93-89934-68-7

APPENDIX

Graphics

- **Plan 1:** Plan showing various parts of Nagpur city (pg. 05)
- **Image 1:** Views of the day of sthapna celebrating utsav with dhol tasha (pg. 06)
- **Image 2:** View of riots and rituals on the day of sthapna (pg. 06)
- **Image 3:** View of fair happening in reshimbagh ground (pg. 06)
- **Image 4:** An overview map from Reshimbagh to the location of Ganesh Sthapna (pg. 07)
- **Image 5:** Map highlighting the location and nearby Nala and Reshimbagh ground (pg. 07)
- **Image 6:** An overview map from tulsi bagh to Reshimbagh ground (pg. 07)
- **Image 7:** Map highlighting the location of Nagpur cha Raja and ground (pg. 07)
- **Image 8:** Plan of Street in front of Mandal and ground (pg. 07)
- **Image 9:** View of the Nala adjacent to the site (pg. 08)
- **Image 10:** View of the site of Ganesh Sthapna (pg. 08)
- **Image 11:** View of the pathway and road (pg. 08)
- **Image 12:** View of site before few days of sthapna (pg. 08)
- **Image 13:** View of the site before a day of ganpati visarjan (pg. 08)
- **Image 14:** View of the place at night of utsav (pg. 08)
- **Map 1:** Detailed plan of street in front of mandap and reshimbagh ground which has major transformation during ganesh utsav (pg. 12)
- **Map 2:** Detailed plan of street in front of mandap which is been most active during ganesh utsav (before festival) (pg. 13)
- **Map 3:** Detailed plan of street in front of mandap which is been most active during ganesh utsav (after festival) (pg. 13)
- **Analysis 1:** Site of ganesh utsav (Analysis during the various phases of festivals through photographs) (pg. 14)
- **Analysis 2:** Fair on Reshimbagh Ground (Analysis of various phases of festivals through photographs) (pg. 14)
- **Section AA:** Cutting across reshimbagh ground and showing the activities and fair happening (pg. 14)
- **Section BB:** Cutting across the area adjacent to the site where ganesh sthapna is done. Temporary stalls can be seen on the footpath (pg. 15)
- **Section CC:** Cutting through the ganesh mandap and showing the increase in footfall (pg. 15)
- **Section DD:** Cutting across a bridge showing the maximum number of activities of vendors happening on footpaths. (pg. 16)
- **Section EE:** Going through the road adjacent to bridge near ganesh mandap and showing the increase in pedestrian (pg. 17)
- **Section FF:** Showing the increase in pedestrian footfall (pg. 17, 18)
- **Sketch 1:** Sketch showing activity of the vendors utilising footpath (pg. 18)
- **Sketch 2:** Sketch showing arrangements made by the vendor on footpath (pg. 19)
- **Sketch 3:** Sketch showing the activity of the same vendor arranging the items. (pg. 19)
- **Sketch 4:** Sketch showing the placement of trampoline and ferris wheel for the kids visiting the place (pg. 19)
- **Sketch 5:** Sketch showing the arrangement according to the item which has been sold during utsav (pg. 20)

ISBN: 978-93-89934-68-7

Exploring the Fantastic in Architecture

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ABSTRACT: The world around us is surrounded with buildings each of different nature and use. While some structures have no effect on us, others do. There are a lot of buildings all around the world that are widely recognized, well-known to everyone, and highly admired due to particular features that they have. Because of the impact they have, both architects and residents of the area hold a special place in their hearts. The goal of this research is to comprehend the attributes and features that give a structure its fantastic appearance as well as the types of sensations, experiences, and fantastic interactions that are produced by the physical traits that it possesses. The study aims to look at various structures that appear fantastic to the majority of the population and analyses them in order to understand the characteristics that are responsible for evoking emotions of fantasy in the users. Here, physical qualities of the structures have been studied for the purpose of this research.

Keywords: *Fantastic, Experience, Emotions, Physical Characteristics, Imagination, Out-worldly.*

1. INTRODUCTION

The word 'fantastic', derived from 'fantasy', describes something that is extravagantly large, grand or beyond expectation (Britannica, n.d.). Fantasy takes imagination from the mind of the perceiver as a result of certain desires or thoughts and projects it onto an object in the mind of the perceiver giving an idea of fulfillment of desire. It mentally blurs the boundaries between imaginary and real thus making it seem visible (Brenner, 2003). Fantasy can be experienced through a series of ways be it watching movies, reading novels or travelling and it provides the users with an outlet for emotions.

In each of these mediums, an architectural setting is required that acts as a backdrop for the story to be narrated which forms a close association with the perceiver. The story and the backdrop, both act as conjoining mediums that subconsciously trigger connections with each other, and hence the presence of a story sparks the memory of the setting and vice versa knitting a close bond with the perceiver.

The architectural spaces of the Jewish museum, Berlin represents Jewish lifestyle before, during and after Holocaust and expresses feelings of absence, emptiness and invisibility to depict the disappearance of Jewish culture through its design. It creates feelings of fear, terror, absence through the narrow passages, sculptural floor and architectural spaces.

The apple piazza, Italy with its glass envelope and fountain jets on either side recreates the childhood experience of running through the fountain and creates child-like excitement of being alive. It recreates feelings of nostalgia, happiness and excitement among the users.

The interesting foreground and white marble massing of Taj along with its rich history and architectural marvel creates a breathtaking magnificent experience for the visitors.

Thus, coming to the point that certain physical characteristics of a space evokes certain emotions in the users thus reinforcing the idea of fantasy in their minds.

2. OBJECTIVES

In order to fulfil the above aim, the following are the objectives:

1. To understand the idea of fantasy and the fantastic in architecture.
2. To identify structures that fall under this category.
3. To identify the elements that contribute towards making the place 'fantastic'.
4. To understand their impact on the users.

ISBN: 978-93-89934-68-7

3. METHODOLOGY

The study will use a variety of primary and secondary sources to analyse the aforementioned features. The literature assessment examines various theories and concepts proposed by academics and architects on the subject and tries to comprehend them using diverse instances of existent architectural work.

4. LITERATURE REVIEW

Fantastic architecture is a type of architecture that breaks from the everyday mundane and has the potential to move people or instill emotions along with providing shelter merely. It is a mix of reality and imagination where imagination is made to fit onto solid grounds to make it real for people to have a fantastic experience.

Another expression of fantastic architecture is seen in comics and animation films, a medium that allows freedom to experiment without the restrictions of the real world as mentioned by Domenico (2017). Since comics make use of both worlds- representation as well as communication, it proves to be an effective medium to depict imagination and fantasy.

Harries (2020) in his research discusses emotions and fantasy being a thread that connects reality to imagination, abstract to concrete and tangible to intangible:

> *"Fantastic Architecture", as a tension between the generally accepted function of architecture—to provide us with physical and spiritual shelter by bounding space- and our unruly fantasy, which, moved by desire and fear, pleasure and disgust, gives birth to fanciful apparitions, fictions, and dream-visions, all creations that do not rest on solid ground.*
>
> *Fantastic architecture belongs with utopia, that land which lies somewhere beyond our all too familiar world with its place-assigning order that land which possesses two faces: "eutopia," understood by Thomas More as an imaginary realm where reason coexists with freedom and happiness, inevitably shadowed by "dystopia": versions of paradise-Jerusalem, or the City of God.*

Prague's 'Dancing House,' also known as 'Fred and Ginger,' a Nationale-Nederlanden building by architect Vlado Milunic, built in cooperation with Frank Gehry in 1996, is one such structure that takes one into a fantasy land similar to that a of children's novel. One of the dual towers of the building appears to be warped and distorted, as if someone squished it up against the other (Rogers, n.d.). The incomprehensible form and optical distortion of structures like the Dancing House, Prague, Museum of Pop Culture, USA, the Crooked House, Poland and the inorganic and biomorphic forms of Casa Batllo and Sagrada Familia, Spain depict fantasy through the irregularities and distortions in their forms. The structure of the lotus temple invokes feelings of spirituality, sacredness and purity in one's mind. The radial symmetrical forms of Lotus temple, Delhi and bilateral symmetry of Gateway of India express design principles that seem pleasing to the eye and makes the structure appear fantastic. Santiago Calatrava transit hub, USA is a symbol of hope and vitality employed through the immense intake of light and ventilation and Changi Airport, Singapore fills up the place with emotions of freedom and openness. One gets the feeling of stepping into a kaleidoscope at one of the most beautiful Pink mosque in Iran through its spectacular rainbow formed by its stained glass, thousands of painted tiles on the ceiling and Persian rugs covering the floor, this place of worship is a gorgeous rainbow of color in every direction (Atlas Obscura, 2018). The Gateway Arch is a 630-foot-tall (192 m) monument in St. Louis, Missouri, United States. Clad in stainless steel and built in the form of a weighted catenary arch, it is the world's tallest arch and Missouri's tallest accessible building. It is also considered as the tallest human-made monument in the Western Hemisphere. The extremely huge scale of the Gateway Arch, USA and the height of Burj Khalifa, Dubai compels one to believe that such scale of structures that could only exist in fantasy is now real. Places like Wonderworks in USA defy natural laws and Pompidou centre, Paris and Lloyd's building, London ignore social laws such as casual consequences, gravity, etc. The presence of large open area around Gateway Arch, USA and landscape around Eiffel tower, Paris makes it an appealing place for visitors.

Vostel and Higgins (1969, p. 27) have identified the physical elements that contribute towards making the place 'fantastic. They talk about how physical aspects can lead the imaginations towards an experience of fantastic. State a few examples such as abnormality in size, unusual forms, exaggeration of physical elements among others. This is also reiterated by Montzarino (1991).

An interesting example of fantastic environments are seen in films. Some examples are: The Hogwarts castle in the Harry potter series. The fictional school of witchcraft and wizardry borrows elements of Gothic architecture inspired by European

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cathedrals. It uses elements like Flying buttresses, turrets, pointed arches and lancet windows to dive deep into surrealism. The aim of the architecture in the movie is to translate the fictional world of imagined spaces, physical settings and highly detailed architectural typologies into a more tangible environment. (RTF, n.d.) Other fantastical movies like Avatar series, The Lord of the Rings, etc. have made an attempt to convert architecture in the fictional environment to be as realistic as possible. They use strategies such as abnormality of colour, anti-gravity, distortions and illusions, irregular forms, inverted structures, etc.

These fantastic built environments eventually connect with the imagination through the stories and emotions they evoke around these fantastic places acting as architectural backdrop through the medium of films, social media or sharing experiences.

5. DISCUSSION

The discussion tries to decode various theories by scholars and academicians on the subject of fantastic architecture and then further tries to relate to it existing examples to understand and explain the factors responsible for making a structure appear fantastic.

As discussed in literature review, there are physical characteristics that contribute towards the built environment for it to be perceived as fantastic. A few of them are discussed below:

5.1 Scale and Proportion

Here, Vostell & Higgins (p. 27) talk about how large must a structure be in order to create the disturbing illusion of the picture and the distance from which it should be viewed to get the best possible view of the architecture to be able to invoke certain feelings. The presence of a structure with a scale abnormal to the average either on its own or in comparison to its surrounding creates experience different from the everyday usual and makes it stand apart. The superdimensional painting ground of the edifice provides a continuous discontinuum because the spectator can perceive only sections of the whole while other parts move out of sight. There is no distance from which the whole becomes visible, an overall idea crytallizes only in the memory. The concept here elaborates that a perceiver's thoughts connects the missing dots and creates his own version of full from the existing parts and views a different image at various distances. The Gateway Arch, USA *(as seen in figure 1a)* is one such example where the scale of the structure is extremely large in comparison to the usual scale creating an impact and giving feelings of awe as one view. Similar goes with Burj Khalifa, Dubai where the extremely tall height mesmerizes the viewers *(as seen in Figure 1b).*



(a) The Gateway Arch, U.S.A.

Source: Sapolin, 2021.



(b) Burj Khalifa, Dubai

Source: Burj Khalifa: The tallest building in the World, 2023.

Figure 1: Buildings Showing the Use of Scale and Proportion

ISBN: 978-93-89934-68-7

5.2 Materials

The idea of using local materials simply because they are available there naturally and usable and to let them determine the aesthetic of the structure proves to be sustainable as well talks about the importance of using materials that are locally available and to use them in a way that it highlights the form of the structure through its own qualities.

5.3 Longevity

Here, Vostell and Higgins (p. 77) discuss about how a structure, work, a saying or deed is worthy of recording or of enduring because it inspires and awakes a consciousness within the visitors. They indirectly also talk about the longevity and durability of the structure that allows it to stand the test of time and inspire generations of generations.

5.4 Uniqueness

Let the houses of the future be one or two miles high, but let them have roads, swinging out to the wind, at each level, so that they are not so much purely vertical but parallel on many levels. At least in good weather, what a pleasure to walk so high above the ground (Vostell & Higgins, p. 117). Here, they talk about how creating from one's imagination and exploring the possibilities that arise from imagining opens up opportunities for creating things other than the commonplace and mundane making it stand out.

5.5 Juxtaposition of Contrasts

Dancing house, Prague *(as seen in figure 2a)* symbolizes a pair of dancers -masculine and feminine, Fred and Ginger and also the concept of static and dynamic to symbolize the transition of Czechoslovakia from a communist regime to a parliamentary Democracy. The Jewish museum, Berlin *(as seen in figure 2b)* is a combination of the old museum along with the addition of the extension by Daniel Libeskind which depicts juxtaposition of old and new and to experience the new, one has to travel from the original one (Vostell & Higgins, p. 150).



(a) Dancing House, Prague



Figure 2b: Jewish Museum, Berlin

Source: Dancing house, The dancing building of Prague, n.d.

Source: Jewish museum berlin, n.d.

Figure 2: Buildings Showing Juxtaposition ¿of Contrasts

5.6 Form

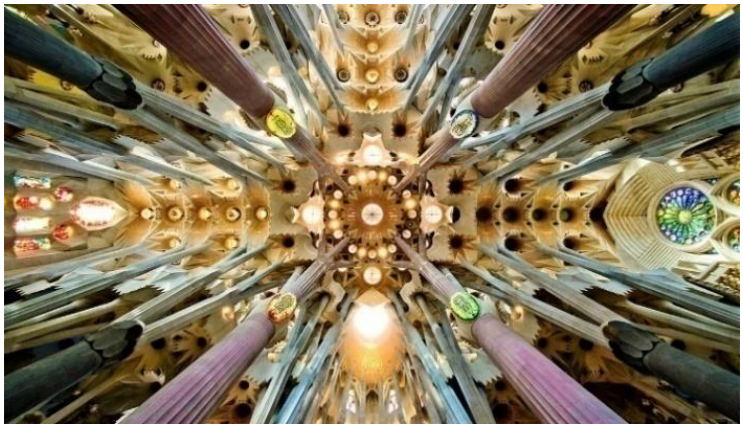
Forms that incomprehensible in nature, baffling or difficult to fathom such as in Museum of Pop culture, USA and the Crooked house, Poland *(as seen in figure 3a).* They also resemble or are inspired by forms of living organisms or shapes of animals, skeletons or nature like Sagrada Familia, Spain *(as seen in figure 3b)* and Casa Batllo, Spain. (Archdaily, 2010) They seem fantastic because these forms are unique in itself and cannot be repeated.

ISBN: 978-93-89934-68-7



(a) Crooked House, Poland

Source: Little crooked house, Poland, 2020.



(b) Interior Ceiling of Sagrada Familia, Spain

Source: La sagrada Familia, 2023.

Figure 3: Buildings Showing Unique and Fantastic Forms

5.7 Silhouette

Most of these fantastic structures can be easily recognised even when they are traced with a single line because of the single striking gesture that they possess. This makes those certain structures catchy and unforgettable and hence adds to their uniqueness. For example: Sydney Opera House, Australia *(as seen in Figure 4a)* and Dancing House, Prague *(as seen in Figure 4b).*



(a) Sydney Opera House, Australia

Source: Dean, 2015.



(b) Dancing House, Prague

Source: Dancing house, The dancing building of Prague, n.d.

Figure 4: Buildings Showing Silhouette of the Form

5.8 Symmetry

The principle of symmetry is the reflection of the arrangement of components such as shapes and forms of a building along an axis in a way that all the areas attract equal attention and the resultant is a balanced composition pleasing to the eye. Structures following symmetry may either follow radial Symmetry, bilateral symmetry or Balanced asymmetry. Radial symmetry is observed in case of Lotus temple, Delhi, Bilateral in case of Gateway of India, Mumbai *(as seen in Figure 5a)* and balanced asymmetry in case of Guggenheim museum, Bilbao *(as seen in Figure 5b).*

ISBN: 978-93-89934-68-7



(a) Elevation of Gateway of India

Source: Gateway of India, Northwest Elevation, n.d.



(b) Elevation of Guggenheim Museum, Bilbao

Source: The Guggenheim Bilbao: the museum that became a work of art, 2020.

Figure 5: Buildings Showing Elevation for Symmetry

6. INFERENCES

From the literature review and discussion, following are the observations regarding the characteristics and features of fantastic architecture in various categories (see Table 1).

The majority of these areas are widely recognized to be a part of UNESCO. Several of them appear in stories and films that relate to individuals. They are crucial in bringing back particular memories or events from the past that give users a sense of belonging and nostalgia. The city's major image is shaped by these attractions. The existence of other notable structures in the area adds to the fantastic worth of an existing structure.

Table 1: Features of Fantastic Architecture.

Categories	***Characteristics***	***Features***	***Examples***
(A) Physical Appearance	1. Form	*Incomprehensible* *Biomorphic* *Organic* *Geometric*	*Dancing House, Prague* *Sagrada Familia, Spain*
	2. Silhouette	Unique Simple	Sydney Opera house, Sydney Calatrava WTC, USA
	3. Symmetry	Radial Bilateral Balanced asymmetry	Lotus temple, Delhi Gateway of India, Mumbai Guggenheim Museum, Bilbao
	4. Exaggeration of perceptual elements	Light and ventilation Color and texture Scale and proportion Height, Parametricity	Calatrava Transit hub, USA Nasir-al-Mulk mosque, Iran Gateway Arch, USA Burj Khalifa, Dubai Guggenheim museum, Bilbao
	5. Materials	Durable Local	Palais ideal, France
	6. Contrast	Surrounded by prominent structures Stands apart from context	Gateway of India, Mumbai Eiffel Tower, Paris
	7. Engineering, technology	Anti-gravity Distorted	Gateway Arch, USA, Sydney opera House, Australia
(B) Context	1. Surroundings	Large open area around	Gateway Arch, USA

ISBN: 978-93-89934-68-7

Categories	*Characteristics*	*Features*	*Examples*
	2. Use of natural elements	Landscape Connect to water	Eiffel Tower, Paris Marine drive promenade
(C) Intangibles	1. Experience	Triggers memories	Apple Piazza, Italy
	2. Emotions	Curiosity, fascination, delight, surprise, fear, threat, nothingness, triggers memories	Jewish Museum, Germany, Park Guell, Spain

Source: Compiled by Author.

As seen in Table 1, a number of physical characteristics are responsible for creating a structure with features that invokes emotions of fantasy in the mind of the perceiver.

Physical characteristics that are visible to the eye like form of the structure which when seems like an illusion, distorted, upside-down or alien to everyday architecture act as a trigger to fantasy. Design principles like symmetry that create a balanced image in the mind of the viewer or silhouette that are so unique that it gets engraved in the memory which makes it easy to recognize the structure even through a single line drawing are factors that create a connect of the viewer and the structure making it appear fantastic due to its uniqueness. Use of distinctive materials, engineering and technology and exaggeration of perceptual elements create a striking feature and a contrast. Surroundings too play an important role in the way an architectural structure is perceived. Intangible aspects such as the experience and emotions are evoked through the use of physical and tangible characteristics as described above to make a place appear fantastic.

7. CONCLUSION

These fantastic places as a result of their qualities then become popular tourist attractions with historical, cultural or architectural significance. They also increase tourism as well as help generate revenue. It acts as a place for exchange of culture between locals and foreigners and help preserve community. Sometimes the act of simply seeing an aesthetic structure creates a sense of happiness and well-being. Fantastic doesn't always cater to reality, instead it distorts reality to create an outwardly, unbelievable and alien to normal experience.

The reason behind the existence of these places also plays a significant role in determining the amount of effort that can be put into a building. These purposes include commemorating or marking a memorial/monument to a special day or event, reviving a historical site, rejuvenating the waterfront, enhancing/redeveloping/expanding an existing site/culture or community and preserving and conserving literature, art, heritage, culture, and artefacts. An existing site that has been enhanced with a marketing plan to give a more immersive experience. Some of them were designed to address an issue that already existed, but with time and development, they developed into spectacular structures. Creating a fantastic place may also be with the intention of revenue-generation and achieving recognition internationally. A fantastic structure helps enhance a location that requires urban renewal and improvement. Some have just pure motives of visual pleasure that include narrating or bringing back a presence for people to experience. Others purely cater to the owner's or the architect's whims. The inclusion of government intervention or religious and spiritual motivations also lead to the creation of fantastic architecture.

Whatever may be the reason, these settings are designed to arouse sentiments and emotions that heighten the senses, such as curiosity, fascination, delight, surprise, dread, threat, feelings of emptiness, and so forth. A sensation of fantasy or anachronism can also be induced in the mind by elements such as nostalgia induced by historical allusions and feelings of grief, despair, etc. Public participation and inclusivity enhance a place's appearance of enchantment, all of which come together to form an experience.

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Residential High Rises as Vertical Communities: To Improve Social Interaction between People

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ABSTRACT: The increasing population has increased the demand for housing with limited available land which has led to the increase in the rise of vertical housing as a solution. Increasing the number of floors to accommodate the density has had various impacts on the social interaction with the community. Aspirations of the who are living in high rises as well as the people who wish to live in high rises is something that we need to understand. The aspirations of the people can also form the base for the design of high rises. This might give a better view on what kind of spaces do people require for better interaction. This research paper aims at understanding the perception of people about high rises and finding out what are the factors that might help in increasing social interaction between the people in order to develop a community. The perception of people and how they respond to the high rises will play a key role. As a part of the methodology, survey was conducted to understand people's perception about high rises and how do they respond to these spaces. The study further included some conclusions based on the on-site photos and observations as to how people are currently using the spaces in high rises. The probable outcome from this study aims to find out how can we further develop the high rises that might help to increase social interaction within the people to develop a community.

Keywords: *Vertical Living, Social Interaction, Community Spaces, Perception of People, Quality of Life.*

1. INTRODUCTION

The high-rise building arises as a solution to the growing population and lack of available space on ground. Due to the increasing vertical housing most of the population is and will be occupying these buildings so it is important to study how they can provide a comfortable living not only in terms of function but also by providing open public spaces to initiate interaction between the people. To accommodate the requirement for the growing population the high rises have become monotonous with no spaces left for interaction. Due to this the interaction between the residents has reduced and the essence of community has been lost in some cases. The main problem faced by the high-rise structures today is that there is very minimal space left for interaction between the residents. Even the neighbours sometimes do not know each other. Keeping in mind the aesthetics of the building, quality of life and open spaces should also be an integral part of the buildings (particularly high rises). Keeping in mind the above three factors, high rises can be redefined in order to create more interactive and comfortable spaces for living. Creating these interactive spaces might want people to live in these spaces which would form an extended part of the community. For redefining these buildings, it is important to understand the perception of the users who will form an integral part of these buildings. Socially interactive spaces within the high rises should form the core of these buildings with which more people will opt to live in high rises.

Through this research paper I would want to understand what is the perception of different users about the high rises, what all spaces do they enjoy and what is their key understanding about high rises. The research will include particularly residential high rises in Mumbai and Pune. The case study will be used to collect information and observations about what kind of open public spaces does the existing high rises have and do people make use of that. By understanding how the people currently use open spaces and what is their perception of how the high rises should be might help to know how we can develop the high rises in future.

The study achieves its goal through three main research questions:

1. What design features can help develop communities in high rises?
2. How can we improve social interaction as well as quality of life in high rises?
3. What is people's perception of high rises and what is their opinion about living in high rises?

ISBN: 978-93-89934-68-7

2. LITERATURE REVIEW

The concept of vertical cities was first proposed by Le Corbusier in the 1920s with the concept of the radiant city (Figure 1). The concept was to create vertical housing for the growing population to have more shared open spaces in between for the people to enjoy and interact. This concept was inspired by the functions of the human body. Each apartment would have a view of the shared open spaces. So, this concept of vertical housing became an inspiration for the other developing cities. But the main idea was not to accommodate a greater number of people but to develop shared open spaces for the people to enjoy, interact and relax.

Another project by Le Corbusier that formed an example of communal living is Unite'd Habitation (Figure 2). This project focused on communal living for the inhabitants to shop, live, play, enjoy in a "vertical garden city". The design includes a terrace garden on the roof with all the common amenities like gym, swimming pool, jogging track for the people to interact at roof top level as shown in the Figure 3. Also, there are various shops, medicals, and other amenities for the people to come and interact. This gives a great example of how to provide privacy and personal space to the inhabitants while also providing with common interactive spaces.



Figure 1: View of the Radiant City as Proposed by Le Corbusier



Figure 2: View of the Entire Building of Unite'd Habitation

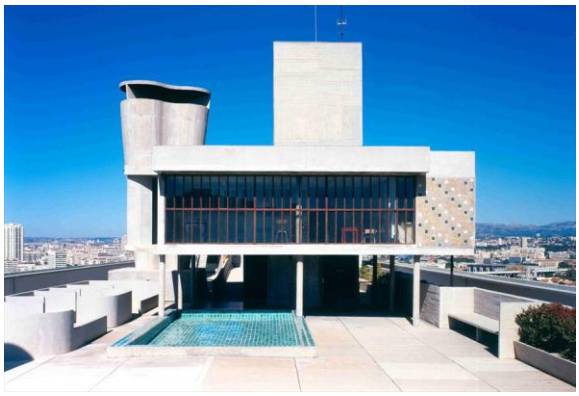


Figure 3: View of the Swimming Pool and Gym in Unite'd Habitation

The necessity for vertical housing has grown as a result of the limited supply and constantly increasing demand for living space. Increasing the number of stacks to maximise density has a variety of effects, particularly on community social interaction. Social interaction in vertical housing can be impacted by a number of circumstances. The importance of social interaction as discussed by (Wie, 2019) in the paper allows to gather information about how the space configuration can affect social interaction. The major question that arises is that does living in the high rises reduces social interaction between the people? If yes, then how can we design our spaces so that we can help increase social quality of a space. The different type of building typologies as discussed in the paper shows the amount of social interaction that can be achieved through just the design of spaces. Though this paper discusses about different typologies and also provides with a proposed model that might be an example as to how we can achieve the social quality through design but it is also important to take

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into consideration the perception of the users. As they are the ones who will be occupying this space. Through the view point of the users as well as the information about the configuration of spaces discussed in this paper, we might be able to achieve the spaces that promote social interaction.

Also, the perception of the users plays a very important role while designing any building as discussed by (Gregoletto & Reis, 2012).It discusses about the impact of tall buildings on the city as perceived by different user groups. The methodology used in this paper includes questionnaires conducted online for different user groups. The respondents were divided into different groups which was easy to collect data and analyse it. This questionnaire was conducted to know how the users think does the tall buildings affect the urban landscape. Through this paper it is observed that the user group always plays an important role. The way the questionnaire is conducted might help me develop the same for the concern of my research paper.

The quality of life in high rises is an understudied area as discussed by (Kalcheva, 2017). The research paper discusses about the quality of life of the people occupying high rises and links it to the sustainable aspect of the building. This area of study is quite new and less researched about. As most of the population will be occupying these spaces it is important that we study how people's quality of life gets affected through design of spaces. The study's objective was to assess the sustainable options for high-rise structures from the perspectives of 12 architects on the sustainable design solutions for an improvement in residents' quality of life. The methodology adopted to carry out research was different. There were some questions prepared to which 12 different architects with different approaches responded. This gave few parameters as to what all can be taken into consideration in the future design of tall buildings.

The interviews of the inhabitants currently living in the high rises is also equally important. The methodology discussed in the paper by (Eichner, 2018) interviews the inhabitants of the high-rise buildings as a part of sociological survey. Through the people we can understand what are the positive as well as negative aspects of living in high rises. With varied opinions there are many possible parameters that can define the spaces that we can design in the future for a better quality of social life.

Kanchanjunga Apartments designed by Ar. Charles Correa is a high rise that provides for double height open terraces for the users to interact within their own houses as seen in the Figure 4. The main thought process involved in the design was the use of climate responsive vernacular techniques to address the functional requirement of the spaces. Charles Correa incorporated the feel of the old Indian bungalows that included open spaces like deep verandas into a high-rise building. This created a feel of separate bungalows within a high rise. In this way the main essence of the old Indian structures was brought into a high rise which helped to increase interaction between the people and also provide a quality of life same as one would have in a separate bungalow. Despite being a high rise, the spaces were planned in such a way that they were functional as well as provided for interactive spaces that improved the quality of life. The main approach that Charles Correa uses in all his designs is the concept of traditional ideologies with modern techniques to keep intact the social quality of the spaces.



Figure 4: View of the Double Height Terraces in Kanchanjunga Apartments

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Another project Amonora Future Towers by the firm MRDV is an example of a high-rise building. It has been developed as a continuous building with six arms that form various courtyards in between as seen in the Figure 5. The main concept that can be analysed through this high rise is that it brings together different backgrounds of people to promote community living. The main thought process was to develop different open spaces at various levels to promote interaction between people. This is one of the thoughts that is less explored today while building the high rises. So, this can form a great example of how we can plan our spaces to promote interaction as well as make the space functional at the same time.



Figure 5: View of the Various Open Spaces between the Buildings in Amanora Future Towers

3. MATERIAL AND METHODOLOGY

The purpose of this article is to understand the perception of people regarding high rises and understand their ways as to how they respond to different spaces in a high rise in order to create a more socially interactive environment in the future high rises. The main objective was to find out people's definition of high rises. The case studies selected for the research include two housing projects Amanora Future Towers, Pune and Kanchenjunga apartments, Mumbai. These projects were selected as Amanora has open spaces at site level where there are different interactive spaces created. This will help in analysing how the open spaces created at the ground level are occupied by the users and how the different arms of the buildings come together at the ground level to create socially interactive spaces. Kanchenjunga apartments situated in Mumbai has open interactive spaces within the flat itself. So, this might help in analysing the open spaces within the house itself and also how these spaces connect with the building as a whole. To study the open as well as the interactive spaces these projects might help to gather data at various levels of site, building, flat.

Amanora Future Towers was visited twice one during the daytime and once during evening to observe how the common spaces are occupied at different times. As Amanora had open spaces at site level it was necessary to observe the usage of the common areas at different times. Kanchanjunga Apartments was visited once to observe the internal arrangement of the spaces and the double height spaces within each apartment and how do they connect with the larger open spaces at site level.

As a methodology procedure to meet the above objectives firstly a questionnaire was conducted online via a google form. This included both qualitative as well as quantitative questions. The questionnaire was conducted online in order to get respondents living in different areas as well as in different housing typologies. This helped in recording responses of the people who are currently living in high rises as well as the people who aspire to live in high rises. The questions were based on what people feel about high rises and how do they perceive high rises. The respondents were divided into two categories i.e., architecture students and non-architects. These two categories were chosen so that through the responses of the non-architects it will be easy to analyse what are the thoughts of the people occupying these spaces and what they aspire for. Through the responses of the architecture students, data has been collected to analyse what they think about a high rise. This will also help to discover differences and similarities in the responses by both the groups for the same questions. The questions that were asked in the google form were in the form of multiple choice and one word answer questions. First criteria included gender and age of the respondent. This was asked to get information about what age group uses which type of spaces for interaction and also do these spaces differ for different genders. The second criteria was where do the respondents live. This might help to get information about what is the opinion of the people living in high rises as compared to what are the thoughts of the people who aspire to live in high-rises. The third criteria was to know what is people's

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perception of a high rise with respect to its height and what do they think are the positive as well as the negative aspects of living there. This also included a question asked on the whether they prefer to have open spaces on various floors or not.

For the last question the respondents were shown an image where there was an open question whether they prefer to have open interactive spaces on ground or on various levels foe which they shared their thoughts. The data collected through the google form was analysed through pie charts and bar charts.

Secondly data was collected by analysing the open and interactive spaces in both the selected case studies. This was done by observing how people use the spaces at different times of the day and where do they interact the most. This data was collected by visiting the site at different times of the day. The data collected has been analysed through plans and sections and also through the photographs taken on site.

The parameters used to analyse the data from the google forms is through graphs and pie charts. The graphs generated through the responses helped to analyse the number of respondents for each of the questions and what do they prefer and their thoughts. Through these charts the data was quantified.

The parameters used to analyse the observations on both the sites is as follows:

Interaction spaces based on the following:

Based on Spatial Planning:

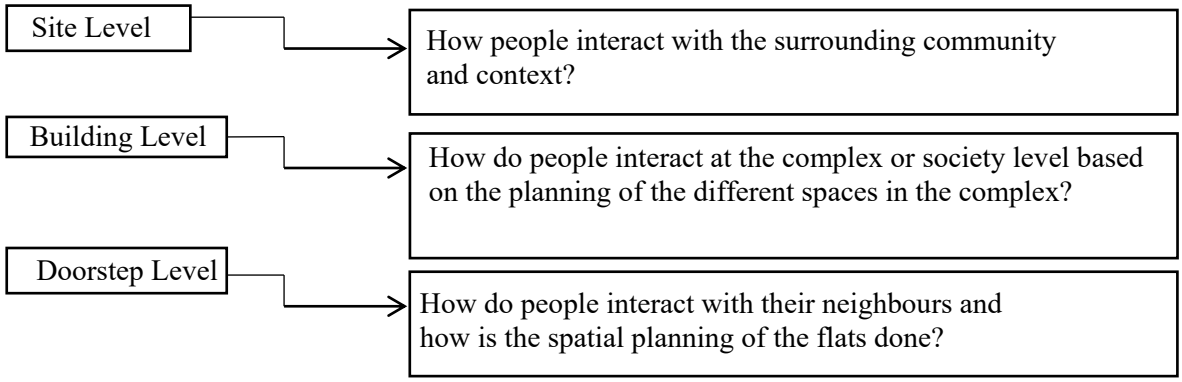


Figure 6: Figure Showing the Analysis to be Carried Out at Various Levels

4. ANALYSIS, RESULTS AND DISCUSSION

The results from the google form were analysed in the forms of pie charts and graphs. The total number of respondents were 95. On the basis of which they were classified as architecture students and non-architecture students as seen in the Figure 7. This helped to analyse the thoughts of both categories of respondents. According to the first question the responses were first classified on the basis of gender. Among the respondents 44 were females and 51 were males. After this the data was further classified on the basis of age group. This helped in collecting data about which age group uses what spaces to interact.

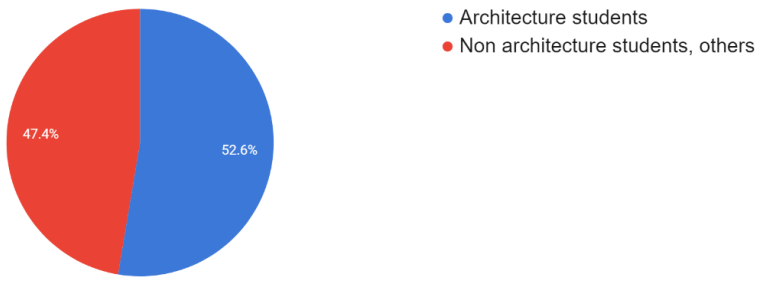


Figure 7: Pie Chart Showing the Classification of Respondents

ISBN: 978-93-89934-68-7

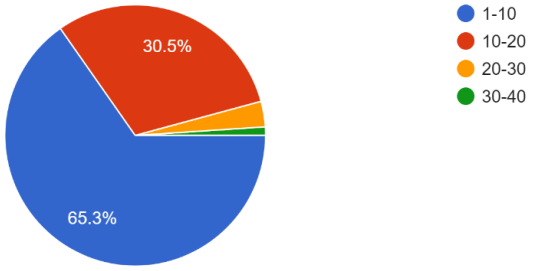


Figure 8: Pie Chart Showing the Percentage of Respondents Living in the Mentioned Number of Floors

The data was then divided into people who live in high rises and people who don't live in high rises. According to the above given Figure 1 about (62) respondents live in building having floors between 1–10 while (29) respondents live in building having floors between 10–20 and only (3) respondents living in building having floors between 20–30 and only (1) respondent living in building having floors between 30–40. According to this data can be noted about what positive and negatives aspects do the people living in high rises have and what aspects do the people not living in the high rises aspire for.

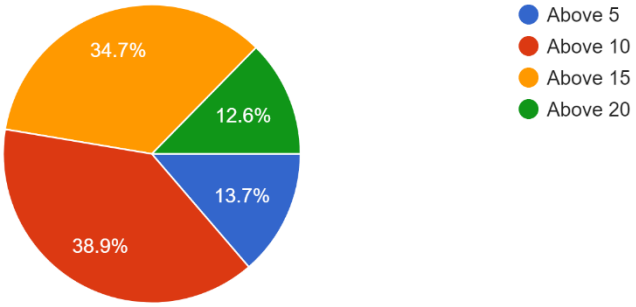


Figure 9: Pie Chart Showing from How Many Floors do the Respondents Consider the Building to be a High Rise

In the identification of the height from which a building is considered high, it was overserved that about 13.7% people consider more than 5 floor building as a high rise, about 38.9% of the total respondents consider a building above 10 floors as a high rise, about 34.7% of the respondents consider a building above 15 floors as a high rise and about 12.6% people consider building above 20 floors as a high rise. Thus, it can be considered that most respondents consider buildings above 10 floors as high rise.

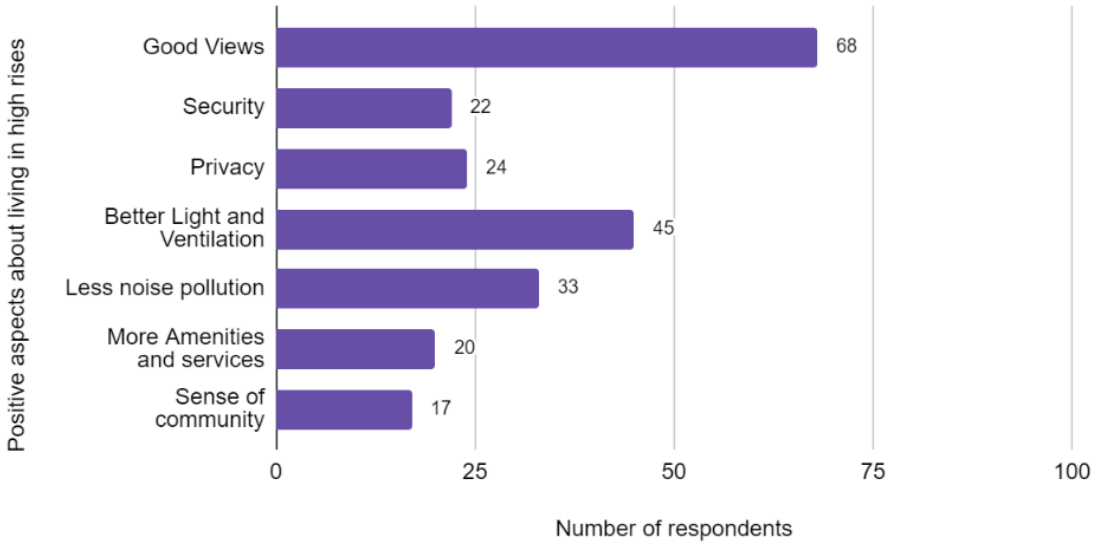


Figure 10: Graph Showing What do the Respondents Think are the Positive Aspects of High Rises

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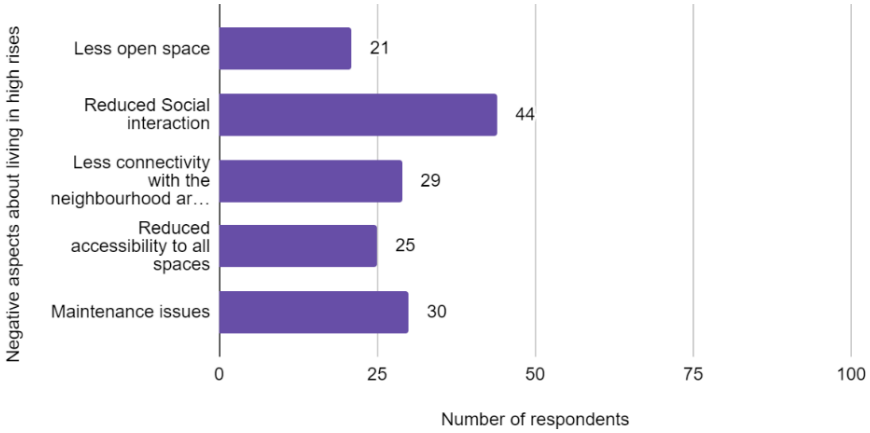


Figure 11: Graph Showing What do the Respondents Think are the Negative Aspects of High Rises

Then the positive and negative aspects of high rises was asked by the respondents which was classified into two categories: one from architecture students and other from the non-architects. It was an open-ended question for the architecture students. According to their responses the question was converted into a multiple choice and then the other responses were recorded as seen in the Figure 10 and Figure 11. A common point between these two categories was that both the respondents thought that view was a positive aspect of the high rises. This was the most common responses. Other than this light and ventilation was also considered as a positive aspect. While lack of interactive spaces, losing the connect with the ground, less open spaces are few of the common negative aspects observed in the responses.

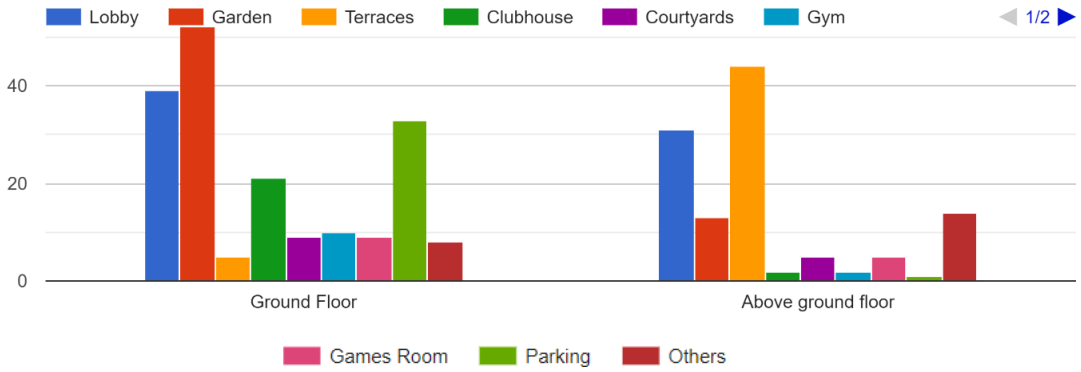


Figure 12: Graph Showing the Spaces Where the Respondents Interact the Most and Where are These Located on Site

After this the respondents were asked where do they interact the most within their society and on which floor is it situated. The maximum respondents interact in gardens situated at the ground level and also the lobby areas according to the Figure 12. Mostly all the spaces which they interact in were situated at the ground floor level. Very few respondents interacted at spaces above ground floor.

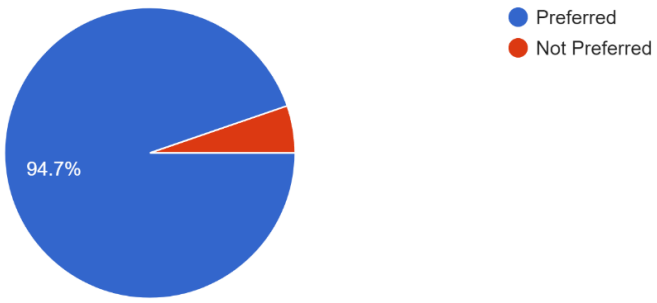


Figure 13: Pie Chart Showing the Preferences of the Respondents Regarding the Location of Open Spaces

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Then a preference was taken by the respondents whether they would like to have open spaces at various levels or only at ground floor level. About 94.7% people think that we can have interactive spaces at various levels while 5.3% people think that it should be located at the ground level itself.

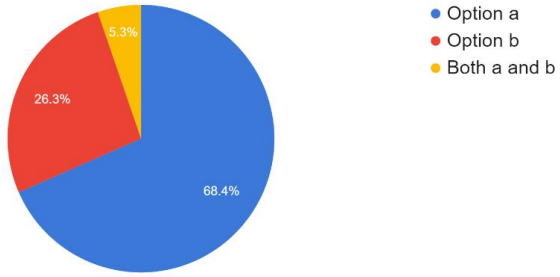


Figure 14: Pie Chart Showing the Preferences of the Respondents Regarding the Location of Open Spaces

For the last question the respondents were shown a photograph and were given two options a. whether the interaction in a high rise should take place at ground level or b. whether it can be distributed across various levels. Out of this 26.3% respondents feel that it should be situated at ground level while 68.4% people think that it should be situated at various levels and 5.3% people think that it should be situated at both levels as seen in the Figure 14.

From this data collected through the form it was concluded what is the people's perception of high rises and what are the positive aspects that can be maintained and what are the negative aspects that can be worked upon in the future high rises.

The data from the case studies was analysed in the form of plans, sections and photographs. The observations on the site were conducted on three levels. One is the site level; second, building level, third, doorstep level. At all three levels observations were made as to how people interact and at what time. The factors considered during the observations were time, age, gender. At different times of the day the activities were observed. Also, the places where the interaction took place was recorded i.e. Whether it was situated on the ground level or at various levels.

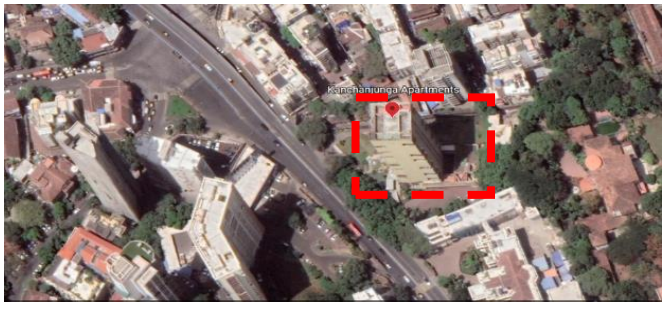
In Kanchanjunga apartments the interaction took place at the terraces in the houses which were also double height. This was at the flat level. Also, at the building level there was a garden where people used to interact during the morning and evening time. At the doorstep level only two flats were situated on a floor on two opposite corners where no interaction took place.

Through these observations one can conclude how the currently occupied high rises are being used and what all changes can be made in the future to make it even better to live. These observations can be seen in the Figure 15.

In Amanora at site level people interacted in the gym, swimming pool and near the garden. This was during the evening time. While at the building level there were some double heights terraces where people interacted at various time of the day. At the doorstep hardly any interaction took place as the flats were situated in different corners and connected through long corridors. These observations can be seen in the Figure 16.

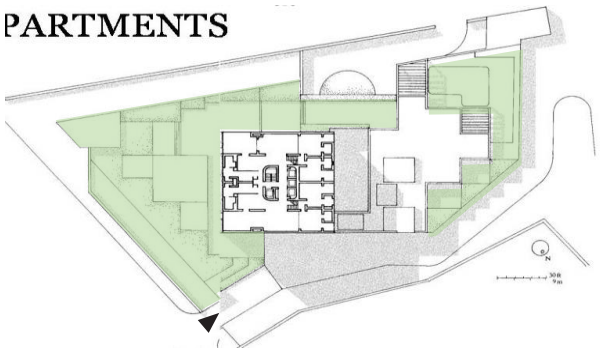
Both the case studies were also analysed in the form of site photographs by comparing the two of them for interaction at various levels. This can be seen in the Figure 17.

Kanchanjunga Apartments, Mumbai



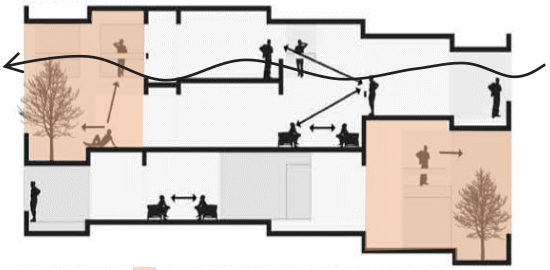
LOCATION PLAN

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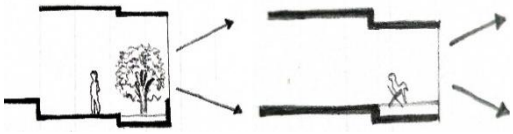
SITE PLAN

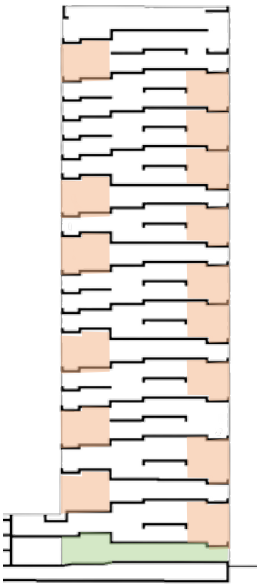
Plan showing green spaces at site level including common garden and seating areas.



Private green spaces

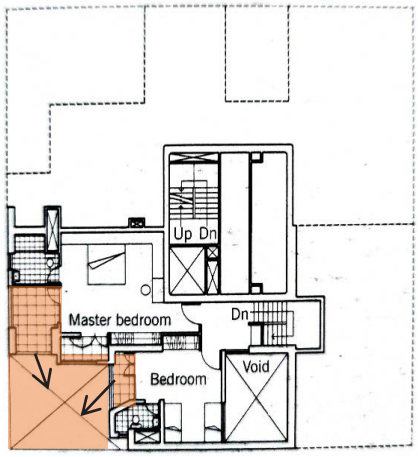
Every terrace garden overlooks the common garden.



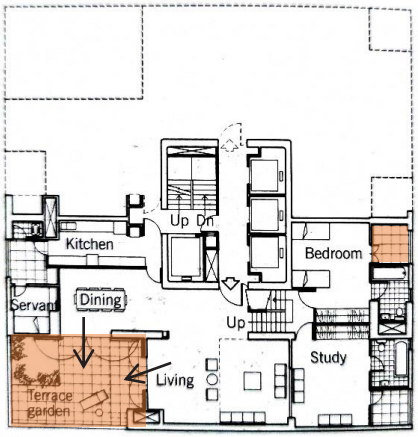


Sketches showing the terraces. Within every flat there is a double height open terrace with the view of the city. This forms the core for the interaction within the flat.

Section showing terraces at various levels and green space at the podium level.



Lower-level plan



Upper-level plan

Plans showing private greens that overlook the public green.
The terraces are double height spaces.

Figure 15: Analysis of Plans and Sections of Kanchanjunga Apartments with Respect to Interactive Spaces

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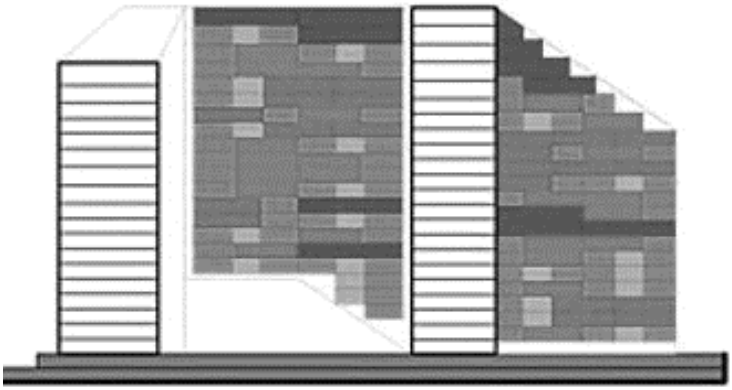


Amanora Future Towers, Pune

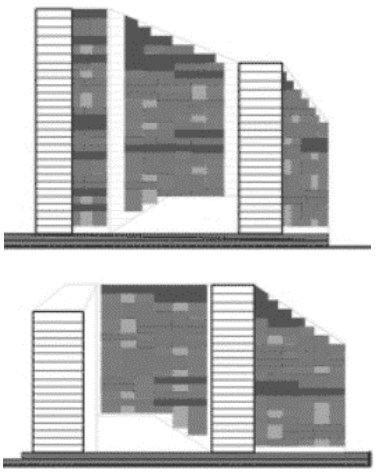
The building mass branches into different arms creating 4 different green pockets for different common activities thereby increasing social interaction between people. Different courtyards formed for socially interactive areas. Some scoops in between the buildings help in creating common spaces within some levels of the building.



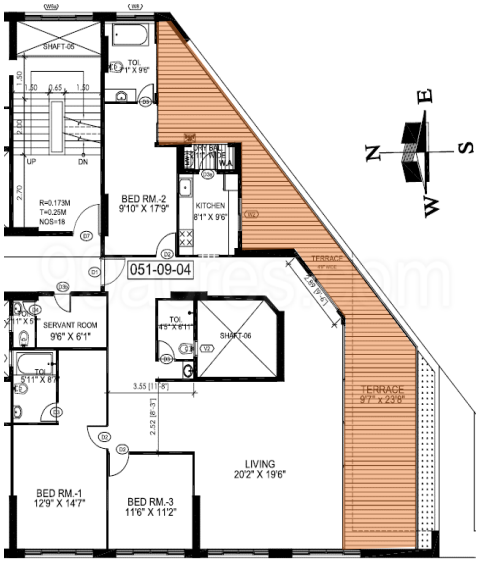
SITE PLAN



Every terrace overlooks the common courtyards

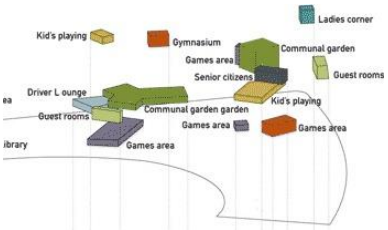


Section showing stepped staircases

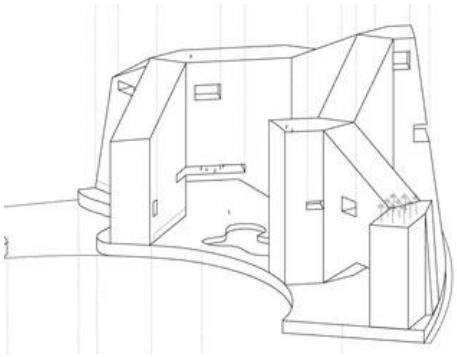


2 Bedroom apartment

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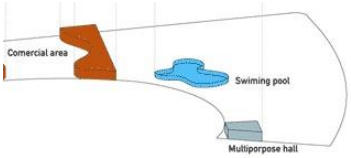
Community spaces within the entire built mass



Entire massing of the project



3 Bedroom apartment



Ground Floor with various activity areas

Plans showing **private** terraces that overlook the public courtyards

Figure 16: Analysis of Plans and Sections of Amanora with Respect to Interactive Spaces

Amanora Future Towers





Figure 17.1

Kanchanjunga Apartments



Figure 17.4

Site Level

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Figure 17.2



Figure 17.5

Building Level

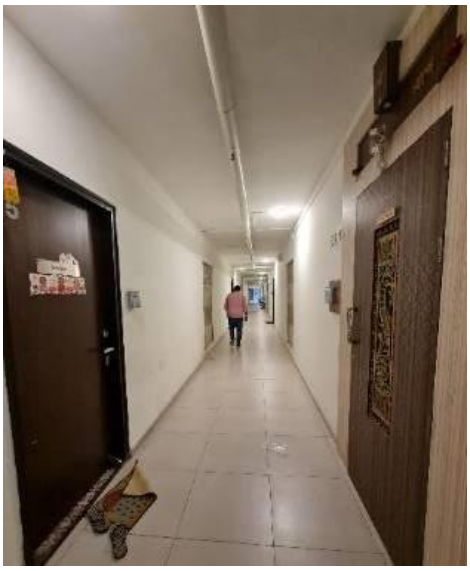


Figure 17.3



Figure 17.6

Doorstep Level

Figure 17: Images of Both the Case Studies Showing Interactions at Various Levels

5. INFERENCE/CONCLUSION

The perception of the people about high rises is that most of the people consider buildings above 10 floors as high rises. One positive factor that people have about high rises which is common for all the respondents is the views and better light and ventilation. Majority of the times the high rises have better light and ventilation due to its height. Two common drawbacks that people have face while living in the high rises is the issues of maintenance and reduced social interaction. Majority of the respondents thought that living in high rises reduces interaction with the people and connect with the ground. This drawback can be overcome by having spaces that promote social interaction. The common facilities like garden, lobbies, terraces and clubhouse can form the key spaces for interaction. The common facilitis can be divided and split into some spaces being situated at the ground and some at intermediate levels for easy access. The Table 1 compares the thoughts of people living in high rises to the people not living in high rises. It includes what do people think are the positive and negative aspects about high rises and what are the common thoughts about both the categories of people.

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Table 1: Showing Comparison between Thoughts of the People Living in High Rises vs Not Living in High Rises

Sr. No.	*Respondents*	*Positive Aspects about High Rises*	*Negative Aspects about High Rises*
1.	Living in residential building up to 10 floors	Good Views, Security, Privacy, Community Living, Good Light and ventilation, Amenities	Less open spaces, less connect with the ground, Less interaction, reduced accessibility, Maintenance issues
2.	Living in residential building with more than 10 floors	Good views, good light and ventilation, less noise, security, More amenities	Less interaction, Lack of open spaces, less connect with the ground, Reduced accessibility to common spaces, detach people from street life
3.	Common aspects between respondents living and not living in high rises	Good views, good light and ventilation, security, more amenities	Less open spaces, less connect with the ground, Less interaction, Reduced accessibility to common spaces

As we can see from the responses that about 94.7% people prefer to have open spaces at various levels of the building this factor is important to be taken care of. This is necessary for it to be accessed by people of all age groups. These results about the positive and negative aspects of high rises, responses on what spaces do people use for interaction and where should they be located can form the basis of the development of future high rises to increase social interaction between people. The common spaces like lobbies, parking where people tend to come together at different times of the day can be considered as some spaces where the interaction can start. The spaces for interaction should be provided such that it is accessible by all age groups and has some connect with the ground.

In conclusion, the results provided a better view about what is people's perception of high rises and what all spaces can help increase interaction between people in in terms of spaces and their location.

ACKNOWLEDGEMENT

I would like to acknowledge and give my warmest thanks to my guide, Ar. Aarthi Chandrashekar, who has made this research possible. Her guidance and advice helped me through all the stages of my research. I would also like to thank the entire research team to help me provide knowledge about how to write the paper.

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The residents of Kanchanjunga Apartments and Amanora for helping me to study and analyse these case studies and also share their thoughts on the projects. I would also like to thank them for giving some information about their preferences and thoughts on my project topic.

I would also want to extend my thanks to all those who helped me fill my research form without which my paper would not have been complete.

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Kinetic Architecture: An Exploration and Experimentation of Design

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ABSTRACT: The proposed research attempts to explore the utilization of this Kinetic aspect in design through module implementations and it's extensive contribution in multiple functions. Architecture is a constantly evolving field of experimentation and exploration of which Kinetic has become integral part. Kinetic means motion. Anything in motion is said to be the result of kinetic. The concept of kinetic has proven to be a solution to eliminate the energy depletion crisis by invention of turbines or pavegen tiles which converts kinetic energy to electricity. Kinetic in Architecture is most talked but least explored subject. The experimentation of use of technology and the concept of transformation in space and design must be explored to generate a user oriented space. The need for getting acquainted with the extents and limitations of the technological aspects of the design in different fields becomes necessary to understand its application and potential in the current issues in the world of architecture. With rapid development in the field of construction, many issues related to environment, space and technologies have been an obstacle for creativity in design. Kinetic can be that asset to resolve the block and let the creativity flow along with design. In order to bring in the new language of spaces and dynamism, it becomes vital to briefly address the concept of how 'Kinetic' is the future of architecture aiming to improve the spatial experience, aesthetic and flexibility of the structure.

Keywords: *Kinetic Architecture, Futuristic Approach, Multi-Functional Spaces, Dynamism, Sustainable Architecture.*

1. INTRODUCTION

The word kinetic is originated from the Greek word *Kinetickos,* meaning to put something in motion meaning to bring any static body in action with application of external forces. The resultant of this process of bringing any inanimate object into motion can be labeled as Kinetic. Kinetic is further presented with a supporting word like energy, force, movement, reaction, architecture etc. This field is explored for energy generation, fashion, art and installations, chemistry and even in medical field. Recently, designers and architects have recently conducted various exploration to introduce kinetic as design element. This intervention is the stem to the term Kinetic Architecture, but, Kinetic architecture is more

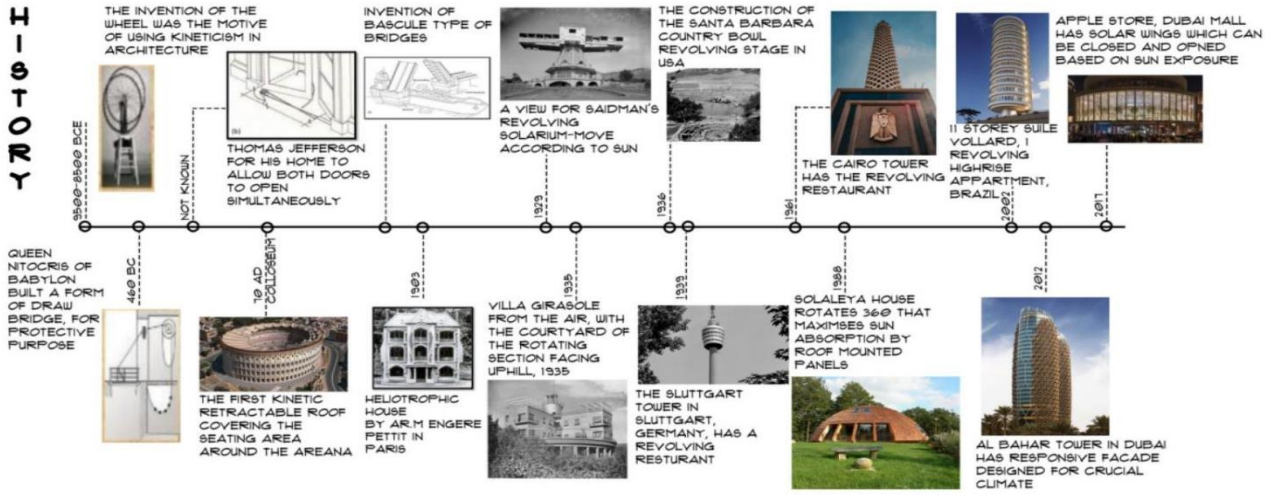


Figure 1: Timeline

(*Source:* Author)

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than designing parametric structures. The small gap between kinetic and parametric is generally skipped by people. Introducing a new concept can bring clarity in forming an ideal definition to explain what kinetic exactly means. Kinetic means involvement of electronic, mechanical and robotic interventions. Experiments in terms of dynamism is carried out in latest as a solution to various problems in the real estate. Since kinetic gives the liberty of exploration, roofs, facades, walls, floors and other such structural systems can be experimented for space modification and transformation.

Technology has an impact on the manufacturing, production, automotive, and construction industries. The influence of architectural technology extends beyond the initial design phase to execution and management beyond occupancy. As a result of this phenomenon, kinetic technology has been incorporated in architecture, creating interactive architecture, which is playing an increasingly important role in the current situation. The interaction or response can take place at any level, depending on the demands of the occupants or users or environmental/climatic conditions like light, temperature, wind, sound, touch. The mechanism changes in line with the various functions.

History

Taking into consideration the history of structures, the Need was major factor to come up with a solid solution which led to the creation of structures. Built structures previously, was the way to fulfill the need of protection from the wild attacks. Later on, as time went by, the need changed and the protection from adverse winds, rain and temperature along with wild attack became a necessity. That is the way evolution of architecture and techniques was recorded. Need is the mother of evolution and till date this need is the resultant of various styles and branches of architecture. The use of kinesis in architecture was inspired by the development of the wheel. Moving stones, logs, or animal skins covering cave or hut entrances were the first examples of adaptation and movement in architecture. The shape and materials of kinetic structures would also be different from those of conventional structures. When kinetic is brought into picture, it means the parallel functioning of design and technology to justify the necessity or demand of the situation. Kinetic is the term where designs are proposed with facilities to modify itself to minimize the adverse effect of the environment. The initial wave of contemporary kinetic architecture was inspired by the futurist movement. Futuristic movement had inspired to break down the geometry and form a new language of architecture with curves, domes and free flowing forms. These new characters represented dynamism, speed and motion through structures. Various form and material exploration were witnessed during this phase of transformation. There were also stone pivots utilized, along with leather or wooden hinges.

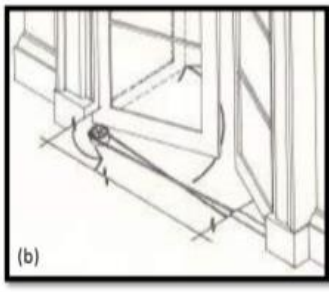


Figure 2: Swing of Door

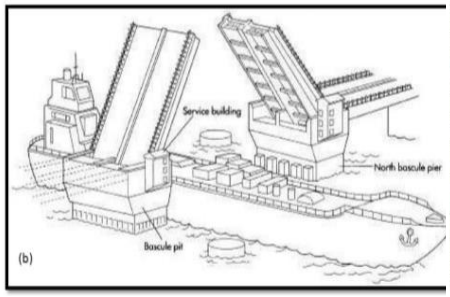


Figure 3: Bridge

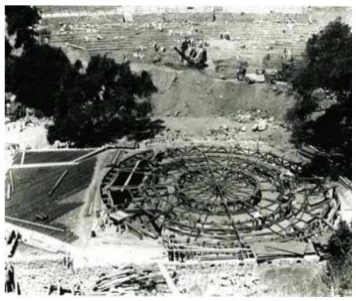


Figure 4: Retractable Roof of Colosseum



Figure 5: Rotating House

Source: www.survivorlibrary.com

For example, after metals were invented, pivots and hinges composed of brass and iron were utilised. The introduction of metal improved the functionality and aesthetics of doors and window shutters, making them more effective for both weather and security protection. (Figure 2)

Taking bridges into consideration, were mostly used for security or defence purpose. Those bridges could be moved according to situations. (Figure 3)

As mentioned earlier, the original usage of moveable bridges was for defence. Moats were covered with them in mediaeval castles and forts. During that time, drawbridges were often utilised, and were typically of the bascule type with trunnions pivoting upward. They served as simple bridges across moats when they were dropped, but they were also employed for protection as when raised since the floor of their leafs served as powerful doors that prevented access and deflected missiles from catapults. With the use of winches and levers, these bridges were moved by the direct pull of chains near one end. In

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the sixteenth century, Leonardo da Vinci invented bascule bridges. The counterweight, which is situated on the side of the pivot from the bridge opposing the bridge, made lifting considerably simpler and protected against unexpectedly dropping from the higher position (Zuk, 1970). Instead of using chain hoists, modern bascule bridges rotate thanks to motor-driven gears mounted on a horizontal pintle. The less counterweight, bearings, equipment, and foundations that were required, the lighter the moveable bridges' dead weight could be. Most of these bridges are made of steel, but a small number are also made of aluminium, which cuts the dead weight in half. The weight of any kinetic structure must be kept to a minimum for this reason (vi). Additionally, kinetic structures will be different from traditional static ones in terms of both material and form.

At the Paris Exposition de habitation, in 1903 renowned French architect M. Engere Pettit displayed the spinning "heliotropic home" under the guidance of physician Lucien Pellegrine. The model was created using data from the south of France-built Villa Tournesol Pattit. Because of the doctor's conviction that the sun could treat the majority of illnesses, it was sometimes referred to as a "family sanatorium". The home was cross-shaped, with big window openings on most walls, to maximise the benefits of sunshine in various spaces at various times. Additionally, the home was mounted on a turntable with a ball bearing raceway at ground level, which allowed it to rotate a few inches once per hour to track the sun. (Figure 5) waiting and examination rooms. Conical in design with a steep pitch, it had diamond-shaped tiles covering the roof.

Kinetic architecture could provide a creative and effective solution to problems related to environment and lack of land in both developed and developing countries. The kind of structure observed around is static and generally restricted to a singular function. Kinetic architecture is that perspective which encourages change. It adapts to the transformation instantly without disturbing the existing built environment.

This research addresses to the questions like,

a. What is the use of kinetics in architecture? Is it merely aesthetics or it has other aspects too?
b. Kinetics is a design outcome or technological outcome?

Research aims to establish that, since architecture is mother of all arts and technology has been the major contributor in development in any field. Kinetic is a language where both, architecture and technology can collaborate to form solutions to various issues. The research aims to study the applications of kinetic in architectural intervention and derive to a functional solution with use of technology as a new design language.

Research targets to analyse the scale of kinetic interventions with respect to the functions through case studies. It continues to further analyse viable parameters of use of kinetic element in the design and understand the mechanism to modify structures without disturbing the existing structural integrity. Kinetic as a route is still under experimentation, making it expensive in-terms of installing of mechanisms. Lack of software to support these kind of designs is a drawback. Kinetic may prove to be a foreign element to the users and adaptability by users can be a point of question. Compromises in materials can restrict the functionality of kinetic elements and lead to malfunctioning of the program as whole.

2. LITERATURE REVIEW

Kinetic has been used majorly for designing bridges or tall towers as a structural system resistant to disasters or aesthetic purpose. There are researches and experiments being conducted in terms of how kinetic can be used in day to day life. Introducing kinetic in interiors or retreat projects like resorts, shopping malls, gardens etc are being proposed.

Depending on the purpose for which motion or kinetic is been used, the idea of Kinetic architecture is divided into four sub categories: (a) Intelligent architecture (b) Interactive architecture (c) Responsive architecture (d) Adaptive architecture

Architecture has advanced in a way that it has started to take control over the structural, mechanical, and other functions that determine the mood of the room.

Architecture should be patterns that adapt to their environment. An architecture that is primarily responsive is designed for specific systems that can gracefully deal with changes in the environment or influences from the natural world. One can use systems that change the exterior of a structure or alter structural elements under specific circumstances. Designs must be adaptive in order to support the idea of sustainability, much like humans may adjust to diverse climatic, physiological, or biological changes occurring across the planet for survival. This branch of architecture typically includes spaces with multiple uses.

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There are numerous justifications for incorporating kineticism into architectural design. It is possible to use kineticism to advance environmental causes. These technologies can be utilised to both save energy and improve the effectiveness of ventilation and natural light. By allowing the indoor environment to change in size and shape and by improving the quality of it, kineticism can increase space efficiency. Kinetic systems may be employed conceptually to draw in viewers and express social and cultural aspects (viii). The motivation to examine how theory and practise have dealt with kinetic possibility in design. While the examples provide compelling visions, there is no evidence of designers fully exploiting kinetics' ability to widen the agenda of architectural composition. There are no theoretical models to identify design variables, nor is there a nomenclature to express the language of motion. Kinetic motion in a building is determined by its typology and purpose to serve. The function of the building decides the movement of the building element. Multiple experiment have been conducted to define kinetics in architecture. Depending on the need of site, design, typology of the structure, the use of kinetics differs. Kinetics can be used solely for aesthetics for some structures or can be incorporated as an integral design element. Also along with the use of kinetics, the reason and intent of motion changes too. Kinetic has provided liberty to either experiment with movement of structural elements like slab, wall, facade etc. or move the structure as whole. Kinetic facades can be used for visual barriers in an aesthetically pleasing manner to keep the privacy of space in tact. Dynamism in kinetic architecture is exhibited through natural, artificial, or mechanical processes. According to the topology of the building's components, their quality, the movement's form, and the fluidity of the form, the idea of mobility/dynamism on kinetic fronts in the literature is split into two categories: spatial and non-spatial movement in some studies (vii). Different methods of control are available for kinetic systems that are put in buildings. Kinetic systems may be controlled in a variety of ways, from straightforward human control to intricate automation control. The complexity of automated control can range from simple pre-programmed automatic systems that just enable users to perform a certain action by turning the device on and off to more sophisticated automatic systems. These systems are capable of full automation and may be connected to a variety of sensors and detectors to detect any changes. This enables these kinetic systems to react in accordance with pre-programmed settings without interference from building occupants. Additionally, certain pre-programmed automated kinetic systems may be configured to permit operator interaction, even when linked to sensors, to add alterations and updates. Additionally, kineticism may be incorporated in structures devoid of any automated or integrated computation, enabling building occupants to physically fold, slide, or even push various components to create the settings they wish.

Kinetic can be categorized into multiple branches depending on its type of use. It can be further branched out under the sub categories like responsive, adaptable, transformable, interactive, portable etc. Different structural elements can be modified to achieve the kinetic aspect in the design. Kinetic is applicable in designs like residential space, commercial space, spaces for public gathering etc. Kinetic intervention in the design can be a solution to problems like climate, migration and space scarcity.

With the world turning towards globalization, the space is being used up at a greater extent. In order to tackle this issue of space scarcity, a space which can accommodate multiple function in it at once can be proposed. The space not only allows the flexibility of inculcating different functions but also can be converted into such a design which can transform itself according to the demand of the situation.

3. MATERIAL AND METHODOLOGY

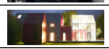
Case studies to understand the use of kinetic elements according to the location, typology of building and purpose.

Many explorations are observed where kinetic is brought in as a design element. The facades are majorly explored as kinetic element of the structure, since it is exposed to the outer climate directly. The need for controlled environment is fulfilled by introducing such movable parts on the building envelope. Use of kinetics in architecture can be climate responsive, functional or to create a luxury through space. Till date, kinetic elements are used to either fulfill the purpose of future expansion or adapt to the changing climate. Different materials has been explored depending upon the location and typology of the structure. Steel is most preferable material since it provides strength and resistance simultaneously.

Introducing kinetic in the architecture can create a language of innovation and flexibility which is user centric. Kinetic approach in design allows the user to filter their interaction to the outside world and it's the structure that adapts the demands of the user or nature.

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Table 1: Buildings where Kinetic is Explored as an Element

Project		Architect	Location	Year of Completion	Area	Typology	Kinetic elements	Reason of Motion	Material
Institut de Monde Arabe		Jean Nouvel	France	1987	16,894 sq. m.	Institutional Building	Mashrabiya Jalis diaphgrams	Environmental light and temperature	Glazed aluminum, steel, glass and light sensitive diaphragms
GucklHupf		Hans Peter Wörndl	Mondsee, Austria	1993	48 sq. m.	Residential	Structural system	Functional	Wood, glass, aluminium
Pfalzkeller Gallery		Santiago Calatrava	Switzerland	1999	70 m. long	Art Gallery	Elevational elements	Environmental	Pre-fabricated concrete
The Naked House		Shigeru Ban	Saitama, Japan	2000	195 sq. m.	Residential	Movable boxes/ rooms	Functional	Timber, paper, honeycom panels
Milwakee Art museum		Santiago Calatrava	United States	2001	13,192 sq. m.	Art Museum	Wings or Elevational element	Environmental and light	Steel and concrete
The Rolling Bridge		Thomas Heatherwick	United Kingdom	2004	17 sq. m.	Bridge	Trusses	Functional connecting spaces	Metal trusses
Dragspelhuset		24>H	Glaskogen, Sweden	2004	72 sq. m.	Cabin	Expandable room	Functional	Red cedar wood, pine lattice and steel
The Leaf Chapel		Klein Dytham Architecture	Kobuchizawa, Japan	2004	2,322 sq. m.	Chapel/ Wedding space	Walls	Design and aesthetics	Steel and glass
QiZhong Forest Sports City Tennis Centre		Mitsuru Senda	Shanghai, China	2005	8,09,371 sq.m.	Sports Stadium	Roof petals	Environmental- light and control to adapt weather	Aluminum and steel
Sliding House		dRMM Architects	Suffolk, UK	2009	28m. long	Residential	Structural parts	Environmental light and ventilation	Steel, timber, glass
The Olympic Tennis Centre "Magic Box"		Dominique Perrault Architecte	Madrid, Spain	2009	1,00,000 sq. m.	Sports Stadium	Roof lids	Environmental- Light	Aluminium
Cherokee Studio Lofts		Pugh + Scarpa Architects	California, USA	2010	260 sq. m.	Residential	Elevation elements	Environmental light control and natural ventilation	Aluminum
The World Trade Centre		Santiago Calatrava	New York	2016	64,750 sq. m.	Transportation Hub	Retractable roof, Steel wings	Environmental light control	Steel and glass
Transformable Shed		Diler Scofidio+ Renfro	New York	2019	18,580 sq. m.	Art Museum	Framework that can be extended when needed	Functional creating spaces	Steel lattice
Dynamic Tower		David Fisher	Dubai, UAE	N/A	420 m. high	Commercial, Hospitality, Residential	Floor plates	Luxury and environmental	Steel, aluminum, carbon fibre

Source: Author.

4. RESULTS AND DISCUSSION

The classification studies on kinetic fronts that have been offered up to this point have been thoroughly reviewed in the study as a result of the literature review under five primary headings: function, design, idea, technology, and motion. A more thorough classification and evaluation scheme was developed for these five titles in light of the data received. A conclusion concerning the characteristics and design criteria of the structures has been drawn by applying this complete framework to well-known examples of kinetic façades constructed in various geographic locations to date, and the current findings have been made clear.

Kinetic architecture can be further classified into four major branches according to its purpose and design.

1. ***Aesthetic:*** Kinetic creates unique pattern resulting in a play of facade. With moving elements the facade creates an aesthetic effect which can either compliment the design or stand out.
2. ***Responsive:*** Structures designed in a way where they can adapt or respond to the climatic conditions of the site to make the building functional are categorized under responsive architecture.
3. **Transformable/Adaptable:** Structures that can be changed or transformed as per functional requirement without disturbing the main structural system are said as transformable designs. Generally the transformation is observed in the interior layout.
4. **Portable:** Modules of spaces which allows to fold and relocate without compromising on the structural integrity are portable structures. These structures can be reused or utilized again for the same or a different function while still maintaining their structural integrity. Case studies for the same have been examined in order to further human understanding of these categories and to consider elements other than livable spaces as a means of translating these concepts. These designs have utilized the concept of the image of each category at some point to construct the shape of the structure, and these dynamic aspects are crucial in establishing the language of architecture.

Current trends in architecture go in the direction of dynamic and adaptive building envelopes, which reconfigure themselves to meet external and internal changes in climate and user behavior. Despite recent developments and some landmark projects, the market is, where applicable, still dominated by traditional blinds and shutters. These systems however fail at high wind

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speeds and are restricted to planar façades and rectangular grids. However, contemporary high rise architecture shows a trend towards complex curved and triangulated façade systems. This trend is particularly present in the Middle East, where external shading devices would seem essential.

5. CONCLUSION

Architecture affects the environment it surrounded with, but it also depends on a variety of other elements, such as technology, people, and the surrounding environment, both man-made and natural. Kinetic architecture can be the answer to creating environmentally friendly, secure, well-organized, pleasurable, and flexible spaces in order to raise the quality of the built environment. Architects should work in teams to better research through collaboration with experts from other domains in order to provide incredibly valuable outcomes. Kinetic architecture also involves contribution to branches including information technology, communications, mechanical and structural engineering, as well as social and environmental science.

Architects, designers or planners should put in a lot of effort to find ways to develop and execute ideas at the pace necessary to keep up with the rest of the world. The impact of kinetic architecture on urban planning must be fully understood via study. Kinetic design will give planners innovative ways to approach problems utilizing recent technical developments that streamline decision-making and encourage cooperation among various interest groups throughout the process. Greater comfort and safety may be provided for all people if urban planners take events, activities, and changes into account instead of only buildings and infrastructure. Complexity in design, high cost, and difficulty in implementation are the causes of the lack of true movement in kinetic architecture; nevertheless, as smart materials advance, this challenge becomes less challenging and simpler. Kinetic architecture improves building efficiency and reduces solar heat gain, both of which are environmentally friendly benefits. A building's typology and intended use determine its kinetic motion. The mobility of an architectural element is determined by the structure's purpose. There have been numerous experiments done to define kinetics in architecture. Kinetic architecture is an intervention which can provide dynamism in a building along with keeping its structural system intact.

The world is moving with urban problem like space scarcity, climate change, increasing population etc. Designing requires a creative approach kinetic architecture gives similar path where spaces can be modified as per the demand of circumstances introduction of kinetic in architecture is corroborative vision of nature inspired form and technology. Kinetic in short is an extraction of minute processes occurring in nature. The way nature can adapt changes immediately, the buildings can have similar tendency too. Also designing spaces with a future scope of extension already proposed can be a highlight and start of new history.

"Kinetic architecture is rethinking spaces as functions and meeting the needs of situation".

ACKNOWLEDGEMENT

The research wouldn't be accomplished without sincere support of my mentor and other faculty members. I would like to express my gratitude to Prof. Yogita Nagpure and Prof. Tanvee Joshi for her valuable guidance and direction for completion of this research. Special thanks to my family and friends for being a supportive hand to accomplish this research.

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Laurie Baker in Gujarat: A Study of Works and Regional Setting

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ABSTRACT: Laurie Baker (1917–2007) is considered to be a pioneer architect of India, who worked in the southern state of Kerala. Baker had an oeuvre spanning for over five decades, during which he worked on projects across all scales and diverse programs. However he was known for his architectural contribution in the state of Kerala, but a very little has been studied beyond Kerala, his adopted hometown. Baker's work is not yet documented in any terms apart from only a few books, articles or journals, even these books and articles have only mentioned and talked about works done by him in Kerala whereas some of the projects in Gujarat are still unknown and has not drawn any attention towards it.

The present study will be an attempt to bridge this gap through the study of works of Laurie Baker in Gujarat a few projects designed by Baker in Gujarat will be brought to the attention of academia. The study intends to recognize the processes involved in designing to create an architecture which is user-friendly taking a few factors like the cost, culture: social systems and values, region: climate and topography into consideration. With regional study, the vocabulary, philosophies and ideologies of the architect will be studied to understand the design approach of an architect in a particular region.

Some buildings by Baker will be documented as to add on to the academic library before they are taken down. The author intends to visit the buildings by Baker in Kerala as well as in Gujarat with a detailed analysis there will be a presentation on if there is any difference between the two context and their responses according to the context.

Keywords: *Laurie Baker Architecture, Philosophy of the Architect, Architecture in Particular Region, Architectural Vocabulary, Laurie Baker in Gujarat, Laurie Baker in Kerala.*

1. INTRODUCTION

Laurie Baker is known for his works in Kerala. Before coming to Kerala, Baker worked in Pithoragarh, Uttarakhand and while working in Kerala, Baker got an opportunity to work in Gujarat. In year 1975-1985, Baker had designed few buildings in Gujarat at Vadodara and Surat.

Baker first came to Gujarat in the year 1976 and started designing or started the very first project in Vadodara and then went to Surat but all these projects have not yet drawn any attention towards it.

2. LAURIE BAKER IN GUJARAT

In the mid-1970s, industrialist Nanubhai Amin invited Baker to design three buildings in Vadodara the Jyoti Ltd., the Primary Health Centre and Centre for people with Disability. During his visit to his friend's place in Kerala, Nanubhai Amin inquired about the architect Laurie Baker and invited Baker to come to Vadodara, Gujarat. All three buildings by Baker in Vadodara are of exposed bricks but he has added Indian architecture to his style.

Baker didn't only work in Vadodara but in Surat as well. In Surat, he designed several buildings on government land at the campus of Veer Narmad South Gujarat University for the Centre for Social Studies department wherein he designed an office building, a library, a conference room and 3 different types of quarters. Of these 6 buildings of only 3 of the buildings are still standing, others have been pulled down.

Aim

The study aims to explore and analyse Baker's projects in context of Gujarat.

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Objectives

- To document the works of Laurie Baker in Surat before they are taken down or gone.
- To understand the design concerns and vocabulary established in buildings of Gujarat.
- To compare the projects designed by Baker in Gujarat with the projects in Kerala.

Research Questions

- Is there any difference in design approach in Kerala and Gujarat? If yes then what are those differences?
- What are the design concerns considered specifically in buildings of Gujarat?

Scope and Limitations

The study will focus on different design concerns and aspects of Baker's project in Gujarat at Vadodara and Surat. The study is limited to Gujarat only and the comparison will be done with only institutional buildings as the primary case studies are institutional buildings.

3. METHODOLOGY

Study depends on both primary and secondary data where secondary data will be collected from books, unpublished thesis, articles, websites and papers. While primary data has include site visits and on site documentation of the buildings, collecting information by interviewing the people associated with.

4. LAURIE BAKER

> *"….and we are not just here to design another building or a home or something. I think we can influence if we want the whole business of ecology and environment. We are very much part of it. Whatever you do, whatever I do is, you can say…. a blot on the landscape. And if we think the landscape is hill and trees and water and all that, then we are bit of a blot. Whether it's a nice red ink blot that you can shape…"*[1]
>
> **—Laurie Baker**

Laurence Wilfred (2nd March 1917- 1st April 2007) was born in British family in England in a Quaker family. As he belonged to a Quaker family, he was taught the ideals of simplicity and rejecting all ornamentation and luxury. He was always interested in nature and often went on trips with his friends to the countryside. Once at the age of 17, Baker went on a cycling tour to Europe with his friends where he noticed the changing landscape, variation in the houses, he also noticed the difference in life style of the people. All these things left impression on his mind and by the end of the tour, he had made up his mind for career in architecture. Baker studied architecture in Birmingham school of architecture.

During Second World War, he served in the Friends Ambulance Unit in China with a surgical team and further the team was shifted to Burma where he had to deal with civilians suffering from Leprosy. He had spent most of his time treating leprosy victims and the pressure of work affected Baker's health and so was ordered to go back to England to recover in 1943.

Influence to come to India

While going back to England, Baker had to wait for three months in Bombay for the boat. During this period of stay, he had accompanied some Quaker friends who were influenced by Mahatma Gandhi and so he was highly influenced by Gandhi and had the urge to come back and settle in India.

Contribution to India

His initial intent was to work as an architect for the World Leprosy Mission, an international and interdenominational mission dedicated to the care of those suffering from leprosy. The organization wanted a builder-architect-engineer. Baker had carried his text books, reference books and construction manuals.

[1] Laurie Baker, in conversation with Ar. Keshav Gangadhar. *Indian Architect and Builder*, March, 1994.

ISBN: 978-93-89934-68-7

"I had brought with me my text books, reference books and construction manuals, but a bundle of comic strips would have been as helpful"[2]. The reference material that he carried with himself while coming to India was of no use and so he observed and learned the methods of construction from the local people. Baker adopted local craftsmanship, local material and traditional techniques which he combined with modern design and technology. He built many schools, chapels, hospitals and focused on converting or replacing the slums.

5. IDEOLOGIES OF THE ARCHITECT

In every building that Baker has designed, seems to have incorporated to sensibility to local conditions, adaptation of locally available materials. Baker had and followed simple set of principles in his architectural practice. Based on his own note and literature readings, Baker's philosophy can be summarised as follow.

- Study and use of local material and techniques
- Involvement of local labors
- Cost-effectiveness
- Site response
- Avoid extravagance
- Personal involvement of the architect in the project
- Minimal use of energy
- Creative and innovative use of materials
- Preserve and reuse resources
- Not to disturb the existing landscape

6. LITERATURE REVIEW

The major contribution to Baker's work is by Gautam Bhatia in 1994 in form of a book named ***Laurie Baker: Life, Works and Writings.*** In this book, Bhatia has talked about Baker's life, his contribution to architecture, his influences, journey of the architect from Britain to India and has also focused on Laurie Baker's views and methods. With his life's journey, the book also talks about works of Baker and has described Baker's projects with few major aspects that Baker had used while designing. Apart from Bhatia's work, many scholars and architects have studied Baker. Some of them have stated Baker as a regionalist, some have talked about Baker only from the point of how Baker has used brick has a material whereas someone has talked about his ideologies.

Only a few researchers have looked upon Baker's work as a regionalist architect and have talked about sense of place making in Baker's buildings. However, most of the scholars have studied Baker only from the point of view of low cost architecture. People have seen his work for his expertise in exposed brick work, rather than looking at the principles or concerns of his architecture. Dr. Shashi Bhooshan has said that putting Baker into only category of architect might not do the justice to Baker because Baker has done multitasking while designing. Further, he adds that people has also mistaken him as only looked Baker as working with brick and exploration in brick as material. People have also mistaken his style of designing as Kerala style and the author says that the Kerala style is itself a questionable notion. But in the architectural history of Kerala, Baker will remain a turning point.

With few books and theses, there are many more books containing writings by Baker himself talking about one of his important project CDS, Trivandrum (Centre for Development studies), also has talked about slums, how to reduce building cost and so on. Based on my literature review and visits to the buildings, I have developed a framework for analyzing his architecture:

7. FRAME WORK OF ANALYSIS

- Siting of the built form (Approach)
- Contextual response
- Climatic response

[2]Bhatia, Gautam. *Laurie Baker: Life, Works, Writings.* New Delhi: Penguin, 1994.

ISBN: 978-93-89934-68-7

- Articulation of form, space and surface
- Architectural vocabulary

The buildings of Gujarat have been studied for these factors and then will be compared with the works in Kerala.

8. ANALYSIS

Case Study 1: Conference room (Centre for Social Studies, Surat).

8.1 Siting of the built form

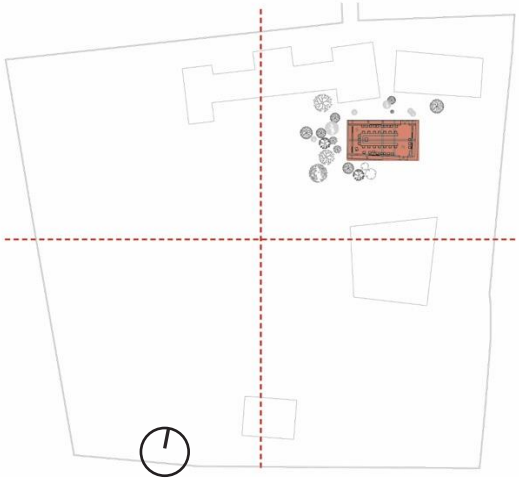


Figure 1: Site Plan Showing Location of the Conference Room

The built form is seen to place in the North corner of the site within the trees. As the main entrance of the campus is from North-West direction so it is kept near to the entrance as per the function of the building.

8.2 Contextual Response

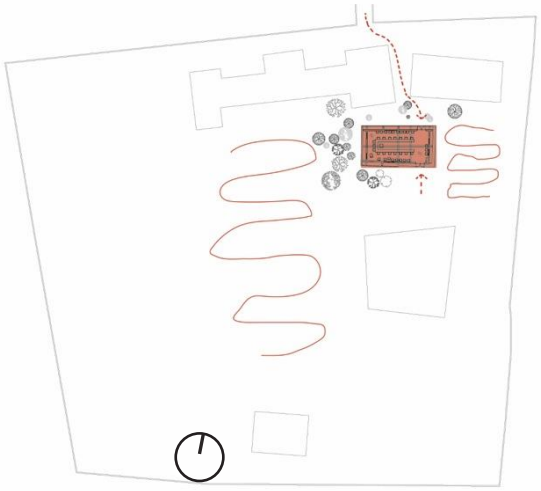


Figure 2: Site Plan Showing the Open Spaces around the Building

The entrance of the building is from the North and South façade and as the building is placed in corner, the open spaces are left on the other to sides of the façade. As seen in other projects by Baker in Kerala, there's no a physical courtyard but the open spaces around it acts as courtyard.

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8.3 Climatic Response

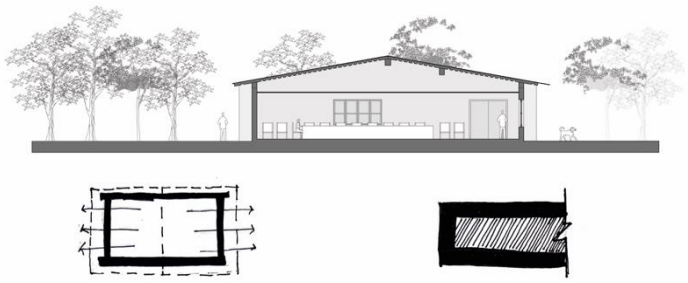


Figure 3: Section having Pitch Roof on Two Side and the Cavity Wall

The whole building is covered by one roof sloping in two directions which take cares of the rain water and protects the windows through overhangs.

The cavity wall deals with the harsh summer heat and keeps the internal space cool.

8.4 Articulation of Form, Space and Surface



Figure 4: Shows the Form in Elevations, Internal Space and the Surfaces of the Building

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The form is defined by a sloping roof and the space underneath it has a simple rectangular form.

The space is used as a conference room so a per the function, the space is column and wall free means there are no partition walls within the building.

As seen in the projects by Baker in Kerala, he tries to break the surfaces of the buildings by adding niches, by creating ach shaped openings, by making jaali walls or by using any other element which adds aesthetics to the building. But here in this project, the surfaces of the interior and exterior both are plain and have very limited articulation or play of elements.

8.5 Architectural Vocabulary



Figure 5: Comparison for Elements that Baker Used in Gujarat in Conference Room in Veer Narmad South Gujarat University v/s in Kerala in Centre for Development Studies

As seen in other projects by Baker, the basic element is jaali wall. The types of jaali walls that Baker uses in the projects in Kerala is not seen in the projects in Gujarat. The other major thing is that all his buildings are of exposed brick which is not the case in this building the walls in this building are plastered from inside and outside.

The use of landscape is not as seen in Gujarat's project as seen in the projects of Kerala.

The building has filler slab which becomes part of cost reduction or reduces the cost of the building and also reduces the usage of the material.

9. CONCLUSION

Baker worked in India for over seven decades. His primary contribution has been an architecture that is rooted in its soil. His projects in Kerala reflect a fairly detailed understanding of the local contexts, programs and direct understanding of clients, which is the most essential feature of his architecture. It belonged to the people and place it was designed for, Baker stayed in Kerala for five decades, observing the culture and life of the place, which directly affected the way he designed his buildings.

ISBN: 978-93-89934-68-7

His projects in Gujarat remained greatly unrecognized. The reasons for these could be the socio-political factors of the place. Baker got greater recognition in Kerala, after the successful completion of his master work – Centre for Development Studies, Trivandrum. It was the scale and the significance of the project that he could apply his ideology to such an immense scale. These factors played a major role in successful architecture of Baker in Kerala, Whereas in Gujarat Baker did not get all the three supports up to some extent which left Baker unknown in Gujarat or rather Baker was not able to develop his style of architecture for Gujarat.

For ideologies of an architect to succeed it needs the environment that is conducive to the creative genius. This study has provided a comparative understanding of works of Laurie Baker. His works in Gujarat provide a different evaluation as compared to the projects in Kerala.

ACKNOWLEDGEMENTS

I would sincerely like to thank my guide Dr. Naresh Chhatwani for consistently helping me with this research and providing his invaluable insights and keeping indulgence with the topic. I would also like to thank the students who have helped me to carry out the on-site documentation of the buildings.

ILLUSTRATION CREDITS

1. Figure 1 to 5: all analysis drawings are made by author.
2. Figure 4 photos are captured by author.
3. Figure 5 photos are from article the Centre for Development Studies, Trivandrum- A Laurie Baker Masterpiece on archestudy wedsite.

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Displace:
Case of Placelessness of Riverine Community in Assam

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ABSTRACT: This research focuses on the aftermath of river erosion caused by River Beki in Khar Balli village, Barpeta district in Assam. The intense disconnection and rejoining of the river create a braiding pattern, leading to internal disaster displacements of the local populace in Khar Balli village. Consequently, issues related to displacement, like health issues, improper education, poverty in society, lack of incompatible transport systems, loss of cultural spaces and identity etc., create a sense of placelessness in the community.

The study analyses geographical layers and anthropogenic factors specific to the selected area leading to dislocation; The data is collected through GIS Mapping, field visits, documentation of spaces and interviews to identify challenges experienced by native communities due to slow-onset events. Comparative analysis between Majuli island and Khar Balli village determines the damage caused by floods in the same context but in a different location, considering the common factors based on the effects of flooding and erosion.

It is observed that traditional and cultural patterns are slowly disappearing due to emerging and shifting land dynamics. Finally, Suggesting adaptive strategies and supportive mitigation measures that will benefit in responding to the populace in a similar context towards an integrated approach to addressing problems can improve community capacity building.

Keywords: *Floods, River Erosion, Disaster Internal Displacement, Mitigation, Dislocate.*

1. INTRODUCTION

The River Beki originates from the Mountain Reserve Forest at Mathanguri and joins the river Manas after traversing a length of about 85 km. It drains an area of about 26,243 Sq.km in the Barpeta district (India, 2023). The intense flooding and water logging effects in the shifting course of River Beki result in river erosion in Khar Balli village.

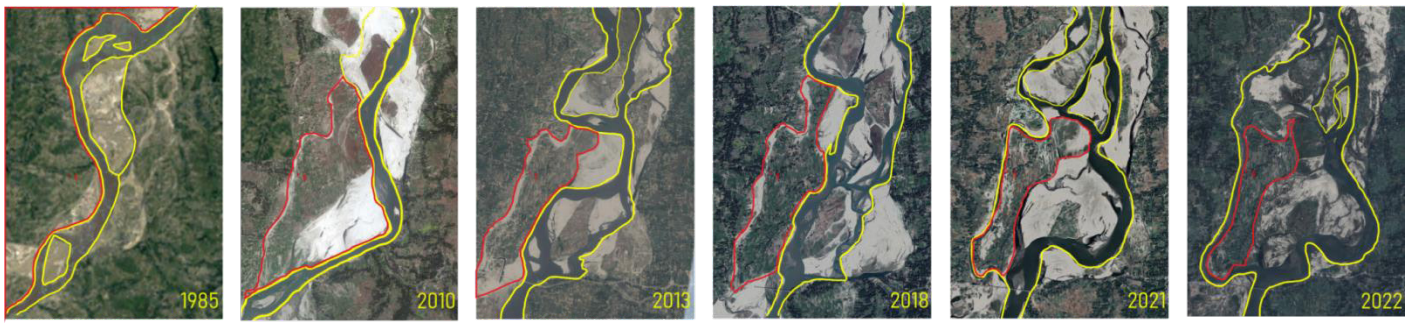


Figure 1: Evolution Map of Khar Balli Village along with the Shifting Course of River Beki

(*Source:* Google Earth)

The Khar Balli village in Assam falls under one of the most vulnerable regions exposed to extreme floods in India due to its hydro meteorological and topographical changes throughout time. The island is situated in the middle of the Beki River in the Barpeta District of Assam, with 533 houses in the village and a population of 3196 residing in a land area of 257.74 hectares (Directory, 2023).The livelihoods of communities become challenging when they lose landholdings, lack stability, and reinvest in restoring facilities while having no reliable source of income. The continuous efforts to find new territory and secure land create placelessness influencing the loss of the culture and practices of the population.

ISBN: 978-93-89934-68-7

2. METHODOLOGY

Flooding leads to river erosion, causing land depletion and impacting people's habitat in Khar Balli Village. The data is collected to comprehend the geographical layers that are unique to the region under consideration and the unsettlement of their routine alteration by studying the physical characteristics of selected locations through visits and qualitative interviews to gain an in-depth insight into resident's experiences with their psychological and physical living conditions in comparison with their neighborhood's social behavior, mapping the evolution through satellite imageries, documenting the existing implemented government policies. To understand the layers of internal disaster displacement through literature and case studies, mitigation attempts are viewed with a secondary examination of similar topography in Majuli Island, Assam.

3. LITERATURE REVIEW

Case 1: Khar Balli Village, Barpeta, Assam.

As per an elected member of Khar Balli Village, it was a big chunk of land with road connectivity to neighboring villages, community spaces to celebrate festivals and occasional gatherings; the government created flood shelters to set up relief camps and schools for education. People practiced farming, organized funfairs, and performed rituals in religious spaces. And today, there is none. People celebrate survival as the only thing that keeps us intact as a community. According to the evolution map (Figure 1), the river distinguished the village boundary in 2018, forming a new riverscape. The examination is based on the village's condition in the year 2022–2023.



River Erosion of Beki river | Structural damage during 2022 floods | Displaced Communities along with their livestock | Disaster Relief facilities

Figure 2: Impact of Floods and Erosion in Khar Balli Village

(*Source:* Author)

Structural Observation: The structures in the village have lower plinths with no structural stability allowing flood water to enter inside. Later when the situation is calm, refurbishing and re-construction of damaged structures have become part of a yearly practice for these villagers. The houses in the village are built with temporary materials with the fear of investment.

The village needs to provide sanitation facilities at the household level and community. There are fewer toilets observed with no proper disposal or covering. Women and young girls in the village experience lack of privacy and hygiene issues during floods when overlapped with the menstrual cycle (Figure 2).

Ecological Observation: Rapid-growing grass, climbers, and crops are cultivated to eat food and create shelters. Vegetation like Pat, Banana herbs and Bamboo is used for building infrastructure and preparing food and creating banana rafts during emergence to migrate during floods. Unfortunately, the roots of these plantations do not hold the soil, resulting in land depletion during river erosion.

Intangible-heritage cultural space.

Celebration of the festivals takes place on the periphery of the river without performing any rituals; boat racing is celebrated as the new sport as the island is surrounded by the river where fluctuant water remains constant than the topsoil.

Implementation by Government: An area of 112 sq.m is provided for each family with a minimum of 6 people (Figure 3). The built space is unable to fit ancillary activities and livestock. People have built rooms around the Pradhan Mantri Awas Yojna infrastructure as per their requirements. The PMAY structure is currently used as a living area where individual families separately build different structures, such as toilets & bathrooms, a kitchen, storage, a shed for cattle, and space for drying Jute threads and sticks (Figure 3).

ISBN: 978-93-89934-68-7



Figure 3: Documentation of Pradhan Mantri Awas Yojna

(*Source:* Author)

Lower Primary School

School is used for holding wedding ceremonies and panchayat meetings. It was the only gathering space in the village that vanished due to river erosion in 2022 (Figure 4).

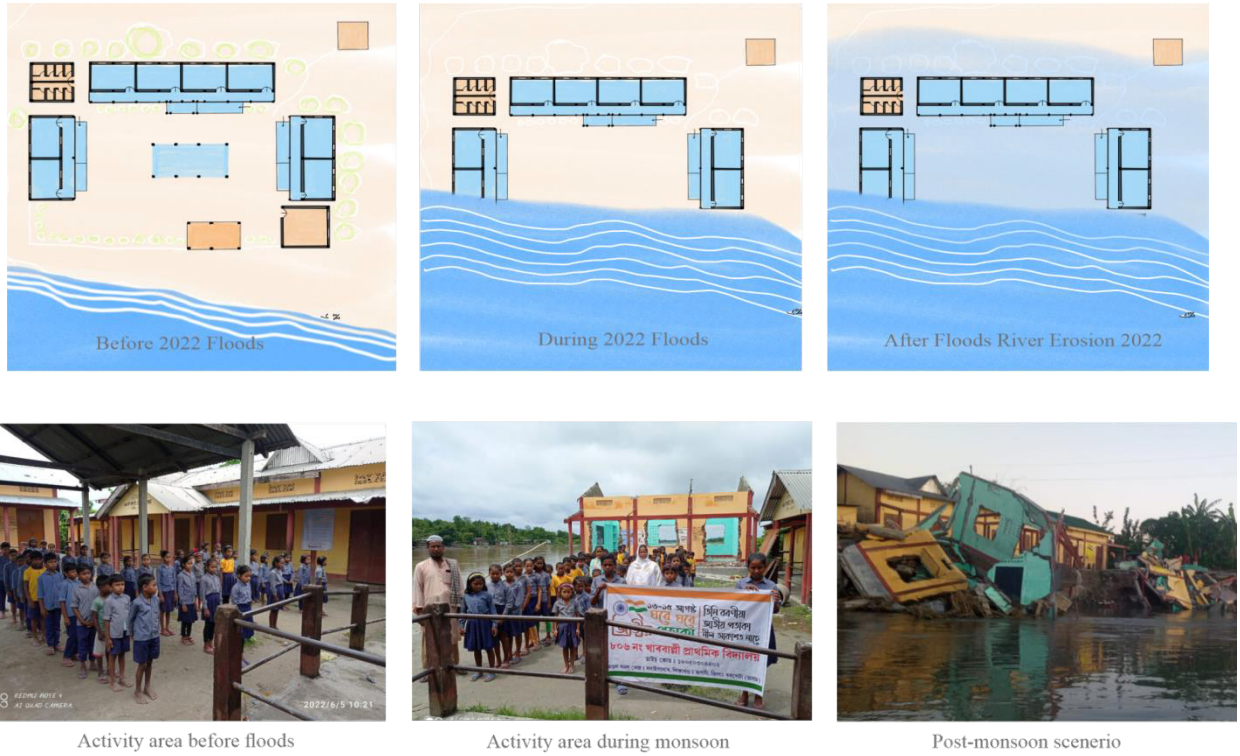


Figure 4: Changing Dynamics of Government Lower Primary School in the year 2022

(*Source:* Author)

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Case 2: Majuli Island, Assam

Considering the above observation, Majuli island is studied to understand the coping mechanisms adopted by the communities in a similar context.



Majuli island surrounded by river Bramhaputra | Chang house by Mising Community | Wattle and daub house on high plinth | Traditional and Culture of community in Majuli

Figure 5: Observations in Majuli Island

(*Source:* Author (Sridhar, 2018) (Sharma, 2014))

Structural Observation: Chang house, made by the Mising community, is a century-old architecture practice where structures are elevated on stilt and are made of natural materials and traditional building techniques to resist floods, high wind storms, and earthquakes (Figure 5).

Ecological Observations: At the individual level, personalities like Jadav Payeng, known as 'The Forest Man', have identified deep-rooted species to hold on to the soil to reduce the problem of river erosion. This results in people thinking a step forward in conserving land and culture, due to which placelessness is not experienced. People migrate for better opportunities to earn and invest in developing the homeland with communities around them without fear of placelessness.

Intangible-heritage cultural space:

The island comprises indigenous communities practicing mask painting and performing cultural programs and gatherings in Satras(Figure 5).

Implementation by Government: The government has proposed various schemes to preserve the island and its communities. Learning from the past and encouraging the population to build more flood-resistant structures as part of mitigation strategy.

Table 1: Comparative analysis of Kharballi Village with Salmora Village

After Effects of Flooding	*Khar Balli Village, Barpeta*	*Salmora Village, Majuli*	*Remark*
Internal displacement 0–25%,25–50%,50–100%	50–100%	0–25%	Land erosion or during extreme flood villagers are forced to migrate and search for new land.
Transport system gets affected 0–25%,25–50%,50–100%	50–100%	0–25%	Water transportation gets affected due to high river currents during floods and no road accessibility as the island is surrounded by water. The populace becomes dependent on air transportation.
Loss of Land 0–25%,25–50%,50–100%	25–50%	0–25%	Lack of land allocation for affected families who lost their land. This detaches the people from their communities while making space for new communities.
Structural damage 0–25%, 25 –50%, 50–100%	50–100%	25–50%	Lack of construction techniques rebuilding in houses post floods has become a seasonal practice, whereas Salmora village requires refurbishment only during extreme flood situations.

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After Effects of Flooding	*Khar Balli Village, Barpeta*	*Salmora Village, Majuli*	*Remark*
Loss of life and livestock 0–25%, 25 –50%, 50–100%	25–50%	0–25%	Less availability of food and water during floods and raised plinths provided by the government is insufficient to accommodate livestock.
Reduction of farming practices	Yes	No	Search for better work opportunities to sustain and rebuild homes post floods people try looking for better work opportunities to have rental land.
Facilities			
Community space in the village to celebrate cultural events	No	Yes	Lack of community space leads to loss of intangible cultural and traditional spaces and activities.
Education Facility in the village	No	Yes	Children suffer from improper education due to displacement.
Increase in Poverty 0–25%,25–50%,50–100%	25%–50%	0–25%	Loss of important documents, wealth and resources

From the above observations, people in Khar Balli village have lacked in coping mechanism for fear of uncertainty in the past few years, have started shaping the lifestyle of the people leading to loss of identity, loss of culture and traditions along with limitations on performing rituals, loss of community, health and educational centers forces people to displace and find better job opportunities, healthcare centers and educational facilities which head them to forced displacement.

5. RESULTS AND DISCUSSION

It is observed that traditional and cultural patterns are slowly disappearing due to emerging and shifting land dynamics. Moreover, there is a critical point at which populations migrate voluntarily and constructively before being forcefully relocated. The community is at the risk of gradually growing hungry as their coping methods become exhausted, leading to being evacuated and experiencing homelessness. Health relief facilities or capacity-building programs should be made available to the populace as part of preparedness and mitigation measures. Grass species and rapid growing choice of climbers and plantations do not hold onto the soil directing to the rapid flow of river erosion. Workshops creating awareness of land types and plant species to be cultivated to reduce the speed of erosion in the specific area must be carried out.

6. CONCLUSION

Migration and displacement should be considered in policies and programs. As there is no one size fits all approach, it should be flexible according to communities. The number of displaced people must be counted in a proper census review. Area provision under any scheme must be considered after taking the survey and studying community lifestyle. Health camps and workshops should be organized to create awareness about hygiene and the importance of proper sanitation during vulnerable situations. As a mitigating technique, the government should distribute seeds to encourage planting these appropriate species in the proper locations. An integrated approach towards addressing problems can improve capacity building within the communities. Creating employment possibilities that meet shifting market demands while empowering communities.

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Natural Light Enhancing the Quality of Space in Modern Churches

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ABSTRACT: Looking at the current situation, progress is driving people to rely on mechanical lighting, while overlooking the importance of natural light in making a structure livable and user-friendly. Lighting is a sign of the divine. As previously said, special natural lighting is an intriguing topic to argue as an issue in architectural design, particularly in the Christian church. This is because, in the past, churches faced west, with the altar facing east at the far end of the construction, with the purpose of enabling natural light to shine on the altar, especially in the morning. The research methodology approach leads to an exploration of the analysis of the factor of natural light and how it enhances the quality of space based on an examination of three structures built by Le Corbusier, Charles Correa, and Tadao Ando. The work of these architects focuses on experimenting with light quality inside a built environment and gives a greater knowledge of how it was done. We'll look at Modern Churches in this case study. This research examines the features of natural light that may be seen within late-twentieth-century Modern Churches. Throughout the history of architecture, natural light has been used in a variety of ways to achieve the desired effect inside a built form. New materials have been used in creative ways to create a dynamic dance of light and shadow, while playing with colour, texture, and the reflecting properties of the surface. Reinforced concrete is one such material that has provided a new degree of adaptability when it comes to dealing with the overall shape, design, and placement of the various apertures while examining the impact of natural light within a structure. The outcomes of this study will add to the philosophy of church architecture and offer architects a better knowledge of how natural light affects church design.

Keywords: *Natural Lighting, Altar, Meaning of Lighting, Light Filter, Sacredness.*

1. INTRODUCTION

According to Christian beliefs, lighting fixtures affect holiness in church structures. Light is stated to play a symbolic position that is carefully tied to spiritual human thoughts of sacredness. Because it's far extensively held that mild is an illustration of the mildness of God's love that saves human beings from darkness and evil strength, God is likewise called mild. As a result, it's far acknowledged that the sacred area is constantly prominent through the presence of mild.

The sun's natural light travels 93 million kilometres to reach us. It exposes the colour in our environment by including all of the hues of the spectrum. It also highlights items' sculptural features, such as arches and sculptures.

The observation's end is a comparative evaluation of diverse contemporary-day church buildings via elements like the orientation of church buildings consistent with solar direction diagrams, version of mild coming in, observed through the shadow patterns, intensity, and comparison and colour of the mild. The orientation of mild produces a sanctified impression. The lighting fixtures at the altar are the church shape's climax, and the path of the mild at the altar as a climax is the expression of stillness and mildness.

2. LITERATURE REVIEW

Natural lighting for the church that has the potential to transmit sanctity should be analysed utilising the approach and opinions of holiness specialists as well as designers who have worked on holy structures, notably the church. Natural light was strategically placed in Christian churches to emphasise a range of religious ideas. In recent decades, the solutions commonly seen in Latin and Byzantine cathedrals have been studied. However, civilizations that arose at the crossroads of the Latin, Greek, and Slavic cultural domains, notably in the Balkan Peninsula and the Carpathian Mountains, created their formulae for using natural light in church structures. These solutions were based on antiquity-inherited know-how and influenced by local climatic, economic, and theological factors. Following is the table showing how natural light is used in various styles of churches using several elements.

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Le Corbusier is one of the most well-known architects who has used natural lighting to improve a building's expressive dimension. His designs were prominent examples of the most innovative work done with natural light inside a built setting at the time. Two famous architects, Louis I. Kahn and subsequently Tadao Ando, created a definite concept concerning natural light. Their emphasis was on increasing the quality of interior spaces through the utilisation of natural light, as seen by the majority of the information provided on their projects.

Lighting, particularly in the altar area, may produce a hallowed feeling. Meanwhile, the sitting area is frequently darker than the altar area. The impact of lighting is vital to people since the light entering the church may move humans closer to God while also promoting holy values. There are colorful factors to consider when it comes to natural lighting, such as the optimum structure exposure is North-South, while East-West exposure should be avoided. Four elements influence the luminous impact of all light sources.

Following is the example to explain how these factors are analyzed:

3. CATHEDRAL CHURCH IN JAKARTA

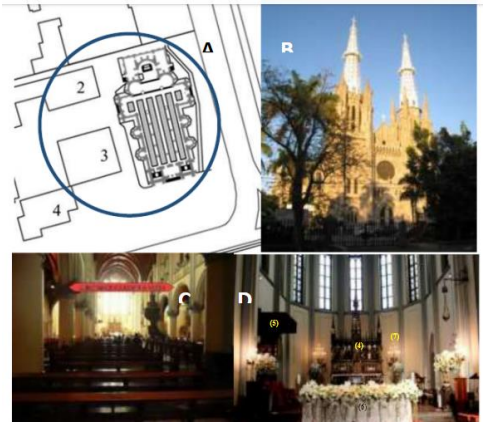


Figure 1: Cathedral Church

A) Site plan of Cathedral, B) Exterior of Cathedral, C) Interior of Cathedral with Light in Altar, D) Natural light in Altar

Orientation of the light filter on the altar and sitting room as an audio-visual buffer

The light filter behind the altar and the audio-visual buffer in the sitting area are shown in Figure 1C, resulting in a reflection of the light's direction on a very dominant altar. As a result, the Cathedral Church design uses light direction reflection as a filter and audio-visual buffer to great effect.

Natural lighting as the centre of divine power is at the church altar

Because the altar is lit by a light, it is regarded in figure 1D as a reflection of the centre of divine power. Because the altar is lit by a light, it is the climax of the direction of light.

Creation of a sacred atmosphere that is silent and light

Because the ratio of natural lighting as a light filter is approximately 30% of the audio-visual buffer, allowing for a silent and light atmosphere to be felt, the sacred atmosphere can be emitted based on the orientation of light analysis as a filter and audio-visual buffer (Figure 1C) and natural lighting analysis on the Altar as Divine power (Figure 1D).

- Following the principles of Christianity, lighting has an impact on holiness in church structures.
- Light is said to have a symbolic significance that is linked to religious human conceptions of holiness.
- Light is often thought to be a sign of God's love, which protects mankind from darkness and evil power, hence God is also known as light.
- God, for example, is also known as the Father of Light in Christianity. As a result, it's clear that the sacred space is always characterized by the presence of light.

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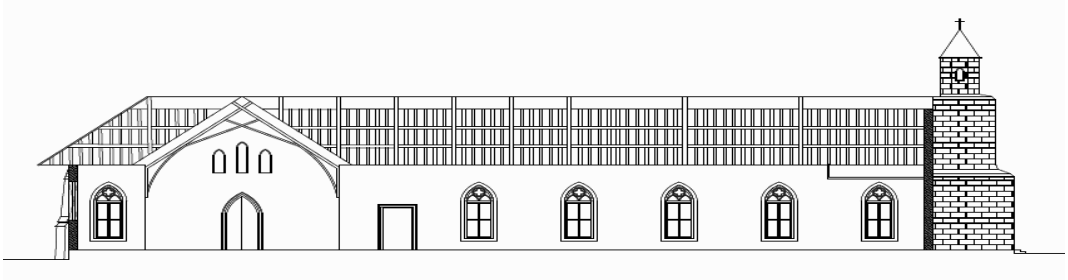


Figure 2: Section of St. Xaviers Church, Pune

Look at Figure 2 and Figure 3, it is noticed that the opening of the windows is below level so there is direct sunlight in the morning lighting the whole church. But, it is a kind of disturbance for the devotees, because direct light is falling on them while they are praying. Also, the altar space is not much highlighted. Whereas, on the other hand, if we look at the example of St. Paul Church in Pune, the window opening is above level therefore no direct light on the devotees and the altar space is enhanced due to the light coming from stained glass above it. (Figure 4)

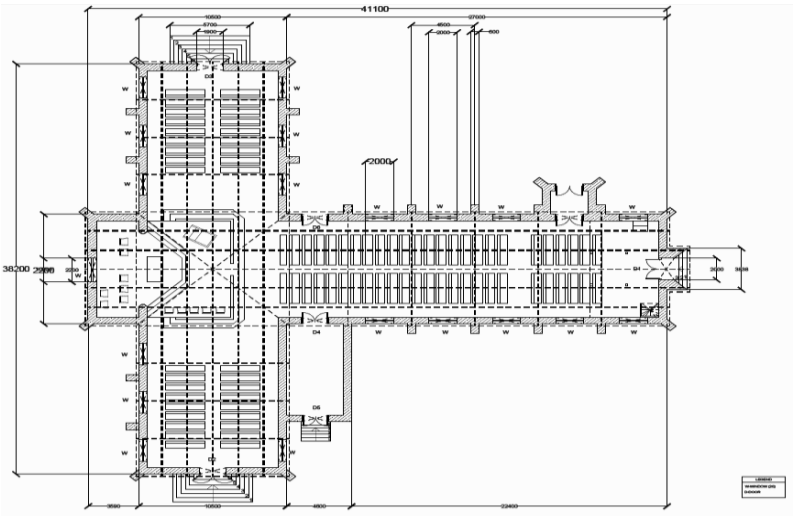


Figure 3: Plan of St. Xaviers Church, Pune



Figure 4: Interior View of St. Paul Church, Pune

4. RESEARCH METHODS

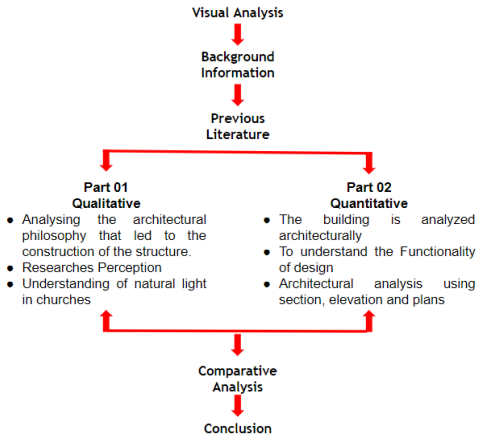


Figure 5: Flowchart Explaining the Research Method

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The research methodology approach leads to an exploration of analysis of the factor of natural light and how it enhances the quality of space based on an examination of three structures built by Le Corbusier, Charles Correa, and Tadao Ando. The work of these architects focuses on experimenting with light quality inside a built environment and gives a greater knowledge of how it was done. We'll look at Modern Churches in this case study. Fundamental guidelines must be set that take into account all of the numerous aspects that influence the built environment's design in order to properly grasp and examine the impact of natural light on the overall perception of a site. The visual aspect of the study will need the usage of photos from various projects that might serve as a helpful source of data. The analytical approach is based on visual perception concepts that are strongly related to an emotional reaction, which is a deciding element in the overall impressions of a place in terms of exposing character and atmosphere. The emphasis is not on obtaining quantitative brightness values, but on understanding the qualities of natural light that contribute to the humanization of architecture. It differs from traditional techniques of analysis that are based on the observer's fixed location, which is not how a place is viewed in reality.

The research questions are as follows:

- What are the properties of natural light that influence how a space is perceived?
- How does natural light appear inside the church when it comes from stained glass windows?
- Does the different seating arrangement configuration affect the upcoming light?

In conclusion, the research will end with a comparison between different churches based on the following point:

- Orientation of the structure according to sun
- What are various shadow patterns?
- Variation of light coming in.
- Contrast and color of light.
- Intensity of light.

5. ANALYSIS, RESULTS & DISCUSSION

The case study obtained in this study (a) Chapel of Notre Dame du Haut Ronchamp by Le Corbusier, (b) Church of the Light by Tadao Ando, (c) Portuguese Church by Charles Correa

5.1 Chapel of Notre Dame Du Haut Ronchamp by Le Corbusier



Figure 6: Exterior View of Chapel

Le Corbusier began designing the Chapel of Notre Dame du Haut in 1950, and the project was completed in 1955. It is the first of Le Corbusier's only two church constructions, the other being the Monastery of La Tourette. Le Corbusier used curved reinforced concrete surfaces to create a striking and organic shape in the Chapel at Ronchamp (see Figure 6). Visitors who view the play of light and shadow on diverse surfaces have had poetic ideas about the building from its conception.

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In the case of the Chapel of Notre Dame du Haut, the chosen spatial envelope is the major area of worship used within the structure (see Figure 7). The use of curved surfaces creates a dish with an inactive form for the building envelope, which is made possible by the elasticity provided by concrete as a construction material. The spatial envelope is an enclosed physical area with solid walls and small holes that permit a controlled amount of light, giving the interior limitations the illusion of being confined and static. This spatial envelope acts as a full enclosure, separating all major borders from their surroundings. These are detailed below.

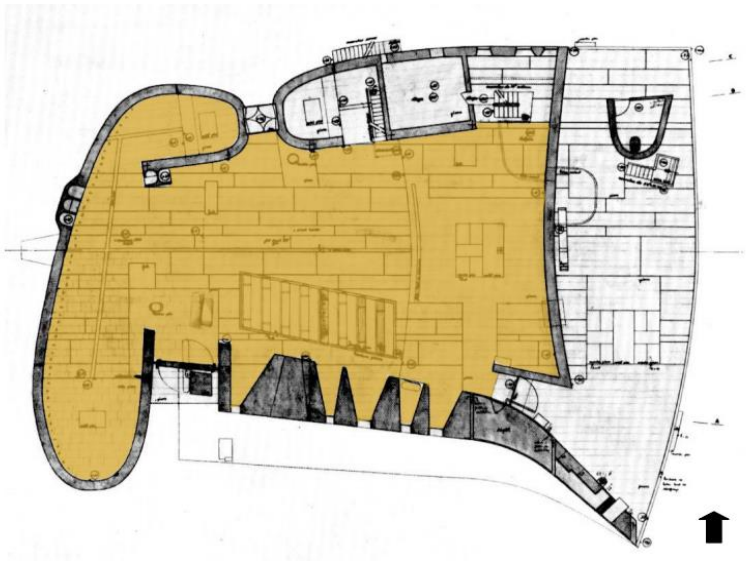


Figure 7: Plan of Chapel of Notre Dame Du Haut

1. ***South Wall:*** In plan, this wall bends in from the exterior (see Figure 4) for a convex form. Vertical triangular frames embedded in the thickness of the south wall become evident only at the top, where it supports the roof shell. The south side features one vertical tower along the west end, which allows light to enter via the clerestory aperture (see Figure 8). The south wall of the east side includes several modest broad splayed holes that allow a uniform dispersion of light to the inside (see Figure 9). There is also a 10-centimetre gap between the walls and the roof, allowing washed light to stream through the ceiling. The vertical tower is separated from the east end of the wall by the main sculptural entrance. The cast concrete wall has a rough white surface (see Figure 8).
2. ***East Wall:*** The east wall leans inwards from the exterior. The altar is in the centre, with a crucifix beside it. Behind the altar, there are several little apertures. The major source of light is a window that opens on the top of the altar door, which is positioned towards the south end of the wall.



Figure 8: Interior View of Chapel Looking Towards the South Entrance



Figure 9: View of the South Window Wall

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3. ***North Wall:*** From the inside, the profile of this wall bulges out (concave shape, see Figure 10). It has two vertical towers that face each other and let light in through the clerestory apertures. The towers are constructed of stone masonry and are topped with cement domes**.**



Figure 10: Close-up View of the Area Behind the Altar from the South

4. ***West Wall:*** This wall likewise slopes outward from the interior (concave form, see Figure 7) and contains a confessional in the bulge that protrudes from the wall's bulk.



Figure 11: View Towards the East Depicting the Slope Gradient in the Floor

4. ***Floor:*** The altar is set on a slanted floor that slopes downhill. The building material is cement paved and poured in place between the battens, resulting in a tiled pattern on the floor, the design of which is governed by the modular system (see Figure 11).
5. ***Roof:*** The roof is made up of two concrete membranes that are 6 cm thick and separated by 2.26 meters. The notion of a crab shell led Corbusier to create the final design for the roof.
6. ***Ceiling:*** The roof is made up of two concrete membranes that are 6 cm thick and separated by 2.26 m. The final shape of the roof was inspired by a crab's shell, which also influenced Corbusier's design. The sources of light look even more obvious in the dark interiors due to the strong visual contrast provided by the openings, notably on the south and east sides (see Figure 12).

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Figure 12: Detail of the Openings on the South Wall

The spatial envelope and all apertures are proportioned according to a modular that is based on the golden section, as is the case with the roof's lowest point, which is 4.52 m high. The chapel's interior is a mix of bright and dark colours.

White is the dominant colour on vertical surfaces with a rough texture. As a result, the space is bathed in natural light and provides a crisp, clear backdrop against which to view the dance of light and shadow projected in grey tones.



Figure 13: General View of Interior Looking East



Figure 14: Interior: Northwest Side Altar

The chapel's exterior features a well-designed promenade that directs visitors' movements. The steep approach to the mountaintop provides intriguing views that show the structure through the greenery, leaving the visitor awestruck by the chapel's sculptural quality on the outside.



Figure 15: View Towards the South Wall

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5.2 Church of the Light by Tadao Ando

Tadao Ando's Church of Light (1989), which won the Pritzker Prize in 1995, was one of the first projects that brought him international fame. The minimalist construction is composed of simple architectural features with few openings, creating a light-filled environment. The interiors are dark and ethereal, with light passing through numerous openings producing a dramatic event in and of itself. The amount of light that comes through the cruciform aperture on the south wall (see Figure 16) makes the place sacred and strong.

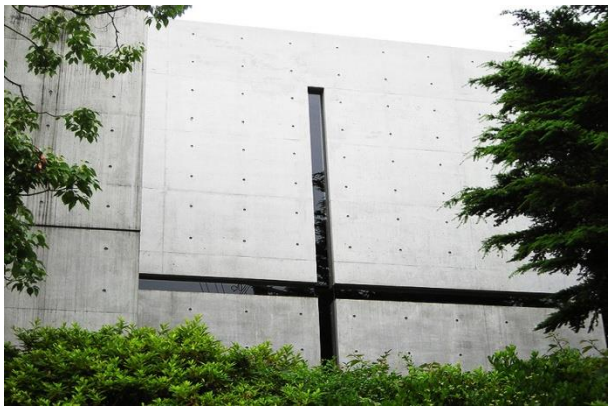


Figure 16: Exterior View of the Church of the Light Showing the Cross Cut in the Concrete Wall

The main chapel at the Church of the Light was chosen as the spatial envelope for the final study. In layout, it is a rectangular form pierced by a 15-degree inclined wall through the west wall (see Figure 17). It's an example of Confining and Static Enclosed Space, in which multiple surfaces and boundary edges close in to form a full enclosure.

The chapel's various border boundaries are aligned in the four cardinal directions. The spatial enclosure is defined by the following main boundaries:

1. ***South wall:*** A slit hole (with fixed float glass) in the shape of a cross is located right beyond the altar on the exposed concrete wall. As the cross is bathed in dazzling white light, the sun's direct beams cast a shadow across the whole wall.
2. The east wall is a basic exposed concrete wall with no openings to the outside. At a height of 7 m, there is a horizontal groove line that goes flush down the lower arm of the cross on the south wall.

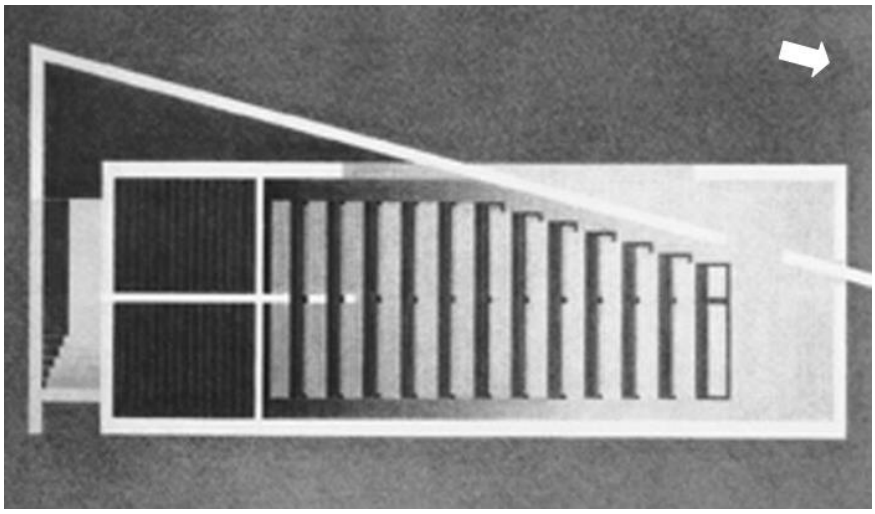


Figure 17: Plan-Church of the Light

3. The exposed concrete wall on the north side is cut through by the splay wall on the west side. The two walls meet in such a way that they do not appear to touch, creating two small slit holes for light that run the whole height of the north wall and aid in leading the visitor to the chapel's entrance.

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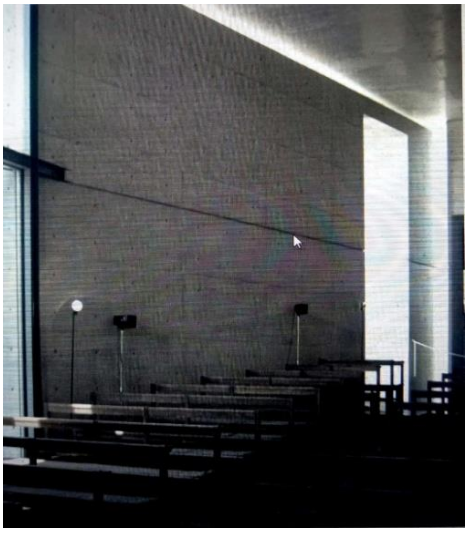


Figure 18: The Entry into the Chapel from the Rectangular Opening in the West Wall

4. ***West Wall:*** The chapel's west side is made up of two intersecting exposed concrete walls. The splay wall on the west side cuts across the rectangular area, forming an L-shaped entry sequence on the chapel's northwest side. The apertures on the west side feature a substantial full-height glass opening cut into the splay wall.

The effect of light passing through the little openings appears stronger since the room is dark. The material is largely grey-coloured exposed concrete, with the exception of the dark brown hardwood flooring. As light is reflected by the exposed concrete walls with a mirror-like shine, the space appears to grow along the vertical axis due to the dark-coloured material on the floor. The ceiling is also 5.9 metres high, which heightens the observer's awareness of vertical stimuli.



Figure 19: The Linear Perspective Towards the South

The room's major light source is the south wall's cross-shaped entryway. The east and west walls, the floor, and the ceiling are all illuminated by the light from this aperture. On all four surfaces, the light and shadow patterns are similar, adding to the space's order and symmetry. Light enters the chapel along the principal north-south axis, preserving the integrity of the spatial envelope.

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Figure 20: Cross-Shaped Slit Opening in the South Wall

There are three key zones of transition in the chapel's spatial arrangement. The first is the L-shaped court, which has dark shadows that stand out against the outside. various environments

5.3 Portuguese Church, Mumbai by Charles Correa



Figure 21: Exterior view of Portuguese Church

The Church of Our Lady of Salvation, also known as Portuguese Church, is one of Mumbai's (previously Bombay's) oldest churches. It was established in 1596 by the Portuguese Franciscans as Nossa Senhora de Salvaço and is now located in Dadar. The current edifice was built between 1974 and 1977 and was designed by renowned Indian architect Charles Correa.

The notion is one of peaceful introspection and meditation from an architectural standpoint. The baptistery's vast covered area, the main congregational space, the sacristy, and the oratory are all linked, thus the church's covered seating and standing capacity is well over a thousand people. All of these places lead to the gardens and courtyard, which serve as overflow rooms for even bigger crowds. The courtyard will house the Grottos, Stations of the Cross, and several other shrines.

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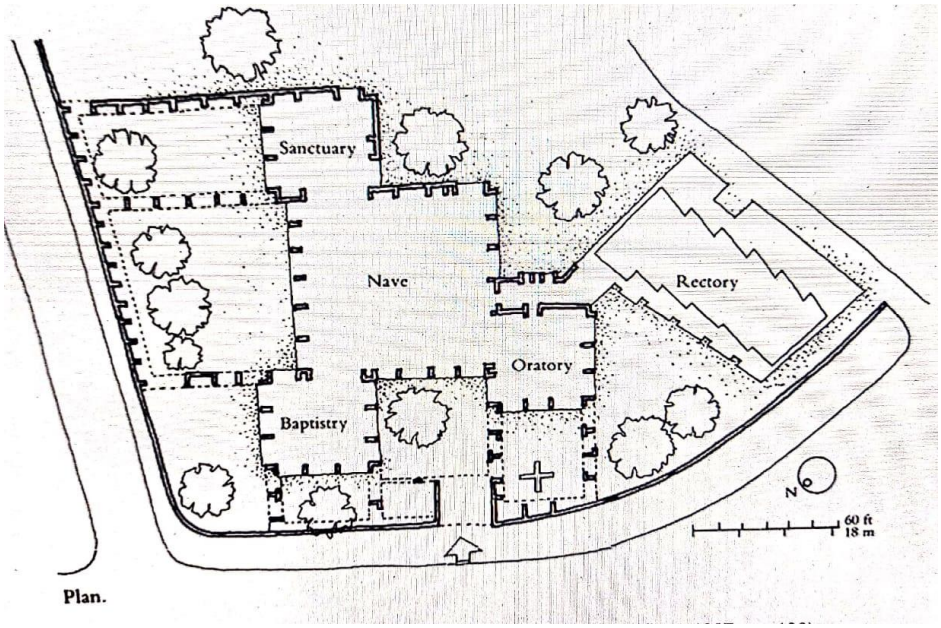


Figure 22: Plan of Portuguese Church

Unlike early Christian buildings, the overall trend in church architecture was for all of the features—confessional, baptismal font, pulpit, main altar, and side altars—to be grouped together in one unified area. The new church's design was based on traditional church-building ideas. From the street outside to the main congregational area, the entry courtyard acted as a transition. The confessional and baptismal font is placed in the baptistery on the left side of the courtyard. The major congregational space is centred on the pulpit and lectern, the region of illumination and education. The sanctuary, the region of sacrifice and meeting with God, lies beyond this congregational space.

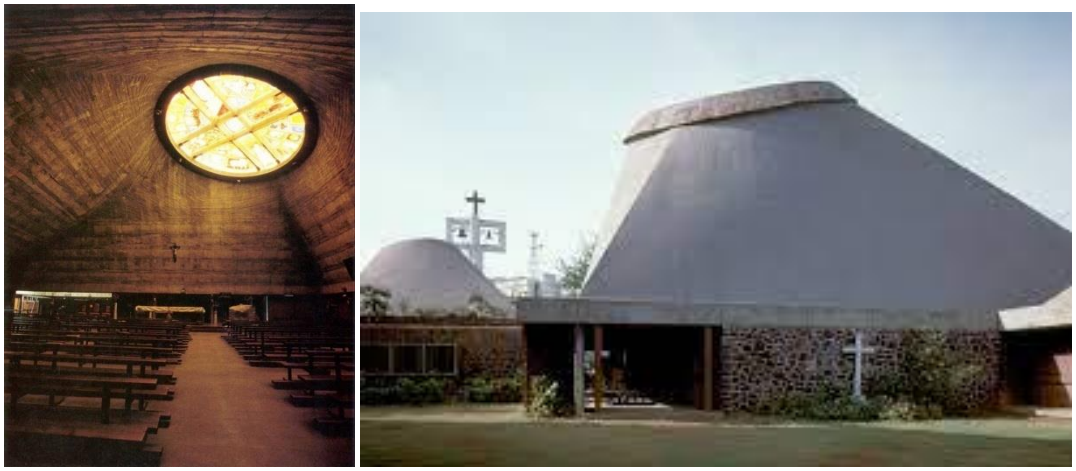


Figure 23: Internal Light Quality of the Church and Roof Profile

Correa also defied precedent by commissioning MF Husain to paint a fresco on glass for the central dome. It was his notion to externalise religion's "social component." For a stained-glass effect, Husain cut the glass into numerous parts and painted the tale of the five loaves and two fish, as well as Christ's death and resurrection. It's beautiful to see the light flowing through the picture on a sunny day.

6. INFERENCE/CONCLUSION

This research examines the features of natural light that may be seen within late-twentieth-century Modern Churches. Throughout the history of architecture, natural light has been used in a variety of ways to achieve the desired effect inside a

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built form. New materials have been used in creative ways to create a dynamic dance of light and shadow, while playing with colour, texture, and the reflecting properties of the surface. Reinforced concrete is one such material that has provided a new degree of adaptability when it comes to dealing with the overall shape, design, and placement of the various apertures while examining the impact of natural light within a structure. The research pursued three key aims in carrying out this examination.

Because light is not composed of substance, it is not commonly thought of as one of the materials utilised in church design (such as marble, slate, porcelain, wood, paint, and so on). The findings show that the three projects utilise similar design approaches to create some of the same common light effects and that the light characteristics discussed with the overall sense of space do not differ considerably across them. a) Orientation, b) Intensity, d) Shadow, e) Contrast, f) Color, and g) Variation are the properties of natural light (see Tables 1 to 7).

6.1 Orientation

Table 2: Comparison for Orientation

Chapel of Notre Dame du Haut Ronchamp by Le Corbusier	*Portuguese Church by Charles Correa*	*Church of the Light by Tadao Ando*
An east-west axis in the chapel connects the confessional in the west wall with the altar in front of the east wall. .	Located in the south end of the site with its own independent entrains.	The altar is located in front of the south wall of the church, which is oriented north-south. The light openings are on the south, west, and north walls, with no openings to the external on the east wall.

6.2 Intensity

Table 3: Comparison for Intensity

Chapel of Notre Dame du Haut Ronchamp by Le Corbusier	***Portuguese Church by Charles Correa***	***Church of the Light by Tadao Ando***
`The chapel's small light apertures assist to hide the inside area from any distracting outside sights. The quantity of penetration is adequate to illuminate the periphery of the spatial envelope while leaving the inside dark.	The church is made up of a network of interconnected courtyards and covered rooms that allow any occasion to be held indoors or outdoors depending on the weather. Intensity of the many light sources is a result of the chapel's dark innards.	Intensity of the many light sources is a result of the chapel's dark innards. The intensity with which light penetrates the chapel generates a strong emphasis that aids in emphasising the space's hallowed nature.

6.3 Shadow

Table 4: Comparison for Shadow

Chapel of Notre Dame du Haut Ronchamp by Le Corbusier	*Portuguese Church by Charles Correa*	*Church of the Light by Tadao Ando*
There are no harsh shadows within the chapel. With each successive reflection, the rough grainy texture of the wall surfaces diffuses and scatters the light.	Within the chapel, there are no harsh shadows. The rough grainy texture of the wall surfaces diffuses and scatters the light with each consecutive reflection.	The floor, ceiling, and east and west walls of the chapel show distinct patterns of shadows created by light coming through the cross-shaped hole on the south wall.

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6.4 Contrast

Table 5: Comparison for Contrast

Chapel of Notre Dame du Haut Ronchamp by Le Corbusier	*Portuguese Church by Charles Correa*	*Church of the Light by Tadao Ando*
There is a lot of contrast since the foreground and backdrop brightness ratios are so different. This is because the apertures are narrow, resulting in shallow surface penetration, leaving the interiors dark and devoid of natural light.	The richness of the altar and the fresco on glass contrasts with the simplicity of the concrete structure and pavement, as well as the plain woodwork furnishings. And also light coming forms given skylight roof enhances the quality inside the church.	Inside the chapel, the contrast between the brightness ratio of the apertures and the exposed concrete surfaces provides a significant visual contrast. In the intense strong light, the geometry of the holes is accentuated, providing a greater visual focus against the grey-coloured surfaces of exposed concrete.

6.5 Colour

Table 6: Comparison for Colour

Chapel of Notre Dame du Haut Ronchamp by Le Corbusier	*Portuguese Church by Charles Correa*	*Church of the Light by Tadao Ando*
The interiors of the chapel are painted in white lime, providing a clean, pure, and neutral backdrop against which to explore the effects of light streaming through clear, coloured, and painted glass in the many apertures on the south wall.	This section depicts the extrovert and sociable features of religion in the architect's vision.	The primary surface boundaries are defined by the use of exposed concrete. When projected with extended shadows, the grey tone of the surfaces seems dark.

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APPENDIX

Questionnaire

- What are the properties of natural light that influence how a space is perceived?
- How does natural light appear inside the church when it comes from stained glass windows?
- Does the different seating arrangement configuration affect the upcoming light?

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Examining Contemporary Issues in Architectural Identity in Heritage Precincts: Case of Ghanta Ghar, Jodhpur

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ABSTRACT: Architecture is a reflection of historical, social and economical incidences. It is a continuous process from past to future. Heritage buildings are an architectural identity that creates harmony between the current context and social history. Therefore, there is a need to sync the heritage spaces and current functions. The paper aims to recognize the issues of a heritage precinct in a modern context. A case study research on Ghanta Ghar has been done. The stakeholders like shopkeepers and visitors are identified. The inquisitive inquiry is done to obtain qualitative and quantitative data through questionnaires, surveys and interviews. The field visit is done for on-site observations and photographic documentation. This study decodes the factors defining an architectural identity. It further analyzes the issues like poor light & ventilation, non-usability of spaces, maintenance issues etc. due to erratic development in a heritage precinct of Ghanta Ghar. The study concludes by mentioning the severity of issues and strongly recommends a sensitive approach for catering current context with heritage and keeping architectural identity alive.

Keywords: *Heritage Precinct, Revitalization, Jodhpur, Ghanta Ghar, an Image of the Structure, Architectural Identity, Identity Issues.*

1. INTRODUCTION

Heritage and architecture may be two separate terms, but they are interrelated in some way. "Heritage" is a broad notion that encompasses culture, historic locations, sites, landscapes, and architecture. Architecture is a visible depiction of aesthetic, artistic, and cultural expression that has outstanding qualities of beautifying society (Verma & Gupta, 2017). Monuments surrounding the structure play a vital role in preserving the essence of the location (Mohanty & Chani, 2015). It is an essential part that keeps us connected to our roots and our culture.

The ideas, consequences, and functions that emerge from the cultural aspects contained in a piece of building form its architectural identity (Torabi & Brahman, 2013). Preserving a location's identity and unique traits necessitates a thorough awareness of the natural systems in existence. However, because of the rapid modernisation and significant economic, social, and cultural changes that occurred in the region, the vernacular architecture has been subjected to extreme degradation and destruction (Salman, 2019). It not only causes instability, but it also shatters people's connections to their past, culture, and tradition. It has been noticed that urbanisation always focuses on growth, leaving the tangible and intangible features of the built environment behind.

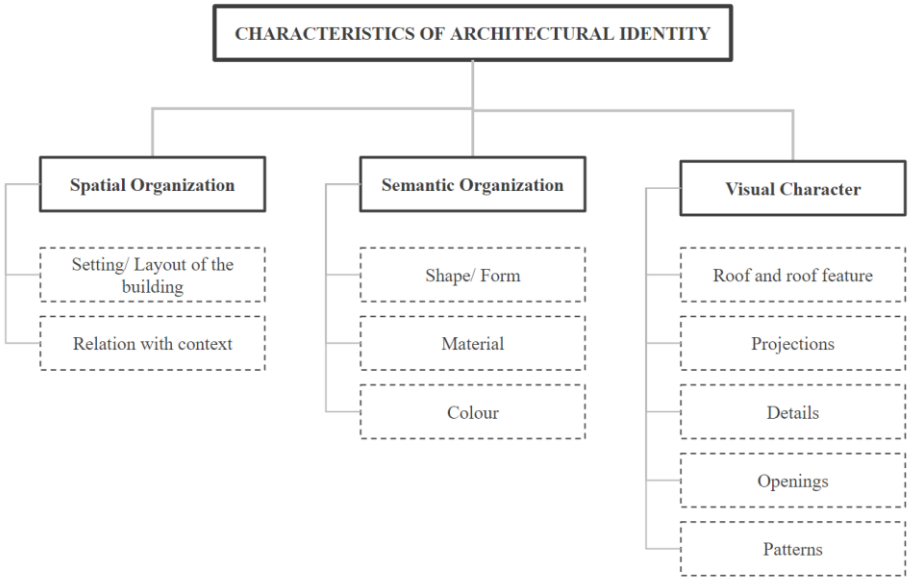
Through the case study of Ghanta Ghar, Jodhpur, various factors involved in establishing the architectural identity of a place are discussed. Furthermore, the identification of contemporary issues leading to the loss of architectural identity in heritage precincts is done. A detailed analysis of the types of stakeholders involved and what kind of perception they have of Ghanta Ghar is also done.

2. FACTORS ESTABLISHING THE ARCHITECTURAL IDENTITY

Identity is a feature that differentiates and aids in the identification of one element from another. Lynch discusses two important identity functions. The first is a sensation of recognition. In other words, identification provides us with judgement and aids us in understanding and predicting our surroundings. The second function is the emotional function of environment identification (Torabi & Brahman, 2013).

There are many features which help in creating an architectural identity. Flowchart 1 represents the characteristics involved in the process.

ISBN: 978-93-89934-68-7



Flowchart 1: Characteristics of Architectural Identity

(*Source:* Author)

3. LITERATURE REVIEW

Architectural identity as defined by Bhatiyar & Yaldiz (2021) is more than just a physical notion with natural and manmade aspects. It also includes various social, economic, and cultural components. Furthermore, Roslan & Said (2018) explain that each architectural style of a heritage building has its own substance that must be conserved. It bears the building's characteristics. They need to be protected for as long as possible as they depict our culture, create an image of the place, and are different from modern buildings. According to Roslan & Said (2018), a well-maintained heritage building improves the quality of life for everyone in the community, attracts investment (tourism), contributes to the generation, and serves as a source of local pride and feeling of a place.

If only identity had a fixed status then, architecture throughout our history would have been consistent. However, architectural identity is similar to human identity as it is fixed as well as dynamic. There are several factors which help in creating an architectural identity, which can be broadly classified as spatial organization, semantic organization, and visual character.

However, Bhatiyar & Yaldiz (2021) explains that a common issue in our period is that cities and architectural structures experience new urban and architectural restoration processes. It causes them to lose their genuine identities as a result of frequent modifications and repairs. As a result, cities and architectural buildings lose their readability throughout the restoration time, leaving city people with issues linked to perception or recall of these cities and buildings. The loss of identity has become a serious problem, which needs to be focused on

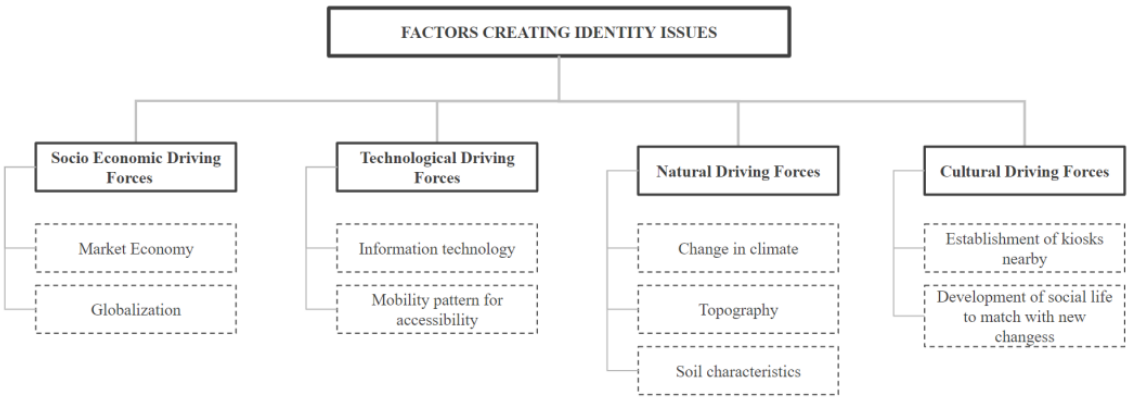
3.1 Identity Issues and Factors Creating Identity Issues

The identities of cities and urban architectural buildings vary throughout time as a result of historical, cultural, physical, social, and stylistic variables. However, cities' incapacity to preserve their cultural assets causes economic and socio-cultural deterioration, causing them to lose their identity. It becomes more difficult to preserve urban and spatial identities as cities grow in size. As a result, cities lose their distinct values and cultural identities and eventually resemble one another (Bhatiyar & Yaldiz, 2021). Throughout history, cities arise and evolve. They are continually changing, developing, and transforming. The most visible manifestation of this transition is architectural heritage.

The major factors creating identity issues are shown in Flowchart 2.

ISBN: 978-93-89934-68-7

Flowchart 2: Factors Creating Identity Issues



(*Source:* Author & Kaymaz (2013)))

3.2 Loss of Architectural Identity Due to Contemporary Issues

Place has a tremendous impact on human well-being and behaviour, in addition to being vital in forming and sustaining self-identity. A person and a location have a two-way relationship. The factors, as mentioned in Flowchart 2, make the heritage precincts struggle for their identity and existence in one way or the other. It not only affects the built environment but also has a psychological impact on the people associated with it. The identity issues faced by heritage precincts in this modern context are:

1. Insufficient light and ventilation
2. Poor visual quality
3. Damping usability
4. Structural instability
5. Irregular/No maintenance

4. MATERIAL AND METHODOLOGY

The aim of the research is to recognize the identity issues faced by Ghanta Ghar, Jodhpur in the modern context. Hence, case study research is done for the paper. Detailed documentation and study of the Ghanta Ghar precinct are done. Direct observation, photography, surveys and random visitor interviews were the tools used for data collection. Primary data was collected through semi-structured questionnaires. This data was collected from three types of stakeholders involved - Shop Owners, Kiosk Owners and Visitors. A total of 50 samples were collected, of which 11 samples were from Shop Owners, 10 samples were from Kiosk Owners and 29 samples were from Visitors. The questionnaire was in two parts: Part I: Respondent's Profile and their perception of the heritage and architectural identity of Sardar Market; and Part II: Their view on what causes identity issues and how can be solved. The observation technique helped in understanding the respondent's feedback on the study area. Secondary data was collected through articles, reports and studies available.

To understand more about identity issues, Descriptive research inferences from previous research papers about the religious route of Haridwar and the old Havelis of Saharanpur have been opted. The scope of the study is limited to Ghanta Ghar, Jodhpur.

5. ANALYSIS AND DISCUSSIONS

The prime focus or the site of interest is located in Jodhpur, Rajasthan. Jodhpur is a historical town that entices visitors to discover its rich culture and traditions. Adding to its allure, the clock tower is an important part of Jodhpur's history, containing some fascinating facts and legends. Jodhpur's Sadar market is a well-known retail district. Because of the Sadar Market, Ghanta Ghar, popularly known as the 'Clock Tower,' is the busiest area in Jodhpur. Ghanta Ghar/ The clock tower is undoubtedly a landmark of Jodhpur. However, the fabric of Sardar Market is woven not only by it but some other factors as shown in Figure 1.

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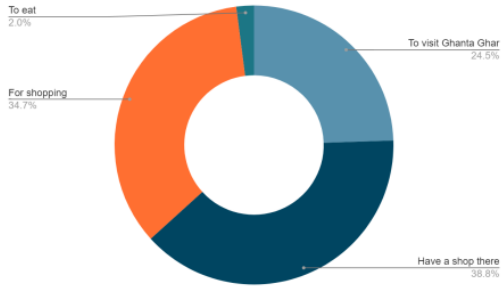


Figure 1: Purpose of Visiting Sardar Market by Different Stakeholders

(*Source:* Author)

Since the fabric of the Sardar Market varies so do the factors creating an architectural identity as shown in Figure 2. The shops and the clock tower bind to create a spectacular experience for the visitors. It's an excellent opportunity to learn about people's daily lives in Jodhpur.

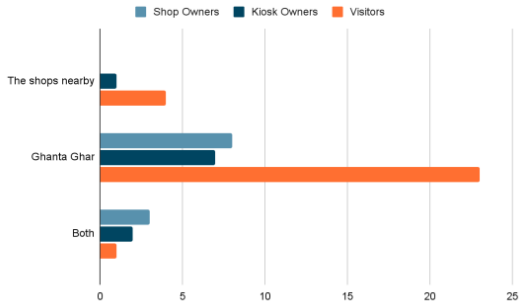


Figure 2: Perception of Stakeholders on Factors Creating the Architectural Identity of Sardar Market

(*Source:* Author)

However, modernization doesn't always do good. It affects the heritage in numerous ways as shown in Figure 3. The effect of modernization is different in different heritage precincts and contexts. Although the driving forces involved in it might be the same (Figure 2) and none other than the stakeholders can notice this change between the past and present scenarios.

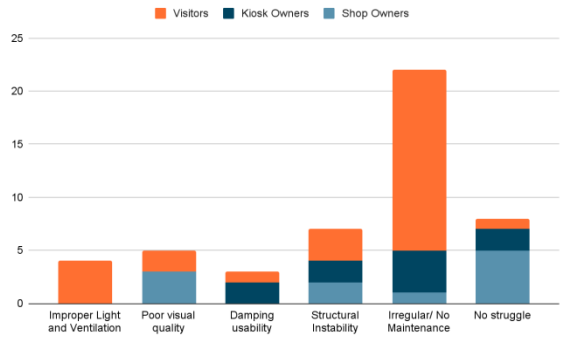


Figure 3: Struggle of Ghanta Ghar in a Modern Context: Perception of Stakeholders

(*Source:* Author)

Table 1: Table Showing the Perception of Stakeholders Regarding Factors Creating the Architectural Identity Issues of Ghanta Ghar, Jodhpur

ISBN: 978-93-89934-68-7

Site / Issue	Ghanta Ghar, Jodhpur		
	Respondent's Opinion	Inference	References
Insufficient light and ventilation	 Dozens of shops surrounding the tower makes it difficult not only for the visitors to walk and experience but also for the structure itself to breathe.	Cultural driving forces such as establishment of kiosks nearby and development of social life to match with new changes are responsible for it.	(Szpakiewicz, n.d.) (Verma & Gupta, 2017)
Poor Visual Quality	 The lustre of the tower as well as the shops has gone. There are number of posters being stuck on its facade along with graffiti.	Cultural driving forces such as development of social life to match with new changes and Socioeconomic driving forces such as Globalization and Technological driving forces such as mobility pattern for accessibility are responsible for it.	(Verma & Gupta, 2017)
Damping usability	 Improper/ No parking space and increase in number of kiosks nearby is creating more and more problems	Cultural driving forces such as establishment of kiosks nearby and Technological driving forces such as mobility pattern for accessibility are responsible for it.	(Verma & Gupta, 2017) (Mohanty & Chani, 2015) (Panse & Raval, 2020)

Site / Issue	Ghanta Ghar, Jodhpur		
	Respondent's Opinion	Inference	References
Structural Instability	 The 200 years old tower's masonry has started getting destroyed a little.	Natural driving forces such as change in climate and Socioeconomic driving forces such as Globalization are responsible for it.	(Verma & Gupta, 2017) (Mohanty & Chani, 2015)
Irregular/ No maintenance	 The clock of the clock tower is broken and not in working condition. The balconies are not cleaned and its surrounding is covered with garbage.	Cultural driving forces such as development of social life to match with new changes and Socioeconomic driving forces such as Globalization are responsible for it.	(Verma & Gupta, 2017) (Mohanty & Chani, 2015)

(*Source:* Jodhpur)

Since the stakeholders experienced the transformation, their sense of connection to this area has caused them to be concerned about the tower and to begin planning a path ahead as shown in Figure 4.

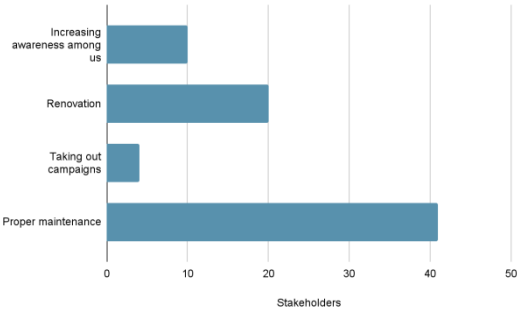


Figure 4: Perception of Stakeholders on Way Forward

(*Source:* Author)

6. CONCLUSION

According to the survey, the stakeholders feel it is the improper maintenance, design and usage that is affecting the architectural identity of Ghanta Ghar. No stakeholder minds having kiosks until and unless they don't hinder their experience and heritage. This proves that aesthetics is experienced in how a person interprets and perceives it. The shops, kiosks and the clock tower together weave a fabric that creates an experience for the visitors.

Instead of removing the kiosks completely, proper planning of kiosks like assigning a proper place or already existing shops which no one occupies. The government or the authority concerned should provide proper parking, maintenance and garbage management. Government should start the renovation process also, as the structure has already been damaged. Stakeholders involved should be sensitive enough and park in the proper place such that the vehicles don't create chaos for themselves as well as the heritage. Careful design and planning need to be done in order to cater to each and every stakeholder's rights.

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Study of Spatial Semantics in Indian Cinema: Case of Sanjay Leela Bhansali

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ABSTRACT: Through the years, cinema has played a significant role in people's lives. This is in regard to entertaining, expanding the horizons of one's thoughts, and acting as an eye-opener to contemporary issues. Mainstream Hindi cinema mainly known as 'Bollywood' features aesthetically pleasing visuals, splendour, and spectacular costumes. So basically, films tell stories which are set in some kind of a spatial setting. Using the lens of meaning making from space, it is possible to analyse and compare films that employ architecture in their storytelling.

The present research enquires into the integration of spaces and storylines in film frames, and to check whether they retain their consistency and authenticity to create a visual effect and provide a good cinematic experience. There is a vast range of background integration that is seen in films and hence, checking the consistency and authenticity of these films becomes crucial. In order to facilitate this enquiry, a critical comparison is done using the visual data and historical references. The scope of this research is limited to analysing the frames from films created by an accomplished cinematographer and director, Sanjay Leela Bhansali, who leverages the visual appeal in mainstream cinema to enhance the grandeur and aesthetics of his work.

The research argues with the fact whether the frames in Sanjay Leela Bhansali's films reflect the values of consistency and authenticity in a film in terms of its architecture and spatial semantics or they are simply intended to create visual effects.

Keywords: *Bollywood, Frames, Spatial Semantics, Consistency, Historical Authenticity, Visual Appeal.*

1. INTRODUCTION

Stories and their setting go hand in hand in a film. The stories happen in a tangible space which has to be communicated that many a times plays a role in the film as well. In addition to simply telling a story, filmmakers make meaning every time they lay out sets, direct actors, place the camera in a certain position, and assemble the resulting mass of shots into a cohesive narrative. It is not always a case that the films have an intentional or deliberate meaning. For an architect, observing visual nature of space is very important. This visual communication varies on several levels: with background settings, spatial configurations and so on. (Ryan & Lenos, 2020)



Figure 1: Films: Cat Sticks (2019) Illustrates the Effect of Haunting and Mystery using Light, Smoke, Shape, Forms and Shadows.
(Roushni Sarkar, n.d.)

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Figure 2: Films: Sairat (2016) Illustrates Behind them, the fire symbolizes the rot of the harvest, a metaphor for the incinerated world of deep caste bias. This comes up with the moment of escape towards a better world where caste might be a less solid construct. (*Film Campanion*)

Generally, different scales of spaces can be observed. There can be private spaces (individual homes), neighbourhood spaces and city level spaces. The focus here is solely about the private spaces (individual homes) as a component of storytelling.

A space's spatial configuration defines how it is seen from a certain perspective, and how good it is from a certain standpoint. The concept of semantics refers to the process by which meaning is created. (Yan, 2014) Spatial semantics as a whole, is a visual representation that relates objects to their spatial contexts, whether in films or in real-life experiences. (Franz & Wiener, 2008) As such, it also refers to how we interpret visual signs or how we compare objects with their surroundings to generate a sense of meaning.

As a cinematic experience, a good film gives a feeling of enhanced appreciation of an architectural space where a specific incident takes place. This is clearly visible from the consistency of elements, spatial characteristics, use of finishes in the frames of a film. The consistency of images or frames is extremely important. If it is neglected, the architectural aspect is lost. In the light of this, the question arises as to whether a director really keeps these values in mind while directing a film or merely creates a visual effect as a result of being inconsistent. Such a cinematographer Sanjay Leela Bhansali has his films in direct contrast with his personality. He tries to create space settings that form innovate and creative frames for a better films experience. Many of his films are not just films but experience of scales, beauty, and opulence. There is no doubt that he works in excess, the affluent styles, consumerism, fantasies however any such linkages will be thwarted by the fact that Bhansali's films contain no element placements. Hence the critical assessment of his visual style is necessary to understand the films and their impact. This paper presents a framework for the classification of different frames from Sanjay Leela Bhansali's films as consistent and authentic from an architectural expert's point of view. (Viswamohan & John, 2017)

1.1 Research Question

- What components of spatial semantics may be examined to find out whether Sanjay Leela Bhansali's films reflect consistent and authentic values?
- What do the spatial configuration in Sanjay Leela Bhansali's frames indicate? Are they coherent with each other or just act good as individual frames?

1.2 Objective

- To explore the connection of storyline in the film and its respective space setting.
- To investigate whether the frames in Sanjay Leela Bhansali's films reflect the values of consistency and authenticity in a film in terms of its architecture and spatial semantics or they are simply intended to create visual effects.

2. LITERATURE REVIEW

The film making process communicates the qualitative aspects of a certain environment. Cinematic observation and mapping allow meaning to get conveyed via multiple time frames and viewports simultaneously. This concept is broadly classified as expanded cinema. (Golden, 2017)

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Architects and cinematographers share many common threads. In the case of cinema, time, space, light, colour, and sound are manipulated to enhance the narrative of a film, while in the case of architecture, they are utilized to communicate the intentions behind a design. (Ryan & Lenos, 2020) Architecture is often portrayed in cinema, mainly as a prop or a backdrop rather than a focal point. In most of the films, the cinematographers consider architecture as a secondary fiddle to the storyline of the film. Despite being vital to any narrative in a film, architecture is only depicted in a few shots. (Yadav & Vishwakarma, 2020)

Cinema can greatly benefit from bringing architecture to the forefront when it is used as a narrative aid. The frames in a film are like a moving image which draw people, objects through spaces, direct their attention to particular aspects, and at times, disrupt expectations and preconceived notions. A clear cinematic experience is mediated through a frame. The frame has its direct connection with the space. Hence how a film can be enhanced using architectural aspects depends on the frame or space setting. The assembly and analysis of the various reviews thus state that as creative forms, cinema, and architecture work with space in different ways. (Franz & Wiener, 2008)

Bhansali stated in an interview that he sees filmmaking more as an art than a numbers game. Whenever he's in a particular space, he's often inspired to shift things around. In other words, he aims to keep things off-centre while still creating visual delights. All Bhansali films are known for their huge sets and larger-than-life visuals.

3. MATERIAL AND METHODOLOGY

Sanjay Leela Bhansali's films have been recognized for their visual stylistics, regardless of whether he is praised or ridiculed for his choices in grandeur and aesthetics. While his style has admirers, it also has detractors. The purpose of this study is to emphasize that the visual style and space setting contribute to the content. Any filmmaker's ideological tools consist of elements of film styling, such as spatial character, product placement, etc. This paper does not offer comprehensive coverage of all Bhansali films.

Step 1: Films Selection

There is a limit to the analysis of Bhansali's complex and differently styled films within the confines of this paper. Thus, the study will focus on three films based on three different genres, decades, and visual patterns, namely Bajirao Mastani (2015), Black (2005), and Khamoshi: The Musical (1996). There are three broad themes represented in the films: the first is a period piece, the second is about disability and adaptation, and the third is about art.

Step 2: Space Setting

The second step would be the selection of space or the setting. It would be determined by the number of frames available for a given setting. As a result of this selection, a particular syntax can be established. As syntax requires different frames or components, the more frames, the better the space or setting. Hence,

- For the first film, the major space setting would be Michelle's House (Woodville Palace Hotel, Shimla)
- For the second film, the major space setting would be Shaniwar Wada.
- For the third film, the major space setting would be a typical house on the coast of Goa.

Step 3: Capturing the frames

Freezing most adequate frames available for that space. Photographic method i.e., the comparison between actual frames of that space and frames captured from the cinema could also help in understanding the semantics of the space.

3.1 Interpretation the Method

A frame is defined by its colour palette, its materiality, its scale, its characters, and its symbols or props. In cinematography, framing refers to the way elements are arranged in the frame. Framing plays a large role in the telling of a visual story.

This paper is purely based on qualitative research methodology, in which the first case would be a check for coherence. In cases where the person is unfamiliar with the place or only has a vague idea of what it looks like in his mind, this method can be used. Hence, it is crucial to determine if the individual frames are connected to create a complete picture. The coherence would be checked based on three aspects observed in the frames i.e., spatial character, material finishes and

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elements. Are these frames accurate representations of the space? The authenticity check will be based on a reality check. It will be evaluated by observing the scales and sizes of the elements in the setting, investigating the authenticity of the materials, and looking at the framing details. This reality check is possible when there's already a clear image of the place in one's mind. Thus, the real and the reel can be compared automatically. Trying to draw a connectivity plan for spaces distribution within a space is also a way used here to find out the relation between the spaces.

3.2 Analysis of the Frames

The following is the example of how analysis for each frame was done considering its spatial character, material finishes and elements.



Figure 3: Films: Bajirao Mastani

(*Source:* Author)



Figure 4. Films: Bajirao Mastani (Source: Author)

Table 1: Illustrates the Spatial Character Observed in the Two Frames

Sr No.	*Frames Category (Interior/ Exterior)*	*Data Observed*			*Coherence Checklist*	*Historical Authenticity Checklist*
		Spatial Characteristics	***Material and Finishes***	***Elements***		
1.	Frame 1: refer **Figure 3.**	Arch structure on the left, and front side. Space description: Open to sky court surrounded by structures on all 4 sides which might be used for royal court meetings, conferences, and war practice.	Clay tile sloping roof cover, Concrete arches and columns on right Stone structure on front side, Walls plastered in shades of yellow, ochre, Teakwood pillars finished with polishing	Colonial Indian columns with brackets. Metal traditional fire holder.	Clay tile sloping roof cover. Walls plastered in shades of yellow, ochre	Metal traditional fire holder Teakwood pillars finished with polishing
2.	Frame 2: refer **Figure 4.**	According to standard human height, plinth is 1050 mm and floor to floor height is 4600 mm. Space description: Front elevation of the structure which a variety of arched openings and level plays.	Clay tile sloping roof cover. Walls plastered in shades of yellow, ochre, stone plinth Teakwood pillars finished with polishing.	Metal traditional fire holder. Colonial Indian columns with brackets.	Teakwood pillars finished with polishing	Metal traditional fire holder.

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Bajirao Mastani, being a period film needs to be checked mostly for its historical authenticity because of the use of different elements that depict the Maratha era. Hence, from the above example, it can be observed that the characteristics from the first frame repeat in the second elements when considered in terms of material finishes and elements but lack connection when compared with spatial character of the frame. The extravagant scales shown in the film also must be checked to define its spatial character. Thus, this shows that the elements which repeat should be checked for historical authenticity to understand whether they really relate to that period or are just a visual attraction. All these characteristics should be critically investigated for all the three films from different genres. The following is the analysis for each of the three films.

3.2.1 *Bajirao Mastani: Year of release (2015)*

This film features actors Deepika Padukone, Priyanka Chopra and Ranveer Singh. It is a film based on life story of glorious warrior Bajirao Ballal tatha Thorale Bajirao Peshwa (1720–1740 CE). The period described in the films is the early 18th century when Maratha Emperor Chhatrapati Shahu assigned Bajirao as the new Peshwa.

Coherence in the Frames:

Coherence in the frames can be in any form such as the frames can be coherent with respect to spatial characteristics but not in terms of material finishes and elements. Hence checking these three aspects coherence is necessary.

Coherence in Terms of Spatial Characteristics

Two to three courtyards connected through lobbies and as extended spaces can be seen throughout the frames. The plinth level (1050 mm) observed varies in some frames. Mezzanine floor with a staircase running parallel to it is only seen in frame 14 which has no specific connection with other frames. The heights of main doorways vary from 5400 mm to 7000 mm. The comparison for the scales (heights) of rooms and their ratio with other surrounding spaces differs in each frame. (Refer Appendix A) It seems much larger than the real wada and is considered to be a flaw in terms of architectural sensitivity in a film. Hence this feature in the film has simply been considered to make the space appear larger than life without taking into consideration its architectural importance. A comparison of what is depicted in a film and how the spaces are arranged in a wada can be seen in the images below. As a part of analysis, the following is the comparison between the reconstructed plan based on the frames observed and the actual plan of a wada.

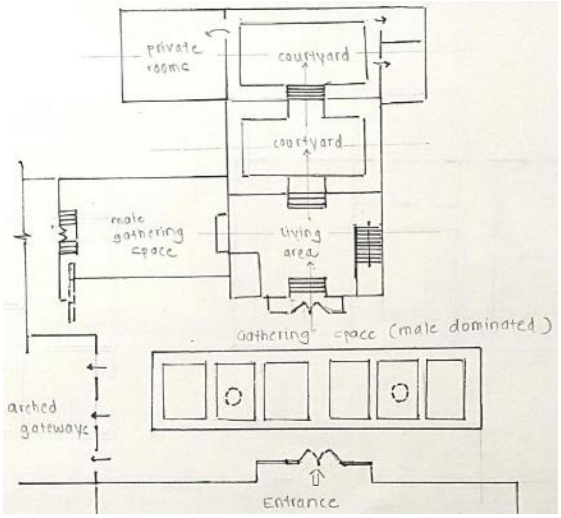


Figure 5: Illustrates the Flow of Spaces Predicted Through

(*Source:* Author)

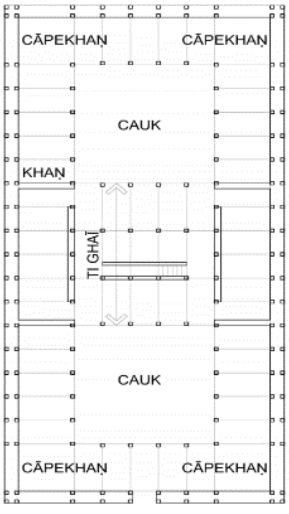


Figure 6: Illustrates the Flow of Spaces in a Film Frame of Actual Wada

(Sahasrabudhe, 2017)

From the above plans and the analysis made, it is clear that the film lacks in terms of spatial character. (Refer appendix A)

ISBN: 978-93-89934-68-7

Coherence in Terms of Material and Finishes

The roofing system i.e., the clay tile sloping roof is seen in most of the frames. Wall finishes are either plastered surfaces in shades of warm colours or a type of stone masonry is observed. The inconsistency is seen when the wallpapers on wall in frame 14, 21, 22 come into picture. Also, there's a variation in the type of stone masonry observed (Bradstone masonry and natural stone masonry). Hence, coherence in terms of material and finishes is not seen. (Refer appendix A)

Coherence in Terms of Elements: Colonial Indian teakwood pillars finished with polishing is consistently seen through all the frames. These pillars are supported by brackets which in turn hold the roof or the lobby of the above floor. Multifolied arches and one point arch openings and gateways seen. Hence there is coherence seen in the frames in terms of elements. (Refer appendix A)

Authenticity in the Frames

An understanding of such schemata for the eighteenth-century architecture of the Peshwa region can come from socio-linguistic or anthropological studies of the period *(Sahasrabudhe)*.Wada typically begin with verandas, followed by frontcourts, which were considered public spaces. These were mostly male-dominated areas, which holds true for the frames studied. More private spaces were placed in the interiors. Spaces, where women were allowed and not allowed, were clearly marked. To determine historical authenticity in eighteenth-century architecture, references must be examined. Here are some elements that reflect the architecture of the eighteenth century.

Table 2: Illustrates Whether the Actual Design Components in Maratha Architecture Existed in the Frames (Sahasrabudhe)

Sr No.	***Type of Components***	***Design Components***	***Actual Pictures of the Design Component***	***The Components Seen in Frames (comments)***	***Actual Design Components Comparison with the Frames***	
					Exist	***Does Not Exist***
1.	Primary	Sloping roof with 'u' shaped clay tiles	 Raste wada, Pune	Similar clay tile roofing observed.		
2.	Primary	Simple woodwork or 'divankhana' type of woodwork.	 Woodwork with columns and arches at Tulsibaug, Pune	Similar woodwork observed.		
3.	Primary	Wooden columns with base stone	 Raste wada, Pune	Similar columns with base stone observed.		

ISBN: 978-93-89934-68-7

Sr No.	***Type of Components***	***Design Components***	***Actual Pictures of the Design Component***	***The Components Seen in Frames (comments)***	***Actual Design Components Comparison with the Frames***	
					Exist	***Does Not Exist***
4.	Primary	Doors and windows with double shutters	 Window shutters at Raste wada,Pune	Similar Doors and windows with double shutters observed.		
5.	Primary	Cauks with sopā around	 Sopa at Raste Wada, Pune	Cauks with sopā around observed in courtyards.		
6.	Secondary	A bangala at corners	 Bangladar profile at Nagarkhana, Dhom- wai	A different type of element but not resembling a bangala was seen in some shots.		
7.	Secondary	Wall with niches	 Wall niches at Raste Wada, Pune	Different shapes and styles of niches observed.		
8.	Secondary	Ganeshpatti Design	 Raste Wada, Pune	Lintels decorated with flower and leaf motifs seen.		

According to the analysis, most of the elements are covered in the film and therefore a clear image of Wada can be obtained in terms of elements. While the visuals in this film are appealing, the architectural significance is lacking. **(Refer appendix A)**

3.2.2 *Black: Year of Release (2004)*

This film features actors Rani Mukherjee and Amitabh Bachchan. It was based on Helen Keller's autobiography '*The story of my life (1996)*' which was first published in book form in 1903, on which she immerses the reader into her world and her experience of acquiring language as a dead blind girl. The film begins with a black screen frame where Michelle McNally (Rani Mukherjee) is typing her story in braille using a typewriter. The period described in the films might be 1880's which can be guessed from the costumes and elements in the frame. (Costumes: Vintage British style maxi dress worn by women

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and blazers, thermal shawls worn by men, elements: candle holders, hat rack and old-style standing lamp).(Ahluwalia, 2005) The frames captured and its corresponding data collection is mentioned in Appendix B. Hence the results for coherence and authenticity are as follows:

Coherence in the frames:

Coherence in terms of spatial characteristics: The different spaces identified throughout the film were the living room (double height), Dining room (double height), restrooms, study rooms, lobby crossing many other rooms, bedroom and so on. The observations were that the similar buffer spaces created repeat in many frames. The similar type of openings (door) has a height 2500 mm which remains constant throughout the frames and the height of large style gothic windows is 3500mm which also remains throughout. The height of hall and living room is approx. 8000 mm which makes them double height with a mezzanine style lobby running between them. The lobby is observed in all the frames which defines the overall height of the structure. Frame 3 and 20 contradicts this as the window here seems to be much larger than the actual height of the floor and the windows observed on the exterior face of the structure. Hence it lacks coherence in terms of spatial character. (Refer appendix B)

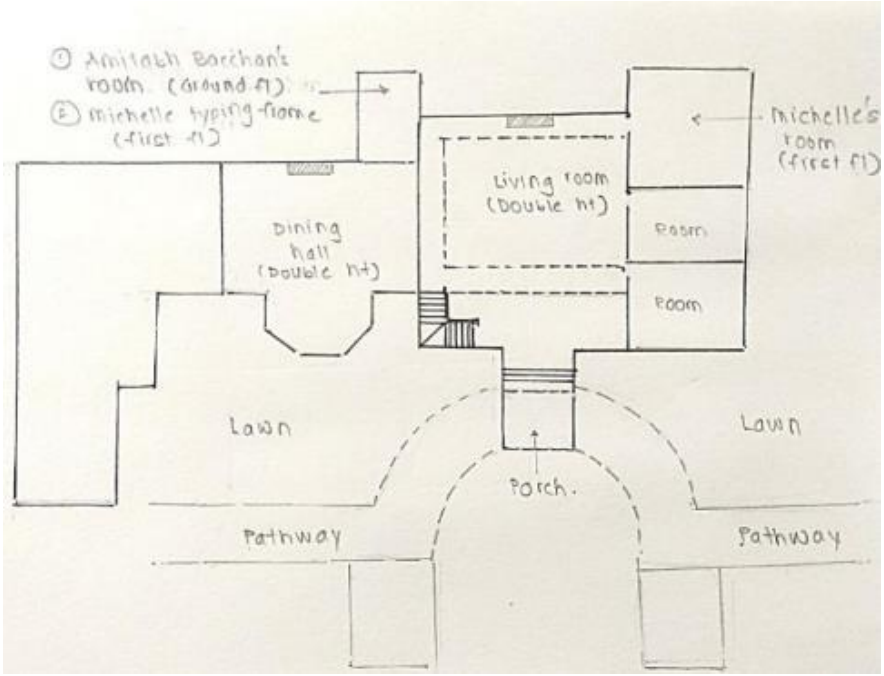


Figure 7: Illustrates the Flow of Spaces Predicted Through the Frames in the Film

(*Source:* Author)

Coherence in terms of material and finishes: Different type of material palette is observed for the floor of the rooms. It varies from wooden panel flooring to reflective concrete flooring. The flooring patterns remain consistent throughout the frames. The wall finishes vary from normal plastered walls, wooden paneled walls, random uncoursed rubble masonry on wall in frame 3 and luster paints (frame 4, 6), wallpapers on some walls. Hence there is no consistency in observed in the wall finishes of the structure. (Refer appendix B)

Coherence in terms of elements: Sixteen glass paneled windows on the ground floor while eight glass paneled windows on the first floor are the elements that remain consistent throughout all frames. The position of fireplaces in the interior and the chimneys observed in the exterior frame match and hence are considered consistent. (Refer appendix B)

Authenticity in the Frames

According to the period that can be understood in this film, the different elements such as differing masonry styles, wallpapers in terms of material finishes and extravagant window sizes which cannot be seen from outside, in terms of spatial character are the things which contradict the fact that the film is done at a single place and setting. (Refer appendix B)

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3.2.3 *Khamoshi, The musical: Year of release (1996)*

This film features actors Salman khan and Manisha Koirala. The film is young girl who is the only hearing member from a deaf family who tries to help her family while pursuing her dream to become a singer. (Chatterjee, 2020)

Coherence in the frames:

Coherence in terms of spatial characteristics: The frames describe a blurred image of a typical goan style farmhouse. The pattern of arrangement of spaces starts from a semi covered verandah which leads to a hallway with staircase on one side, then the kitchen and a backyard. As Bhansali has managed to take many shots of a single frame and from different angles, the complete idea of that particular space and its connection with spaces near to it is understood. The opening (door) heights remain constant throughout the frames. Hence coherence in spatial character is seen. (Refer appendix C)

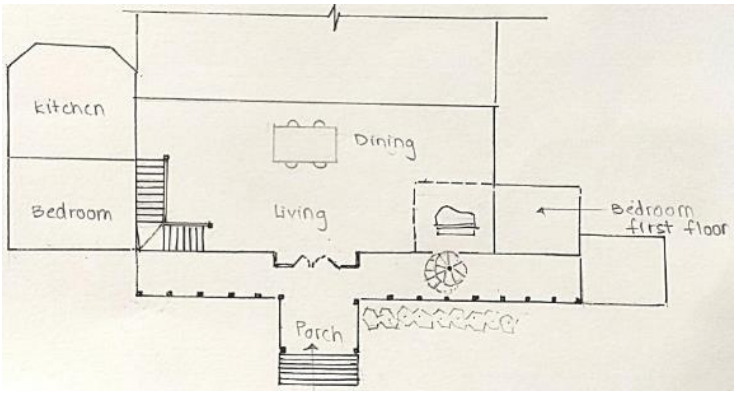


Figure 8: Illustrates the Flow of Spaces Predicted Through the Frames

(*Source:* Author)

Coherence in terms of material and finishes: Plastered walls in shades of purple, orange and yellow are observed in all frames with concrete flooring and clay shingled roofing. Hence, consistency in terms of materials is seen. (Refer appendix C)

Coherence in terms of elements: Typical goan style opening with glass panel fittings and four paneled windows are mostly seen in the frames. Antique furniture in different rooms is another common aspect. Thus, as most of the elements relative to its position don't change in the frames, coherence in term of elements can be observed. (Refer appendix C)

Authenticity in the Frames

This case shows that the visual clues within the frames are consistent both internally and externally. 'Anne' (Manisha Koirala) lives in a simple holiday home in Goa that doesn't specify a start or end date. It appears, however, that the films dates back to the 90s. Every element in a film has a specific purpose and, as a result, cannot be questioned. A gramophone or piano, for example, can be verified for authenticity, but a music-based film is why these elements are placed in specific positions in the frames. Their placement in the living room is ideal hence they can be seen from all angles. By maintaining simplicity in the space settings while still trying to capture interesting frames, authenticity in the frames is verified and justified. (Refer appendix C)

4. RESULTS AND DISCUSSION

In Sanjay Leela Bhansali's films, good visual clues are delivered through spaces, but there is a lack of connectivity between them. Order and flow within the space are critical for figuring out the place and arrangement of interiors as well as understanding where specific rooms/spaces are located within the overall setting, whether it be a set or a realistic location. The person who creates a film that can make the audience understand the pattern despite taking a sensitive approach to a topic is capable of being called a good cinematographer. Here, Sanjay Leela Bhansali succeeds in making the audience understand the narrative and the storyline that is followed throughout the films while maintaining sensitivity to the topic but fails to

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convey the spatial significance of his films. Spatially effective films are true masterpieces because the audience can relate all the frames to the timeline, to elements, to flow of spaces, to topics and so on.

The flow of spaces for the film Bajirao Mastani doesn't resemble the actual image of a wada and hence coherence within the frames is missing. The segregation for spaces from the actual wada area different than what the Sanjay Leela Bhansali's set defines. Visual narrative in the film seems a little confusing in these films and hence a proper connect cannot be obtained (Figure 6). In the second case, Black, the film fails to derive where the different rooms in the frames are positioned. Again, it partially lacks in creating a spatial connect (Figure 7). The third case, Khamoshi—The musical, has different angles taken from the same frame describing the positions of people, elements in the same frame. Hence it seems to have good visual narrative and connection (Figure 8).

5. CONCLUSION

A major accomplishment of Sanjay Leela Bhansali's work is to imaginatively recreate not only the parent text and its narrative mode, but also indigenous theatrical art forms. It is a strand of his work he is keen to promote. Style clearly is very important to Bhansali. His grammar raises provocative socio-political questions, whether he promotes historical facts in Bajirao Mastani or forces the audience to pay attention to the concentrated nature of disability in black. Thus, a film's ability to be enhanced by architectural elements depends on its setting. Based on the analysis and assembly of the various reviews, it appears that cinema and architecture use space differently.

Sanjay Leela Bhansali has cautiously played with the elements in all the three movies and managed to create good aesthetics and visuals but when it comes to scales and enclosures there's a problem. He has not been able to work out the spatial configuration in the frames that effectively. Exceeding scales and extravagant heights just to create a visual treat may sometimes lead to distorted frames and seem falser to the audience. Hence working with the elements, spatial character and its materials shown in the movie should have a deliberate connect between each other to make a film appear good in terms of reality and visual appeal. The directors always strive for perfection, but can a beautiful rose be without thorns? In a similar vein, even if Sanjay Leela Bhansali's film is visually appealing and appears to be bigger than life, it nevertheless contains some flaws. Accordingly, depending upon the pattern he follows in his films, there seems to be no coherence between the frames. Several of those frames just seem extravagant as individual frames that have no connection with each other. Still, the effort and the ultimate show that is put up could surely be enhanced if he becomes more conscious towards having an architectural and spatial approach towards his films.

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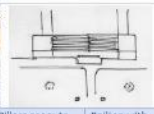
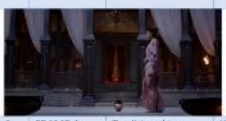
APPENDIX

Appendix A: Data collection for film Bajirao Mastani (*Source:* Author)

FILM: BAJIRAO MASTANI

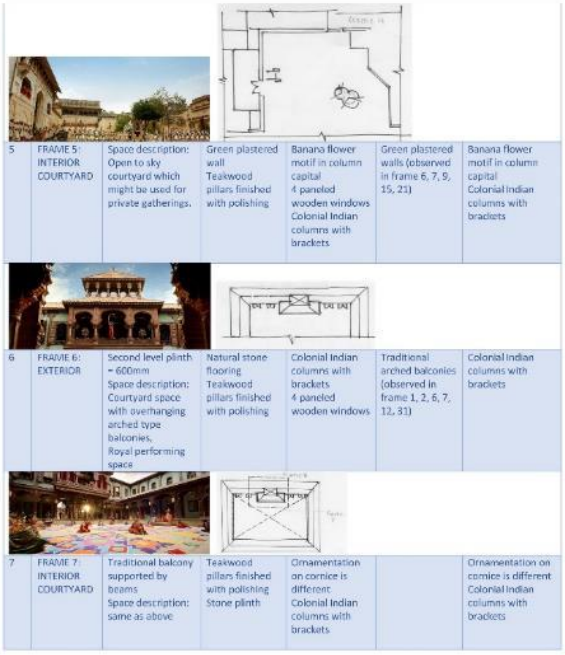
SR NO	FRAMES CATERGORY (INTERIOR/ EXTERIOR)	DATA CAPTURED (GENERAL)			CHECKLIST FOR COHERENCE AND CONSISTENCY	CHECKLIST FOR AUTHENTICITY
		SPATIAL CHARACTERISTICS	MATERIAL AND FINISHES	ELEMENTS		
1	FRAME 1: EXTERIOR	Arch structure on the left, and front side. Space description: Open to sky court surrounded by structures on all 4 sides which might be used for royal court meetings, conferences, and war practice.	Clay tile sloping roof cover Concrete arches and columns on right Stone structure on front side Walls plastered in shades of yellow, ochre. Teakwood pillars finished with polishing	Colonial Indian columns with brackets Metal traditional fire holder Too many different types of arches used in a single profile	Clay tile sloping roof cover (Observed in frame 2, 5, 6, 12, 13, 28, 31 as well) Walls plastered in shades of yellow, ochre. (Observed in frame 2, 3, 4, 9, 10, 28, 33 as well) Stone plinth (observed in frame 2, 3, 6, 7, 13, 16, 28, 30, 34 as well)	Metal traditional fire holder Teakwood pillars finished with polishing
						
2	FRAME 2: EXTERIOR	According to standard human height, plinth is 1050mm and floor to floor height is 4600mm Space description: Front elevation of the structure which a variety of arched openings and level plays.	Clay tile sloping roof cover Walls plastered in shades of yellow, ochre, stone plinth Teakwood pillars finished with polishing	Metal traditional fire holder Colonial Indian columns with brackets	Teakwood pillars finished with polishing (observed in frame 3, 5, 6, 7, 9, 11, 15, 16, 21, 27, 28, 29, 30, 31)	Metal traditional fire holder

Data collection page 1

						
3	FRAME 3: INTERIOR	Original Plinth height = 1050mm (7steps) Second level = 600mm Space description: Courtyard space surrounded by enclosed passages on all sides, might be used as a gathering/ community interaction space.	Pillars seem to be brown painted and not polished Stone masonry on wall at the center. Natural stone flooring Walls are yellow plastered Wooden railing	Railing with traditional jali	Original Plinth height = 1050mm (Observed in frame 2, 13, 28 as well) Second level = 600mm Natural stone flooring (observed in frame 6 as well)	Natural stone flooring
						
4	FRAME 4: EXTERIOR	Traditional type terraces Wall niches to put diyas Space description: Huge entry gate on the left, surrounding structures are 3 story, space used as exterior gathering space.	Yellow plastered wall surfaces Tin sheet roofing on left	Pointed arches Traditional chhatris Brackets and corbels with different motifs	Pointed arches (observed in frame 5, 6, 7, 8, 9,10, 12, 18, 20, 23, 25, 31 as well) Wall niches to put diyas (observed in frame 8 as well)	Pointed arches Brackets and corbels with different motifs

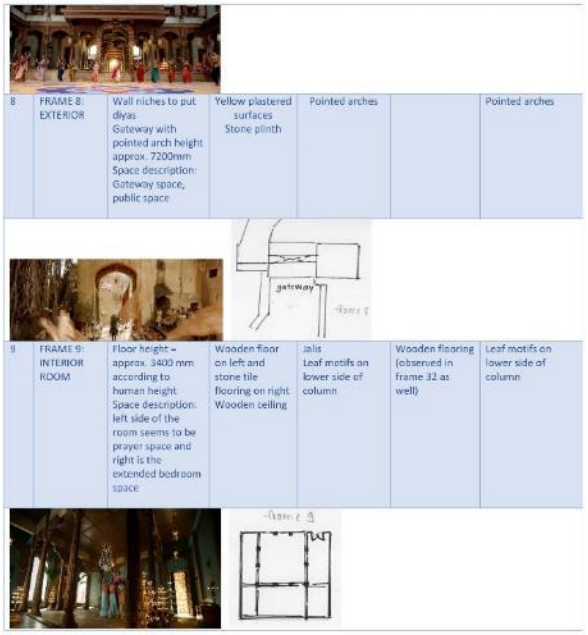
Data collection page 2

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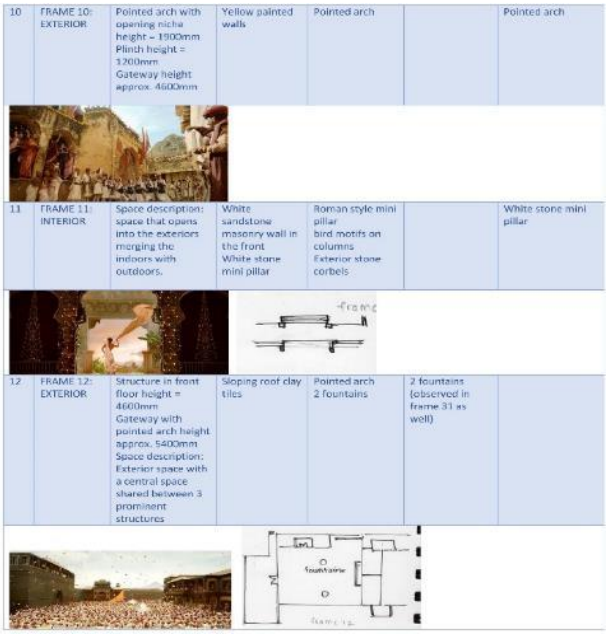
5	FRAME 5: INTERIOR COURTYARD	Space description: Open to sky courtyard which might be used for private gatherings.	Green plastered wall Teakwood pillars finished with polishing	Banana flower motif in column capital 4 paneled wooden windows Colonial Indian columns with brackets	Green plastered walls (observed in frame 6, 7, 9, 15, 21)	Banana flower motif in column capital Colonial Indian columns with brackets
6	FRAME 6: EXTERIOR	Second level plinth = 600mm Space description: Courtyard space with overhanging arched type balconies, Royal performing space	Natural stone flooring Teakwood pillars finished with polishing	Colonial Indian columns with brackets 4 paneled wooden windows	Traditional arched balconies (observed in frame 1, 2, 6, 7, 12, 31)	Colonial Indian columns with brackets
7	FRAME 7: INTERIOR COURTYARD	Traditional balcony supported by beams Space description: same as above	Teakwood pillars finished with polishing Stone plinth	Ornamentation on cornice is different Colonial Indian columns with brackets		Ornamentation on cornice is different Colonial Indian columns with brackets

Data collection page 3



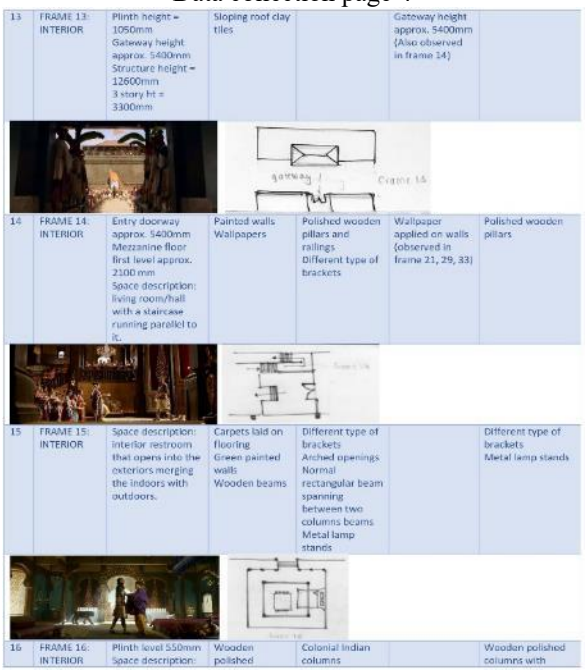
8	FRAME 8: EXTERIOR	Wall niches to put diyas Gateway with pointed arch height approx. 7200mm Space description: Gateway space, public space	Yellow plastered surfaces Stone plinth	Pointed arches		Pointed arches
9	FRAME 9: INTERIOR ROOM	Floor height – approx. 3400 mm according to human height Space description: left side of the room seems to be prayer space and right is the extended bedroom space	Wooden floor on left and stone tile flooring on right Wooden ceiling	Jalis Leaf motifs on lower side of column	Wooden flooring (observed in frame 32 as well)	Leaf motifs on lower side of column

Data collection page 4



10	FRAME 10: EXTERIOR	Pointed arch with opening niche height – 1900mm Plinth height = 1200mm Gateway height approx. 4600mm	Yellow painted walls	Pointed arch		Pointed arch
11	FRAME 11: INTERIOR	Space description: space that opens into the exteriors merging the indoors with outdoors.	White sandstone masonry wall in the front White stone mini pillar	Roman style mini pillar bird motifs on columns Exterior stone corbels		White stone mini pillar
12	FRAME 12: EXTERIOR	Structure in front floor height = 4600mm Gateway with pointed arch height approx. 5400mm Space description: Exterior space with a central space shared between 3 prominent structures	Sloping roof clay tiles	Pointed arch 2 fountains	2 fountains (observed in frame 31 as well)	

Data collection page 5



13	FRAME 13: INTERIOR	Plinth height = 1050mm Gateway height approx. 5400mm Structure height = 12600mm 3 story ht = 3300mm	Sloping roof clay tiles		Gateway height approx. 5400mm (Also observed in frame 14)	
14	FRAME 14: INTERIOR	Entry doorway approx. 5400mm Mezzanine floor first level approx. 2100 mm Space description: living room/hall with a staircase running parallel to it.	Painted walls Wallpapers	Polished wooden pillars and railings Different type of brackets	Wallpaper applied on walls (observed in frame 21, 29, 33)	Polished wooden pillars
15	FRAME 15: INTERIOR	Space description: interior restroom that opens into the exteriors merging the indoors with outdoors.	Carpets laid on flooring Green painted walls Wooden beams	Different type of brackets Arched openings Normal rectangular beam spanning between two columns beams Metal lamp stands		Different type of brackets Metal lamp stands
16	FRAME 16: INTERIOR	Plinth level 550mm Space description:	Wooden polished	Colonial Indian columns		Wooden polished columns with

Data collection page 6

ISBN: 978-93-89934-68-7

		It is a lobby space around a central courtyard connecting other rooms.	columns with concrete base			concrete base
						
17	FRAME 17: EXTERIOR		Wooden polished columns with concrete base	Floral jalis Colonial Indian columns with concrete block base	Colonial Indian columns with concrete block base (observed in frame 1, 2, 6, 7,16 as well)	Floral jalis
						
18	FRAME 18: AAINA MAHAL	HT = 9000-10000mm Dome ceiling with one point arch, circular plan Walls with small arched niches Entrance gateway height 3600mm	Marble flooring Mirrored ceiling Metallic appearance columns	One point arch	Marble flooring (observed in frame 19, 23, 25, 26 as well) Height = 9000mm (observed in frame 27, 34 as well)	Marble flooring
						
19	FRAME 19: AAINA MAHAL	Space description: Circular enclosed space with large spans having seating spaces all around. Might be used as performing space.	Designer marble flooring			Designer marble flooring

Data collection page 7

						
20	FRAME 20: AAINA MAHAL	Niche formed in the ceiling height = 2200mm	Mirrored ceiling Metallic appearance columns	Walls with small arched niches		
						
21	FRAME 21: INTERIOR	Space description: A small room with combined prayer space and restroom.	Green coloured wallpapers Green plastered wall surface Wooden polished columns with wooden base	Floral jalis Metal lamp stands Columns with bracket supporting the ceiling above		Floral jalis Metal lamp stands
						
22	FRAME 22: INTERIOR	Space description: Same as above	Silk Chaddar or curtains Wallpaper on wall at the back	Small niches in wall to keep diyas		
						
23	FRAME 23: AAINA MAHAL	Entry doorway approx. 6300mm		Light net curtains to cover light and for privacy		

Data collection page 8

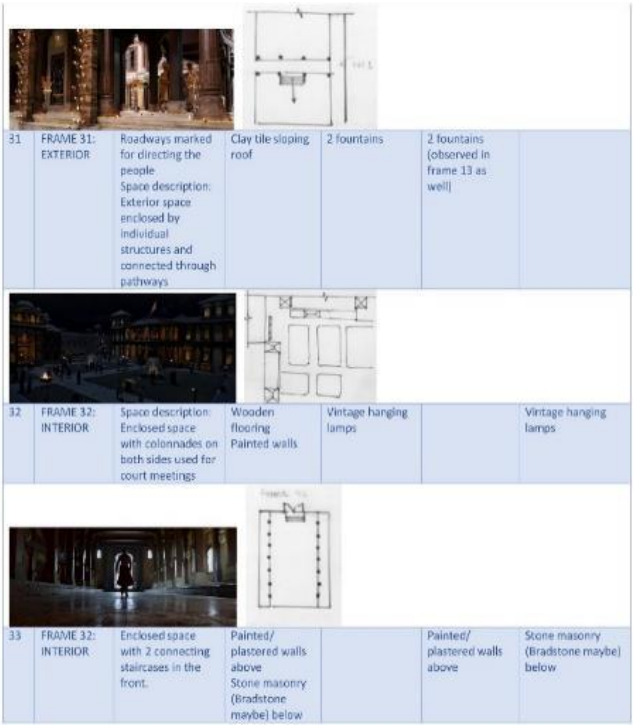
						
24	FRAME 24: AAINA MAHAL	Structure does not seem rigid Seating level for Bajirao 2000mm		Ornate walls and arches		Ornate walls
						
25	FRAME 25: AAINA MAHAL	Level of seating for spectators 450mm Doorway on right = 3600mm Seating level for women = 12000 from ground			Doorway on right = 3600mm (Observed in frame 18 as well)	
						
26	FRAME 26: AAINA MAHAL			Floral motifs on arch		Floral motifs on arch
						
27	FRAME 27: COURTYARD	Height seen on opposite side approx. 9000-10000mm Passage/ transition space seen on right seems to have a dead end Space description: semi covered	Stone deep maal	Column style different sharp edges Slender columns		Stone deep maal Column style different sharp edges

Data collection page 9

		courtyard space used for court meetings				
						
28	FRAME 28: COURTYARD	2 levels 1 level = 600mm 2 level = 1050mm Ht of space = 7000mm from ground Space description: Open to sky courtyard with surrounding lobby as seating spaces.	Yellow plastered walls Clay tile sloping roof	Vintage style lamps		
						
29	FRAME 29: INTERIOR ROOM	Space description: A room that is attached to an open to sky courtyard	Wallpaper on walls	Vintage style metal swing Settee / cot for seating and resting		Settee / cot for seating and resting
						
30	FRAME 30: COURTYARD	Space description: a lobby connecting two courtyard spaces.	Wooden polished columns with concrete base	Colonial Indian columns Metal lamp stands Wooden candle holders		Metal lamp stands Wooden candle holders

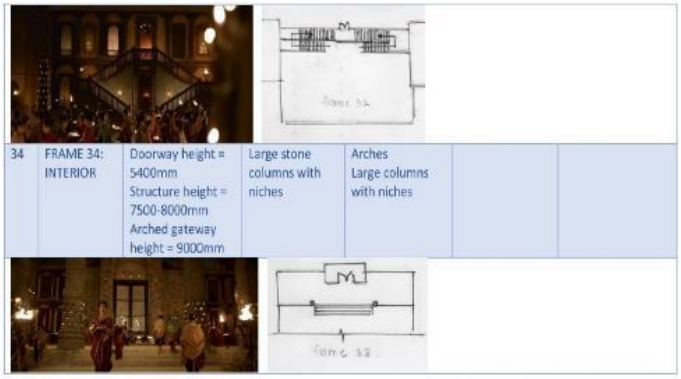
Data collection page 10

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31	FRAME 31: EXTERIOR	Roadways marked for directing the people Space description: Exterior space enclosed by individual structures and connected through pathways	Clay tile sloping roof	2 fountains	2 fountains (observed in frame 13 as well)	
32	FRAME 32: INTERIOR	Space description: Enclosed space with colonnades on both sides used for court meetings	Wooden flooring Painted walls	Vintage hanging lamps		Vintage hanging lamps
33	FRAME 32: INTERIOR	Enclosed space with 2 connecting staircases in the front.	Painted/ plastered walls above Stone masonry (Bradstone maybe) below		Painted/ plastered walls above	Stone masonry (Bradstone maybe) below

Data collection page 11

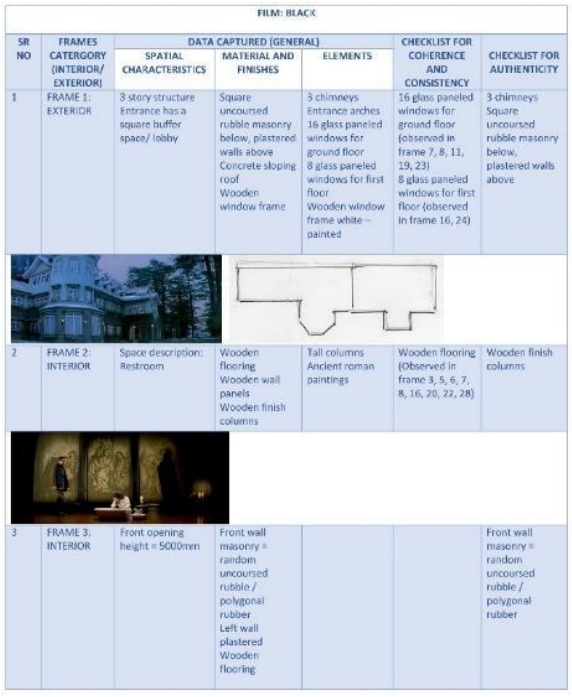


34	FRAME 34: INTERIOR	Doorway height = 5400mm Structure height = 7500-8000mm Arched gateway height = 9000mm	Large stone columns with niches	Arches Large columns with niches		

Data collection page 12

APPENDIX B

Data collection for film Black (*Source:* Author)



SR NO	FRAMES CATERGORY (INTERIOR/ EXTERIOR)	DATA CAPTURED (GENERAL)			CHECKLIST FOR COHERENCE AND CONSISTENCY	CHECKLIST FOR AUTHENTICITY
		SPATIAL CHARACTERISTICS	MATERIAL AND FINISHES	ELEMENTS		
1	FRAME 1: EXTERIOR	3 story structure Entrance has a square buffer space/ lobby	Square uncoursed rubble masonry below, plastered walls above Concrete sloping roof Wooden window frame	3 chimneys Entrance arches 16 glass paneled windows for ground floor 8 glass paneled windows for first floor Wooden window frame white -- painted	16 glass paneled windows for ground floor (observed in frame 7, 8, 11, 19, 23) 8 glass paneled windows for first floor (observed in frame 16, 24)	3 chimneys Square uncoursed rubble masonry below, plastered walls above
2	FRAME 2: INTERIOR	Space description: Restroom	Wooden flooring Wooden wall panels Wooden finish columns	Tall columns Ancient roman paintings	Wooden flooring (Observed in frame 3, 5, 6, 7, 8, 16, 20, 22, 28)	Wooden finish columns
3	FRAME 3: INTERIOR	Front opening height = 5000mm	Front wall masonry = random uncoursed rubble / polygonal rubber Left wall plastered Wooden flooring			Front wall masonry = random uncoursed rubble / polygonal rubber

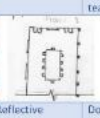
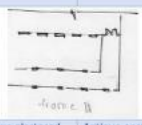
Data collection page 1



4	FRAME 4: INTERIOR	Height of the opening 2500mm Space description: bedroom space	Luster paint on walls	Fireplace to warm up the room Wooden door Candle holder Polished wooden furniture	Wooden doors (observed in frame 6 as well) Luster paint on walls (observed in frame 6 as well)	Fireplace Polished wooden furniture
5	FRAME 5: INTERIOR	Height of the opening (door) 2500mm Space description: study space	Wall has wallpapers Wooden panel flooring White colored wooden door frames	Fireplace on left Braille typewriter		Fireplace on left Braille typewriter
6	FRAME 6: INTERIOR	Space description: bedroom space	Luster textured paint	Old style standing lamp (late 1950s) Vintage hat rack Indian colonial bed style (1840-1947) Vintage wine glass		Vintage hat rack

Data collection page 2

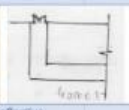
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7	FRAME 7: INTERIOR	Space description: dining and interaction space	Brown wooden paneled polished walls Black painted wooden flooring	Vintage wooden furniture (early 1910s)/ art deco Artificial flowers		Vintage wooden furniture
						
8	FRAME 8: INTERIOR	Space description: dining and interaction space	Blue plastered walls	Large Fireplace in front Corbels with animal motifs Antique teakwood pillars	Plastered walls (observed in 3, 10, 11, 15, 77, 28)	Large Fireplace in front
						
9	FRAME 9: INTERIOR	Space description: It is a lobby space with many openings	Reflective concrete flooring	Doors painted green Wainscoted square hardwood columns	Reflective concrete flooring (observed in frame 18, 26 as well)	Wainscoted square hardwood columns
						
10	FRAME 10: INTERIOR ROOM		Blue plastered walls	Antique posts Wooden stairs		Wooden stairs
						

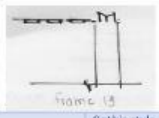
Data collection page 3

11	FRAME 11: INTERIOR	Central Lobby with double ht floors on both sides Ht up to lobby = 3600mm Ht above lobby = 4000mm	Venetian blinds	Lobby supported by woodan pillars and brackets Venetian blinds	Central Lobby with double ht floors on both sides (observed in frame 15, 19, 21, 22 as well)	Venetian blinds
						
12	FRAME 12: INTERIOR	Opening height = 3300mm	Wall has wallpapers	Vintage style bed Long case clock (late 19th – early 20th century)		
						
13	FRAME 13: INTERIOR			Wooden wardrobe Hat rack Antique study lamp		Hat rack
						
14	FRAME 14: EXTERIOR		Wall at right = concrete Plastered and painted wall in front	Pointed Archway at entrance		
						
15	FRAME 15: INTERIOR	Double height hall = 8000mm approx. Space description:	Material difference for floor 1 and 2	Fireplace at center Internal windows		Fireplace at center Hardwood pillar

Data collection page 4

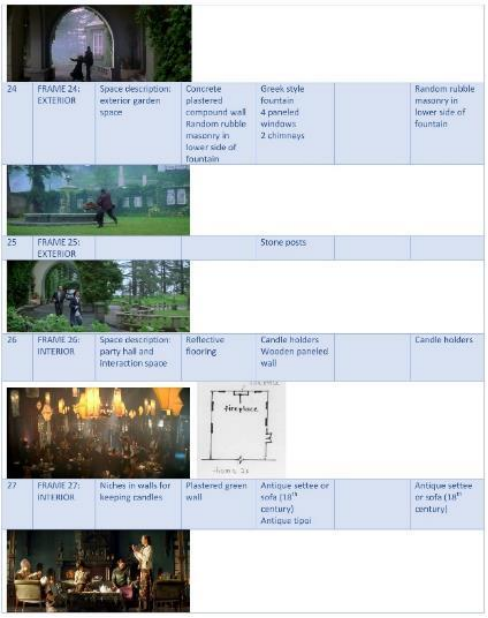
		Living room with two huge columns and a lobby seen running across it on floor above.	plastered and wood paneled	8 paneled Hardwood pillar wainscoted		wainscoted
						
16	FRAME 16: INTERIOR		Brown dark wood panel floor	Winder stairs Metal handrail design French style painting		Winder stairs Metal handrail design
						
17	FRAME 17: INTERIOR		Wall on left has two textures: normal painted wall and wood paneled wall		Wooden paneled wall (observed in frame 7, 8, 17, 26)	
						
18	FRAME 18: INTERIOR	Room height = 3800-4000mm Space description: library, study room	Reflective flooring and not paneled			
						
19	FRAME 19: INTERIOR	Double height		Internal windows		

Data collection page 5

						
20	FRAME 20: INTERIOR	Window height 5000mm Floor height seems to be approx. 6000mm		Gothic style window		
						
21	FRAME 21: INTERIOR	Open lobby and rooms	Wooden columns	Antique hanging lamp columns with brackets Aluminum tower bolts		Antique hanging lamp Wooden columns with brackets
						
22	FRAME 22: INTERIOR	Height of lobby 3600-4000mm		Antique style dining table		Antique style dining table
						
23	FRAME 23: EXTERIOR	Plinth level = 600 mm	Paving rubble stones Stone blocks fitted to lower column level	Stone blocks fitted to lower column level		Paving rubble stones

Data collection page 6

ISBN: 978-93-89934-68-7



24	FRAME 24: EXTERIOR	Space description: exterior garden space	Concrete plastered compound wall Random rubble masonry in lower side of fountain	Greek style fountain 4 paneled windows 2 chimneys		Random rubble masonry in lower side of fountain
25	FRAME 25: EXTERIOR			Stone posts		
26	FRAME 26: INTERIOR	Space description: party hall and interaction space	Reflective flooring	Candle holders Wooden paneled wall		Candle holders
27	FRAME 27: INTERIOR	Niches in walls for keeping candles	Plastered green wall	Antique settee or sofa (18th century) Antique tipoi		Antique settee or sofa (18th century)

Data collection page 7

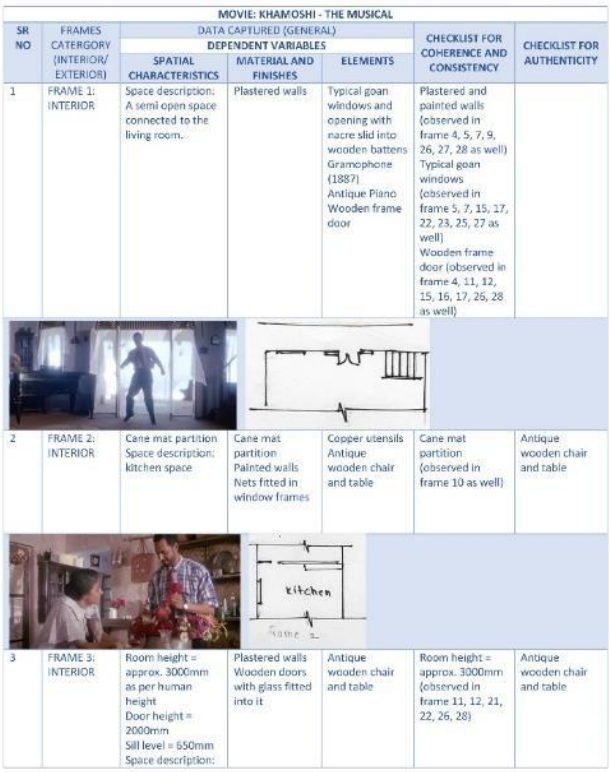


28	FRAME 28: EXTERIOR		Wooden panel flooring Furniture from different period			Antique furniture

Data collection page 8

APPENDIX C

Data collection for film Khamoshi —The musical (*Source:* Author)



SR NO	FRAMES CATERGORY (INTERIOR/ EXTERIOR)	DATA CAPTURED (GENERAL) DEPENDENT VARIABLES: SPATIAL CHARACTERISTICS	MATERIAL AND FINISHES	ELEMENTS	CHECKLIST FOR COHERENCE AND CONSISTENCY	CHECKLIST FOR AUTHENTICITY
MOVIE: KHAMOSHI - THE MUSICAL						
1	FRAME 1: INTERIOR	Space description: A semi open space connected to the living room.	Plastered walls	Typical goan windows and opening with nacre slid into wooden battens Gramophone (1887) Antique Piano Wooden frame door	Plastered and painted walls (observed in frame 4, 5, 7, 9, 26, 27, 28 as well) Typical goan windows (observed in frame 5, 7, 15, 17, 22, 23, 25, 27 as well) Wooden frame door (observed in frame 4, 11, 12, 15, 16, 17, 26, 28 as well)	
2	FRAME 2: INTERIOR	Cane mat partition Space description: kitchen space	Cane mat partition Painted walls Nets fitted in window frames	Copper utensils Antique wooden chair and table	Cane mat partition (observed in frame 10 as well)	Antique wooden chair and table
3	FRAME 3: INTERIOR	Room height = approx. 3000mm as per human height Door height = 2000mm Sill level = 650mm Space description:	Plastered walls Wooden doors with glass fitted into it	Antique wooden chair and table	Room height = approx. 3000mm (observed in frame 11, 12, 21, 22, 26, 28)	Antique wooden chair and table

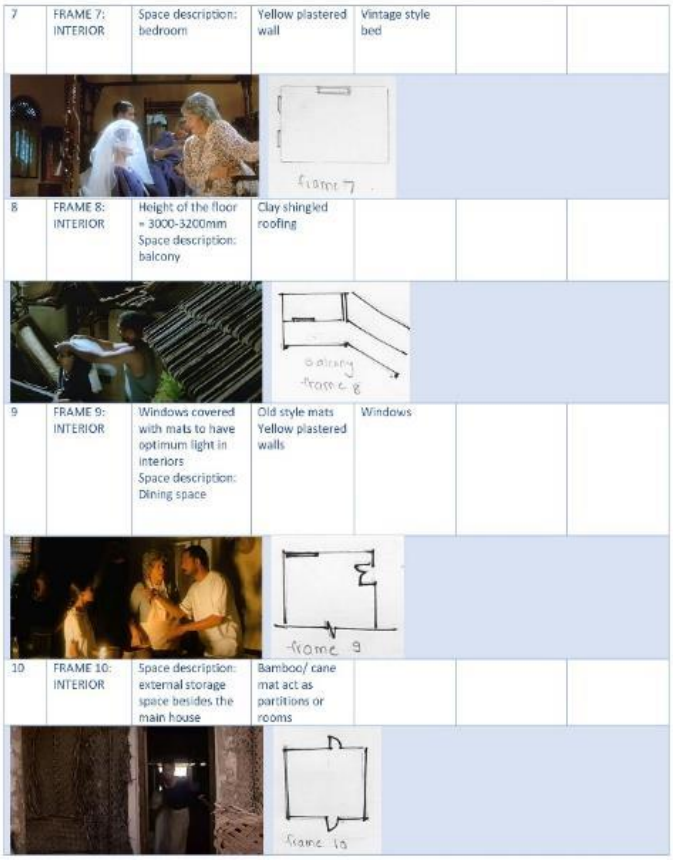
Data collection page 1



		combined living and dining space			
4	FRAME 4: INTERIOR	Space description: common area/ veranda connects to the bedroom.	Orange plastered walls Wooden door	4 paneled doors	
5	FRAME 5: INTERIOR	Space description: common area/ veranda connects to the bedroom.	Textured transparent glass Orange plastered walls	Textured transparent glass panels fitted in the door frame. Vintage rocking chair (1830s)	Textured transparent glass (Observed in frame 11, 15, 17, 20, 29)
6	FRAME 6: EXTERIOR	Height of 1st floor = 3000-3200mm	Clay shingles roofing	Wooden design railing for upper floor Wooden spiral staircase	Clay shingles roofing (observed in frame 8, 17, 18)

Data collection page 2

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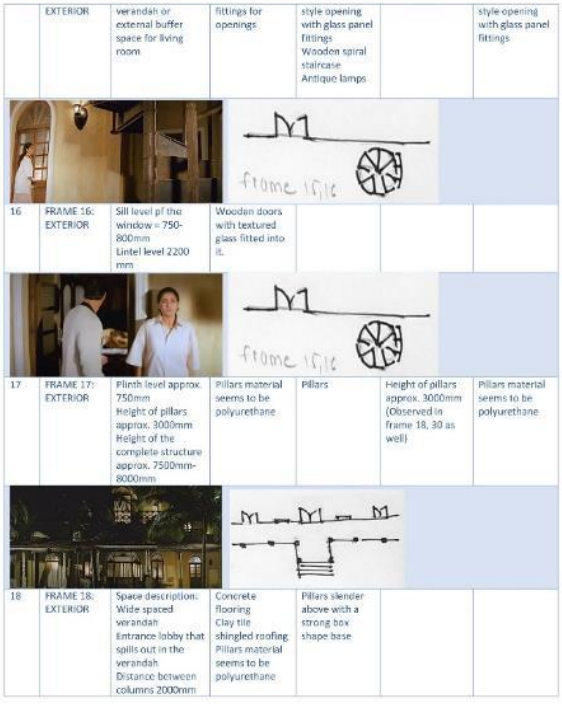
7	FRAME 7: INTERIOR	Space description: bedroom	Yellow plastered wall	Vintage style bed		
8	FRAME 8: INTERIOR	Height of the floor = 3000-3200mm Space description: balcony	Clay shingled roofing			
9	FRAME 9: INTERIOR	Windows covered with mats to have optimum light in interiors Space description: Dining space	Old style mats Yellow plastered walls	Windows		
10	FRAME 10: INTERIOR	Space description: external storage space besides the main house	Bamboo/ cane mat act as partitions or rooms			

Data collection page 3



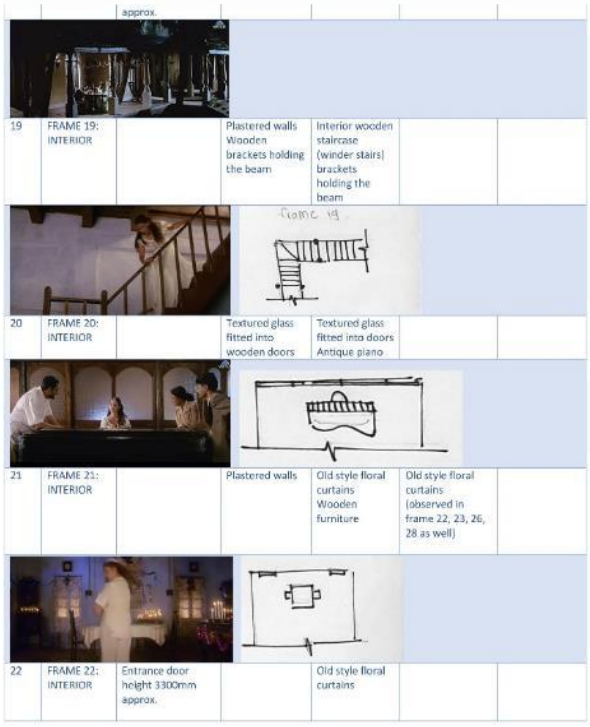
11	FRAME 11: INTERIOR	Opening (door) height 2100mm	Plastered walls Wooden doors with glass fitted into it	Vintage style lights		Vintage style lights
12	FRAME 12: INTERIOR	Height of door = 2200mm Height of floor = 3600mm- 3800mm	Plastered walls Wooden doors with glass fitted into it	Gramophone (1887)		
13	FRAME 13: EXTERIOR	Space description: Verandah of house which connects to the living room	Concrete flooring Yellow painted walls		Concrete flooring (Observed in frame 18, 30 as well)	
14	FRAME 14: INTERIOR		Textured transparent glass Walls - painted	Transparent glass panels fitted in the window frame.		
15	FRAME 15:	Space description:	Glass panel	Typical goan		Typical goan

Data collection page 4



	EXTERIOR	verandah or external buffer space for living room	fittings for openings	style opening with glass panel fittings Wooden spiral staircase Antique lamps		style opening with glass panel fittings
16	FRAME 16: EXTERIOR	Sill level pf the window = 750-800mm Lintel level 2200 mm	Wooden doors with textured glass fitted into it.			
17	FRAME 17: EXTERIOR	Plinth level approx. 750mm Height of pillars approx. 3000mm Height of the complete structure approx. 7500mm-8000mm	Pillars material seems to be polyurethane	Pillars	Height of pillars approx. 3000mm (Observed in frame 18, 30 as well)	Pillars material seems to be polyurethane
18	FRAME 18: EXTERIOR	Space description: Wide spaced verandah Entrance lobby that spills out in the verandah Distance between columns 2000mm	Concrete flooring Clay tile shingled roofing Pillars material seems to be polyurethane	Pillars slender above with a strong box shape base		

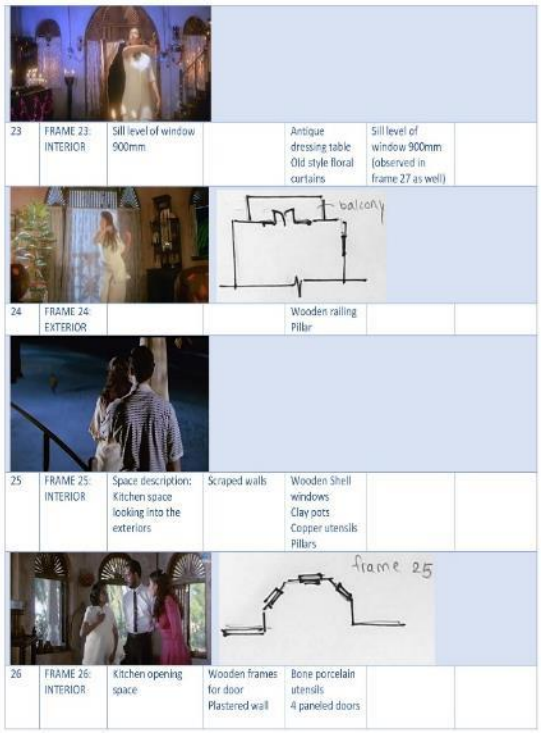
Data collection page 5



		approx.				
19	FRAME 19: INTERIOR		Plastered walls Wooden brackets holding the beam	Interior wooden staircase (winder stairs) brackets holding the beam		
20	FRAME 20: INTERIOR		Textured glass fitted into wooden doors	Textured glass fitted into doors Antique piano		
21	FRAME 21: INTERIOR		Plastered walls	Old style floral curtains Wooden furniture	Old style floral curtains (observed in frame 22, 23, 26, 28 as well)	
22	FRAME 22: INTERIOR	Entrance door height 3300mm approx.		Old style floral curtains		

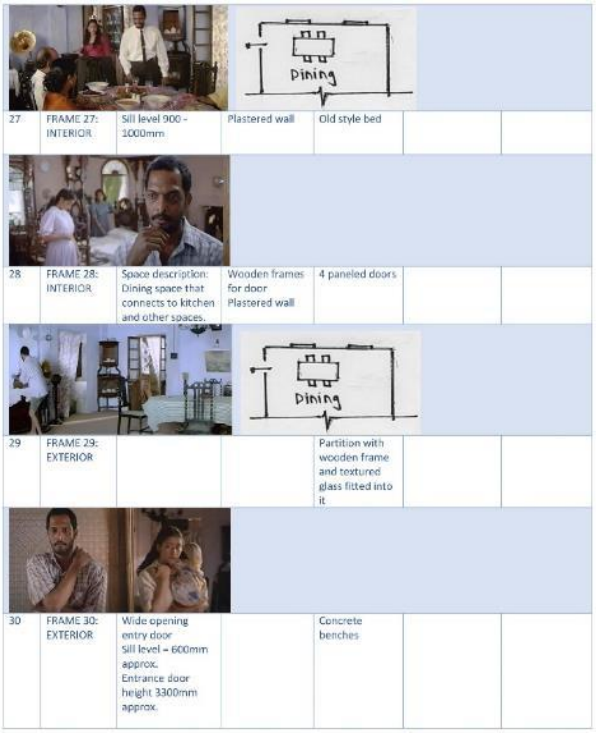
Data collection page 6

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23	FRAME 23: INTERIOR	Sill level of window 900mm		Antique dressing table Old style floral curtains	Sill level of window 900mm (observed in frame 27 as well)
24	FRAME 24: EXTERIOR			Wooden railing Pillar	
25	FRAME 25: INTERIOR	Space description: Kitchen space looking into the exteriors	Scraped walls	Wooden Shell windows Clay pots Copper utensils Pillars	
26	FRAME 26: INTERIOR	Kitchen opening space	Wooden frames for door Plastered wall	Bone porcelain utensils 4 paneled doors	

Data collection page 7



27	FRAME 27: INTERIOR	Sill level 900 - 1000mm	Plastered wall	Old style bed	
28	FRAME 28: INTERIOR	Space description: Dining space that connects to kitchen and other spaces.	Wooden frames for door Plastered wall	4 paneled doors	
29	FRAME 29: EXTERIOR			Partition with wooden frame and textured glass fitted into it	
30	FRAME 30: EXTERIOR	Wide opening entry door Sill level - 600mm approx. Entrance door height 3300mm approx.		Concrete benches	

Data collection page 8



Data collection page 9

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A Study of the 'Core of an Institution', Architecture of Anant Raje

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ABSTRACT: The research is based on the works and philosophies of architect Anant Raje. He was part of the rapid progress of India, through the institutions which developed after the independence of India. He worked with Louis I. Kahn for five years and then continued his practice in Ahmedabad. He designed and completed many architectural projects of different scales, mainly Institutional. He was inspired by the works of master architects, Le Corbusier, Louis Kahn, etc, *and also the heritage buildings in India and around the world, especially Mandu.*

The present study will focus on studying the idea of core and its significance in making of an institution in Raje's works. The objectives would be to know about the philosophies of Raje, the influences which shaped those philosophies, to understand the idea of 'The core of an Institution' and how it can be shaped or achieved. To understand the 'The core of an Institution', first what is the 'Core' needs to be understood. Raje talked about Hierarchical centralized spatial organization, the interrelationship between bold primary volumes and powerful voids, etc., which can be stated as an idea of defying or creating the Core. The aspects that constitute the Core of an Institution can be identified as the realization of form, the relationship between built-unbuilt, and the order of different architectural elements like structure, form, fenestrations, etc. Based on that understanding, analysis of Raje's selected projects would be done through developing a 'Model of Analysis'. From the analytical study, the inferences or the conclusion would be formed.

Keywords: *Works of Anant Raje, Modern Architecture in India, Built-Unbuilt Spaces, Order and Geometry in Architecture.*

1. INTRODUCTION

"The Heart is a new social symbol of an appropriate relationship between the private and public realm, between collective and individual activities, between 'You and Me'."[1]

– Sigfried Giedion

Just as the heart is the central organ that sustains the body and enables it to function, in architecture, the term "heart" generally refers to the central or focal point of a building or a space. In urban design, heart means the core of the city, the squares, monuments, the downtown area, etc. In a building, the core might be the courtyard that holds every space together or the specific function around which everything is associated. Like in an institution, a central plaza around which all the buildings are located might be referred to as a core or in the case of a hospital the core can be the system incorporating all the rooms, corridors, and services. There can be different perspectives to look at the core in architecture. Sigfried Giedion talks about the heart as an aggregation of individuals. Different architects have incorporated the concept of the "heart" or "core" in their designs, such as Balkrishna Doshi, Achyut Kanvinde, and Anant Raje in their institutional works.

Anant D. Raje was part of a generation of architects that grew up following the Independence of India and was present for the nation's quick modernization. The challenge of building the institutions of a new society fell to architects. They looked ahead while also reflecting on India's extensive pre-colonial architecture and heritage of India. "It was impossible to avoid the influence of both Le Corbusier and Louis I. Kahn, and in Raje's case it was a question of distilling lessons from these modern mentors while seeking longer-range touchstones in the past."[2]

Working with Kahn was learning all the time for Anant Raje. He mentioned that "choosing to work with Louis Kahn instead of studying him provided him a clue to a personal orientation towards a pragmatic orientation towards

[1] Giedion, Siegfried. Architecture You and Me. Harvard Uni. Press, 1958.

[2] Raje, Shubhra and Amita Raje, Anant Raje Architect Selected works 1971-2009. Anant Raje Foundation, 2012.

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architecture. This can be seen in his works which exhibit the search for order at various levels of architecture".[3] *Other than modern masters, he was influenced by the heritage buildings in India and around the world.*

Going through the available literature, I have come up with the things which have not been discussed in Anant Raje's works, which are 'Building the Unbuilt', **'Search for the core in the Institution'**, 'Breaking and the Following of Geometry'. The present study will focus on sudying the idea of core and its significance in making of an institution in Raje's works.

"The spaces that are created outside the program of requirements are architecturally, the most important spaces. They set up a rhythm and establish identities, to the space that follows."[4]

– ***Anant Raje***

Aim

To study the significance of the 'Core of an Institution', through Architect Anant Raje's works.

Objectives

- To understand the meaning of 'Core of an Institution'.
- To understand the design philosophies of Anant Raje.

Research Questions

1. What are the design philosophies of Anant Raje and the influences that shaped those philosophies?
2. What is the role of 'Order at different architectural elements and expressions' in making the 'Core of an Institution'?

Scope and Limitations

During his oeuvre Raje designed and executed many projects of different architectural scales. The research would limit itself to the detailed study of his selected institutional projects situated in Gujarat and Madhya Pradesh.

Methodology

1. Readings to understand his design philosophies and develop an eye to look at Raje's architecture.
2. Discussions and interactions with architects and scholars who have worked with Raje, or who have been close associates of Raje.
3. Base drawings were acquired from various sources and re-drawn wherever required
4. Visiting the buildings designed by Raje to get the first-hand experience of his architecture.
5. Finally, the study is conclude based on the analytical framework to find core in his buildings.

2. ARCHITECT ANANT RAJE

Introduction

Anant D. Raje was born in Mumbai in 1929. He received his training at the Sir J.J. School of Art where he graduated with a diploma in architecture in 1954. Raje started his professional practice in the city of Ahmedabad with his former school colleague, Balkrishna Doshi. Between 1964 and 1969, Raje worked with Louis I. Kahn, where he contributed to a number of Kahn's works. Raje returned to Ahmedabad to serve as Kahn's on-site architect for the Indian Institute of Management project overseeing design development and construction of the school's main complex, dormitories, and housing additions, in addition to the initial designs for dining halls and a Management Development Centre. Following Kahn's death in March 1974, Raje served as lead architect for the campus's completion. Raje worked in private practice in India for the duration of his career, designing a number of significant public institution and office building projects as well as individual bunglows.

[3] Ibid.
[4] Ibid.

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Design Ideas and Philosophies

In an interview with well-known Architect Narendra Dengle, Raje had shared his ideology. Raje talked about decoding his own intuition and his attempt to resolve philosophical riddles, his constant search for order. He tells that "Solutions lie in rediscovering order within you;"[5]

Here are some of his design ideologies,

- Bold primary volumes and powerful voids to create spatial complexity.
- Spaces created outside of the program.
- Light wells, shadow pockets.
- Structural manifestations in the facade.
- The composition and integrity.
- Shaded courts, surrounded by transitional spaces.
- Responding to material and construction technology.
- Offering different vistas along with movement through spaces, spaces with different types of fenestrations.
- Design of space characterized by natural light and its definite form to achieve the same.
- Making intangible, tangible through architecture.
- Order at different levels of architecture.
- Scale & proportions, strict geometry regulating the elements, harmony, hierarchy…

Influence of Modern Masters

As Raje belongs to the first generation of architects who came after the independence of India, he was inspired by master architects around the world, especially Louis I. Kahn and Le Corbusier who have worked in India. As Raje worked with Kahn, one can see the influence of Kahn in his works.

Influence of Modern Masters

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Some of the philosophies of Louis Kahn based on his books *Between silence and light* and *Louis Kahn Essential texts* can be seen in the works of Anant Raje, Like, Kahn talks about honoring the material, asking brick what it wants to be. He talks about the junctions of structure as modern ornamentation. This can be seen in Raje's building and the way he has dealt with different materials in different structures-forms. Kahn talks about sculpting the light before bringing it into the room, which can be seen in the works of Raje the way he has created a hierarchical layer to diffuse the light, to create a better microenvironment. Kahn talks about total harmony one feels without knowing which can be seen in Raje's works in the way he used order at different architectural levels.

Influence of Heritage Buildings

> *"Today, I am Accused of being A revolutionary yet I confess to having only one master- the past, and only one discipline, the study of the past."* [6]
>
> ***– Anant Raje***

Raje talks about the influence of Mandu and other heritage buildings and sites on his design. In the Indian Institute of Forrest Management (IIFM, Bhopal) one can see the influence of Mandu in the way arches, pavilions, courts, etc are being done. In the Museum of Minerals and Mines, one can see the influence of Adalaj Stepwells, Ahmedabad the way the plinth and circulation have been worked out.

[5] Dengle, Narendra. *Dialogues with Indian master architects*. The Marg Foundation, 2015.

[6] Khan, Wakeel. *Search for an order: An inquiry into the contemporary direction in Indian architecture*. Vastu Shilpa Foundation, 1994.

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3. CORE OF AN INSTITUTION

The idea of the Core

The core is something that holds everything. It is something that holds the parts together from falling apart, different parts confronting each other and also accommodating each other in order to constitute the whole. The core can be identified as an aggregation of the individual as S. Giedion says or as something which makes a community, a community, something that helps people to come together. There are many ways to describe what core might mean as the core can be identified as a symbol or as a metaphor.

Raje talks about Hierarchical centralized spatial organization, compositions, etc which might be one of the approaches toward the making of the core.

The idea of an Institution

Institutions in architecture can be seen as an expression of people's desire to design spaces that reflect and reinforce the values and beliefs of a particular society or culture, and occasionally sometimes of various societies and cultures. Institutions can be thought of as a way to mould and control human behaviour. In addition to providing a sense of hierarchy and order, a building's physical design can affect how people move through and interact with the space.

Louis Kahn talks about institutions as an inspiration to learn, an inspiration to meet, and an inspiration for well beings. Raje says that institutions start with two inseparable parts, a library and the place where learning happens, the informal spaces, the spaces that are created outside of the program.

Making of the 'Core of an Institution'

What makes the core of an Institution? How can one create the core of an institution through architecture?

1. Realization of the form: Response to the site, response to material, structural manifestation…
2. Relationship between built-unbuilt: Response to the climate, Creation of In-between spaces…
3. Order of different architectural elements: Spatial Organization, Symmetry and Balance, Scale and proportion, Rhythm and Repetition…
4. Following and breaking of geometry
5. Dichotomous existence: Duality, Composite use of different materials like brick and concrete, light-dark…

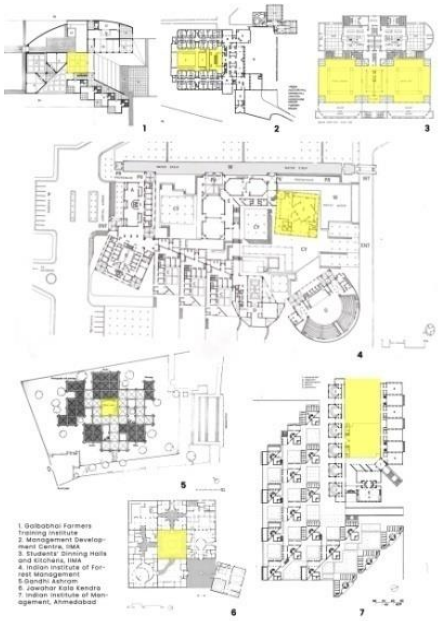
4. INFERENCES

The quotes mentioned in the introduction and the reading literature, one can find that the theories and quotes were referring 2-3 important aspects, very important in the making of the core of an institution in Raje's building,

1. The court
2. The transitional space around the court or the edge that defines the court

With this, the idea of openings in the façade, their scale, shape, etc plays a very crucial role in creating the core of an institution. So, the facade treatment becomes very essential in Raje's works. Even the volumetric change, the balance of solids and voids, etc. gives importance to defining the core.

Based on the understanding of Raje's Architecture, the experience of visiting the institutions, and secondary analytical studies/sketches, the framework of analysis has been developed for further study.

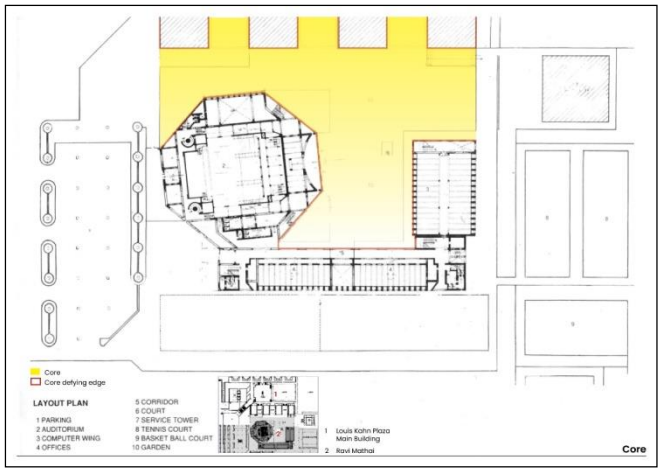


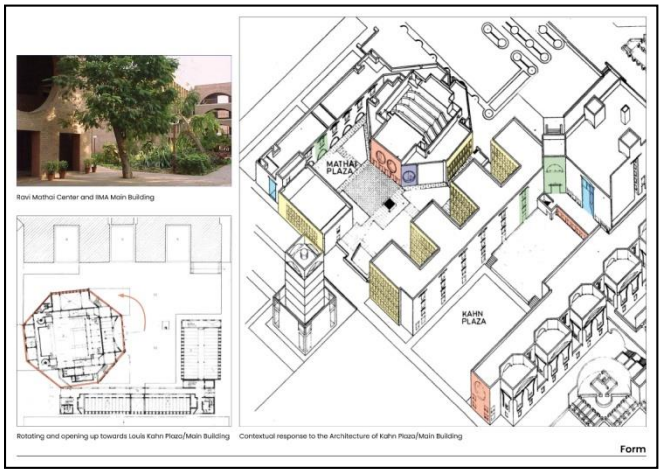
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Framework of Analysis

1. Core And Core-defying edges
2. Form
   (a) Structure
   (b) Volume
3. Solid-Void
   (a) Built-Unbuilt
   (b) Fenestrations
4. Ordering principle
   (a) Symmetry and Balance
   (b) Scale and proportion
   (c) Rhythm and Repetition
   (d) Functional hierarchy and transition
5. Circulation
6. Experiential qualities of space
   (a) Inside-Outside connection
   (b) Attitude towards Light
   (c) Attitude towards Material

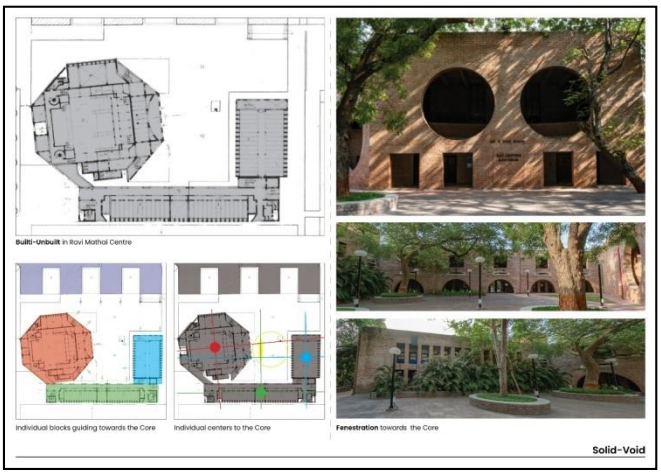
5. ANALYSIS OF RAVI MATHAI CENTRE, IIMA

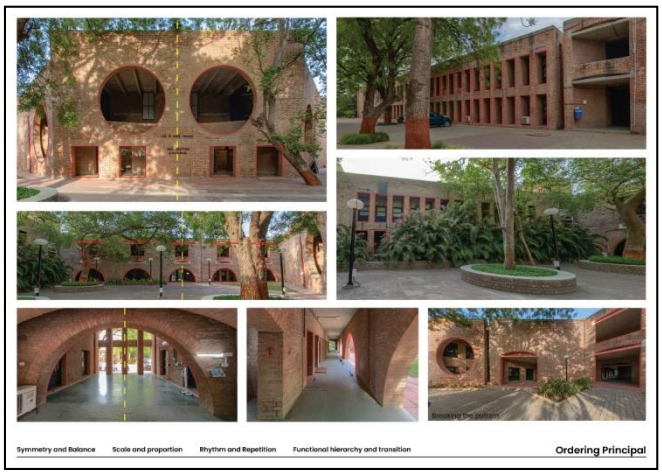




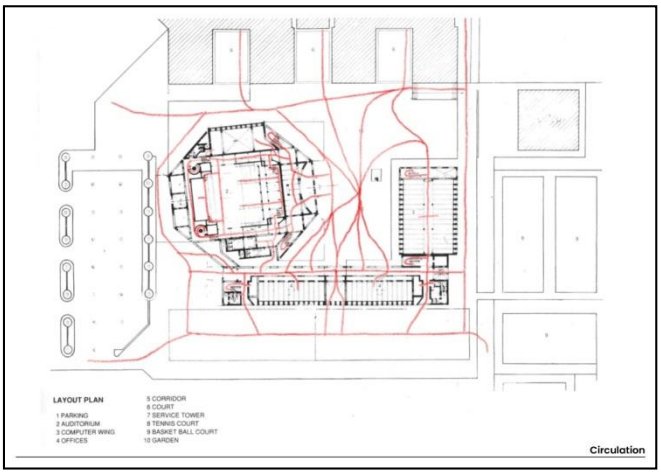
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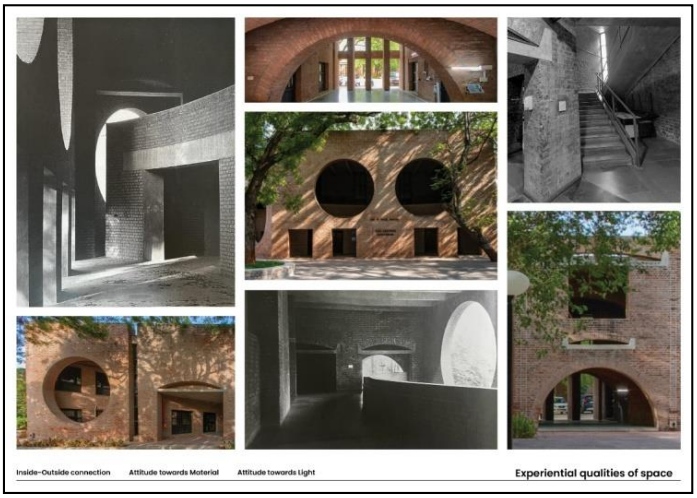
1. **Core and Core-defying Edges:** The court in Ravi Mathai can be identified as a core. As Ravi Mathai is a sort of extension to the main building at IIMA, we can say that the core of Ravi Mathai is more towards the main building. And the edges that define the core are highlighted in red.





2. **Form:** The auditorium building is rotated towards IIMA. Facade treatment and architectural language is responding to the architecture of the main building.
3. **Solid-void:** Solid void means, solid-void in the plan which is built-unbuilt, and solid-void in elevation which is fenestration in the wall. One can see how Individual blocks are guiding toward the Core and how individual centers of the buildings makes the core of the whole building. Different types of fenestrations are there on the three facades around the core. Some provide visual and physical connection and some only visual.
4. **Ordering Principle:** It shows how geometry has been followed and even broken in the building. One can see Symmetry and Balance, Scale and proportion, Rhythm and Repetition, and Functional hierarchy and transition.
5. **Circulation:** The circulation diagram gives the idea that where most of the circulation paths meet, which is towards the core.
6. **Experiential Qualities of Space:** It talks about Inside-Outside connection, Attitude towards Light, and Attitude towards Material. It talks about how with layers and different types of fenestrations of different scales and proportions light has been brought to the space, how the composite of two materials, brick, and concrete are used in different ways, and how with these fenestrations and structural details inside-outside connections are made.





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6. CONCLUSION

In conclusion, the present study focused on understanding the idea of the 'Core' and its significance in making an Institution in the works of architect Anant Raje. Through the study, it was observed that Raje's design philosophy was influenced by the works of modern masters like Le Corbusier and Louis Kahn, as well as the heritage buildings in India and around the world. Raje's search for order at various levels of architecture was seen as an attempt to create the core of an institution. The aspects that made the core of an institution, including the realization of form, the relationship between built-unbuilt spaces, and the order of different architectural elements, etc were identified and analysed on his one of the projects, Ravi Mathai Centre through a model of analysis. From the analysis of Raje's selected project, it can be stated that the core of an institution can be achieved through a hierarchical centralized spatial organization, the interrelationship between bold primary volumes and powerful voids etc.

With this one might argue about the Core identified in his institutes and also other institutes are mostly the courts, then how a normal court is different from the one that which makes the core in Raje's architecture. Raje himself had described about the idea of courtyard in his interview with Narendra Dengle. He says that,"….for instance, when we talk about the courtyard, we say, "There is hierarchy because this is the starting point of a building with elements within and around it." But if you ask me, frankly, the strength of the courtyard is what formulates that courtyard; the courtyard is a space until it is made by something; the courtyard has no presence - it is abstract. So the elements of architecture begin to give the courtyard character. Now if you see these elements - columns, walls etc. - you have an opening, you have walls, in a non-hierarchical way, then the courtyard finds its position and axis and forms a new relationship with these elements - and that is rediscovery of a courtyard."[7] So the way Raje articulates or orders the spaces, the fenestrations, the walls etc makes it the Core of an Institution in his buildings. Sometimes the core might not be the courtyard, it might be a in-between space, a specific prominent function or something else. But the order with which Raje works makes it the Core.

LIST OF ILLUSTRATIONS (*Note:* All figures are edited by the Author)

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वाचाल तर वाचाल

Re-Imagining the Dying Culture of Reading and Public Libraries

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ABSTRACT: Due to increasing digitization, people are chained by technology and therefore they are drifting farther from books and knowledge. Individuals fail to recognize this immense knowledge. Nowadays people are increasingly dependent on their cellphones. Due to this, literacy rate has been reduced and people do not get enough knowledge, therefore, one can see a decline in reading culture. It is particularly important to engage young crowd towards reading and libraries since libraries are a place that provides knowledge, it has a preserved history, it is the safest and most accessible space to go to, it's a space where there can be a social engagement and it helps in connecting the community. The current research focuses on establishing a library that is distinct from the typical library, one where people not only learn but enjoy learning it by developing spaces and functions which help unite the community. The design will promote reading and assist libraries regain their significance.

As one cannot ignore this advancement in technology, using it for better learning and an advantage for humankind in terms of gaining knowledge will be of utmost importance. With integrating another program of meditation center the space brings out the mindfulness of the people. While a library being a meditation center for the people who love reading, both programs focus on holistic healing of your body. Thus, providing a calm and relaxing environment can help people build focus and better their life.

Keywords: *Learning, Culture, Creativity, Safe, Accessibility, Social Engagement.*

1. INTRODUCTION

As the world has submerged itself in social media and digital technology, it has overlooked on a substantial part in terms of acquiring knowledge, that is, a Library. Libraries are entryways to information and culture. They provide resources and services that foster learning opportunities, encourage literacy and education. It is a place that involves community, where users can access magazines, newspapers, articles, books, research papers, and other media. As a result of technological innovation, libraries now offer internet and Wi-Fi access. Without libraries, it would be challenging to promote human knowledge and research as well as safeguard accumulated knowledge and cultural legacy for future generations.

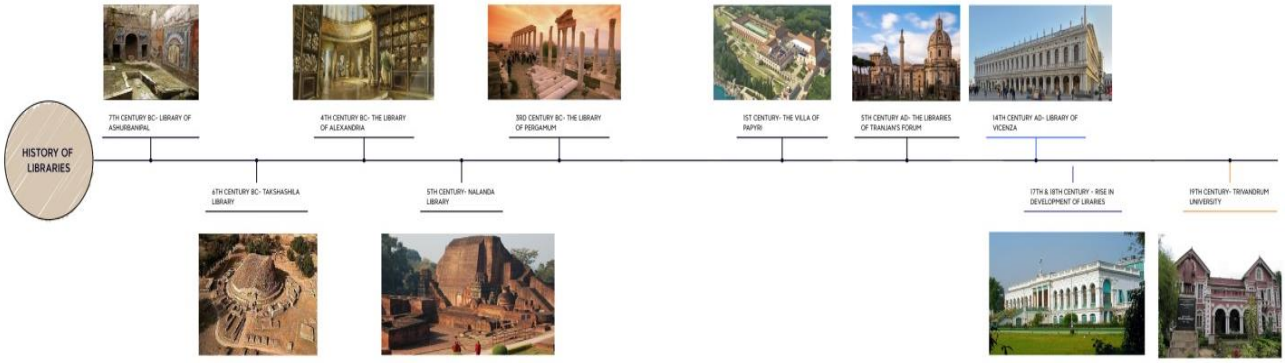


Figure 1: History of Libraries

(*Source:* Author)

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Libraries have existed for over 5000 years. They were created in order to preserve documents, written works, and literature. Libraries contained tablets describing Mesopotamian history and culture. These were created as they were the primary source of knowledge and information about vanished cultures and ancient history. For centuries, these libraries were of utmost significance to the learning of the ancient world. Libraries therefore developed as a temple of knowledge and information but also a place for community engagement in order to offer knowledge and preserve the past. Due to digitization and technology advancement this vital place is losing its importance. Hence it is necessary to bring together the society and reduce the gap due to technology. To promote self-learning, knowledge, social interaction, that can help community as a whole and grasp the information which is being neglected due to "digital divide". Hence to help a public library regain its importance in its state, neglecting digital advancement cannot to be an option as it comes with pros and hence using it as a benefit to approach towards public libraries can help in providing a new definition to it. A blend of traditional and modern learning and the essence of collective spread of information can bring more people to read and visit a library, hence public library can also act as a public space. However, people today rely on their telephones more and more. Due to this trend, the literacy rate has decreased, and people are not receiving adequate education. Consequently, there is a fall in reading culture, and it is crucial to encourage young people to read and use libraries since they offer a wealth of information and are the safest and most secure places to read.

Reading Culture: The origins of reading are probably something that all readers are curious about. While reading someone else's writing, one feels a sense of continuity and unity. One feels more unified if aware of one other's reading preferences. The influence that reading has on us might disclose details about our personality and past experiences. Reading history and analyzing readers may be quite helpful in understanding the nature and history of society as a whole. Building a strong reading culture can demonstrate a high level of literacy. Reading is the mental activity wherein a person looks at a written text and begins to assimilate the information within. Fluency in reading can benefit both work and subsequent study. Early reading habits should be formed. It's crucial to start reading regularly as a young child. It is an acquired habit to view knowledge or entertainment through written words. Reading can be done for pleasure as well as for academic purposes; it can involve newspapers, novels, and even online articles on subjects of interest. Reading has been a popular hobby for many years. It plays a crucial role in every aspect of our daily life. It's essential. When you read a book, you learn new things. Without reading books, one's knowledge stagnates and is unable to advance. Books exist in a variety of genres and categories, including novels, academic texts, light reading, etc. The world's history is also largely preserved through books. This is the primary driver for the establishment of libraries. The library contains all of the history of the ancient world, including the age of clay tablets, cuneiform writing, and printed books. With preservation they hold a great source of knowledge too. It is vital to pay greater attention to children's reading since this habit is carried forward by the individual in the near future. Reading should be acquired early in adolescence. Therefore, it is crucial to deal with the selection of reading patterns, genres, books, and themes in order to interest the kids more. Their ability to be engaged by anything plays a big part in how much they read. Additionally, setting aside time for reading is crucial considering it will always be a part of people's lives. A strong reading culture and suggested outcomes can contribute to a person's success and lead to a brighter future in a changing world as well as among changing young. A good path to adulthood, in the opinion of NZCER, includes students' enjoyment of reading in their spare time The area enhances people's attentiveness by incorporating another programme of—a meditation center. Both programme emphasizes on comprehensive body treatment, as a library serves as a meditation centre for those who enjoy reading. A meditation centre is beneficial to one's mental health, as we all know, "health is wealth." Maintaining good health is crucial. Therefore, fostering a peaceful and serene environment can aid in improving focus and quality of life. Meditation and reading are art of attention. The practice of paying attention helps to evoke mood and helps provide a means of appreciating the cognitive and existential functions of one's imagination. Reading also aids in the creation of new ideas, while meditation improves concentration, which encourages creativity, seek distraction and relief from unpleasant realities by engaging in a fantasy. Reading in a relaxing environment and immersing yourself in the book can help you achieve calmness and relaxation that is similar to meditation.

AIM: To analyze reading culture and to enhance it by integrating of natural and built environment.

2. OBJECTIVES

1. To understand the use of library in urban life.
2. To understand the decline in reading culture.
3. To create ways for people to use library.

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4. To provide a space as social engagement.
5. To help people gain more knowledge about library and bring them closer to libraries.
6. To provide eternal peace through reading and meditation.
7. For betterment of mental health and help reduce stress and anxiety.

Scope

- Help in bringing the community together through reading.
- Proving a space for people to choose through library or meditation centre.
- To provide holistic healing of body mind and soul.
- Help in giving people opportunity to lead a healthy life.
- A space for all the age groups.

Limitations: Many people are not engaged in reading hence designing for those people to come is important.

Research Questions

Q.1 What is the importance of libraries?
Q.2 How to engage the Youth and children to visit libraries?
Q.3 How to revive the dying culture of libraries?

Literature Review

Article 1: Saving Maharashtra's Public Library Culture

Purpose: Reviving the use of libraries from earlier eras while providing a critical review on current library use is vital to save the dying library culture.

Analysis: A Librarian from the Chinchpokli Public Library states that, Back then, individuals of all ages would socialize, but that is no longer the case. This is caused by a range of factors, including the COVID-19 pandemic. Members are in the 40+ age range. Since COVID-19, there hasn't been a rise in the number of people coming back because they stopped reading. In 2012, there were 12,861 registered public libraries, but after ten years, there had been a decline of 712 public libraries because of a lack of financing and resources. In an effort to promote reading in today's society, the government has now announced the establishment of book villages in each district.

Article 2: Public Library Revitalization in India: Hopes, Challenges, and New Visions

Purpose: Finally, the library system's negligence is being taken back into consideration. As a result, it examines the proposals with a focus on the public library system in India and the difficulties that would be encountered in putting into practise a new vision for public libraries.

Analysis: India's social and economic growth have improved in the twenty- first century. Even if the majority of India's regions lack developed economies, sustainable economic development methods must be taken into account. Investing in educational objectives or library services is one such solution. Even though things are disregarded, acknowledging their significance and taking action to restore their value are essential. This article presents a fresh perspective on creating public libraries and Create a unique and sustainable approach to it, and develop it so that it serves as a space for learning and socializing as well as for the society's overall development.

Materials and Methodology: The research about the study begins from the concept of the dying culture of libraries, as the newer generations have to internet in visiting libraries and hence reading and public libraries are dying also to understand the importance and need of public libraries so people access them. Hence the study of re-imagining of the dying culture in libraries by referring to books, articles, newspapers and research papers.

Results: Recognizing the current need for public libraries will help in rethinking the concept of libraries in new and creative ways. A library is one of society's greatest treasures and offers all the materials available outside of the WWW; nonetheless, the internet cannot replace a physical public library. Additional literature can be offered, for instance, forbidden old books. A public library offers free books to read for pleasure or to learn from. Get books in various categories, including sci-fi and

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fiction, a controlled environment with no distractions, no noise, calm, decorum, plenty of room and air, comfort, and focus. Free internet. People frequently go to cafes to work and use the free internet. A public library, on the other hand, may contribute to the richness of a community by enabling more individuals to access duty-free internet. Many visitors can be engaged if they have access to e-books, DVDs, and audio books access to many software along with conducting programme of awareness in the library. The younger generations can participate in storytelling sessions, a good setting for socializing and forming relationships apart from home.

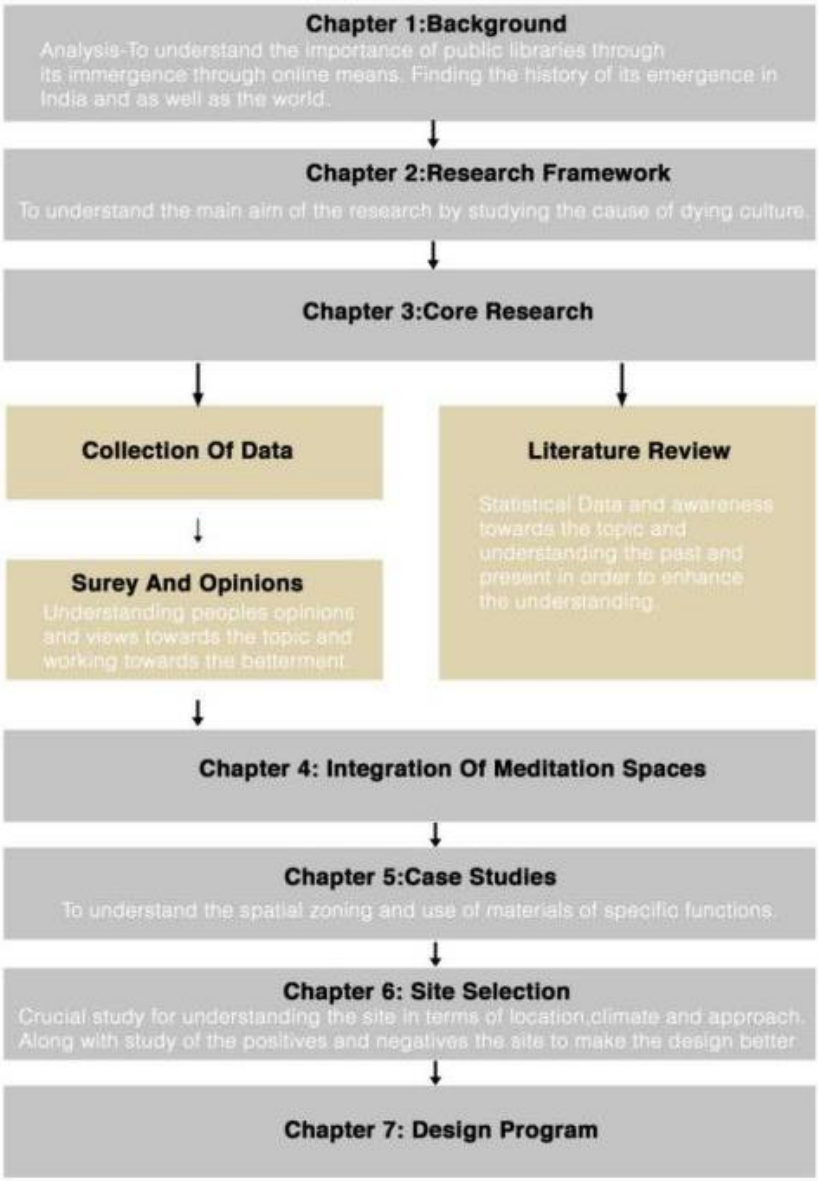


Figure 2: Research Methodology

(*Source:* Author)

Human Library: "A stranger is a friend you haven't met yet".

A new approach, a new trend to learn more about life can be headed by a human library. Human library is a space that offers people to put forth their personal life's in public. It is an opportunity for the people to share their life lessons and experiences to spread knowledge to others. It acts as an informal educational program which helps in personal growth as

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well as community growth. Main aim of the human library is to accept the diversity and differences, hence living in harmony and unity. In all it helps broaden people's perspective towards life and have different approach to different problems. In this, humans are the new BOOKS. As life of a person is like a book where the birth of a person is like opening the book and the years in a persons life are like chapters waiting to be turned. The more the years pass by the more closer you are to a new chapter, to understand new things, experience new stories and to have curiosity and to go ahead and open more chapters in life. Experience is a persons biggest learning hence la person is just like a book and writing their own stories. Hence a human library becomes a platform for people to showcase their chapters in their life and cherish and remember them forever and spread it across the community.

Decline in Reading Culture and Libraries: Even though there were a number of libraries in the start a lot of them are left unused. Since many people don't use these libraries due to certain reasons, they are losing their importance and accessibility. As they have a very traditional approach and don't cater to the requirements for all age groups, only older people can be seen visiting the public libraries. As many libraries are left unattended, they are not maintained properly which makes it more unapproachable. In addition they don't have a spatial experience while reading. They are termed as old and dingy being a reason people find them boring. Also the books are not arranged properly and many spaces are left unused and not designed properly. Libraries provide a greater selection of printed materials. Reading a physical book can have tons of advantages. The primary benefit of reading paperbacks is their friendliness. When compared to an electronic book, A paperback provides a tactile, authentic experience. Reading actual books instead of digital ones allows you to retain information longer, which is a good approach to cut down on screen time. While reading e-books on a phone or tablet can be more distracting. A physical book can open multiple books at once while an electronic book can only open one tab at a time while research. Wi-Fi and batteries are not necessary. A tangible book has an actual collection of knowledge. Libraries are currently suffering as a result of crucial factors like the global pandemic COVID 19 and social media. The libraries were nonetheless able to function before Covid despite having minimal funding because the trusts used their own methods of generating income. Despite their diminutive size, the actions guaranteed ongoing financial assistance. One of them was membership fees, which is one of the easiest ways for libraries to make money. Some people hosted workshops and study groups while others rented out their space. However, Covid stopped all of that. The Indian Express was able to get data showing that Maharashtra's membership decreased from 2033406 in 2019–20 to 1881565 in 2020–21. These libraries were popular not only for reading but also for finding old journals, magazines, newspapers, reference books, and other academic literature, which drew a lot of researchers to their locations. However, even those figures have recently decreased, from 805088 in 2019–20 to 561929 in 2020–21, despite an increase in the number of books in libraries from 66679295 to 98713810. Due to advancement of technology social media has taken a front foot. From being in contact with family and friends in one touch to getting everything in one go. It has become an escape which leads to ignoring aspects of life. Young age children are sinking into the virtual world of social media. Due to this communication on chat has become easier than face to face communication. Interaction has reduced and knowledge has taken a back seat. Due to social media people do not socialize and this adds on to laziness, hence going to a library currently has become difficult. Howbeit, children today are distracted from books and miss out on the unique experience of reading. Malls and digital distractions are the main causes of this problem since people are now so preoccupied with the changing trends and technology that reading culture has been severely neglected.

Hence it is essential to meet the requirements for all the people such that everyone visits the library and it can regain its importance. To re-imagine public libraries and to break their preconceived notions about them. to encourage social interaction and draw large numbers of visitors. Understanding the role of public libraries and designing them to cater to the needs of all age groups while also including ancillary activities to make them more lively. To break from the traditional ways of spatial zoning and creating innovative and modern approaches. a place where learning is of vital importance and gaining knowledge serves as the main goal. Where people can escape from their barriers and study in natural context. to create an inviting, peaceful atmosphere with interactive spaces that can draw visitors in and pique their curiosity. Mental well-being and general health can both be improved by the sense of calm, peace, and balance that meditation can bring you. Redirecting your attention to something peaceful can help you unwind and manage stress. You can learn to maintain inner serenity and focus by practising meditation. These advantages continue even after your meditation session is over. Your day will go more smoothly if you practise meditation. Additionally, meditation may help you control the symptoms of particular medical disorders.

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3. CONCLUSION

It's crucial to comprehend the value of public libraries as well as how people utilize and perceive them. Its evolving function as a place for people to interact, read, exchange, and explore ideas should be acknowledged. It is a location that caters to a wide range of people, including children and youth, adults, professionals, and the elderly. Before the digital revolution, libraries were the sole sources for knowledge and history. In order to maintain its significance, it is crucial that the local population understands how to utilize the space. Due to the fact that we now exist in the Internet era, public libraries should be updated to meet the requirements of all knowledge society users. Therefore, providing technology-oriented services in libraries can enhance footfall when it comes to the younger generation. The importance of education is spread through the use of public libraries. Consequently, it must be available to everyone. Regardless of race, religion, or nationality. They can attract users and aid to revive their vitality if the traditional approach is changed and they are modernism along with meeting the requirements of everyone. All age groups can access the space and encourage social interaction and learning by comprehending the key challenges of the dying culture and rejuvenating it with contemporary fun learning methods. Technology can assist libraries in attracting users, acquiring knowledge, and otherwise fulfilling their intended functions in the modern era. Therefore, it is necessary to emphasize the importance of public libraries as public spaces where people may both gain knowledge and maintain the life of the community, also pay attention to focus on strengthening public library services and to create a new, sustainable vision that will primarily support the growth and development of public libraries. The integration of a library and a meditation centre can introduce users to more conventional self-improvement techniques. These two functions can satisfy the longing for warmth and peace in this chaotic and bustling lifestyle. You can free your mind from the numerous distractions that lead to stress and worry by focusing your attention. A particular object, an image, a mantra, or even reading can be used to direct your attention. In order to achieve a sense of community learning, access to public space, a knowledge hub, and promoting overall development of an individual and community, libraries should be developed in and around urban areas.

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Traditionalism in Modern Residential Architecture of Emerging Indian Cities

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ABSTRACT: Change is inevitable and time spares none, being aware of the recent statement the following research is an attempt to analyse how the traditional architectural elements have evolved over time and can be used in contemporary homes. Key focus of the research spans across residential typology looking at the state of Maharashtra as context of study. Tradition is an element of the development process that is passed down through the generations. It is not only a part of the past but also continues to play an important part in modern life. In today's scenario, the pace of change is quite rapid, making one wonder whether the western influence of architecture is leading Indian traditionalism in architecture toward oblivion. As the old saying goes, no matter how far one goes, one must always stay connected to their roots. Tradition and modernity are in a time and space-ordered transitional relationship. Tradition reflects the past, yet modernity is derived from it, meaning that tradition is the premise and foundation of modern growth and that it would be disrupted without it. Tradition is an element of the development process that is passed down through the generations. It is not just a part of the past but additionally plays a crucial element in present-day life.

Keywords: *Traditional Architectural Elements, Modern Elements, Modern Life, Development Process.*

1. INTRODUCTION

Traditional architectural layout patterns evolve with time; as a result, every structure layout's modernity must be primarily based totally on the conventional architectural fashion of its very own location, in preference to rising from someplace else, because it might be evident and unfriendly. Tradition is not unchangeable, yet it is a variable that is relatively stable. Tradition has stood the test of time throughout history, gaining acceptance and acknowledgment from the majority of people and developing a conventional thought. Tradition has come to a halt as a result of conforming to societal development trends. As a result, tradition has a kind of evolved nature to it. The basis of the introduction and increase of the latest things is to interrupt loose tradition, which suggests as it should be treating tradition, now no longer totally sticking to it or being frightened of change, nor absolutely ignoring or denying its importance. In a nutshell, modern growth should be inventive and founded on tradition. With the development of the social economy, people's living demands are changing as well, which implies that following regional architectural traditions uncritically will no longer fulfill the needs of modern people. The accurate technique is to mix the outside traits of the surroundings and herbal sources with the brand new functions of existence to layout construction that now no longer handiest meets conventional aesthetic necessities, however additionally meets the desires of modern-day people, and adapts to protecting the outside surroundings, is energy-efficient, environmentally friendly, and sustainable, which necessitates an architectural layout to have "functions" that meet the necessities of the time. In fact, the fusion of history with modernity in architectural design is a representation of architectural design progressing with the times, as it is a fusion of "culture" and "function."

This study is based on a few traditional residential units and a few modern residential units designed by Ar. Sunil Patil in Ichalkaranji and Kolhapur. The reason behind choosing two different types of residences from two different time periods is to understand and compare the concept used in traditional houses, what actually are the traditional elements and how they can be used in today's modern buildings.

2. LITERATURE REVIEW

2.1 Traditionalism and Modernism: Approaches to Vernacular Architecture

This paper gives a brief knowledge of the concepts of traditionalism and modernism through vernacular architecture. Tradition defines, restricts, and establishes a sense of social integrity and order, while modernism advocates the eclipsing of accepted truths and traditional values. Modernism originated from social, political, and industrial revolutions that began in

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the late 18th century. It is a force in a more equal and more politicized world. This is a force that has changed the world, and it has changed the way we look at the world. In other words, changed the foundation on which we established values and standards. The modernist ideology challenges accepted emotions and conventions and offers an aesthetic of constant renewal. It is fresh and always full of challenges and is often unpredictable and uncertain.

2.2 Discussion on Fusion Method of Tradition and Modernity in Architecture

This paper tells how the amalgamation of tradition and modernity can be achieved in architecture. Globalization has turned the Earth into a global village shared by all humans, cutting time and space distances and narrowing regional differences, putting regional culture at risk of assimilation and extinction. Globalization has introduced the latest construction technologies and materials to each country, as well as new theories, genres, and architectural styles. It not only introduces new ideas to the world's regional architectural culture, but it also has a significant impact. The global cultural convergence caused by globalization is reflected in architecture. Architecture's regional culture is progressively being absorbed by global culture, and "nationality" is being supplanted by "internationalization." The regional culture, as the heart and soul of the city and its architecture, is progressively fading and disappearing. How to maintain and develop regional architectural culture, as well as how to connect regional architectural culture with the requirements of modern building function, is particularly crucial in the context of globalization and cultural integration.

2.3 Traditional Versus Contemporary Elements in Architecture

This paper explains the comparison and difference between traditional and contemporary elements. There is a clear relationship between "tradition" and "contemporary". If an architectural solution provides an unambiguous repeat of a form that has evolved in the past and has been acknowledged by prior generations as a universal means to meet architectural requirements, it is referred to as "Tradition.". The architecture of past generations is a direct response to two sets of basic design constraints. The first is physics, which understands the climate and the materials available on-site; the second is culture, including attitudes of religion, personal, and society. Traditional architecture is characterized by the fact that it has evolved over time. The general point is that all traditional architectures respond to a particular context. This reasoning, however, does now no longer constitute normal truth; many traditional architectural paperwork have these days been proved to be useless in addressing associated issues.

2.4 Can Culture and Tradition be Considered in Modern Architecture? How?

This paper raises the question of how tradition can be considered in modern architectural style. Modernism in the Western world quickly followed in the footsteps of the industrial revolution. This era is characterized by mass production and cheaper and easier-to-assemble buildings. Its inherent minimalism and simplicity mark its departure from the previous gorgeous and gorgeous buildings. The world was undergoing major changes when modernism provided a new face. Changes in various political, economic, and social aspects. It was born for challenges and guidelines and didn't come out of anywhere. This is a way of moving forward; he never suppresses or hides the past or his culture, but just moves forward. Because, "You can't grow in the soil that poisons you"-change is inevitable.

2.5 Modernity in Tradition: Reflections on Building Design and Technology in the Asian Vernacular

Starting with discussions of the construction of modernity and its bounds withinside the context of architectural evolution, this look indicates how environmentally demanding situations and generations show off themselves in Asian vernacular examples. The article's primary dreams are to make a contribution to an essential debate approximately the relevance of any facet among conventional and present-day factors of layout choices and generation and to focus on materiality, layout innovations, and ingenuity in a nearby structures, especially in Asian vernacular examples, which are extra on par with vernacular homes than present-day homes. With this foundation, vernacular may be followed as a technologically sound version of sustainable paperwork withinside the twenty-first century. Modernism in structure is hard to describe, no matter the truth that it's far manifestly against historicism withinside the overdue 19th century and rejects historic precedents and conventional production methods. Modern-fashion homes have simple paperwork, visually expressive structures, summary ornamentation, and functions, and they imply a sturdy desire for commercial constructing substances and production. In sure ways, the structure's quantity is pretty large. In order to price homes, modernism redefines the cultured notion of them. In phrases of look and details, be clean and emphasize the "much less is extra" philosophy. Surprisingly, the early

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twentieth-century movement's forerunners additionally expressed a super appreciation for nature, environmental variables, structural precision, and cloth integrity, all of which can be crucial traits of vernacular structure.

3. MATERIAL AND METHODOLOGY

To study the topic qualitative methods of data collection were used. A semi-structured interview was conducted with the residents of the above-mentioned buildings as well a literature review on Wada typology was done to compare the traditional and modern elements used and how those elements can be implemented in the present situation. The research was conducted in Ichalkaranji and Kolhapur. 3 modern bungalows designed by Ar. Sunil Patil were studied and 1 Wada was studied in order to see what were the traditional elements and how they have been used in modern buildings.

The interview questions have been listed below:

- When was this house constructed?
- What problems are faced due to the use of traditional materials like wood and stone
- How is the maintenance of the house done and how often is the maintenance required?
- What are the effects of using traditional elements in your house?
- What were your ideas for constructing a house that had traditional elements in it and how did the architect incorporate them into the design?
- What effect does the courtyard have?
- Why did you want the use of stone and wood instead of brick and concrete in your house?
- Do you think the use of these elements is important in today's houses?

4. RESULTS AND DISCUSSION

Element Study:

- **Courtyard**: In Wadas, the courtyard was a core element in the design of Wadas. It was usually surrounded by a building or a complex and it was open to the sky. Courtyards not only add to the aesthetics of a place but also tackles climatic conditions.



Figure 1: Courtyard in the Wada Durganivas

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Figure 2: Courtyard in Yashman Twin



Figure 3: Courtyard in Mr. Poddars Bungalow

Bungalow

These are the modern residences visited by me in Kolhapur and Ichalkaranji. In Figure 2 it can be seen that there is a courtyard that has been provided with skylights above and in Figure 3 it can be seen that there is a courtyard in this bungalow is an element that is open to the sky which provides an outdoor space but is designed in such a way that it is away from the public eye. This space is used by the family for organizing parties there and also sitting there and spending time together.

- **Material (Stone as the plinth):** The locally available material in the construction of Wadas was the combination of clay, sand, cow dung, and lime to make bricks. Wadas had exposed basalt stonework up to the plinth level.



Figure 4: Stone Plinth in Durganivas

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Figures 5 *Figures 6*

Figures 5&6: Stone Plinth in Yashman Twin Bungalow

This is the residence in Kolhapur where the use of stone was seen as the plinth material. The owner of the house was Maharashtrian and wanted to use the traditional elements that were used in their old home where stone plinth was one of the materials. They wanted to use stone as the plinth material because stone helps in keeping the house cool as well as it is a locally available material in Maharashtra.

- ***Timber Doors:*** In Wadas, one of the most dominating features was the large entrance doorway made of wood. The main entrance door had a smaller door which was called the Dindi Darwaza. Dindi, the smaller door only, was kept open for regular use.



Figure 7: Timber door in Durganivas

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Figure 8: Timber door in

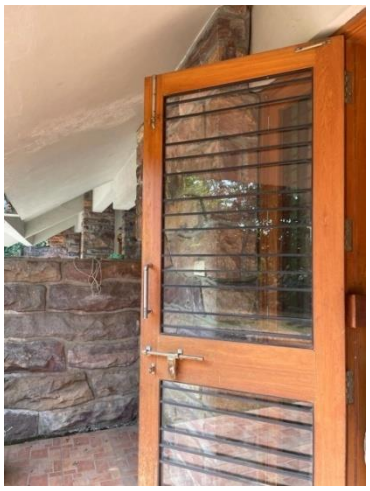


Figure 9: Door in Yashman Twin Bungalow

Shankarpushp

In Figure 8 it can be seen that timber is used in doors with small openings in it while in Figure 9 it is seen that timber is used along with glass which is a modern material. It can be seen how modern and traditional materials can be combined which adds to the aesthetics of the material along with keeping the use of traditional materials.

- **Timber staircases:** Wooden stairways were used which were built within the thick mud-mortared brick walls. Staircases were sandwiched between walls and usually, they were dark to maintain privacy.



Figure 10: Timber staircase in Durganivas Wada

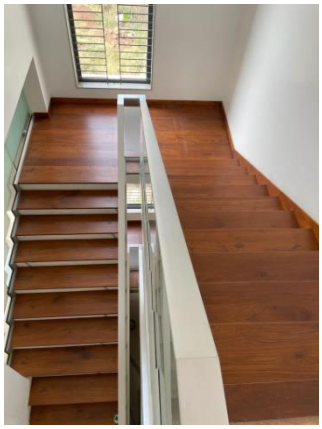


Figure 11: Timber Staircase in Mr. Poddar's Bungalow Shankarpushp

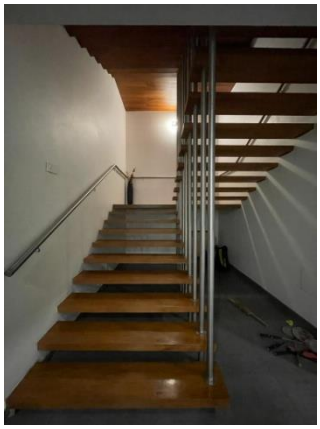


Figure 12: Timber Staircase in Mr. Poddar's Bungalow Shankarpushp

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In modern houses, it can be seen that the staircases have been updated with light using timber as the material and adding a few more elements like glass or steel railings which adds to the aesthetics of it. In Figure 11, it can be seen that only the finish material is timber finish while in Figure 12 the entire staircase is made of timber giving it a different style because of the additions of different elements.

- **Timber Sloping Roof with Skylights:** Timber-sloping roofs were used in Wadas which had skylights on them. The purpose of skylights was to provide light and ventilation. They provide natural light and solve the issue of darkness in the rooms. The main function of skylights was that they released the hot air that accumulated near the ceiling naturally.

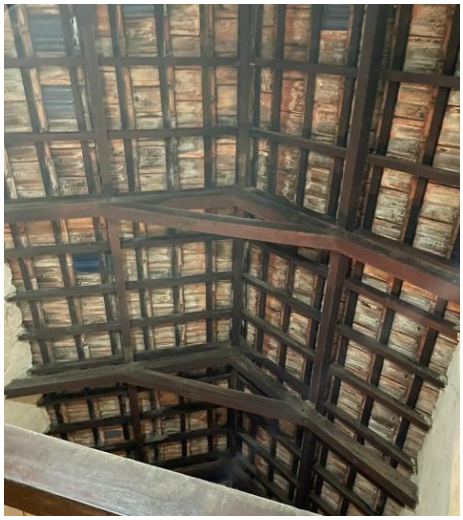


Figure 13: Timber Sloping Roof with Skylights in Durganivas



Figures 14



Figures 15

Figure 14&15: Timber Sloping Roof with Skylights in Yashman Twin Bungalow

It can be seen how skylights have been used as a traditional element in the sloping timber roofs of the verandah to provide natural light. Different patterns have been used as an aesthetic elements in different places. There were 4 places in the residence where skylights were used. There is no need to turn on the lights in these areas during the day as the skylights provide ample light.

- **Verandahs:** In Wadas, there was a semi-open passageway that had columns which were known as Sopa. This was used as an unprogrammed space where various activities took place. This space was used for entertainment. Usually, a swing was placed in the verandah which was the recreational element as well as a feature of the verandah. Verandahs provide shelter from rain and light and diffuse light and are a transitional element of the space.

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Figures 16 ***Figures 17***

Figure 16&17: Verandah in Durganivas

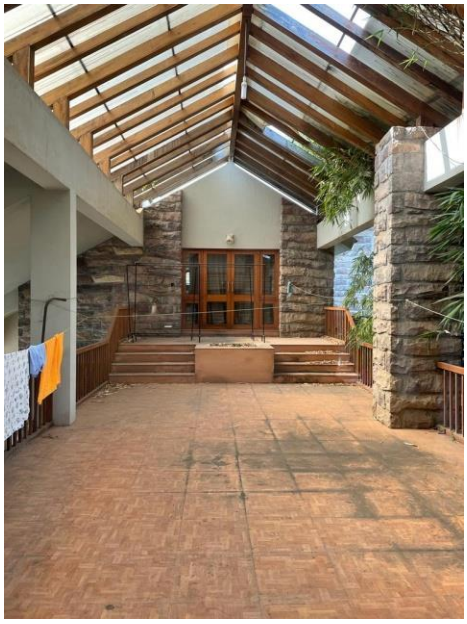


Figure 18: Verandah in Yashman Twin Bungalow

In this residence, there is a verandah that has skylights on the roof. This space is used as a recreational space and for small family gatherings. This is a twin bungalow so this verandah is a common point that connects both the bungalows and acts as a meeting point for the two families. Stone columns are used in the verandah along with a timber roof. It can be seen how traditional elements are used in the modern house.

Tradition is often thought of as the opposite of modernity. One may think of vernacular architecture as a type of traditional architecture that is distinct from modern architecture. Vernacular structures serve as instances of long-term building solutions. These solutions, however, are thought to be inapplicable to modern structures. Building technology and sustainable design are now regarded as critical components of the rapidly evolving field of modern architecture. With the shift in worldwide awareness about the use of energy and resources, practicing architects face a difficult task in designing buildings that are environmentally friendly. It is important to understand how traditional and modern practices can be combined to design sustainable and smart spaces. Tradition has constantly stimulated the rate and peak of improvement in various degrees, consequently completely spotting and the use of the price and strength blessings of lifestyle is the decisive aspect in fast and orderly contemporary-day improvement.

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India being a diverse country has developed into one of the world's largest industrialized nations. This development in industrialization has also been reflected in architecture. There is a clear relationship between the terms "traditional" and "contemporary". An architectural answer may be described as Traditional if it represents an unquestionable repetition of the shape that has advanced withinside the past, and has been ordinary with the aid of using preceding generations in an ordinary manner to remedy architectural requirements. Tradition defines, restricts, and establishes a sense of social integrity and order, while modernism advocates the eclipsing of accepted truths and traditional values. The architecture of past generations is a direct response to two sets of basic design constraints. The first is physics, which understands the climate and the materials available on-site; the second is culture, including attitudes of religion, personal, and society. A basic feature of traditional architecture is that it has evolved over a long period of time. This is far from the truth. Even though the two have their own merits, neither of them is superior to the other. Modernism and traditionalism have always been a long-running debate, and this debate has split rather than resolved. No matter how beautiful, innovative, or efficient the structure of one place is, there is no guarantee that it will work in other places. The term 'modern architecture' is difficult to focus on just one definition, and the opinions on it are endless. For some people it is a sign of progress: the bigger, the taller, the smarter the buildings are, the better the city is. For some people, the originally beautiful traditional houses may be destroyed by people or things that damage their happiness, while modern houses become their escape. It provides opportunities for a new and better future, and perhaps also the much-needed pace and environmental changes. Some people hug it while it is just a concrete jungle for others which is filled with massive glass towers and apartment buildings, containing all the hustles of the racing world. So how important and relevant is modern architecture to a world that strives to understand and adapt to its culture and traditions? Given the current state of affairs, people worry that developing towns are becoming cheap copies of each other, hidden behind unique and indistinguishable faces. The realities of architectural education revolve around the idea of a shared paradigm. The education of contemporary architecture shows attention to the immediate environment, historical precedents of user needs, and energy conservation. It teaches students to deal with the present and predict the future. But below this surface is still the modern paradigm, which continues to reward students for their creative wisdom in their work and the novelty of sensitivity to social traditions. As long as the existing paradigm only leans toward modern architecture, the architecture will never be understood, and will only respond when native architecture may be needed. There is a dire need to amalgamate traditional and modern architecture considering the current situation and promote traditional techniques such as courtyards, passive design strategies, and sustainable strategies.

5. CONCLUSION

Architecture is the achievement of civilization. When modern people explore the history, they cannot do without studying historic buildings. Only while it's far blended with ancient tradition and neighborhood tradition is used as a vital foundation for the layout and construction, cutting-edge homes have vitality. We propose the nationality of architectural tradition, however, that doesn't imply that we simplest pursue mimicking vintage homes. Studies have found that rigid imitation of old buildings and blind westernization do the same damage to the image of the city. The modern structure most effectively has one goal—structure modernization. The hassle of lifestyle and the modern is the knowledge that an architect has to face. Through this knowledge and analysis, the general public has to be enlightened. A new building, built with the most readily available material, fully meets the needs of users and is the sincerest answer to traditional architecture courses. Chapter means that knowledge overlap, old knowledge, and new knowledge are expressed through current products. The discussion between modernism and traditionalism, in a country like India which is rich in history and culture, is not expected but is also very obvious. In some cases, modernism can be regarded as anti-ethnic, but these perspectives do nothing to improve the current infrastructure. In the evolving modern world, tradition and modernity both play a key role. The real danger lies in baseless imitation. A modern structure can be special from the conventional making plans and structure of an area, however, the great manner to locate relevance is to combine and modify it. The modern structure is in no way restricted to harsh angles, quirky curves, or high-give-up technological advancements. Sometimes it is only a count of reinventing or recycling. The realities of architectural schooling revolve around the concept of a shared paradigm. The education of contemporary architecture shows attention to the immediate environment, historical precedents of user needs, and energy conservation. It teaches students to deal with the present and predict the future. But below this surface is still the modern paradigm, which continues to reward students for their creative wisdom in their work and the novelty of sensitivity to social traditions. The architecture will never be understood, and will only respond when native architecture is required, as long as the present paradigm solely tends towards modern architecture.

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Resource Persons

1. Owner of Yashman Twin Bungalows- Mr. P.M. Patil, Kolhapur.
2. Owner of Shankarpushp- Mrs. Patil, Ichalkaranji.
3. Owner of Mr. Poddar's Bungalow- Mrs. Rachana Poddar, Ichalkaranji.
4. Owner of the Wada Durganivas- Mrs. Bhide, Ichalkaranji.

APPENDIX

Questionnaire

- When was this house constructed?
- What problems are faced due to the use of traditional materials like wood and stone
- How is the maintenance of the house done and how often is the maintenance required?
- What are the effects of using traditional elements in your house?
- What were your ideas for constructing a house that had traditional elements in it and how did the architect incorporate them into the design?
- What effect does the courtyard have?
- Why did you want the use of stone and wood instead of brick and concrete in your house?
- Do you think the use of these elements is important in today's houses?

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Workspace Fabric Design of I.T. Offices in Regards to the Introversion Spectrum*

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ABSTRACT: The wake of the COVID-19 pandemic and the consequential lockdown, confined us to our homes questioning the true need for a formalized workspace. Keeping in mind the fabric of IT office spaces, if we go back to working out of the formalized setup post-pandemic, the research questions the design of 21st-century office spaces in coherence with the physical and primarily psychological comfort of its employees. Mental and physical comfort largely contribute to the work performance of the user of any workspace, while also increasing their efficiency. However, the fundamentals of how do we design office spaces that cater to the levels of privacy each employee requires to function at their optimum capacity, and how do we amalgamate private, semi-private, and public spaces that create a varied yet curated range of work environments still remain unanswered. The research aims to assess the current situation of IT offices, particularly in the context of Pune city, and aims towards emphasizing the need for well-designed workspaces post-pandemic.

Keywords: *Workspace Design, Introversion Spectrum, Human Comfort, Privacy, Office Spaces.*

1. INTRODUCTION

In the context of the ongoing pandemic where we weighed the necessity and demerits of stepping out of our thresholds, the built environment went through fundamental changes in terms of its use and hence spatial character. Our balconies and terraces became our parks, dining areas our restaurants, and most importantly our homes became our offices. While

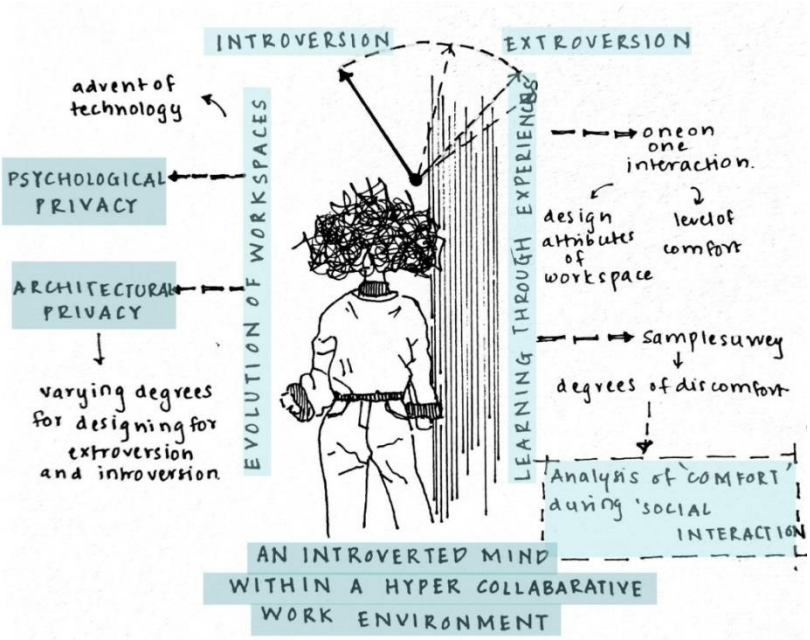


Figure 1a

* Rethinking the Need for Formal Work Environments in the Post-Pandemic Scenario and Studying the Correlation between Human Comfort and Workspace Design.

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workspaces saw a paradigm shift from huge physical built environments typically ornamented with glass facades to the virtual world, we as designers of built space began to question the primary need for an office space. While we see the face of workspaces change into something never seen before, now more than ever becomes the most crucial time to rethink what our formal work environments lack and what are the design attributes that can make them better. Offices over the past few decades have gone through rapid changes in terms of the work environments they offer. With the evolution of workplaces from the Taylorist office that was designed to highlight hierarchy, to the 21st-century open office plans that intend to create an open, interactive and collaborative office environment, there has been a dramatic shift in the degrees of privacy of the corporate environment. The efficiency and work performance of any employee are closely cognate with the levels of physical and vitally psychological comfort they experience within their work environment. Physical comfort attributes for thermal comfort, proper light, appropriate provisions of work furniture, etc whereas psychological comfort, commonly known as mental comfort, encompasses the ability to concentrate, disturbances caused by the architecture or human interaction of the office space, creative focus, etc. Studies have proven that at least one-third of the population classifies as introverts on the pendulum that ranges from introverts to extroverts. Many more of us identify as ambiverts. These users work in the current day same hyper collaborative office environments characterized by interaction and socializing as extroverts do. However, while these environments boost the efficiency and thinking capacity of extroverted minds, they negatively impact the performance of others. On the other hand, some typical work environments that still use cubicles and cabins as work environments, prove to be mundane and uninteresting for extroverted minds while providing the privacy at work, that introverted minds need. This research aims to study factors contributing to architectural and psychological privacy, in IT office setups largely in the context of I.T. Offices, Maharashtra, India with a few exceptions.

The research will be limited to IT offices and will not be able to cover the entire spectrum of office spaces. The larger group of samples will be limited to the context of Pune. Due to the ongoing pandemic, physical case studies will not be a part of the research.



Figure 1b

2. LITERATURE REVIEW

The journal article 'Privacy at Work: Architectural Correlates of Job Satisfaction and Job Performance', even though has been published in 1980, still holds relevancy in terms of the methodology of research and the way analysis of the study has been done. The study focused on studying the correlation between architectural privacy, psychological privacy with job satisfaction, and employee performance. Architectural privacy refers to visual and acoustic isolation offered by any environment. Psychological privacy focuses on the mental and emotional comfort a user feels within their workspace. (Eric Sundstrom, Robert E. Burt and Douglas Kamp, 1980, #) The study broadly studies two categories of employees differing in the type of work. The first category includes clerical work- a job that requires the worker to execute the same mechanical job throughout their period of working. The second category can be classified as people having complex jobs- ones that do

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not have repetitive work and offer a different degree of difficulty in their work tasks every day. The main aim of the research is to study the fundamental correlation between privacy within the workspace and the job satisfaction and job performance of its user. The gist of the intent, methodology, and inferences of the research article is- 'Three correlational studies examined relationships among architectural privacy, psychological privacy, job satisfaction, and job performance. All three studies showed that architectural privacy-as embodied in places with physical means of visual and acoustic isolation-was consistently associated with psychological privacy. Even in relatively accessible places, privacy was related to the amount of enclosure and the number of architectural and psychological privacy. The three studies showed an association between architectural and psychological privacy and found both types of privacy related to satisfaction with workspaces and job satisfaction. This was held for all types of jobs studied, including secretarial and clerical. The results might stem partly from freedom from distractions in private places, partly from the capacity of private spaces to signify status, and partly from the link of privacy with self-identity. In any case, privacy at work remains an important issue with practical implications for the design and management of physical environments. (Eric Sundstrom, Robert E. Burt and Douglas Kamp, 1980, 113,114,115)

'Difference in Satisfaction with Office Environment among Employees in Different Office Types' is another article of study that looks into factors that affect job satisfaction and are related to architectural planning and space-making.

There is research indicating that different environmental factors and conditions in the office environment can affect employees' productivity, job satisfaction, and health. Digging deeper into a similar study, this research studies cell-office, shared-room offices, small open-plan offices, medium open-plan offices, large open plan offices, flex-office, and combi-office (different types of offices each having their own work environment, type of work, number of employees and most importantly nature of workspace) through broadly three parameters: (1) ambient factors, (2) noise and privacy, and (3) design-related factors. Ambient factors include light, thermal comfort, air quality, noise, etc. Noise and privacy are two factors that go hand in hand and are closely related to the concept of 'crowding' within a workspace and is a key contributor to satisfaction. Finally, Design-related factors in office environments include workstation design, workspace design, and general office design, and these factors constitute the physical frame within which the work activity takes place in an office. The article (published in 2009) studies the relevancy of different office spaces according to the types of work happening within those environments and identifies two main issues in the research done on offices before, forging the need for this research. They are: (1) There is a lack of differentiation between the definitions of office types. This makes it difficult to compare different office types to each other from a design perspective as well as a research perspective.

The perception of environmental factors in office environments has mainly regarded the environmental factors as single, isolated factors, when, in reality, they always exist and act together in the office environment. Hence, the research is less useful from a design perspective. The research fundamentally aims towards studying the relation of ambient, noise, and privacy-related and design-related factors in different office environments. In order to be able to do a detailed comparative analysis, it becomes essential to know the character and salient features of each workspace and the way its built environment and planning relate to the type of work. Ambient Factors- In all office types, the two highest proportions of complaints regarding factors are about "inferior air quality" (22%) and "less temperature comfort" (20%). The lowest proportions of dissatisfaction with all items related to ambient factors, 4–14%, are among employees in cell offices. Shared-room offices have the highest proportions of dissatisfaction with all items in this domain. Noise and Privacy- There is a lower proportion of dissatisfaction with respect to noise among employees in cell offices compared with other office types. Design-Related Factors- The highest proportions of complaints with regard to design-related factors are reported on the items for workspace design, an average of around 40%, followed by office design, about 32% For workstation design, the figures are lower with one exception for complaints about no possibility to personalize workstation (56%). There is an overall lower dissatisfaction with workstation and workspace design among cell-office employees, but for support of affinity, there is an important exception since cell office reports the highest value (63%). Most dissatisfaction with workstation and workspace design is reported in medium open-plan offices. With regard to office design, there is a more mixed distribution of satisfaction and dissatisfaction between employees in different office types. (Christina Bodin Danielsson and Lennart Bodin, 2009, 247–254)

'Alone time: Buildings can be introverted too' is published in the globe and mail.

With the present-day principles of office design being dominated by the ideologies of collaboration, interaction, and maximum communication, the need for seclusion emerges for the introverted minds functioning within that space. The article expresses the need to rethink the open nature of office spaces and discusses aspects that could bring in an appropriate

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amount of seclusion within the work environment. The text highlights examples like Toronto Headquarters designed by MSDS studio where mobile furniture helps employees get spaces that facilitate introspection as well as socializing. Such examples characterized by design sensitivity towards introverts, extroverts, and ambiverts help one understand the impact a well-designed, strategically planned space has on the creativity, peace of mind, and productivity of an individual. The article also speaks about the interrelation of seclusion and introspection. Quaint, quiet places are not just meant for cutting away from public interaction but are spaces that force us to introspect—a form of self-realization. In the current age of hyper collaboration and overstimulation, the article urges us to break away from the trend of aesthetics and looks getting an upper hand over the quality of space. After all, we as architects should design the environment, and the structure will be what will follow.

3. RESEARCH METHODS

The research focuses on workspace design in coherence with the introversion spectrum. The research methodology tried to find an answer to a central question of whether or not our workspaces have been designed keeping in mind the mental, and physical comfort as well need for privacy of each of its employees. The methodology of research can be primarily divided into four parts:

1. This section had focused on studying the evolution of workspaces over the years. This study of evolution has been done in terms of changes in architectural and psychological privacy across different types of offices due to changes in the type of architecture and planning. Architectural features acted as the set of parameters in a dot plotting method where the presence of the dot indicated the presence of the architectural feature while the intensity indicated its quantum. The comparative analysis was done between all the chosen office tyes and finally, a bar diagram was produced to show the increase and decrease in certain architectural features leading to lack or gain in privacy and hence comfort.
2. The second part of the research was a qualitative study entailing a structured interview of a sample size of 4–5 people. The qualitative study tried to find out degrees of privacy in a current-day IT setup through mapping. It has tried to infer factors that affect privacy within an office space and their existence within the workspace of the interviewees. Degrees of comfort and discomfort have been mapped and the correlation between introversion and workspace privacy has been understood. The structured interview has 4 parts. The first one focuses on the basic information of the interviewee, the second one is related to their inclination on the introversion spectrum. The third one questions them about privacy within their office while the last part focuses on the comfort of the employee in their designated space of work. Representation techniques of bubble diagrams, back to back bar charts are used to represent, understand and decode the collected data. The interviews were taken either through physical interaction or virtual medium via zoom.
3. The third part of the research methodology is a quantitative study with a sample size of more than 30 employees. The people answering the survey have been so chosen that they are IT employees, have had the opportunity to work in a physical IT office environment, and have work experience of more than 1 year. Most of the people answering the survey are from Pune and have been working in the city itself, however few of them have worked abroad in the USA as well as other parts of India including Banglore, Hyderabad, etc. This survey tries to draw inferences about existing reasons for discomfort within the workspace that are fundamentally caused by the architecture and space planning of the office. It has also tried to deduce measures being taken while the design of workspaces keeping in mind the extremes on the introversion spectrum. This survey has tried to find a relation between the number of introverts and extroverts in a random sample size of 30, and the quantum of spaces designated for each extreme.

   The survey is circulated through the google form and broadly has 3 parts. The first part includes basic information about the form filler, the second has questions relating to their inclination on the introversion spectrum and lastly, the third part includes levels of discomfort and comfort one experiences in their workspace.

   The final conclusions of the research tried to establish the lack of well-designated spaces for introverts in hyper collaborative work environments and have questioned the need for physical workspaces.
4. Final part of the research entailed interviewing a professional psychologist. This interview was conducted on 27th March 2022 via zoom. Mrs. Aarthi Pendse is a professional psychologist and has an experience in the field of industrial psychology. The interview aimed towards understanding the correlation between office spaces affecting mental health issues and the remedy for the same. The questions primarily aimed toward understanding the correlation between issues faced by employees in their workspace and their relation to their rating on the introversion spectrum.

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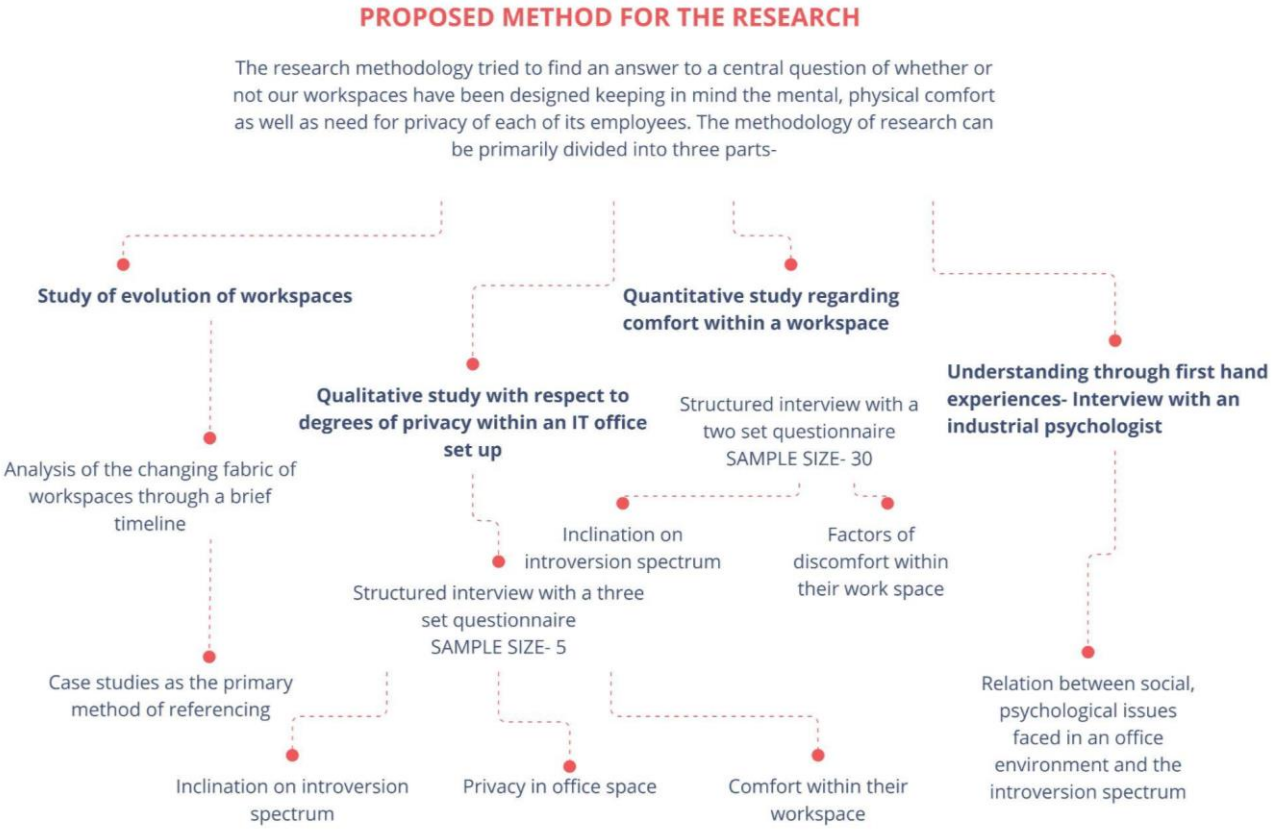


Figure 3a

4. ANALYSIS, RESULTS AND DISCUSSION

4.1 Evolution of Office Spaces

The existence of office spaces can be traced back to the late 1800s with the Rookery building in Chicago being a prominent example. With offices spaces surrounding a central courtyard and the idea of having natural ventilation throughout the day, this office building can be accounted to be one of the very first structures to be specially designed for a formalized work environment. The next step in the evolution of office spaces is regarded as Taylorism as it primarily followed the principles of segregation to establish hierarchy, based on the idea of Fredrick W. Taylor. Breaking away from this conservative route, was the example of the Larkin Building by FLW built-in 1905. The structure had a relatively open office environment where all employees sat in one common room, bringing in the aspect of union and a sense of family. Taking ahead these principles of openness, the open office planning system was developed in the 1900s. Be it the Johson wax building or the Gustavo Capanema palace in Rio de Janeiro, these office spaces were characterized by large-scale, column-free office spaces, enabling all employees to share a common workspace. In the early 1960s, the workplace really started to change with the adoption of a more socially democratic layout which consequently encouraged a great degree of human interaction and engagement. This office design style became known as Burolandschaft, an originally German concept, which translates to 'office landscape', and after becoming popular in northern Europe, began to spread around the world. Burolanschaft advocated a less rigid approach to office layouts (K2 Spaces, n.d.) The action offices, developed in the 1960s were a series of furniture designed by Robert Propost marketed by Herman Miller. This easy to install furniture system created minor visual and physical divisions in the workspaces enabling each employee a degree of privacy. Strengthening the ideas of privacy within a workspace, the cubicle system developed in the 1980s divided the office plans into smaller units. The system gave a large degree of privacy, especially to women who had recently started working in a workspace. The developments in technology led to office spaces reaching heights never imagined before. The skyscrapers began the trend of artificially ventilated workspaces that offered their employees a view of the city through its glass facades. The early 21st century was characterized by offices that worked on the ideology of creating a live and work environment for its

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employees, creating a comfort like their homes within the office space. Be it large-scale workspaces like the Facebook headquarters designed by Norman Foster or small-scale office spaces like The Strike in Pune, these spaces provided recreational zones, relaxation areas, zones specially oriented towards collaboration, etc making sure that its employees have maximum engagement in their workspace. The pandemic and consequential lockdown led to a large number of professionals working from home. Living rooms have now become meeting rooms, and dining tables act as work desks. The pandemic will give rise to a completely new typology of workspaces, bringing in the aspects of accessibility and flexibility within the built fabric of an office setup.

4.2 Analysis of the Qualitative Survey

The type of spaces offered by a workspace depends on the scale, the number of employees, and the amount of space that the company has. Out of the three interviews, Mahesh Nerlekar and Harshawardhan Joshi strongly believe themselves to be extroverts. Both of the interviewees work at world-renowned firms that could be categorically placed in the spectrum of large IT offices. While one of the offices offered individual work pods and cabins taking into consideration the requirement for private spaces, the other office had an open office layout with cabins allocated only to senior professionals. This proves that even while comparing large-scale IT work fabric, not all offices take into consideration the design aspect of the need for privacy. While Harshwardhan Joshi did not feel the need of having a secluded private workspace, he attributed this opinion to having worked with his team for a considerable amount of time and hence the degree of comfort he had with them. While Mahesh Nerlekar did not feel the need of having private spaces, he himself had a secluded workspace that was a blend of privacy and connection. He was content with his space of work and said that he would not trade it for any other space in the office, reinforcing the need for a certain degree of privacy that each employee enjoys within their workspace. Both of them also felt that working from within the comfort of their homes was a better solution instead of having a physical workspace. Irrespective of their inclination toward being an extrovert, both of the interviewees still enjoyed working in their own company indicating that privacy is not only needed by introverts but by extroverts as well. Madhura Nerlekar thought of herself to be an ambivert and felt disturbed by her colleagues in certain situations as her office has an open office plan with no hierarchical segregation in the work environment. However as her work involves continuous interaction with her team, she was comfortable working in an open setup with them. However, she did express the need for private spaces needed for personal activities like accepting calls or a place of relaxation during breaks. She also thought that physical workspaces were better than working from home giving her an opportunity to concentrate better and have a more efficient flow of work establishing the requirement of a physical space of work.

4.3 Analysis of the Quantitative Survey

A survey was conducted with a sample size of 29 IT employees to get to know about their levels of discomfort within their space of work and the reasons behind the same. Out of the 29 responses, 23 were men and 6 were women, with varying ages- right from age 23 to age 57. The surveyees had varying amounts of experience in the field implying the varying amount of years spent in a formal/ informal workspace set up. The maximum number of years of experience was 33 years while the minimum was 2. The average amount of work hours for each professional ranged from 8 to 10 hours daily. Ratings of the introversion spectrum were on the higher level with 17 people considering themselves as extroverts, 5 as introverts, and 7 being in the middle as ambiverts.

Certain conclusions from the survey were that majority of the interviewees had a strong bond with their co-workers and had a significant social circle outside of their place of work. While people largely came across to be comfortable in social situations, almost 1/3rd of the sample size felt awkward in voicing their opinion, indicating discomfort around large groups of people. Less than half the surveys through that they could not achieve the level of concentration required in their workspace, corresponding with the number of professionals that there wasn't a provision of well-designed spaces in their offices, to sit, relax and work privately. Almost half the surveyees expressed the need for change in the workspace environment. A significant number of professionals with the number going up to 13, felt disturbed by their coworkers while working in an open-plan office set up where work happens alongside their team with limited partitions and divisions, reestablishing the need for more secluded, private workspaces in any formal workspace setup.

Out of the 17 surveyees that opted to express their opinion on the need for physical workspaces in the future post the pandemic, 9 of them believed that there was a need for physical workspace. The ratio almost accounted for more than half of the surveyees, the opinions emphasized the idea that at least half of working professionals feel the need for a place of

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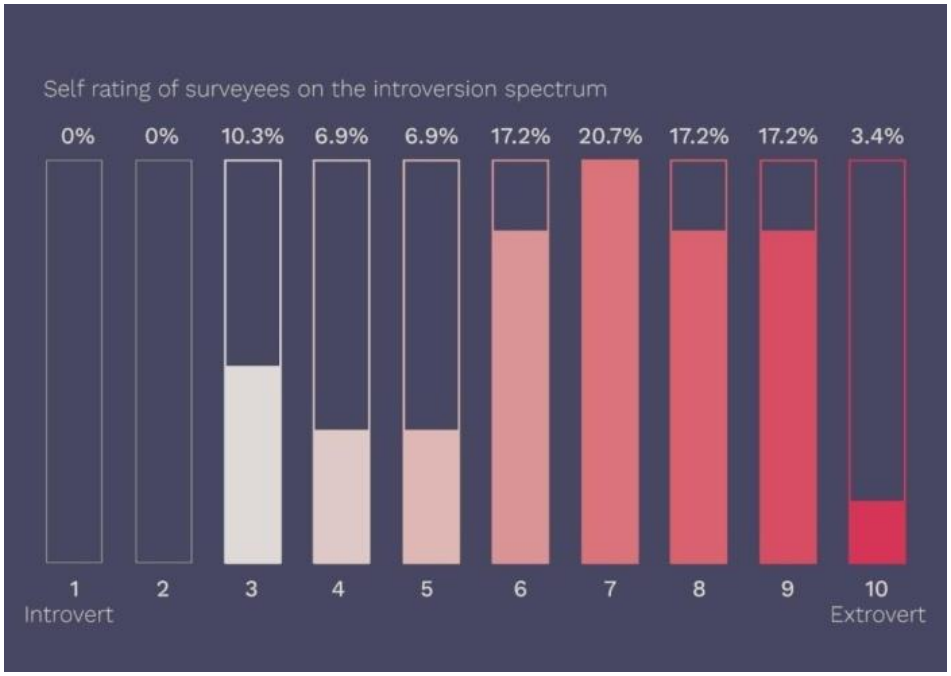


Figure 4(a)

work that can be clearly differentiated from the living space. However, the requirement for change in the nature of offices was also established with insistence for a workspace that has an amalgamation of collaborative spaces like rooms oriented towards team discussions, white boarding, group brainstorming sessions, etc as well as private zones that helps one to enjoy the comfort of their own company. However, this demand was expressed by only half of the surveyees while the other half believed that work from home typology is the new norm, which will persist even after things go back to normal. A hybrid and flexible workspace environment, that provides its employees the convenience of having a formal work set up whenever essential becomes a need. This office space ideally could be an extension in terms of accessibility and approachability to their living environments, providing a distinct yet fitting space of work.

4.4 Analysis of an Interview with Psychologist Aarti Pendse

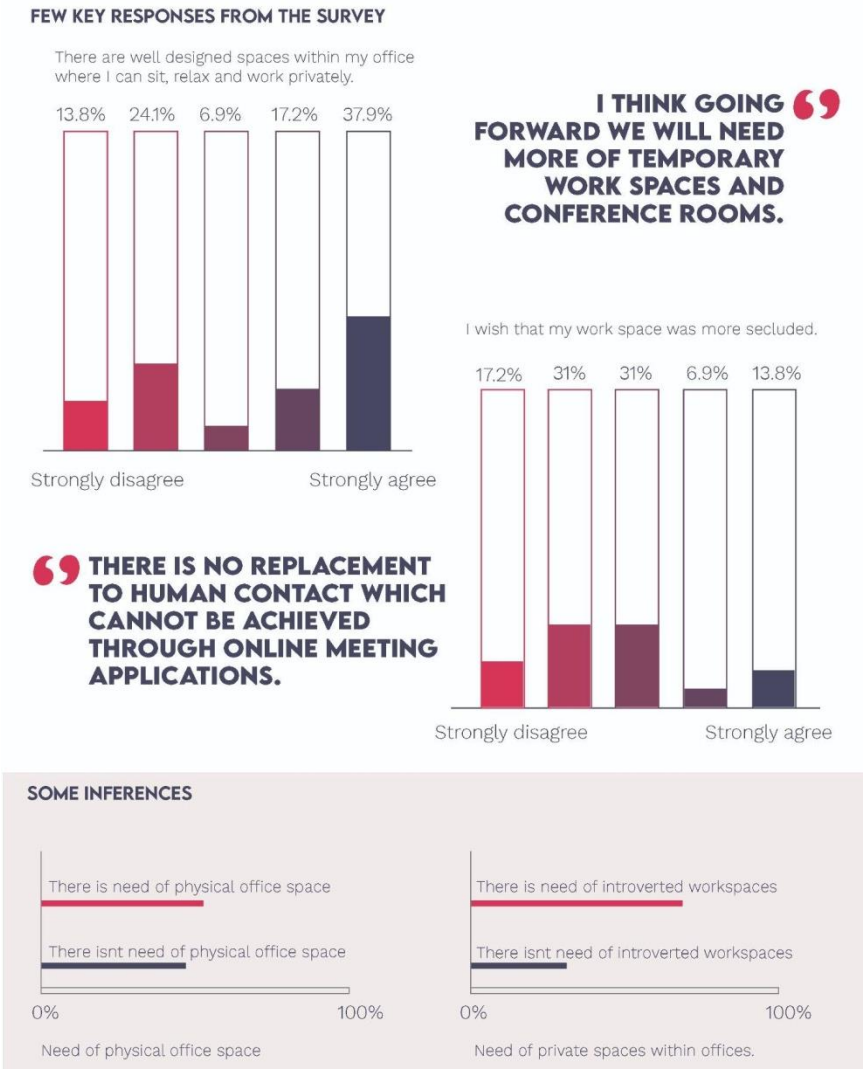
The lack of private spaces largely used during personal time within an office environment was established. This was due to the open office planning and was responsible for increasing levels of stress, especially for introverted minds. The future of office spaces is flexible and should be a balance between work from home and physical office space, hence creating an ideal work environment.

4.4.1 *Inference/Conclusion*

The research even though limited to IT office fabric, strongly establishes the fact that the work environment is directly related to the scale of the office spaces. Small scale offices with the capacity of fewer than 50 people have limited provisions for introverted workspaces while few of the larger offices with considerably more number employees have designed spaces that cater to not only privacy required within a workspace but also provide a platform for discussion and interaction in more open collaborative spaces located within the office floorplate. Most of the surveyees who rated themselves high on the introversion spectrum (inclining towards being extroverts) did not feel the need to have private work pods. However few of them already had a mix of private yet connected workspace which was thought to be the ideal situation by the employee. Surveyees that were established to be ambiverts and introverts had mixed opinions on the need for change in the office fabric. The need for more introspective secluded workspaces was reinforced by a few, while others thought that the work from home pattern suited their comfort better. While the IT sector started questioning the need for physical workspaces post the pandemic, the quantitative survey proved that more than half of the employees would like to continue working in a formalized work setup rather than from home. This need was largely expressed by women who have more distractions at home. The changing face of workspaces should lead to a more flexible work environment. This

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workspace can be an extension of one's home. The interview reiterated the need for a flexible work environment as the future of office spaces. While we as architects rethink the workspace design, the focus should also be given on factors like natural light and ventilation, bringing in green inside the built environment as well as the tactility and colours of the interior of the space- factors that help create a positive atmosphere within a workspace. Creating a utopian situation where an employee has the ease of access to a formal work environment whenever required while also being within the radius of residence, completely omitting issues of travel time seems to be the idealistic solution to the rising question of a paradigm shift in the workspace fabric.



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Resource Persons

Questions	Harshawardhan Joshi	Mahesh Nerlekar	Madhura Nerlekar
Basic information			
Age	45	45	42
No of years of experience in this field	20	22	20
Names of offices worked in the past	KPIT, Sungaurd and Tech Mahindra	Brady Corporation as of today and synergy co-orporation from Monday 01.02.2022	Patni Computers, State farm insurance office, Assurant Health, Kohls Coorporation, Incube Experts
Location of the offices	Hinjewadi, Kharadi, Karve road	Banglore, USA	Pune, Bloomington, Milwalky, Menomenee falls Wisconsin, Pune
Current location	Pune	Banglore	Pune (Incube experts)
Heirarchial position at work	Senior executive and manager	Senior Manager BI	Senior Project Manager
No of working hours per day	Unlimited, but minimum 10 hours	09-10 hours	9
SET 01- Inclination on the introversion spectrum	Tech Mahindra, Pune	Brady Corporation, Banglore	Incube Experts, Pune
1. How is your relationship with your co-workers? Have you developed any strong bonds with the people you work with?	Yes ofcourse. I have a strong connection with people of all herirarchial positions.	Yes I did. Our relationship was fun. I have an absolutely strong bond with my collleagues.	Yes. I can say I have
2. How would you describe your formal work behavior as? Do you think you are friendly, outgoing with your collogues?	Yes I do.	Yes. I am.	I am friendly. I am not naturally outgoing but i try do be becausce of my role
3. Aside from your work, how many strong friendships do you have?	I have strong friendships with lot of people, even my bosses and have a personal relation with them. I also have friends in other departments. I also have a huge friend circle outside my work life.	Oh yes. Too many to tell. Especially the ones from school and college	Yes
4. Do you enjoy public gatherings and social events in your work space as well as outside of it?	Yes. I make a point to attend as many events like annual functions as well as personal events like gettogethers.	Absolutely. I do.	Yes
5. Do you get intimidated to talk to strangers or are a little awkward when it comes to socializing? Are you comfortable in public events and gettogethers like parties?	No. This has never happened. Thats just not how I am as a person. I am very chill. I do enjoy attending public events.	I am comfortable. Very comfortable.	I am not intimidated but I may feel awkward at times depending on who I am with. Its situational too.
6. Finally, what will you classify yourself as- an introvert, extrovert or an ambivert?	Extrovert. I meet strangers as if I have known them since several years now.	I would say I am an extrovert.	Ambivert
Rating on a scale of 1 to 10 (1 being introvert and 10 being extrovert)	10	8-9	6
SET 02- Privacy in your office			
1. What type of a job do you do? Does it involve creating solutions on a daily basis or is your work same every day?	Mostly type of work is same but I am challenged with new issues everyday	It involves creating solutions everyday.	The first one. Creating creative solutions
2. How is the overall planning of your office? Cubicles, open seating etc?	There are cubicles in clusters of 04 with a partition in between as if its a maze. I am able to see the person sitting in front of me.	They had cubicles in my Banglore office.	Its an open office plan. Everyone sits on open tables with small partitions. There is no privacy
3. What does your workspace look like?	I sit on the aisle side with 3 of my collegues. I have my laptop, my phone, a lan cable on my wooden desk. I also have a soft board in front.	Becausce of my position I had a corner desk secluded from others using a glass partition. There werent complete walls. As for the employees sitting outside cabins, there were glass partitions seperating the desks but they were short- around 4 to 5 feet, so you could see the person sitting in front of you.	Just like everyone else. There is a table of four people and 4 people sit on the opposite table. 8 people sit on one table with small aprtitions in between. Even our bosses have the same space of work. No one has cubicles
4. Does your workspace have any physical elements like partitions or walls that separate your workspace from the overall office space?	There is a wooden partition but not a wall. Our bosses have personal cabins.	Yes. But as it was a glass partition it wasnt completely seperated from other's workspace	Well there is a small patition but i can see the person in front.
5. Does your job involve constant interaction with the team you are working with? Does the interaction need to be physical or do you use different mediums to carry out this interaction?	Yes. My job does involve team interaction. Mostly it happens through phones and emails. As I sit with my team, we do discuss issues faced. If my team is placed away from my space of work, I will experience a minor disturbance becausce it will not possible to get up and go talk to a collegue every time.	When I was in office it was constant physical interaction but now it all happens digitally. My team has to enter my cabin to come talk to me.	It ivolves intermediate levels of interaction with my team but I dont need to meet them face to face. Even when we are in office we sometimes have online meetings as its easier to explain the agendas to my team, especially when i have to share my scrren and thats the case for almosta ll the meetings.
6. Are you able to concentrate in your workspace? If not what are the reasons for the same?	Yes. I am able to. There is absolutely no disturbance.	I am able to concentrate as my work involves managing and working with people.	My floor is a little noisy so sometimes its hard to concentrate.
7. In case you feel like working alone someday, is your space of work designed for the same? If no, are there any specific allocations made for the same?	We can sit anywhere in office. There is no different space designed. We can sit in any vaccant cubicle.	Yes. They did have provisions. We had seperate meeting rooms for team discussions as well as colaboration room. It was like an open area where we could sit and have a chat for social interaction.	No. Our office is very small. We have only 4 conference rooms and hence they are occupied constantly. Sometimes i can go sit in the pantry but nothing specially designed.
8. Are there any changes you would make in your space of work? What elements would you add or substract from your workspace to make it more suitable for your needs?	I dont feel the need of a private space in my office.	Not really. That office was very well designed. An improvement would be provision of a small pantry or a cafe as there was no food facilities in the office, so we had to go out a lot to eat.	So one thing i didnt like at all is that there are womens bathrooms on alternate floors. So i have to change my floor to go to the bathroom which i feel very awkward with becausce everyone notices me enter the room. Apart from that i am fine with my workspace. I dont want private pods to work in.
9. Do you think your office space lacks privacy that you sometimes need when you go to work?	No. I can function smoothly in my space of work. I accept my personal calls at my work desk itself where everyone can here me speak but I am comfortable with that as well.	No i dont think so. I had privacy when i needed it.	I dont feel that. I dont have privacy but i dont need it. Actually, if i have to make a personal call i just walk to the staircase shaft and come out of the room. Also i have worked in that office for a very short time so it might not have bothered me yet. But in my US office too i used to take my personal calls in front of my collegues and that didnt bother me. These things dont really bother me.
SET 03- Comfort in workspace			
1. Is your workspace physically comforting? Temperature, ventilation, light?	My work space is artificially ventilated. I work in Sharda centre on the 5th floor. My office recieves ample sunlight and its airy.	Absolutely comfortable	Temperature could be controlled in the better way. As the office is small there is no centralised AC system. Hence people sitting closer to the AC get cold and want higher temperatures whiile those sitting away feel hot and want cooler temperatures. So the people who sit colser to the AC control the temperature.
2. Do you feel at peace or a sense of calm while working in your designated office space?	Yes. 100%	Absolutely	Yes
3. Do you think you are able to achieve the concentration levels required to work well in the workspace?	Yes. I would rate my concentration as 100 on 100.	Yes. I was	Yes
4. Do you think your co-workers are easily accessible from your place of work adding to your overall comfort of working?	Yes and its better to have them around. My job involves team control and hence my team needs to be around me.	Yes. They were as i could see them so ii could easily call them	Yes
5. Do you think you feel stressed or disturbed due to the people working around you? Do you think that sometimes your colleagues create a hinderance while you wish to concentrate on the task at hand?	No. They do create a hinderance but I dont mind that. Its obvious that there are going to be certain disturbances. Afterall its a office. I am able to concentrate well.	Nope. I could concentrate without any issue.	No

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6. Are there any private, secluded spaces allocated for personal space in your office? In case you feel like working alone, are you able to find a space designed for that easily?	No	Yes. There were pods that were created for personal calls or single person meetings.	No
7. Do you feel that your designated space of work affects your efficiency of working? If yes, in what way?	My efficiency is not related specifically to my work desk. I can go work anywhere and still am able to concentrate. I just need my team around to communicate.	I would prefer to work in my space. It was pretty comfortable. If i am put in some other work space, my concentration levels and comfort would depend on the new work space.	I dont think so
8. Is there any specific location in your office you like to go work? What are the features that make that space better than your original work space?	No. My current workspace is where i would like to work.	Not really. My cabin was one of the best.	No
9. In case you were to change something about the environment you work in what would that be?	No major problem. The old wooden desks can be changed. It would be nice to have a desk on which you can directly draw with a marker	Nope	As mentioned above
10. Do you feel physically and mentally comfortable within your space of work in the office?	Yes	Absolutely yes	Yes
11. Do you think there is a need of a physical office space or can the work from home pattern be continued in the post COVID situation as well?	No. The work from home pattern can be continued. I would like to continue working from home. I do get the required amount of privacy and am also able to concentrate equally at my home.	We can absolutely continue working from home post pandemic as well.	I think physical offices have to be there. Personally, i am more efficient in office. There is motivation to work when i am in office vs when i am home i tend to get distracted.
Conclusion	The interviewee seems to be a total extrovert with a large group of friends. He is outgoing and friendly. He has a desk type work space and sits next to 3 collegues of his. Overall, he is satisfied with his space of work. The office does not have any provision for private spaces other than cabins of bosses but he does not find the need to have any. The only thing that is a must in his space of work is to have his team around him so that he can communicate with them easily which is not possible without a formal office space. However he thinks there is no need of a office space and he can continue working from home which I thought was a litlle contradictory.	The interviewee had worked in a decent office space in Banglore for 3-4 years pre pandemic.He is more of an extrovert and is super friendly and straight forward. He had a sort of secluded yet accesible space of work and hence it was a win win situation. I think he felt the same as we said he would not trade his space of work for any other area in the office. Even though he is an extrovert, the fact that he sat alone inside a cabin and still enjoyed it says a lot about the minimum levels of privacy required to work in an office space. He also mentioned that special provisons were made for social as well as private spaces in the office. His comfort and high levels of privacy can be attributed to these already made provisions. He also physically interacted with his team a lot during office hours but does not think that there is a need for an office space. He feels that work from home pattern can continue which again becomes a contradiction in itself.	The interviewee has recently started working in a small office in Pune after working abroad in the USA for several years. Her office has an open office plan and everyone including the boss sit together. Her office does not have privacy according to her. Its noisy and sometimes even hard to concentrate. Even though she says that she does not want any private spaces in the office, she mentions that she has to walk to the staircase lobby to take private calls. This is a sign of lack of a space that is needed in the office. She is an embivert but is comfortable even in an open office space. Infact she needs a physical office to be motivated to work. One may conclude that sitting together with bosses and collegues boosts ones motivation and improve performance and this trait could be directly associated with ambiverted minds who feel comfortable around known people.

Resource Persons

1. Harshawardhan Joshi
2. Mahesh Nerlekar
3. Madhura Nerlekar
4. Aarti Pense

APPENDIX

(a) Questionnaire

a. Qualitative interview

Basic information of the interviewee

1. Name
2. Age
3. Number of years of experience in this field
4. Name of the offices they are working in and have worked in in the past
5. Location of their respective workspaces
6. Current location
7. Hierarchical position at work
8. No of hours of work every day

Set 1: Inclination on Introversion Spectrum

1. How is your relationship with your co-workers? Have you developed strong bonds with the people you work with?
2. How would you describe your formal work behavior as? Do you think you are friendly, outgoing with your colleagues?

ISBN: 978-93-89934-68-7

3. Aside from your work, how many strong friendships do you have?
4. Do you enjoy public gatherings and social events in your workspace as well as outside of it?
5. Do you get intimidated to talk to strangers or are a little awkward when it comes to socializing? Are you comfortable in public events and get-togethers like parties?
6. Finally, what will you classify yourself as an introvert, extrovert or an ambivert? (Can create a graphical scale and ask the interviewee to mark themselves on the introversion scale)

Set 2: Privacy in Office Space

1. What type of a job do you do? Does it involve creating solutions on a daily basis or is your work same every day?
2. How is the overall planning of your office? Cubicles, open seating etc?
3. What does your workspace look like?
4. Does your workspace have any physical elements like partitions or walls that separate your workspace from the overall office space?
5. Does your job involve constant interaction with the team you are working with? Does the interaction need to be physical or do you use different mediums to carry out this interaction?
6. Are you able to concentrate in your workspace? If not what are the reasons for the same?
7. In case you feel like working alone someday, is your space of work designed for the same? If not, are there any specific allocations made for the same?
8. Are there any changes you would make in your space of work? What elements would you add or substract from your workspace to make it more suitable for your needs?
9. Do you think your office space lacks the privacy that you sometimes need when you go to work?

Set 3: Comfort in their Workspace

1. Is your physically comforting? Temperature, ventilation, light?
2. Do you feel at peace or a sense of calm while working in your designated office space?
3. Do you think you are able to achieve the concentration levels required to work well in the workspace?
4. Do you think your co-workers are easily accessible from your place of work adding to your overall comfort of working?
5. Do you think you feel stressed or disturbed due to the people working around you? Do you think that sometimes your colleagues create a hindrance while you wish to concentrate on the task at hand?
6. Are there any private, secluded spaces allocated for personal space in your office? In case you feel like working alone, are you able to find a space designed for that easily?
7. Do you feel that your designated space of work affects your efficiency of working? If yes, in what way?
8. Is there any specific location in your office you like to go work? What are the features that make that space better than your original workspace?
9. In case you were to change something about the environment you work in what would that be?
10. Do you feel physically and mentally comfortable within your space of work the office?
11. Do you think there is a need for a physical office space or can the work from home pattern be continued in the post COVID situation as well?

(b) Quantitative interview

Basic information of the interviewee:

1. Name
2. Age
3. Number of years of experience in this field
4. Name of the offices they are working in and have worked in in the past
5. Location of their respective workspaces

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6. Current location
7. Hierarchical position at work
8. No of hours of work every day

Set 1: Inclination on Introversion Spectrum

The person answering will have to choose a degree from strongly disagree to strongly agree to get a comparative analysis.

1. I have a very good connection with my coworkers.
2. I have several friends at my place of work.
3. I have a large group of friends outside of my work as well.
4. I enjoy going out with my family and friends.
5. I do not feel awkward at large social gatherings. is a large crowd around
6. I do not hesitate to voice my opinion, even if there is me.
7. On the introversion i will rate myself as

Set 2: Discomfort in their Office Space

The person answering will have to choose a degree from strongly disagree strongly agree to get a comparative analysis.

1. I feel comfortable working at my place of work.
2. I do not feel stressed or disturbed by my coworkers.
3. I think my designated space of work is well designed according to my needs and levels of comfort.
4. My team is accessible to my place in an office in case I need them for work related issues.
5. I feel disturbed by the people working around me.
6. I wish that my work space was more secluded.
7. There are well designed spaces within my office where I can sit, relax and work privately.
8. There are a lot of things I would like to change about my space of work.
9. Do you think there is a need of a physical office space in spite of offices functioning well during the pandemic.

(c) Interview with Aarti Pendse

This interview was conducted on 27th March 2022 via zoom. Mrs. Aarthi Pendse is a professional psychologist and has an experience in the field of industrial psychology. The interview aimed towards understanding the correlation between office spaces affecting mental health issues and the remedy for the same.

T- 1. Do you deal with IT employees as your clients?
A- Yes

T- 2. What according to you are the primary reasons for increasing levels of stress in IT professionals lately?
A- The deadlines and the work pressure.

T- 3. From your experience, do you think there are any reasons directly related to the type of work environment that adds to the increasing levels of stress and anxiety?
A- Frankly speaking, the people who I have met didn't have any specific issues related to problems with their workspace so I can't make any comment on that.

T- 4. The face of office spaces has drastically changed in the past few years. The offices now have open environments that aim toward a hyper collaborative work culture. Have you come across any of your clients complaining about a lack of privacy in their space of work, which in turn, affects their mental health.
A- Not necessarily. A few times my clients did face a problem with privacy in their workspaces when it came to doing secretive or more private tasks, especially to fulfill their emotional issues. They felt a feeling of discomfort due to the open nature of the office that lacked partitions. So sometimes such issues do tend to create stress. But lack of privacy is not a major issue while actually doing work or performing the task at hand.

T- 5. You have studied psychology, could you explain what introverts and extroverts are in simple terms?

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A- Introverts are those people who don't like to mix up with others. They are the ones who don't like to express their emotions very easily. Rather they don't like to talk to people quite often. They like to keep their emotions to themselves. They avoid a lot of social interaction and long conversations with unknown people.

Extroverts are exactly the opposite. They like to mix up and mingle with people, they like to be with people. They often tend to approach other people willingly. These people don't hesitate to share their emotions.

It has been observed that extroverts face lesser stress problems or rather emotional problems as compared to introverts in workspaces.

T- 6. From your experience, have you found any connection between introverted people and feelings of discomfort within their space of work?
A- It is not like that. It depends on the type of work. The correlation between being an introvert and an extrovert can be directly established with the profession you have chosen.

T- So if we focus on IT employees as the sub-group did you still find any correlation?
A- No. There wasn't any.

T- If it were in your hand, what would you change in terms of planning or type of space within an office that according to you would help better the mental health of the employees working in that space.
A- I will like to suggest instead of completely closing the office with a mechanically ventilated environment, try to keep it airier. In some offices, small slits have been left open for fresh air to enter. Instead of complete artificial lighting, natural light can be brought into the space. Some natural elements like real plants can be brought inside the environment. This brings positive vibes and an atmosphere to the office.

In offices that lacked these elements, it is obsereved that people prefer to go on levels with natural light and ventilation just for a cup of coffee.

T-Do you feel that the work from home pattern has positively affected the mental health of IT professionals? What is your take on the need for physical office spaces in the future.

A- It has two sides. As per my experience, a blended option is a right solution. For people who don't have enough space at home and live closer to their workplace avoiding loss of hours in commute think that having physical offices is the best solution. On the other hand, there are people who feel comfortable at home because of the privacy they get at home and also save on a lot of commute time. Several people have opted for the work from home option while others say "office ka mahol to alag rehta hai" helping them witch on their work mode.

One recommendation from my side is playing with color in office spaces. Normally office spaces have mundane black, white, and blue interiors. Introducing fresh colors in some way positively affects the mental health of its employees.

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RISE OF OFFICE SPACES

ROOKERY BUILDING, CHICAGO USA, 1886

Daniel Hudson Burnham
John Wellborn Root

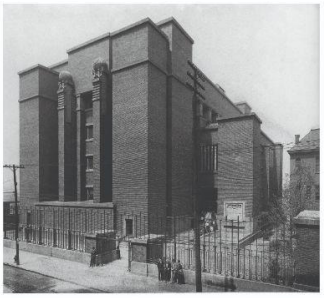


The site is surrounded by streets or alleys on all four sides, offering generous daylight for offices located around its perimeter. In order to gain access to natural ventilation and daylight for these offices, the glass skylight typically located at the top of a single-loaded corridor building, had to be relocated to the lowest office floor.

TAYLORISM-
INSPIRATIONS FROM FRED. W. TAYLOR'S PRINCIPLES OF OFFICE DESIGN

LARKIN BUILDING, NEW YORK, 1905

Frank Lloyd Wright





Taylorist principles had a strong spatial conception which advocated spatial segregation as a way of reaffirming hierarchical differences, aiming at encouraging internal competition and stimulating individual performances.
The Larkin Building (1904) by Frank Lloyd Wright, was the first office building in the mold of Taylorism, where new guidelines for occupancy of spaces were presented, especially in the concern for the well-being of employees. The general layout of the plans, with its open galleries, which open onto a patio full of light, gave employees a sense of "family." All worked together, and there were no private offices or spaces separated.

BIRTH OF OPEN OFFICE PLANS

MODERN MOVEMENT

JOHNSON WAX BUILDING, WISCONSIN, 1939

Frank Lloyd Wright





This office was primarily designed to increase productivity, and as such placed over 200 sales staff on one floor, but also included completely new elements such as bright lights, warm spaces and cork ceilings, which played a major role in absorbing office acoustics.
The open office plan with minimum partitions and a work environment that did not impose direct hierarchy became salient features of this workpsace alongside the iconic use of mushroom columns.

GUSTAVO CAPANEMA PALACE, RIO DE JANERIO, 1943

Lucio Costa along with Affonso Eduardo Reidy, Ernani Vasconcellos, Carlos Leão, Jorge Machado Moreira, and Roberto Burle Marx, Oscar Niemeyer



Modernism gained great momentum as a significant "turning of the page" aesthetic, from the "old" Brazil of Eurocentric post-colonial urban sensibilities, and a countrywide rural, undeveloped and impoverished, and conservative image.

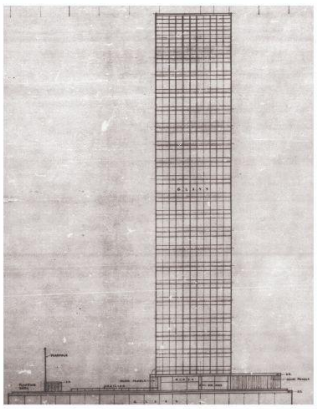
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BUROLANDSCHAFT OFFICES

INTRODUCTION TO RATIONALIST SKYSCRAPERS

LEVER HOUSE, NEW YORK, 1939

Skidmore, Owings & Merrill



The Lever House by Skidmore, Owings & Merrill was one of the first glass International style office buildings in the United States. Located in midtown Manhattan, it was originally the American corporate headquarters of the soap company Lever Brothers. Built between 1951-1952, the Lever House extends 24 stories in height right across from Mies van der Rohe's Seagram Building,

SEAGRAM BUILDING, NEW YORK, 1957

Mies van der Rohe, Philip Johnson



The Seagram Building is a modern office tower. It is a sign of his rationalist mentality, an exercise in architectural elegance that use few elements measured results in one of the most beautiful jewels of twentieth century architecture.

ACTION OFFICES

1964

Robert Propst
Herman Miller

The Action Office is a series of furniture designed by Robert Propst, and manufactured and marketed by Herman Miller. This model differed from Burolandschaft in that it included a variety of alternative work settings for staff, increased freedom of movement and a greater degree of privacy when working. The influence on office design was twofold with increased space required for rows of modular furniture that provided staff with privacy and flexibility to work in a position suitable for the task at hand. While there was an increased emphasis placed on meeting rooms, an individual's workstation became larger and more enclosed.





THE CUBICLE SYSTEM

1980





The availability of cheap, but effective modular walls alongside an increased focus on profitability at the expense of working conditions are seen as the key factors behind the complete shift in office design, suffered throughout the 1980s. The history of office design at this point digressed and became a 'stack them highly; sell them cheap' model, and entered what is now widely acknowledged as one of the more depressive (if not, the

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SKYSCRAPER

SHANGHAI WHEELOCK SQUARE, CHINA, 2010

Kohn Pedersen Fox Associates PC



Shanghai Wheelock Square is a skyscraper located in Puxi, Shanghai, China. It is the 286th tallest building in the world. The Wheelock Square building has 58 floors, and just over 100,000 m2 (1,100,000 sq ft) of prime office space.

WORK AND LIVE

2010S

FACEBOOK HEAD-QUARTERS, CALIFORNIA, 2018

Frank Gehry





Office space design of the 2000s aimed towards creating a flexible office space that feels like home. Collaboration and communication between employees has become increasingly important, with office spaces making efforts to facilitate it. Face to face interaction and group interaction is encouraged in modern office design by the use of hubs and lounges. The Facebook office design is made up of three horizontal layers. Parking is at ground level. Above, raised on dozens of concrete legs, are the offices, filling a long and narrow one-story box.

CROWD STRIKE , PUNE, 2018

Space Matrix





CrowdStrike Holdings, Inc. is an American cybersecurity technology company based in Sunnyvale, California. It provides cloud workload and endpoint security, threat intelligence, and cyberattack response services.

WORK FROM HOME

COVID 19 PANDEMIC





The pandemic and the consequential lockdown confined professionals to their homes, drastically increascing the number of people working from home. Study tables became office desks and living room became meeting rooms.

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Enabled Community Gardens for Senior Citizens of St. Patricks Town, Hadapsar, Pune

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ABSTRACT: The aim of this study is to do a feasibility study of the proposed community garden of St. Patricks Town, Hadapsar, Pune. The society came into existence in the year 1960. It comprises of bungalow plots with 157 bungalows and 110 families residing. Maximum population residing here comprises of seniors so the major focus in this research paper is given on the zoning part of the community garden for the senior citizens. The purpose of this study is to make community gardens in society convenient and safe for senior citizens. Also to study the proposed plan of the community garden and suggest points related to zoning/design and wheelchair accessibility based on the survey done.

A detailed study of the history and evolution of gardens in Pune was done. The research and analysis on this helped with the field work i.e. the survey that was carried out during the process.

From the study done it can be inferred that, since the society comprises of bungalow plots the residents of the place prefer spending time in the gardens of their bungalow itself. Members of the society suggest to use the open space where the plan of the garden has been proposed as a sports playground. The residents of the society are of the view that the maintenance of the garden will cost a heavy amount hence something income generating like a sports ground should be planned.

Keywords: *Psychological Well-Being, Physically Challenged, Wheelchair Accessibility, Mental Well-being.*

1.1 Aim

To do a feasibility study of the community garden in St. Patricks Town for senior citizens of the society.

1.2 Objectives

- To make community gardens in residential societies convenient and safe for senior citizens.
- To study the zoning of the proposed plan and suggest certain points based on the survey.
- To suggest certain parameters for wheelchair accessible users.

1.3 Scope

The main focus in the study will be the following two points:

- Zoning
- Wheelchair accessibility

1.4 Limitation

The study doesn't include parameters like softscape and hardscape materials that should be used in a garden.

1.5 Methodology

- Study of history and evolution of gardens and research regarding senior citizen gardens.
- Case studies of senior citizen gardens.
- Research and analysis on such types of garden.
- Field work of proposed garden in St. Patricks Town, Hadapsar.

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2. INTRODUCTION

2.1 Definition of Gardens

A garden is a planned outdoor open space, set aside for display, cultivation and enjoyment of plants and other forms of nature. It can incorporate both natural and manmade features. It can have aesthetic, functional and recreational use. There are different types of gardens that exist like botanical garden, butterfly garden, rose garden, community (public) garden, sacred garden, rain garden, theme parks etc. I will be dealing with senior citizen gardens in today's residential societies.

2.2 History of Gardens in Pune

Researchers and historians has found leads and references to prove that the city of Pune was truly a city of gardens. Findings in old document writings in 'Modi Script' during the research on Peshwas has found that lakhs of trees were planted around the city creating various baugs. The Peshwas were fond of gardens or baugs as they called them and there were close to 100 baugs in the city 200 years ago but the concept of baug was nothing similar to what we have now as gardens. During the rule of the Peshwas, Pune flourished in terms of green cover. Until 1818, there were at least 100 private 'baugs' (gardens), but they were unlike the gardens we see today. They were more of fruit bearing trees, flowering plants and food crops. There were no landscaped lawns or carved fountains and manicured trees that we find in gardens today. These gardens were found from Shaniwar wada into all four corners of the city as far as Bobdev ghat.

What we know as Tulsibaug, Hirbaug, Belbaug, Chiman baug, Motibaug are not just names of areas but in the Peshwa era were actual gardens spread over acres of land. Now we identify Sarasbaug as one of the oldest baug created by the Peshwas. It was not just the Peshwas who had the gardens, but Pune then boasted of several Sardars as well as commoners having baugs like Purandares who owned tracts of land, which is now known as Nehru Stadium, or Vasantbaug in Bibwewadi, or the Bunglabaug near SP college.

The Peshwas before coming to Pune were residents of Saswad and they brought with them lots of trees of all kinds which were then planted in the city. It is said that there were 1.5 lakh mango trees planted throughout the city from Mandai to Parvati and beyond.

Chandrakant Abhang, a history scholar said that the Peshwes were very particular about the city's green cover. There was a rule then too if a tree was cut then two would be planted in its place which is still applicable even today under the tree authority in PMC. That period also gave importance to the conservation and preservation of nature.

2.3 Need of Gardens for Elderly

As the population ages research into functional health and other aging issues has become a priority. There has been growing interest in community gardens as an effective and affordable health promotion strategy. Exposure to nature through gardens and gardening activities can enhance psychological well- being through emotion regulation and relief from stress. Classic early research shows that viewing nature through windows or in pictures can positively affect stress recovery, lowering blood pressure and slowing heart rate.

2.4 Benefits of Garden for Elderly

In spite of knowing the benefits of exercise, many senior citizens do not engage in physical activity and suffer deteriorating health as a consequence. Deteriorating health may lead to further inactivity and worsening physical condition. Community gardening for senior represents an opportunity for exercise, nutritional benefits, physical and mental well-being, and increased social contacts. Also for the people who are physically challenged with disability or suffering from other physical limitations benefit considerably from the activities provided in community gardens. Many different theories suggest that different activities in community gardens increase the quality of life. Thus, community gardens can significantly improve functional limitations to leisure activities that directly benefit overall health.

Public spaces are the places in which private and common requirements appear because the public life in cities have been satisfied and also which alters by times due to the socio-economy and culture of the public. In all communal life there is a dynamic balance between public and private activities. Within this balance, different cultures place differing emphases on public space.

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2.5 Community Garden in St. Patricks Town

This research paper focuses on the study of proposed community garden in St. Patricks town, Hadapsar. The society comprises of bungalow plots with 156 bungalows and 110 families residing. Maximum population residing here comprises of seniors so the major focus in this research paper is given on the zoning part of the community garden for the senior citizens.

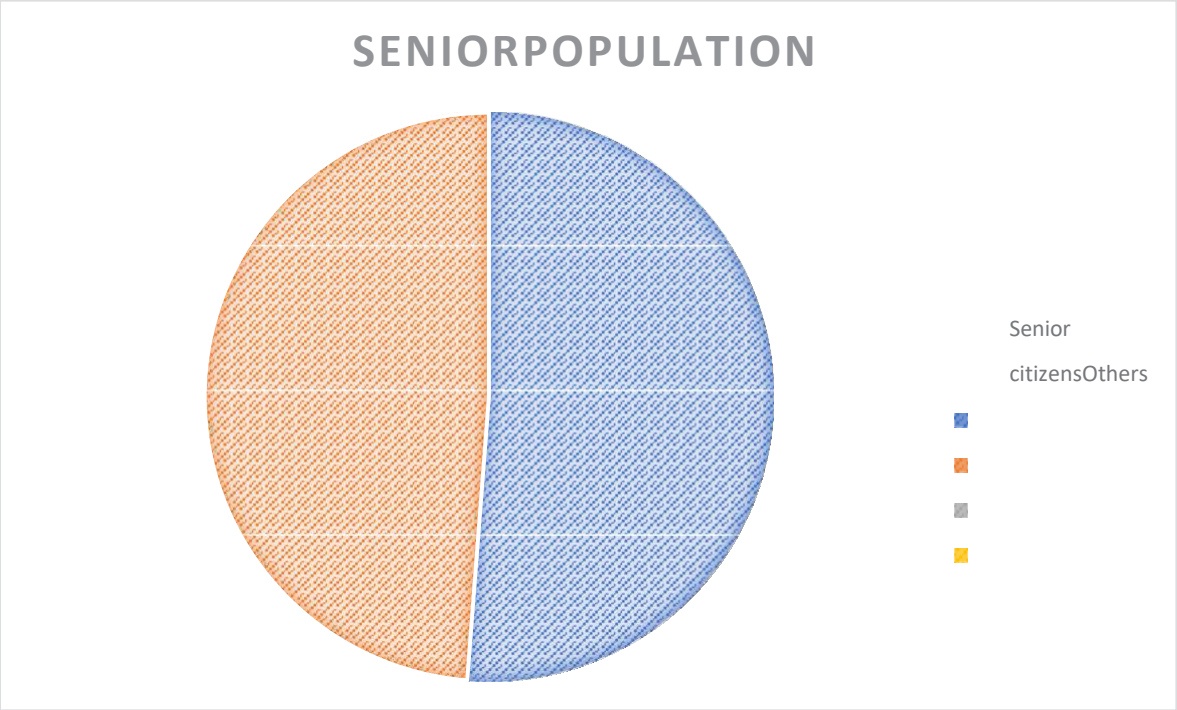


Figure 1: Senior Population

3. CASE STUDY OF THE PORTLAND MEMORY GARDEN USA



Figure 2

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Figure 3

3.1 Introduction

The Portland Memory Garden is the first and only publicly owned garden that is specifically designed to provide respite and refuge for senior citizens and victims and relatives of individuals suffering from memory loss. It is a demonstration garden that was created as part of the "100 parks, 100 years" centennial celebration of the American Society of Landscape Architects (ASIA), and was designed by a multidisciplinary team of volunteers; including landscape architects, horticultural therapy specialists, and architects. (Friends of the Portland Memory Garden, N.D)

The multidisciplinary design team worked hard to match the memory garden to community need, while developing a grassroots campaign to promote citizen involvement. The only other public memory garden built as part of the hundred parks celebration was built in Georgia and it failed soon after completion due to a lack of community support. All the other memory gardens in the US. areated on private property, often owned by hospitals or other health care providers

Friends of the Portland Memory Garden, was founded as a small group of volunteers and became officially incorporated as a non-profit organization in 2008. This organization has served a vital role in providing and securing volunteer hours and funding that have been instrumental in the garden's success

The physical location of the garden is steeped in local and national history. Kelly Butte, a prominent landscape feature, with a fascinating story, sits justs: to the north of the memory garden.

The garden is nestled within Ed Benedict Park, a 127 acre city pars in Southeast Portland that features many other ameneities.

Many of the garden's features, including alignment of the paths, plant materials, paving materials and design, multiple seating options, and outdoor structures are designed specifically to accomodate the elderly and those with memory disorders. An adjacent community garden provides additional space for horticultural therapy activities as well as a place for people to grow their own vegetables.

7.2 Design Process

The garden's design process not only brought the Lents. Neighborhood community members together through the public involvement process, but also created a pro-bono design team. This team worked collaboratively across disciplines, and included at least twelve landscape architecture firms, an architecture firm, and an engineering firm.

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7.3 ASLA Approval

Before a specific site in Portland was chosen, the design team was asked to present preliminary design schemes to the ASLA that adhered to their project design requirements. These plans included therapeutic design principals intended to meet the needs of people with memory disorders and the elderly members of the community. This design proposal was accompanied by other plans responding to ASLA project requirements.



Figure 4

7.4 Garden Development

About two years after hatching the initial idea for a memory garden, Bainnson and team got the official ok to begin construction at the site. The project committee, horticultural therapy students, local design and construction firms, and community volunteers worked tirelessly to put the garden together. After one and a half years of work, the garden was dedicated in May of 2002.

7.5 Updates and Changer

It took another year for restroom facilities and other fixtures to be completed. At the same time, garden aspects were updated and changed.

Bainnson recalls the some problems with the gravel path surrounding the garden that required some modification, “Volunteers put in a gravel path but didn’t use the right kind of gravel so then someone came in and poured cement into the gravel and wet it down, and then it just started to break off really fast which became a hazard.” Having a variation of pathway surfaces was a key design element meant to challenge walking and give special visual cues to changes in grade or surfaces. A few of the gravel pathways were replaced by pavers for greater safety and access throughout the garden, especially to the restrooms.

The Portland police department requested the garden limb up some low lying branches to discourage homeless from squatting in the garden and for sight lines into the garden from the street.

7.6 Plants in the Garden

80% of the plants in the garden were, and continue to be, donated from local nurseries. Although these plants must have the desired qualities for horticultural therapy, most of these plants were not initially intended in the design. Planting of annual plants intensifies seasonal changes in the gardens character, which is even more variable from year to year depending on the types of plants that are donated or available.

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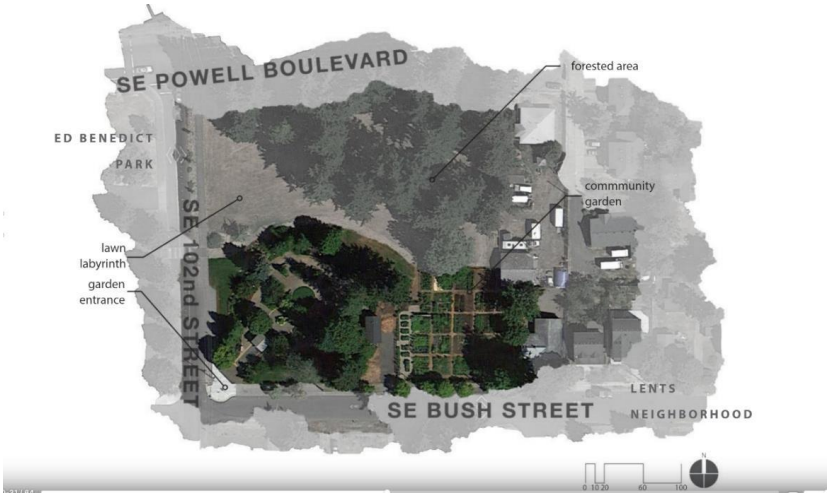


Figure 5



Figure 6



Figure 7

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7.7 Analysis

- Many senior citizens suffer from memory disorders and have a tendency to wander away from their caregivers hence having an enclosed space with only one entrance allows these individuals the freedom to explore without getting lost. A single entrance also marks a landmark that helps visitors navigate the garden.
- Seniors are sensitive to direct sun hence shaded areas with proper seating have been provided throughout the garden which are easily accessible.
- Benches—providing many resting options is important for the physically frail. In this way the design of many benches in the garden is sensitive to the needs of seniors.
- Pathways—circular paths without dead ends help way finding and prevent people with memory disorders from getting lost or disoriented.
- Restroom and tool shed—the restroom facilities provide drinking fountains and house, a tool shed used by volunteers.
- The central lawn—the circular lawn is the center of an implied amphitheatre in the garden. Wide pathways welcome wheelchair users to access the grassy edge that borders them.
- Raised and sloped planter beds—the raised planter beds are located in the inner circle of the garden are sloped towards the circular lawn. The height variation allows the seniors to choose a seating height most comfortable for them.
- Zoning and organization of plantings—the plants within the garden are oriented toward the circumnavigating pathways within.



Figure 8

8. CASE STUDY—SENIORS PLAYGROUND, HYDE PARK, LONDON

In 2009, landscape architects converted a section of London's Hyde Park into a "playground for seniors." This includes six pieces of exercise equipment that have been especially selected to ensure high levels of accessibility by seniors and to help them improve core strength, flexibility and balance. 26 Prior to the installation of the playground, London's Landscape Agency undertook extensive research of the type of available equipment, signage, and marketing strategies that were most appropriate for the attraction and enjoyment of older adults. 27 Younger visitors can also use the equipment; however youth under the age of 15 are not allowed to use it. The area of Blackley in Manchester also has, since 2008, an open space geared towards older adults at Dam Head Park. Its main purpose is to increase the opportunities for socializing among seniors. 28 Local residents chose its location to be specifically placed next to an existing play area for children. 29 The residents also chose 6 pieces of low-impact outdoor exercise equipment, which provide a range of exercise options (skate, ski, and press machines stations for pull-ups, push-ups and pedaling). The resident association built the playground, which cost about $22,500.

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Figure 9

Also in 2008, planners test-fitted two public green spaces in Hampton London, Healthfield Recreation Ground and Whitton and Hampton Common, with a range of outdoor fitness equipment for use by all age groups. 32 Follow-up evaluation noted that, in fact, a cross section of persons of various ages from the community utilized the equipment at both park facilities. 33 Similarly, observations suggest the popularity and frequency of use of seniors' open spaces at Hyde Park and Dam Head Park.

8.1 Analysis

- The spaces could have been more properly zoned in order to suit the requirements of the senior. A proper path should be defined for walking/jogging.
- A good approach is made towards creating an outdoor interactive gym. Proper seating spaces should have been provided.



Figure 10: Proposed Plan at St. Patricks Town

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9. FIELD WORK

9.1 Analysis of the Plan of St. Patricks Town

- Entry—the pedestrian and vehicular entry should be well defined.
- Lawn area—the lawn area seems to be very independent wrt to other parts of the garden.
- Flower garden—the flower garden seems to be concentrated all at one place.
- Tropical garden—the tropical garden seems to have no connection with other parts in the garden. Zen garden—the zen garden has been placed at a proper place.
- Pathways—pathway should be wide enough to accommodate wheelchair users and also a jogging track should be provided.
- Multipurpose court—the multipurpose courts and the childrens play area seem to be quite a distance away from each other.

Based on the Above Analysis the Following Questionnaire has been Preparde:

10. QUESTIONNAIRE 1—YES/NO QUESTIONS

- When I am stressed I know I can go to the garden and get relaxed.
- When my mood is low the garden is one of the best places for me.
- If I have a problem to think about, I go to my garden and it helps me cope better.
- I would feel very unhappy if I had to stop gardening in the near future.
- Gardening for me is an outlet for physical activity/exercise.
- I know that I sleep better after being active in the garden.
- I feel a sense of spirituality when I am in a garden.
- Gardening helps me to feel connected to the outside world.

10.1 Questionnaire - 2

Based on the above analysis a surevy was done which included the questions below:

- Please select your age group from the options given below:
  - 15–24 years
  - 25–35 years
  - 36–44 years
  - 44–54 years
  - 55–59
  - Above 59
- Do you have senior citizen in your family?
- Do you have kids in your family?
- Below given is a picture of a zen garden where you can relax and meditate. Would you like to have such a space in the community garden of your society?



Figure 11

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- Below is the picture of a tropical garden. A tropical garden contains plants with big leaves and vegetation that builds in height creating a dense garden. Would you like to have this type of space/garden?



Figure 12

- The proposed garden has a flower garden situated at one place. How about having equally distributed chunks of flower garden in the entire park??
- Would you like to have proper seating places at certain intervals close to the walking track?
- Would you like planting as an activity in the garden?
- Below is a picture of boardwalk. Would you like to have one in your society garden?



Figure 13

- Would you like to have a seating space around the multipurpose court?
- Which of the following would you prefer:
  - Open gym
  - Indoor gym
  - Both
- Are you a wheelchair user or do you have a person using wheelchair in your family?
- Any thing you would like to suggest?

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11. OBSERVATION

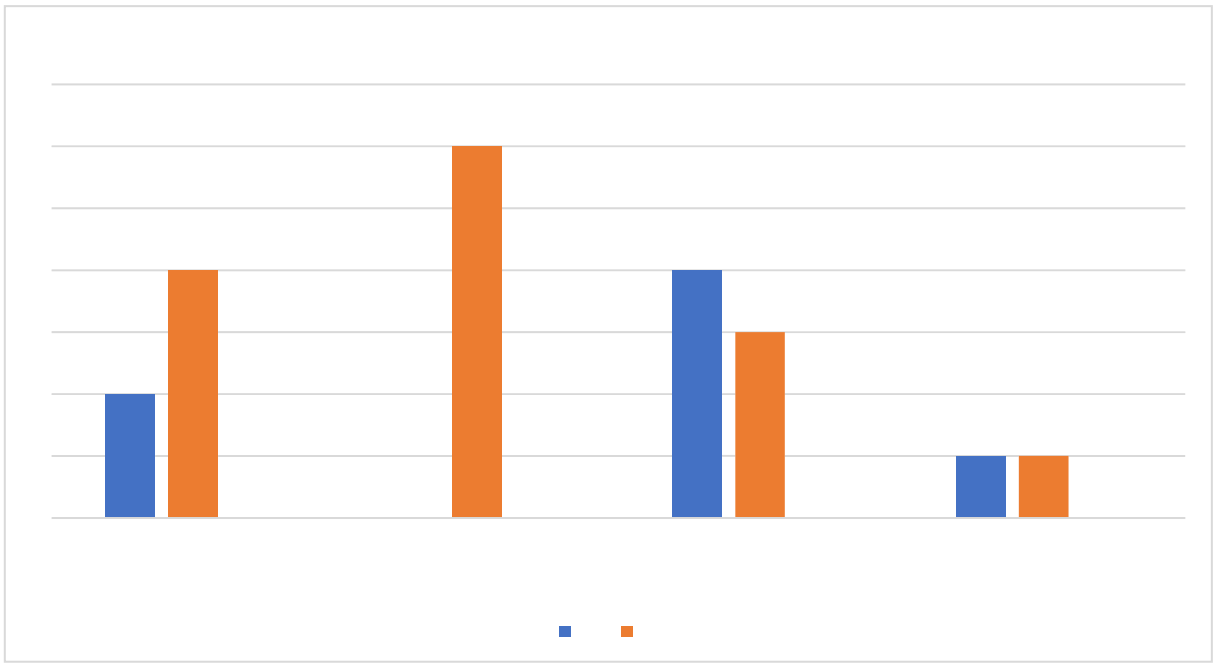


Figure 14

From the above graph we can infer that:

- Many people don't use a garden as a solution to their stress or to get relaxed.
- Some people think that garden is one of the best places when their mood is low.
- People are interested in activity like gardening.
- No one actually feels a sense of spirituality when they are in the garden.

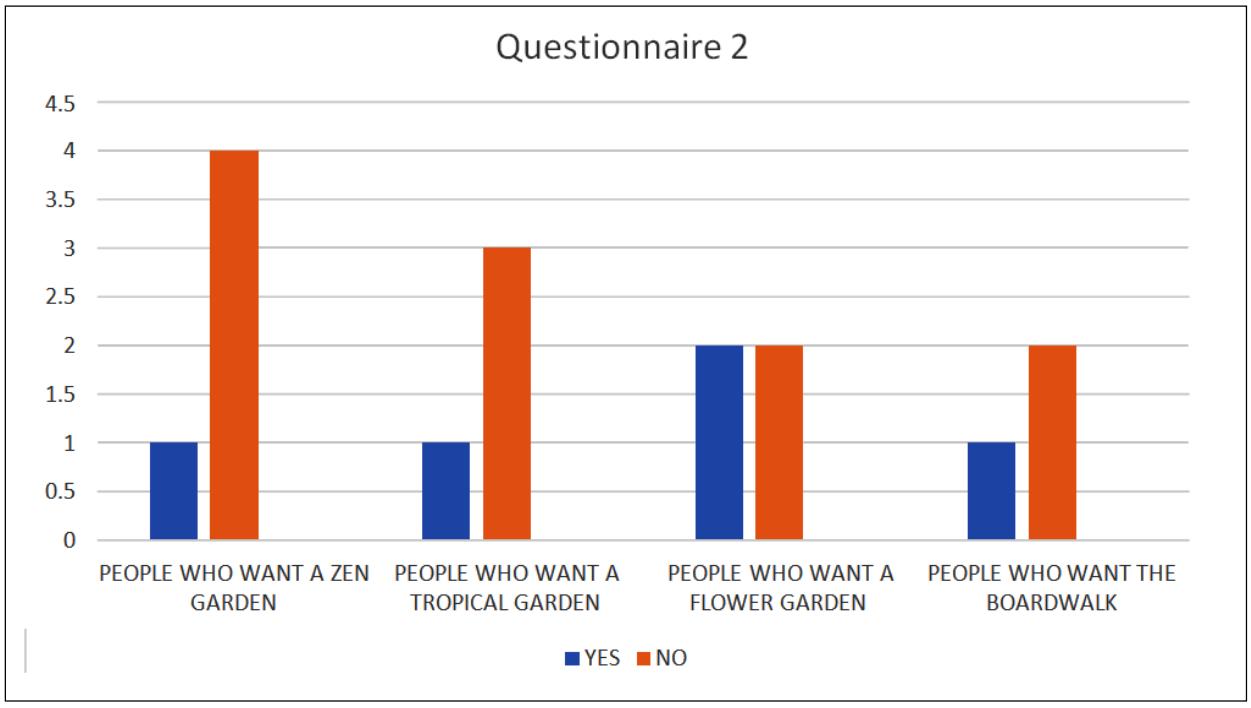


Figure 15

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From the above graph we can infer the following points:

- People residing in the society mostly belong to the following age groups -
- Many of the people don't want a zen garden and a tropical garden.
- People prefer a flower garden.
- Maximum number of people don't want a boardwalk.
- People prefer both indoor and outdoor gym.

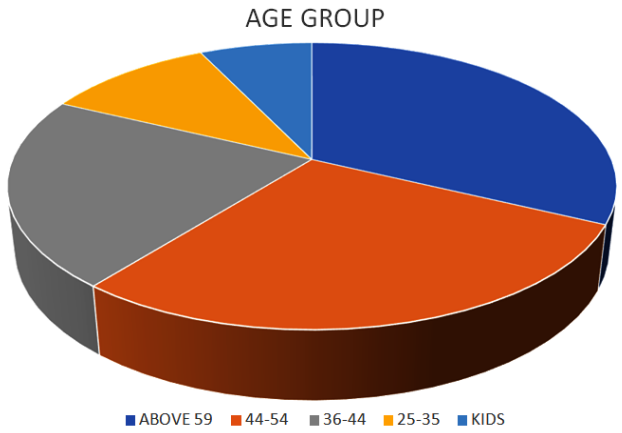


Figure 16

12. CONCLUSION/INFERENCE

A garden for senior citizens is a form of therapy.

To help combat loneliness and anxiety, gardens can be used as an excellent stress- reducers and a space for relaxation. By focusing on the beauty of nature, gardens can help distract seniors from the things that are causing stress and help them stay calm.

However, from the above study of enabled community garden for the members of St. Patricks Town society it can be inferred that, since the society comprises of bungalow plots the residents of the place prefer spending time in the gardens of their bungalow itself. Members of the society suggest to use the open space where the plan of the garden has been proposed as a sports playground. It would prove beneficial for the society to use the space as a playground and also allow outsiders to have membership of the club so that the society also benefits with such gesture. Moreover a proper jogging/walking track should also be provided around the periphery of the plot with proper seating spaces.

Along with that according to the residents a cycling track will also be a good option. The residents of the society are of the view that the maintenance of the garden will cost a heavy amount hence something income generating like a sports ground should be planned.

Hence instead of a community garden the residents of St. Patricks Town have suggested it to be a sports playground.

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Colonial Architecture of Jaora

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ABSTRACT: India was under British power for under three centuries, and things were evolved in some positive and negative both ways. The aim of the Britishers were not to benefit India, but for that the implementations and change which were done by them have helped India, in terms of architecture styles have been evolved and influence from the world can be seen. Colonial architecture is a part of our architectural heritage and during that time period other than British, Princely states were playing a role in building modern India, and to maintain their relations, with them and even getting fascinated by their architecture implementing and applying in our context. Many princely states have been analysed and studied but the architecture of Jaora in Madhya Pradesh is not explored as a important part of central India, in terms of historical significance and a piece which have helped shape modern India.

The study is focused on documenting and analysing the design intentions, factors which shaped the town, and to understand the evolution of the build form with respect to context and changes with the influence of architecture going around across the world, keeping the colonial style as constant and the process of creating a timeline with elements which can define the era of it through illustrations and graphics, and to analyse the architecture expression, which developed in the build form in case of Jaora.

Keywords: *Jaora, Colonial Architecture, Modernization, Regional Identity, Princely state, Architecture character*

1. INTRODUCTION

1.1 British India

Colonialism the practice by which of domination the country with powers controls the other country or countries in order to become richer. The study is about colonial architecture, there were many aspects of mutiny, influence of Europe and foreign which the princes were carrying with them during the period of time to please them the changes were being implied and a hybrid style came into existence which had a mixture of Indian, Islamic and western elements which have been termed as Indo Saracenic architecture, Colonial architecture exhibited itself through institutional, civic and utilitarian buildings. But all of these had their social and cultural influence in it which made them unique in itself, there were other influences also of events or styles evolving around internationally but majorly the locals were the workers so there is always some inheritance of them into it, and many researches have been done about Colonial architecture but many structures which have their significance or have their regional identity have not been explored, Jaora is an example among them.

1.2 Jaora State

Jaora got established in 1818 under the rule of Ghafur Khan, the Nawab was the president of state council, during that time there were seven districts or tehsils, Jaora was one of them, great improvements have been made in the town of Jaora, which contains several imposing buildings including a court house, post and telegraph offices, several schools, and a number of other structures in public and private sector. It distinctive to have such structure in such towns during that period of time. The city is unexplored and no such researches have been done. There are various structures which have elements of Western architecture like porch, spatial planning which they are ornamented in Indian style with Chaitya Arches and Rajputana arches, with Gothic influence windows, roof structures etc.

The attempt is to study, analyse and understand the forces which shaped the characteristic architecture of Jaora during the period of 1850–1950, the focus is also on various stylistic influences on the different elements of architectural composition which makes up the form and affects the structure and aesthetics. Colonial era signifies modern Indian architecture the research can provide criteria in which one can identify what were the forces which transformed the regional architecture

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with colonial architecture, the evolution in architecture and construction technology, is phenomenal and unless we don't study them we cannot appreciate the modern ones.

This study helps in documenting and keeping their significance integral, as these structures may be taken down and their presence would be gone, however these hold important historical meaning and architectural expression in it.

1.1 Aim

The attempt is to study, analyse and understand the forces which shaped the characteristic architectural expression of Jaora during the period of 1825–1947.

1.2 Objectives

- Understand the elements of architecture in Colonial building.
- Understand the evolution in the buildings by Colonial influence, identify the various forces- social, cultural, functional, climatic, that creates variations within specific building type.
- To analyse the architectural expression which developed in the built forms which have reflected the local traditions and their own cultures.

1.3 Scope and Limitations

Out of all the many Colonial structures in Jaora, only four will be analysed. This study is restricted to institutional buildings during the period of 1825 to 1947 in Jaora, as primary case study and for secondary the case studies would be chosen from Gujarat and Rajasthan during the same time period.

2. METHODOLOGY

- Library research, review of the existing data on colonial architecture for general study of evolution, history and development.
- Preliminary visit to Jaora for a general study of Jaora and to collect data.
- Libraries (books, gazetteers, photographs).
- Building drawings, if needed documentation.
- Municipal corporation, personal interviews.
- Analysis and processing the data through drawings and various mode of representation.

2.1 British India

By the middle of the 1600s, the Portuguese, Dutch, and French had established themselves as traders, and the Mughal Empire ruled the nation at that time. The British arrived in India relatively late and were motivated by the same imperial and economic aspirations as their early pioneers. The Mughal Empire declined and fell apart in the first half of the 1700s, while regional powers arose. The transition of authority from the Mughals to the British during the years 1760–1765 signified the start of a new era.

The East India Company, often known as the John Company, expanded its economic empire by diplomacy, deception, alliances, annexation, and open conquest (and hereby referred to as the "E.I.C."). 60% of the subcontinent was under its hands by 1857.The elimination of the E.I.C. was the main result of the revolution of 1857. Crown control replaced the government with private business, leading to the creation of the Indian Civil Services, reorganisation of the army, and implementation of changes in the judicial, financial, educational, land, and revenue systems.

The British utilised architecture on purpose to communicate their aims as traders and much more so as imperialists. The British had commercial objectives earlier, during the Company era, including the desire to trade, generate money, and take use of the country's markets and natural resources. Their utilitarian construction types, such as factories, forts, canals, warehouses, small dwellings, docks, churches, tombs, etc., represented this. The majority of these structures were constructed primarily for commercial purposes by military engineers or amateur architects. Thus, the architecture of these structures was utilitarian, dynamic, and plain.

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Later, during the reign of the Crown, the British objectives evolved from those of traders to those of imperialists determined to rebuild and control the country. By implementing policies that were eventually utilized in favour of the colonial subject, the British intended to do more than simply take advantage of and exploit the country economically.

They designed architecture as a tool to alter the (Indian) people's pre-existing behavioural patterns, preferences, and way of life. They created new administrative, judicial, educational, recreational, and cultural policies as well as systems like railroads, the post office, and the telegraph. Their institutional and civic building types, including as courthouses, prisons, hospitals, post offices, public markets, universities, schools, and colleges, as well as circuit houses, clubs, mansions, theatres, museums, and libraries, all represented this.

These structures were designed with symbolic intents in mind, they executed architecture purposefully as a "economic, political, military, social, intellectual, and religious between the conquerors and the colonised" because they considered themselves as the Mughals' heirs. As a result, structures mainly were placed on design considerations such as the building's placement within the city, its immediate surroundings, its siting, its scale and proportions, its facade, its overall visual effect, its symbolic meanings, and its architectural expressions.

As a result those buildings had western and Indian elements of architecture, Western elements of architecture have huge entrances, gates, porch, piers, magnificent frontages with minimal ornamentations, or many elements were used as per the architectural styles evolving around the world and which were happening and being used in their home country, series of steps, colonnades, Doric or Ionic column, balustraded parapets, double heighted spaces, use of geometry to give importance to central spaces, flat roof etc and later as adapting Indian elements blinds, louvers, verandas etc started getting along with the domestic as well as public buildings. The plans were inspired by their buildings happening in their home town but the craftsman was locals or military so it somehow got evolved and changed in terms of region to region.

Hence, architectural history of British India is a mixture of constant experimentation with different styles of buildings and these structures reflected their intentions and values towards the region and the empowering body of that time. Because of being such an important part of history yet unexplored Jaora becomes a prominent case study to analyse upon.

2.2 Jaora

The Malwa region in Central India is home to the princely state of Jaora. The state covered 1171 square kilometres. The majority of the state's residents were Christians, Muslims, Jains, and Hindus.

As a result of the Mehidpur fight, Jaora was established as a princely state on January 6, 1818 (under the terms of the Treaty of Mansour), with Gafur Khan serving as its first nawab. During his rule. It was a small village with 300 residents before to coming under the control of Nawab Ghafur Khan, and it was owned by the Thakur and Solanki dynasty, which had originally belonged to the Khatki Rajput. So it was such a town or sourced city, but throughout the time they were loyal to the rulers and the tax generation was very higher then their near townships it was labelled as the Tehsil of that region.

During the rule of 2nd Nawab 1825–1865, it had a phase of Mutiny so the major development got into fortifying the town, and constructing like Bridge, Compound wall, 7 Gates and, people were given lands with different occupations and dedicated market streets were declared and constructed to bring the life in the city.

After that during 1865–1895, As the district was giving good revenue to the dominant power more funding was given and government building started developing like Court, Jail, Janani Hospital, roads, Barr high school, Gunajaan Haveli, power plant, and a palace complex was build which even had printing of currency, and a palace complex was build which even had printing of currency. This was the phase of major devolvement of the town.

During 1895–1947 the rule of Nawab, Macchi Bhawan, Ghantaghar, Industries like sugar mill, oil, cotton, textile mills etc came up as industrialization affected and as the nawab was in good terms with the Raj it helped to get the financial support also.

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Phase 1 **Phase 2**



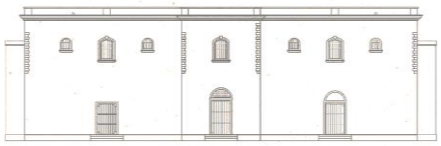
Phase 3 **Phase 4**

Based on the understanding of Colonial architecture:

2.3 Framework of Analysis

1. Structural Composition
2. Geometry and Order
3. Form and Volume
4. Structural system
5. Grid system
6. Scale & Proportion
7. Column/Pillars
8. Spatial planning
9. Material
10. Architectural Elements:

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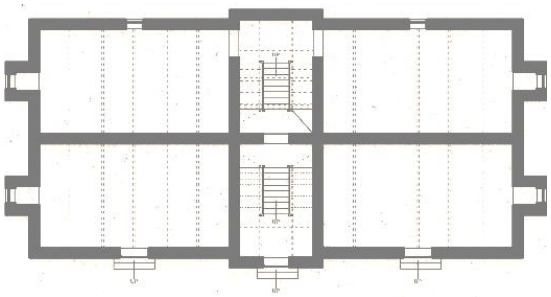


3. ANALYSIS

3.1 Jaora Jail

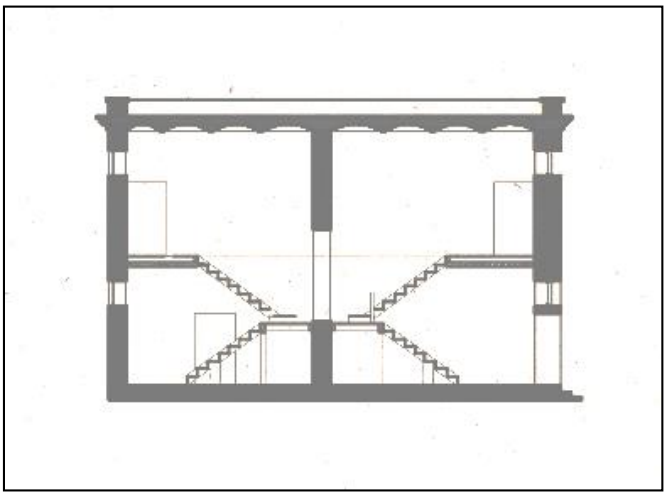
Elevation

Plan



It was built in **1881**, after mutiny and construction of Jaora court, it became the necessity for them to have it, it contains women cell also but now it is not functioning.

Architectural Features: Minimalistic design, Location, Less ornamentation, symmetry, flat roof, arch inspired by chaitya arch etc.



Section

Location in the city: It is situated in west side of the city along the main street in an open land expressing their power. It is on peripheral of the city.

Immediate environment: The Jail has high compound wall which creates a barrier between public and private space.

The Approach: The building is very dominant in respect to the context of local civilians.

Inside the Jail they do farming, cook their own food, clean stuff everyday by themselves which makes it more self-reliant.

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The function is primary as being a Jail but the location and form of it contradicts.

Façade: The boundary is the compound wall; rest is open but the wall creates the physical barrier

The primary approach is direct from the road while other is after entering and completing the other procedure.

Form Articulation: Very large Building in comparison to context.

Form Composition: Subdivided into another 3 different functions as men cell, kitchen, women cell and other supporting buildings like library, and other for storage and other then that they use for farming purpose.

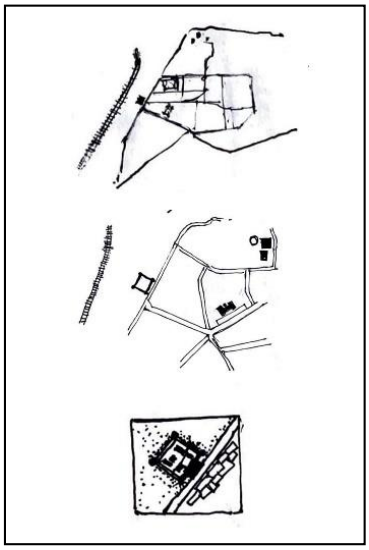
Spatial Organization: Overall symmetry/centrality is absent but individually symmetry is a very key factor in designing the buildings.

The Plan Organization: The general hierarchy observed as men cells then kitchen becomes the core space in and other are the supporting units.

Being a Jail very less ornamentation is used.

Sense of entrance is created by giving offset of thickness of wall.

Circulation: The circulation is linear, approach.



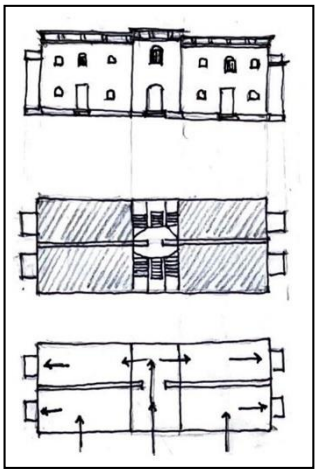
Location of the building in relation to the context.

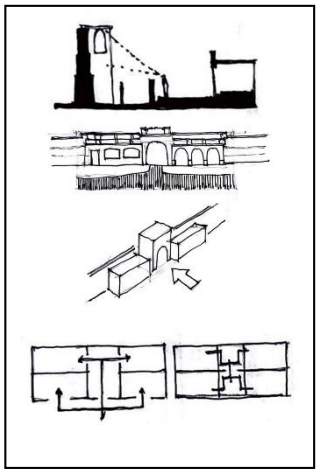
4. INFERENCES

- Locational Importance, the complex of Nawab and the court were very dominant, at that moment and being near still placed at a site which makes it linked to the city and other building also.
- An Important Landmark with respect to its functional scale and visual bold character.
- The building was intended to be visually known but not connection connective to people it is mostly to show the dominance and power of that era.
- The water towers were being used earlier but they are not functioning currently.
- The approach made it elaborate and formal but with the absence of visual contact with the structure form inside.
- While the articulation and building language is very dominant in relation to the context of local residents
- The use of colonnade and semi open space is extreme.
- Maybe the aim of the building up such a building with a function like jail was to make people have regret and fear of the institution and for other that they line among them only and they are not going to separate them.
- Symmetry very evident in form, but not too superimposing but merging with the living factor.

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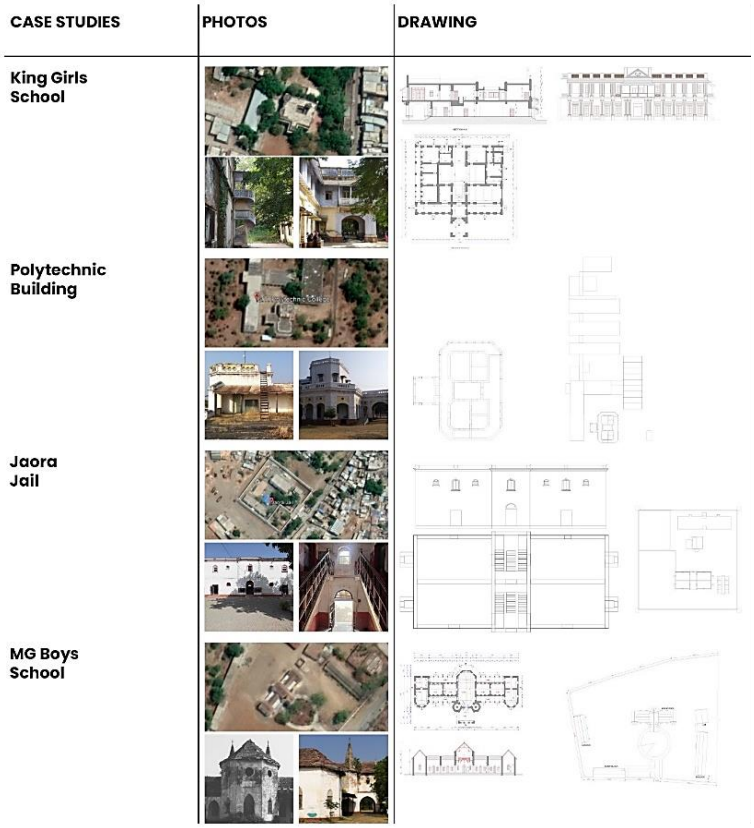
- Central part for primary spaces while the common space and edges treated as vertical circulation & services. Lack of symmetry in terms of overall planning but in units there is pure symmetry.
-





5. OTHER CASE STUDIES

There are other structures build during the same era but with very different approach, and language which doesn't seem similar to the local context, which have influence of colonial architecture happening around the world, like M.G School have influence of Gothic Revival, while Macchi Bhawan was build few decades later and it have Art Deco inspitation and more climatic response like chajjas, verandas according to direction etc.



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6. CONCLUSION

The structures which were made during this time period were highly influenced by their hometown Britain, the designing, use of certain materials remained the same, and as per their requirements and understanding developed they started adding the local touch to the architecture and Hindu and Islamic craftsmen were also involved, many elements were straight taken from some buildings in Britain or it was inspired from the architecture which was happening around the world, So architectural elements got merged and the outcome was a hybrid of their design ideologies and Indian culture with local craftsman.

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Extended Building Edge

(Study of corporate/office building of Ahmedabad)

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ABSTRACT: Facade is an envelope of building which represents the identity, character, typology of a building. Various typology has various kind of activities around the façade. Residential and commercial has silent but interactive activity whereas contemporary corporate buildings are more focused on inside environment of work. So, there is a detachment to external environment and able to give provision of extended facade. Not every building is designed to address all the climatic factors. It is the context on which the considered climatic factor is addressed. Study will be to find and analyze the building which specifically responding to the daylight and how it changes the user experience. Intent will be to understand appropriate use of extended facade. It will be observed with potential use of daylight as considered climatic factor out of all (temperature, humidity, ventilation and daylight).

It has been observed that the elements and material which have been used as extended skin to the building include louvers, uniquely shaped fins, blank walls, MS steel section grid and panels hung through metal studs. Study of corporate office buildings of Ahmedabad will be carried through a methodology that adopts to study the process of user response collection, interviews with the designers, discussion with consultants and daylight analysis. The study questions this new adapted style for the corporate buildings and investigate the future of these trends.

Keywords: *Building Envelope, Façade Architecture, Office Buildings of Ahmedabad, Daylight in Corporate Buildings, Climatical Analysis, Building Envelope.*

1. INTRODUCTION

Façade of an office buildings have adapted extended building edge as climatic response for generic situations like overheating, excessive daylight. Different façade material and sun study is important factor for the daylight study. Daylighting is the practice of designing buildings and spaces to maximize the use of natural light to create a more sustainable and energy-efficient environment. The use of daylighting in architecture can greatly enhance the quality of life and well-being of those using the space, while reducing the energy consumption associated with artificial lighting.

1.1 Aim

The aim is to study daylight of contemporary façade for the corporate buildings of Ahmedabad.

1.2 Objectives

- To analyze the extended building skin with respect to climate response, orientation and context.
- To understand user experience of building skin through study of appropriate daylight range for the internal activity.
- To identify a typical style in building skin which responds to users.

1.3 Scope and Limitations

The scope of the research is to study and analyze corporate and office building type for the extended building edge. There are residential, commercial, corporate and hospital segment of buildings are included for the exploration. Yet corporate buildings found to be the most of them. So, the study will be restricted to the corporate building of Ahmedabad.

Daylight study of the buildings can be done through various studies, the analytical study is limited to criteria: Daylight Autonomy (DA), Useful Daylight Illumination (UDI), Daylight Factor (DF).

ISBN: 978-93-89934-68-7

2. METHOD

Method of the study is based on the analysis of case study of buildings, interviews with architects for the idea of extended building skin, study of approach by architect for design.

Method to analyze building skin for the daylight is part to ways:

1. Year-round method
2. Point to time method

1. Year-round method includes the use of software simulation tools:
   - Velux
   - Andrew Marsh
2. Point to time method includes the use of equipment at specific time and specific point inside building and calculates the amount of daylight.
   - Lux meter

3. OFFICE BUILDINGS IN INDIA

India's major cities like Delhi, Mumbai, Bangalore has always been backbone to economy and business industry that's where the infrastructure comes in the picture. After economic liberalization, the office infrastructure has grown very drastically. Big offices and corporate building became front picture to show dominance. Growth has spread around to mega city Ahmedabad, Gurgaon, Pune and many more cities. Many of the areas in city dedicated to only offices and corporations to make business park and office hubs.

In the cases of three office hubs in India – DLF cyber city in Gurgaon, Bandra Kurla complex in Mumbai and outer ring road in Bengaluru may provide clues about what is needed to be a successful hub. DLF cyber city started in early 2000. The high-quality buildings with large floor plates and world class amenities, such as food court and ATMs, attracted large corporates.[1]

The same way Ahmedabad has grown its business area from Aashram Road to CG Road and SG highway. A wide road leading to Gandhinagar giving exposure to lots of new corporations as well as offices. Office building are not entirely a single corporation rather than shared spaces between multiple small-scale startups. The idea of shared office space came into building style and where façade became important factor to replicate dominance. Also, with response to climate the extended building edge expanded limitations to façade treatment.

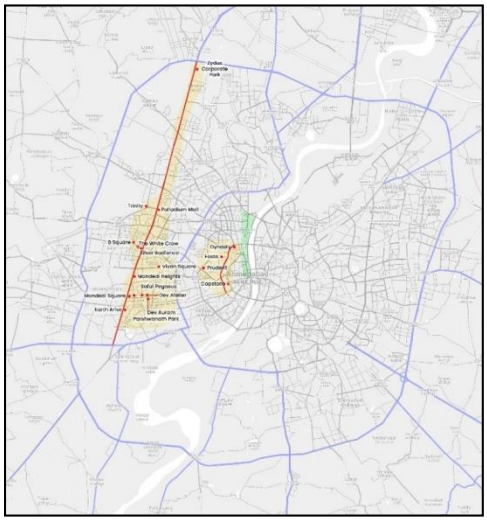


Figure 1: Ahmedabad Map Indicating Major Office Buildings

[1] Article by Trivita Roy "Tapping the office hub establishment curve in India. https://www.jll.co.in/en/trends-and-insights/workplace/tapping-the-office-hub-establishment

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4. DAYLIGHTING TECHNIQUES

1. **Window Design:** The placement and design of windows can have a significant impact on the amount of natural light entering a space. Large windows and skylights can be used to increase the amount of light, while shading devices such as overhangs and louvers can be used to control the amount and direction of light entering a space.
2. **Reflective Surfaces:** Reflective surfaces such as mirrors, light-colored walls, and ceilings can be used to redirect light deeper into a space, increasing the amount of natural light.
3. **Light Tubes:** Light tubes are a type of skylight that uses reflective surfaces to channel natural light into a space. This can be an effective way to bring natural light into a space where traditional windows or skylights are not feasible.
4. **Passive Solar Design:** Passive solar design refers to the use of design elements, such as orientation and window placement, to maximize the use of natural light and reduce the need for artificial lighting.[2]

5. DAYLIGHT IN ARCHITECTURE

There are several methods of analyzing daylight in buildings, including:

1. **Daylight Factor (DF) Analysis:** This is a simple method that calculates the ratio of daylight illuminance on a point inside the building to the outdoor illuminance on an overcast day. It provides a good indication of the overall daylight availability in a room.
2. **Useful Daylight Illuminance (UDI) Analysis:** This method evaluates the quality of daylight in terms of the amount of light that reaches a work plane. It takes into account both the quantity and distribution of light to provide a more complete picture of the daylighting conditions.
3. **Daylight Autonomy (DA) Analysis:** This method calculates the percentage of a year that a space is illuminated to a minimum specified illuminance level, usually 300 lux. It provides an idea of the amount of time that a space can be used without relying on artificial lighting.
4. **Daylight Factor with Temporal Distribution (DFTD) Analysis:** This method adds a time-based dimension to the Daylight Factor analysis, by considering the variation in daylight levels over the course of a day. It provides a more accurate representation of the dynamic nature of daylight.
5. **Annual Sunlight Exposure (ASE) Analysis:** This method analyzes the distribution of direct sunlight into a space over the course of a year, taking into account the sun's position and orientation relative to the building. It provides information on the potential thermal discomfort and glare that may occur as a result of direct sunlight.[3]

6. BUILDING ANALYSIS

CAPSTONE office building (2019), Nr. Parimal Garden, Ahmedabad.

Architect: Pratik Soni and Umang Soni, u design studio.

Yearly analysis of building spaces gave idea of spaces with extreme daylight and spaces deprived from daylight. With this study the overall study of form and façade study is important for equilibrium of daylight in spaces, and smooth transition of daylight factor in spaces.

DAYLIT UPTO (in percentage of time)
Lobby Area: 5.4–8.6% **Lift Foyer** – 27.1–28.8%
East side Offices: 18.8–19% **North side Offices** – 14.1–15.7%
West side Offices: 13–19.1% **South side Offices** – 18.5 – 27.4%[4]

Most daylit area with maximum time is found to be lift foyer area which leads to the lobby for the circulation in which percentage reduced down to 5 percentage. The impact of façade panels on overall daylight of the building is considerable.

[2] Green Home Technology Center https://greenhome.osu.edu/natural-lighting
[3] http://thedaylightsite.com/daylight-analysis-in-the-design-process-of-residential-buildings/
[4] Daylight Factor Analysis by VELUX simulation software.

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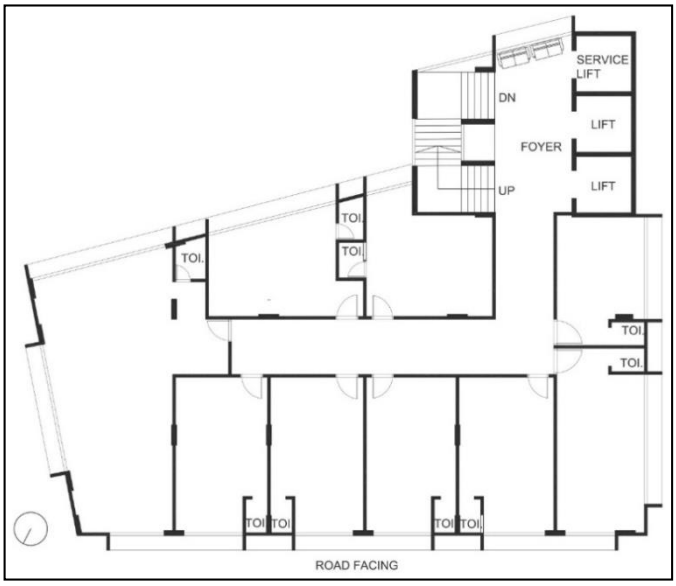


Figure 2: Building Small Office Size Plan – 6th Floor



Figure 3: Building North Side Elevation

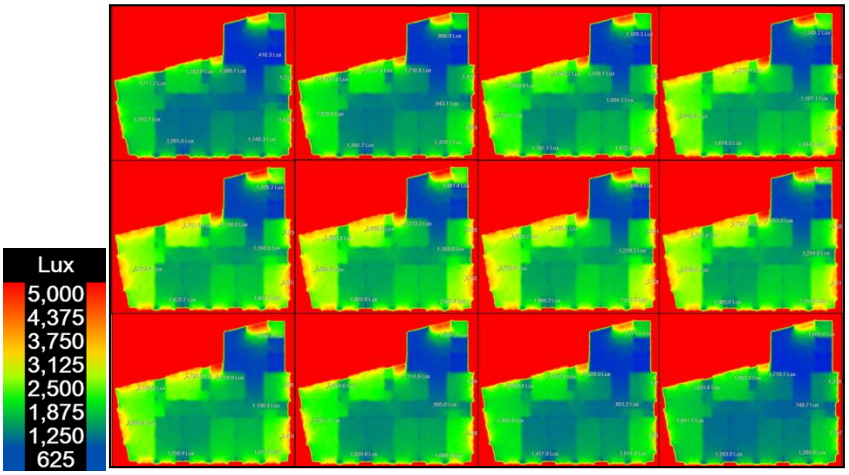


Figure 4: Capstone Building Yearly Daylight Analysis

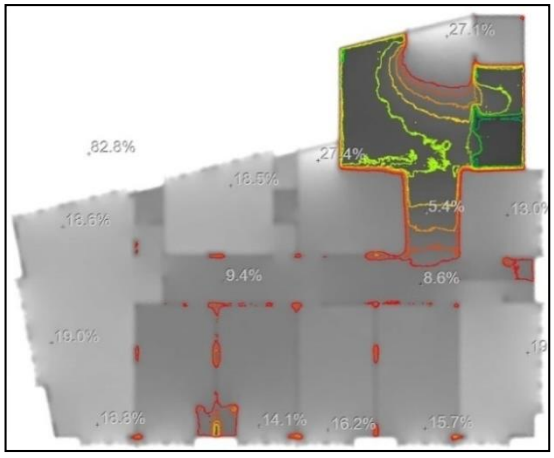


Figure 5: Capstone Building Yearly Daylight Factor

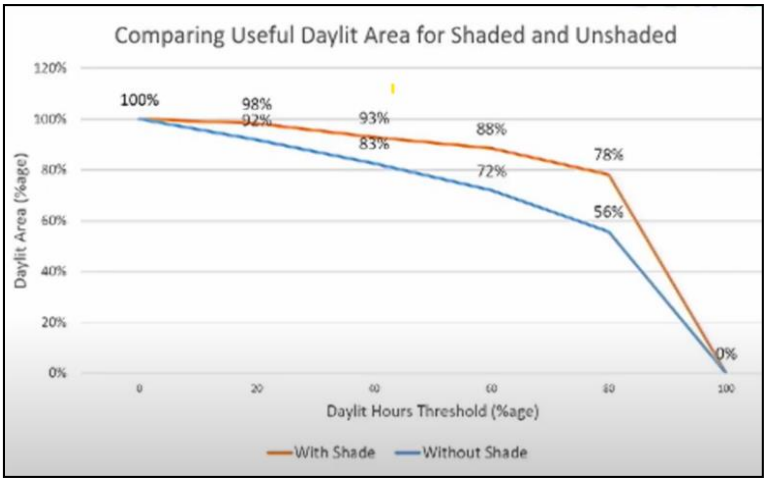


Figure 6: Daylit Area Compared to Daylight Hours

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7. MATERIAL AND COST

Cost is very dominant factor in building construction, in which extended building edge with response to climate or aesthetics comes with additional cost to the project. Not only one time cost but maintance cost also non-negligible, but the quiestion is does this considerable with compared to energy savings and better health of users.

The case study building Capstone had around 1800 Rs/sqft rate for the façade treatment where as another project by the very same architect Dynasty had around 2200 Rs/sqft for the façade treatment. The growing rate of money spent on façade is increasing rapidly. Last few years became an age for the new way to think building edge in Ahmedabad in terms of material also.

Buildings constructed in a sustainable manner are commonly perceived to incur higher cost than conventional buildings and often are deemed not worth the additional cost.[5] It was found that average premium for sustainable buildings is about 2% higher than traditional buildings. The majority of the cost is due to the increased architectural and engineering design time, modelling cost and time necessary to integrate sustainable building practices into projects.[6]

8. CONCLUSION

The use of daylighting in architecture offers a range of benefits, including energy savings, improved health and well-being, aesthetics, and environmental sustainability. By utilizing various daylighting techniques, architects can create buildings and spaces that are more sustainable, energy-efficient, and provide a high-quality environment for those using the space.

Daylighting does not necessarily stay having glass facades all over buildings. An glass building with no daylighting control may experience more problems than benefits in the form of excessive heat gain. Daylighting is about the careful, quantitative and qualitative control of the light inside the building.[7]

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House Form and Settlement Pattern, Study of Patel Community at Amreli, Gujarat

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ABSTRACT: Every community in India has a rich history of contributing to its formation. It's fascinating to examine how each community maintains its unique identity in terms of housing and built form. The way of life in a society is defined by its own culture. Shared cultural values inspire people to communicate and cooperate in community activities to create the community's lifestyle. These values are represented in their beliefs, thoughts, and behavioural patterns. Every built form of the community exhibits a unique narrative that gives existence a reality all its own.

In the Patel community, every brother has his own house but common fadiyu which is shared by every brother. So each house has closed spaces (rooms), semi open spaces (osari), and open spaces (fadiyu). Which is a connection and sharing between all houses or built forms. And now a day's families are living in individual houses or one cluster. Where have a private space, semi-private spaces and open spaces like individual fadiyu. Every connection has a significant function in each other's spaces. Having an understanding of people's lifestyles, which are the key element. Concrete as material is now being used for similar plan sequence of private, semi-private, and open spaces, but this has an impact on architecture. Cluster settlements are created in this way, creating an individual cluster of one person, one economic factor is considered to change a built form of the house.

The study is therefore more focused on the evolution of house form or cluster settlement in the context of transferring materials from wood to concrete and also altering the impression of spaces on the side of dwellings and methodology of house form and document houses in Liliya Taluka, Amreli District, Gujarat.

Keywords: *House Form of Community, Occupation and Architecture, Traditional Houses of Amreli.*

1. INTRODUCTION

Every community in India has a rich history of contributing to its formation. It's fascinating to examine how each community maintains its unique identity in terms of housing and built form. The way of life in a society is defined by its own culture. Shared cultural values inspire people to communicate and cooperate in community activities to create the community's lifestyle. These values are represented in **their beliefs, thoughts, and behavioural patterns**. Every built form of the community exhibits a unique narrative that gives existence a reality all its own.

In the Patel community, every brother has his own house but **common fadiyu** which is shared by every brother. So each house has **close spaces (rooms), semi open spaces (osari), and open spaces (fadiyu).** Which is a connection and sharing between all houses or built forms. And now a day's families are living in individual houses or one cluster. Where have a private space, semi-private spaces and open spaces like individual fadiyu. Every connection has a significant function in each other's spaces. Having an understanding of people's lifestyles, which are the key element. Creating an individual cluster of one person, one economic factor is considered to change a house's built form and materials.

1.1 Aim

Understanding the correlation between a cluster settlement pattern and spatial organization of built form in the case of Lilia taluka, Amreli District.

1.2 Objectives

1. To determine the relationship between cluster and house form.
2. To understanding a sequence of active places.
3. To examine and analyse how space uses affect the arrangement clusters of the built form.

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1.2 RESEARCH QUESTIONS

1. What is a sequence of activity reflecting on spaces?
2. What is the reason for the arrangement and location of clusters to influence space or space use?
3. What influence do lifestyle changes have on house form?

2. METHODOLOGY

- To understand many aspects of peoples' cultures and lifestyles, and with library research from books, articles, and lifestyle of people.
- The entire data collection process for the study of the Patel community will include interviews, interaction, intensive fieldwork and well-chosen documentation.
- Documentation is done using pictures taken while on location as well as plans, selections, and sketches produced while there.
- To document the houses of liliya taluka, Amreli District.

3. SCOPE AND LIMITATION

1. Liliya is traditional settlements that show a variety of housing pattern.
2. My research has been limited to the old fabric of the villages, with the study and documentation of eight houses.

4. OBSERVATION/LEARNINGS

When we talk about a cluster pattern or built form so the first question is how to cluster pattern gives impacts on context and also arrangement of the built form and how to relation or influence each other? So **the relation with the built form is more importance to creating a different space uses**. So there is an importance and **arrangement of clusters and built form it gives a character of house form and also on context.**

4.1 Ramesh Bhai's House

In Ramesh Bhai's house there have five individual built forms and the **built form arrangement is creating a relation between each other and created spaces**. Also built form arrangement is creating to use of spaces. This built form has a one **farzo where are keeping animals**. One built form has a **khodiyar mata no madh** so there is every morning and evening a doing **arti or puja and playing a bhajans** on loud volume so sound goes in every built form or house there have a **semi-open spaces like osari** and in osari has a **paniyaru** and in close spaces have a two **orado** (room) where are people sleeping spaces and eating space. So orado connects to osari and osari connects to common fadiyu. And there has a **kitchen which is connecting to both fadiyu and orado**. There has the first floor there is a **recreational room** so which is one **rectangular large room** which is act as storage. they are **occupation** is a farmer so when some **generate a product from to farm**. So they are used as **storage**. Also when they have any **function** then it is used as a **large hall and gathering over there**. So it is a **multipurpose space**. And one important space is fadiyu and this **fadiyu is connecting to every built form so in this cluster.** This is a very **active space** in this cluster. In fadiyu they are working together so this cluster has a five-built form and creates a relation between each other and creating spaces so peoples use these spaces and active space. So there is **the importance of built form arrangement of spaces and use of spaces**.

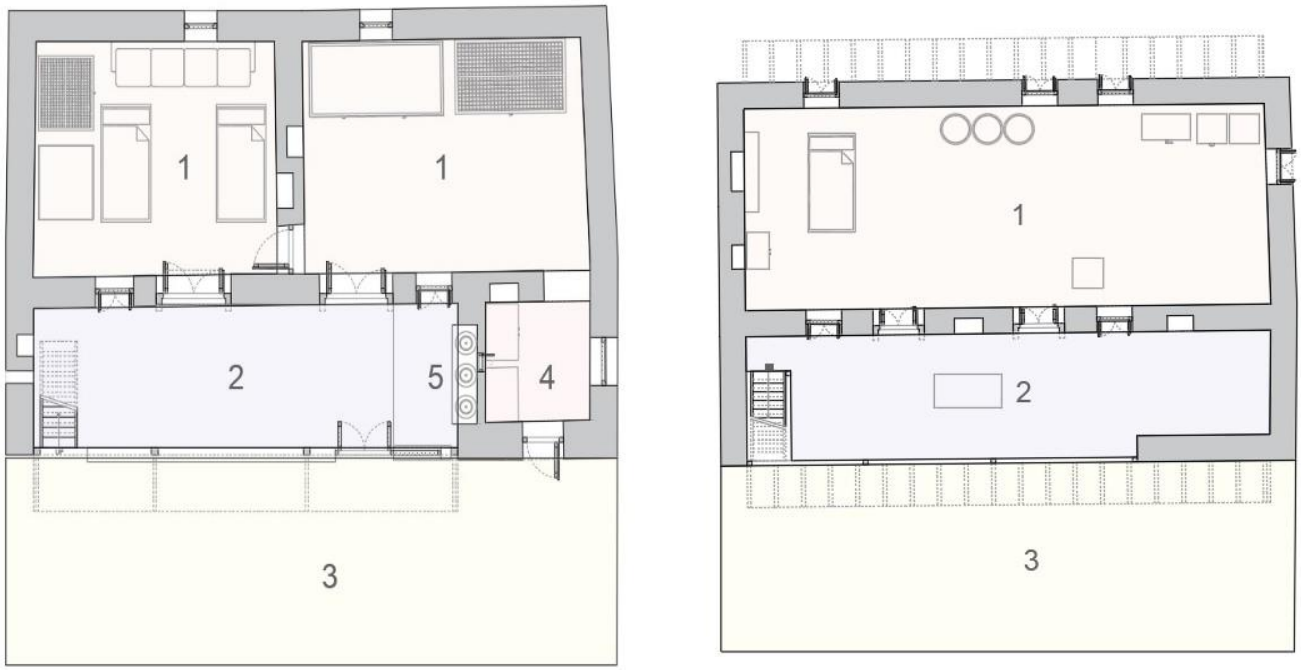
4.2 Patel Deli

In Patel deli, there is a main entrance with a large gate and the **built-form arrangement is linear** so here **fadiyu** becomes **linear automatically**. So osari creates a good relationship with fadiyu rather than Ramesh Bhai's house and paresh bhai's house. And orado is connecting to osari and also in osari has a **paniyaru**. So there have **four built forms that become one cluster.** So every two built form is looking at each other and these four built forms are between one common wall. Also here the **ornamentation** is more like curving a **column and bracket**. So different built-form arrangement gives a different sense of spaces and use of spaces.

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5. FADIYU

- Fadiyu is an open space where people are doing work together.
- In the morning the space uses for the drying the cloths and in the evening this space become the social space. they provide otla to sit in the fadiyu.
- Spaces of house form: Main gate, Ordo, Osari, Farzo, Fadiyu, Paniyaru, Mata no madh.
-



1 Ordo, 2 Osari, 3 Fadiyu, 4 Kitchen, 5 Paniyaru

6. ORADO (ROOM)

- Ordo is used as a place to store items in keeping patara and is usually where people live, dine, and sleep.
- Every Orado's opening is kept at the front of a faliya, and the first floor has a multipurpose room in use for storage and, if needed, conversion into a gathering space.

6.1 Kitchen

- In kitchen they have one door from room and one from the fadiya so they can arrange a function or any celebration they can use the kitchen without disturbing the inside spaces.
- Window of the house is oriented towards the khidki for women to see who is coming in the house.

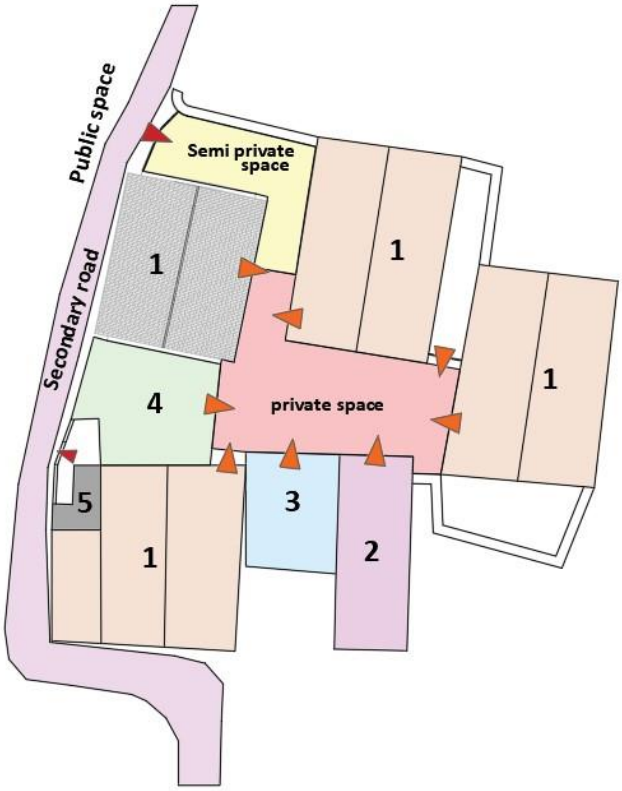
6.2 Osari

- Osari is a semi-open area that connects Fadiyu and orado.
- Paniyaru and a small chokadi are situated in Osari, in chokadi where women wash utensils.

6.3 Farzo

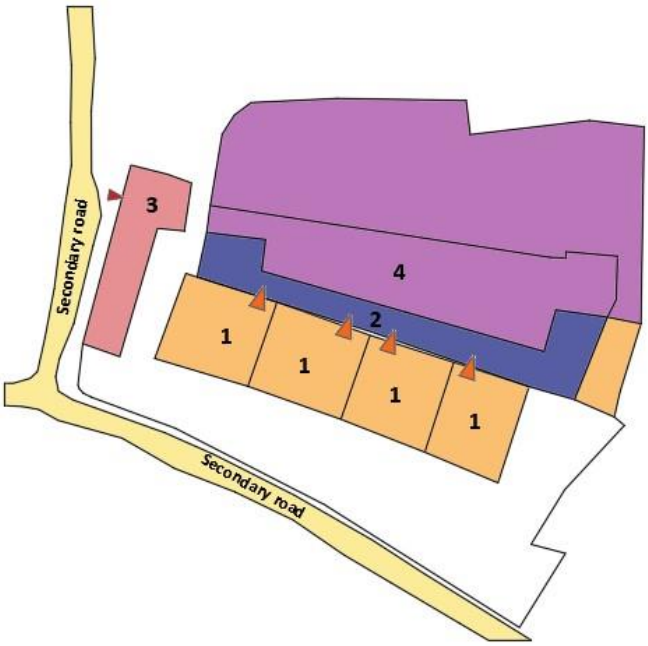
- Farzo is a place where they keep the animals like bulls, buffaloes, and cows.
- Farms use animals and sell milk, butter, and ghee.

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1 Built Form, 2 Concrete Structure, 3 Mata No Madh, 4 Farzo, 5 Toilet

7. RAMESHBHAI'S HOUSE



1 Built Form, 2 Fadiyu, 3 Main Gate, 4 Concrete Structure

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8. PATEL DELI

9. CONCLUSION

A person's home is a reflection of their identity as an individual and not just a place for them to live.

A house is designed with consideration for the user group's cultural beliefs, methods of living, and fundamental needs.

House form is a consequence of both physical and sociology-cultural aspects; while physical factors differ between locations and only provide an opportunity for developing forms, sociocultural influences provide the built form an identity.

The elements Main entrance, osari, fadiyu, farzo, paniyaru, matano madh, etc. build up that space, which is an environment.

These elements help to define the value of space in the house form and contribute in fulfilling needs of the users by reflecting the characteristics of the spaces in the home.

The arrangement of these components creates places that fulfill the needs of the user on a daily and enhance their activities there.

The arrangement and orientation of the spaces in DELO are such that they emphasize FADIYA, the central focus of the home.

As can be seen from the case studies, FADIYU is a most active space of the house with all the major activities taking place throughout the day.

Every house has a window in the kitchen that faces the fadiya and is placed at eye level for ladies cooking there. This window serves two purposes: it allows for security purposes to keep an eye on individuals entering the house as well as on children playing in the fadiya.

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Interactive Streets: Connecting People to Livable Streets: A Case of Walkers Street, Nagpur

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ABSTRACT: Each city has its own essence. The streets define the character of the city. Whether it's Colaba in Mumbai or Mall Road in Shimla, they depict the image of the city. Streets are engines of economic activities, social hubs, and platforms for civic engagement. Streets aren't simply open public places; they're open public areas where a diverse range of people, behaviors, and identities coexist. Planning, designing, and managing better public spaces have become important global discussions. Post-pandemic people have started to come out and interact with each other and with spaces. One such street is Walkers Street situated in Nagpur. Nagpur is one of the fastest-growing cities in terms of infrastructure and community. The city is seeing rapid expansion in the fields of industry, healthcare, and education, among others. It is famous for its greenery and the activities conducted in it. Despite the scorching heat in the summers, Walkers Street tends to be cool and lively. The study is about the activeness and liveliness of Walkers Street which is achieved by the green infrastructure. Green spaces are one such factor that not only helps to keep spaces lively and make them livable. The research follows a comparative analysis of JM Road and Aundh, Pune to check whether the same design module can help to inculcate in various parts of cities. This research paper focuses on how to build livable streets with the help of street furniture and how they can be designed and transformed to make them more interactive, user-friendly, free-flowing, and comfortable for pedestrians.

Keywords: *Streets, Livable Streets, Walkers Street, Interactive Streets, Urban Streets, Urban Spaces, Urban Fabric, Livability.*

1. INTRODUCTION

A street is the basic unit of urban space through which people experience a city. It is often misconceived as the two-dimensional surface that vehicles drive on when moving from one place to another. Streets are, in fact, multidimensional spaces consisting of many surfaces and structures. They stretch from one property line to another, including the building edges, land uses, and setbacks that define each side. They offer space for movement and access and facilitate a variety of uses and activities.

Streets are dynamic spaces that adapt over time to support environmental sustainability, public health, economic activity, and cultural significance. Streets are like outdoor rooms shaped by multiple planes: the ground plane at the bottom, the buildings and the roadbed edges as the side planes, and the canopy plane like the ceiling of the room. Each plane is constructed of many individual elements that are often regulated or created by a range of different policies, codes, guidelines, and building practices.

"Streets are places of social and commercial encounters and exchange. They are where you meet people – which is a basic reason to have cities in any case".

1.1 Nagpur

Streets reflect the diversity and vibrancy of the urban fabric and hold the power to create memories. Among all public spaces, streets emerge as the most public. But what makes the streets interesting are the interactive spaces. What makes these streets livable and breathable are the people. Post-pandemic people started interacting again. The need for green spaces has increased. One such interesting street is Walkers Street situated in Nagpur. Known for its name, the street is full of fitness freaks. The street is a residential street. This community-building activity can lead to something solid. It is famous for its greenery and activities happening there. People come to exercise, relax, and spend time with nature. The best part about this street is that it remains cool during the summer when the temperature in Nagpur reaches 45°–48°C. The city is growing tremendously. And thus, the need for spaces to get the community together is increasing which are safe and healthy.

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1.2 Lifestyle and Community

There are many aspects of Nagpur city that indicate that the city is growing in terms of business, education, industry, manufacturing, and research. As per media reports, Nagpur is already the 11th most competitive city for investment and has got an advantageous geographical location. But the city needs proper provisions in terms of social lifestyle. The need for community spaces is increasing day by day. This street has the potential to bring different communities together and create livable space.

The main objective of this research is to see how the streets are interactive and contribute to livability. It also addresses how different types of provisions for seating, exercise, walking, and jogging can be provided to make the street active. It will also focus on the importance of landscape on the streets to make them greener and more sustainable.

2. LITERATURE REVIEW

2.1 Street: A Genre

The street has always been a gathering area for people to congregate, socialize, and enjoy being a part of a community, as well as a place for people to express themselves. The street even provides the possibility to be alone, relaxed, and ponder while being surrounded by others. This diversity of behaviors and activities among various social groups and classes results in social contacts and experiences that are important for well-being, community, and civility. (Mehta, Streets and social life in cities: a taxonomy of sociability, 2018).

According to Mehta, the "Street" is a crucial public area that makes up half of the city, serving as the primary infrastructure for transportation, accessibility, connection, and transport services while also serving as a venue for social interaction (Mehta, 2013). Jane Jacobs contends that a city's streets serve as a gauge for the quality of its public spaces (Jacob, 1961).

The way that streets change and adapt through time to the environment, reflecting the attitudes, values, and way of life of the locals, helps to leave a lasting impression on visitors. Due to the importance and influence it has, the word "street" is now both a noun and an adjective. According to Anderson's "On Streets," Appleyard's "Livable Streets," Moudon's "Public Streets for Public Use," and Jacobs' "Great Streets," a street is now a shared area that is linked to values and experiences that are particular to the location and help create lasting memories of it. Streets are connected to many different activities, primarily commercial ones.

2.2 Street: A Commercial Hub

According to Mehta, the social, land use, and physical components of the street are all equally important to people. Business-provided seats, government-provided sitting, community-oriented enterprises, individualized street fronts, and sidewalk width all add to the stationery and social activities on neighborhood commercial streets. Both individual business owners and government agencies play a vital role in making local commercial avenues a social gathering place. (Mehta, Lively Streets: Determining Environmental Characteristics to Support Social Behavior, 2007).

2.3 Street: A Social Space

The study of urban streets has been extensively covered in recent urban design and planning literature. Bosson explained that the majority of study does not expressly and directly address the street as a social location of meeting and interaction, despite the fact that there is universal agreement that streets must be regarded as spaces rather than merely as pathways of mobility. Therefore, in this longitudinal study, we focus on the street characteristics that make them good settings for social interaction (Bosson, 2014).

The following are the types of streets that can be treated according to their use.

Alleys: Alleys are small-scale streets that typically only carry low numbers of vehicles accessing adjacent properties. Their character varies across the city, from residential to service alleys. Hence, it should be designed to a pedestrian- scale, speed, and level of detail wherever possible, to calm traffic and emphasize pedestrian use. Alleys may also include seating, landscaping, and pedestrian lighting to create usable public space.

Residential Throughways: Residential throughways are those which have fast-moving traffic with residential land uses. They are often not designed to serve residential uses and can be unpleasant to walk or live along, streetscape improvements

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should focus on buffering the sidewalk and adjacent homes from vehicles passing in the street and providing a generous, useable public realm through landscaping, curb extensions or widened sidewalks.

Neighborhood Residential: Neighborhood residential streets are quieter residential streets with low traffic volumes and speeds. Though they have low levels of activity relative to other street types, they play a key role to support to the social life of a neighborhood. Residential streets should be safe and comfortable. Improvement should focus on slowing traffic, providing usable space and amenities, and making improvements that encourage residents to take pride and ownership of the streetscape outside their front door.

Neighborhood Commercial: These are the streets that are used as places to hang out, shop, and play on the weekends. Short-term parking for customers and space for loading facilities are essential components of commercial districts. However, parking and loading facilities often compete for the same space as desired features such as pedestrian plazas.

Mixed-use Street: Mixed-use streets serve industrial uses, as well as the growing number of residences, shops, and services. Their use and character are in a state of constant change, and the street must reflect this changing character and serve a variety of needs. Mixed-use streets are often wide streets, with high volumes of fast-moving traffic. Streetscape treatment should include landscaping, pedestrian safety elements, public space uses, and other amenities to complement current and future land use.

2.4 Residential Streets

Residential streets are those that give pedestrians and a range of vehicle types access to houses and local attractions. Additionally, they offer a location for social contact; a location where families may gather, neighbors can chat, and locals can go for walks and bike rides. Residential streets are often categorized within a neighborhood subdivision based on the building density, physical qualities, street layout, driving behavior, and human activities.

Residential streets' physical form and urban design traits are important factors to take into account. The physical characteristics of residential streets and building arrangements, together with the volume and speed of the traffic they carry, all play a considerable role in fostering a sense of neighborhood, belonging, comfort, and safety. They also have a significant impact on social behavior and the well-being of the community. (Michael Southworth, 2003).

This involved looking at a number of research papers in order to investigate the peculiarities of residential streets. In 1983, Appleyard posed the question, "What could a residential street -a street on which our children are brought up, adults live, and elders spend their last days- be like?" (Appleyard, 1983). Additionally, the rights of street inhabitants that a residential street might support through design include as follows:

1. **The street as a sanctuary:** pedestrians and children should be able to wander through the neighborhood streets safely, free from vehicles and excessive speed.
2. **The street as a livable, healthy environment:** Streets shouldn't be subjected to traffic noise, vibrations, fumes, and soot, which stress people's everyday lives both inside and out.
3. **The street as a community:** The street should promote neighborhood activities and social interactions and be equipped with appropriate walkways, street furniture, and child-friendly play areas.
4. **The street as a neighborhood territory:** Residents must have a sense of ownership over the street and a sense of obligation to keep it tidy and tree-lined.
5. **The street as a place for learning and play**: In many places, the street is the only public area accessible to kids, thus it should be a suitable and secure area for them to play.
6. **The street as a green and pleasant land:** In large cities, trees, plants, and landscaping are most desired because they offer shade, a respite from pollution, and a beautiful natural setting.
7. **The street as a distinctive historic location:** The street's identity and distinctive character are derived from its history, culture, or specific aspects and elements that create a feeling of a place rather than from its function as a moving channel.

2.5 Livability

The degree to which a place, whether it be a neighborhood, town, or city, fulfills the quality of life, health, and well-being of the people who live there, work there, or visit there is described as livability by CABE. As a result, it is described as the

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end result of interactions between variables affecting social and economic well-being as well as health and the environment (CABE, 2007).

The term "livable street" or "living street" refers to a notion of a street that reflects social fairness, economic health, and ecological vitality. Auto mobilists are not excluded from the concept of a livable street, but they are given space for their cars by enabling a more equitable balance with other street users, such as walkers and cyclists, so that everyone may utilize the street equitably (Francis, 2017).

The notion of a livable street is more human-centered since it places a strong emphasis on the local or neighboring population as the primary focus. Ahmed states that people are seen as the focal point of a street and interact with other components, such as street trees. Human activities and diverse street features have an impact on one another, which also affects how livable the street is. Livable streets in urban communities may be great spaces for public life and social inclusion. Beyond safety and comfort, livable streets must encourage inhabitants to use the public space on the street (Ahmed Atef Elsawy, 2019).

According to Jane Jacobs, every community needs a variety of activities to draw people in, ensuring that they are there when different facilities are used, and creating vibrant, diversified neighborhoods that promote strolling. She also underlined that streets and sidewalks serve more than just the aim of getting people from one location to another; they are also important public areas that guarantee children's safety, human interaction, and assimilation (Jacob, 1961).

Our communities and cities may become Centamore community-red and civic-minded, healthier, inclusive, and ultimately more livable and sustainable by having more sociable and bustling streets. Improvements in commercial seating, public sitting, block variety, independent enterprises, and community meeting locations were all found to be important predictors of liveliness.

2.6 Three Outdoor Activities on the Street

According to Gehl, there are three outdoor activities that lead to interaction on the streets. To put it very simply, there are three types of outdoor activities that take place in public spaces: obligatory activities, optional activities, and social activities. Each of these makes a very distinct impact on the physical environment.

2.6.1 *Necessary Activities*

This division includes routine activities and pleasures in general. This group contains the vast majority of activities connected to walking among other things. The physical framework only a little affects the occurrence of the activities in this category since they are required. These activities may be carried out all year long, in almost any situation, and are mostly unaffected by the environment outside. They have no other option.

2.6.2 *Optional Activities*

It's quite another thing to engage in optional activities, which are activities that are only done if someone wants to and if the circumstances allow it. This category covers activities like going for a stroll to get some fresh air, just hanging out and having fun, or lying in the sun. These activities only occur when the environment is favorable when the weather and location permit them. Because the majority of leisure activities that are very enjoyable to pursue outdoors fall into this group, this link is particularly crucial with respect to physical planning. These activities are particularly reliant on the physical environment outside.

2.6.3 *Social Activities*

Social Activities include activities that rely on other people being present in public areas. Passive interactions, or merely seeing and hearing other people, rank as the most common social activity, along with greetings and chats, community activities of various types, and watching and hearing children play. Many different types of social activities take place everywhere, including homes, offices, public buildings, private gardens, and balconies. However, in this context, only those activities that take place in publicly accessible venues are analyzed. Because they almost often develop from activities connected to the other two activity categories, these activities might also be referred to as "result" activities. People are in the same place, interact, pass by one another, or are just in view, which causes them to grow in relationships with other activities. Social interactions naturally arise as a result of individuals moving about and occupying the same locations. This

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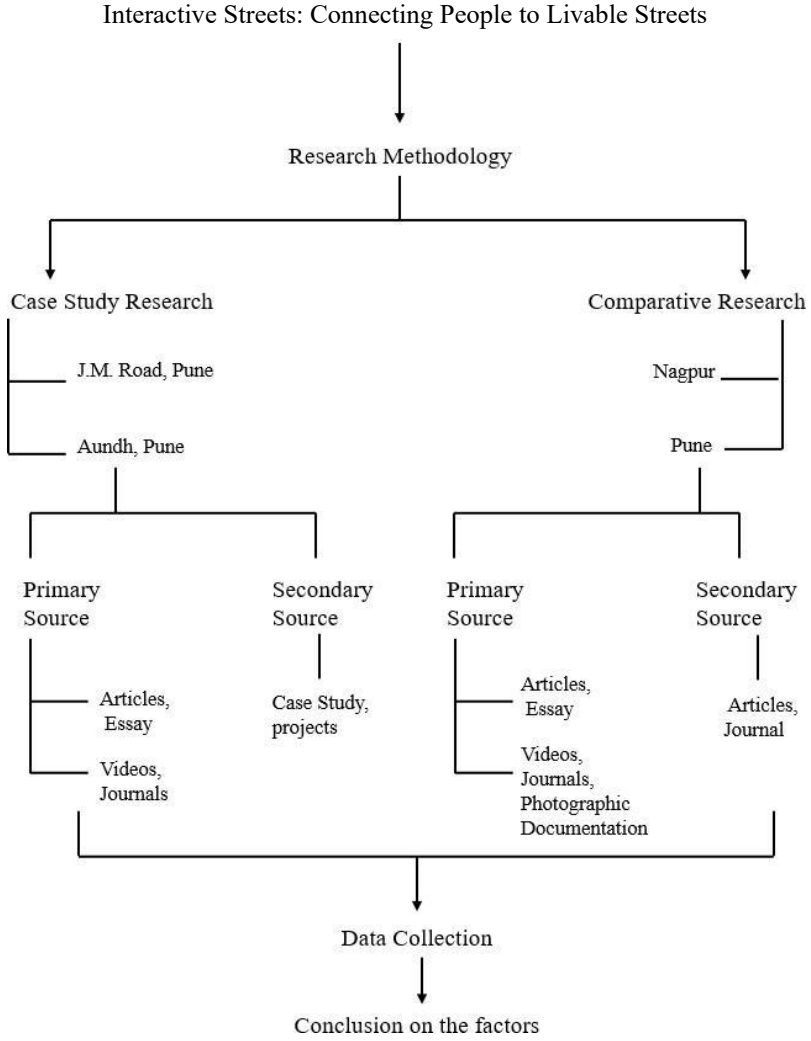
suggests that optional activities are provided in better circumstances in public settings and that social activities are indirectly supported when required.

3. METHODOLOGY

20-10-2022. Walkers Street was selected as the interactive street in the city of Nagpur. In phase 1, the interviews were conducted between August and September 2022, largely between 7 am and 7 pm. Interviews generally extended between 20 and 30 min, though some conversations continued for over an hour. Hindi and Marathi were the languages used for interviews.

1. 20 randomly selected residents from each street were asked to complete an exercise related to the environmental awareness of the street, but many of the respondents struggled to understand it at first. To help with this, we tried to simplify the exercise by including some photos of the most noticeable features on a pre-drawn map of the street. The respondent then attempted to identify which of the places he sees in the photos are familiar to him and where the unfamiliar places are.
2. To discover more about people's opinions on their streets, their issues, and changes in social relations between individuals between now and the previous year, at least five in-depth open dialogues were held on each street.
3. To understand more about the crowd frequency and activities happening on the street an online survey was done. The responses varied from different age groups of people i.e., 18–74, (Total Responses - 44).

In phase 2, the comparative analysis was done for the case study of JM Road, Pune, and Aundh Street, Pune.



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4. DATA COLLECTION AND DATA ANALYSIS

4.1 Case Study 1: JM Road, Pune

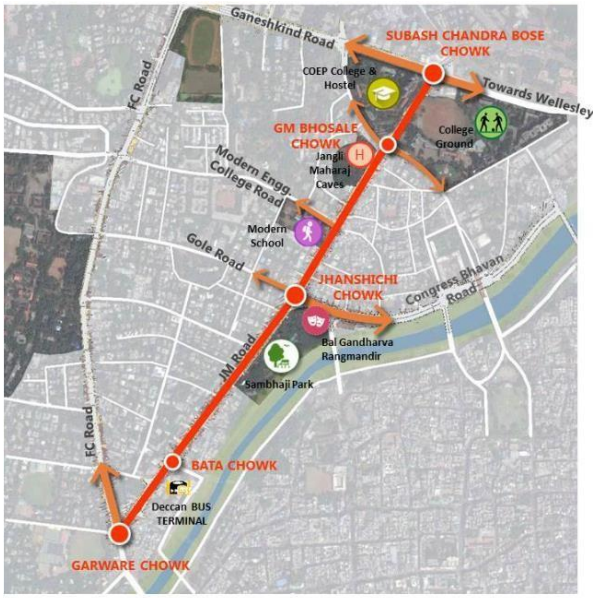


Image 1: Street Map, JM Road, Pune

(*Source:* https://oasisdesigns.org/pune.asp)

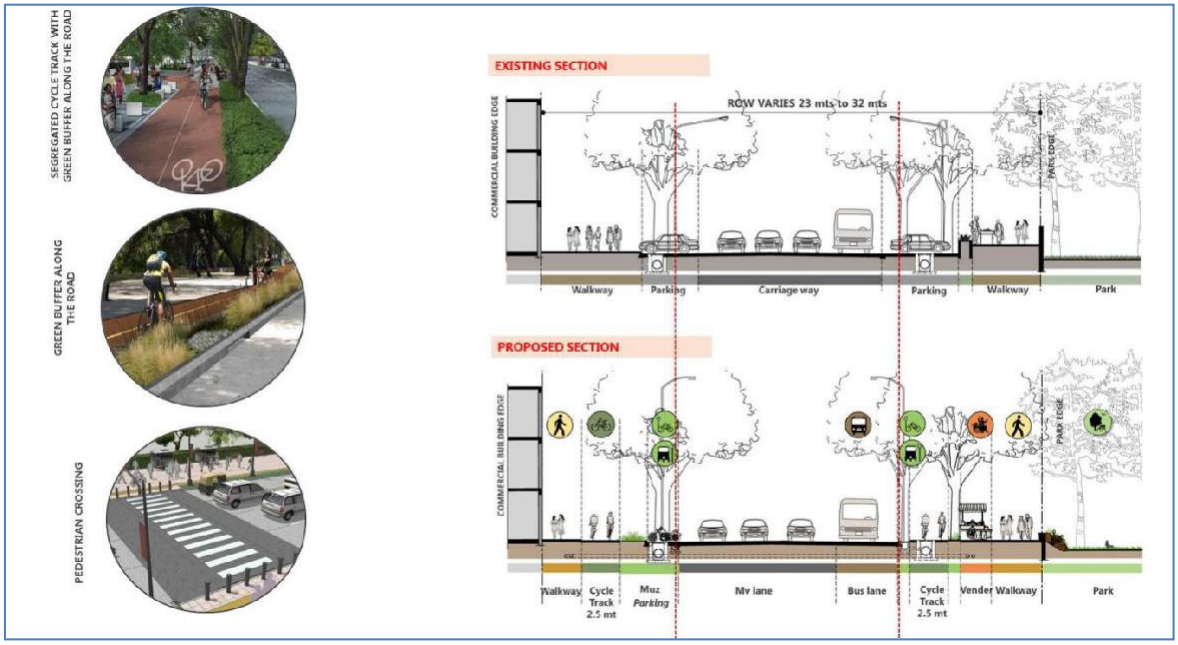


Image 2: Street Design Module, JM Road

(*Source:* https://oasisdesigns.org/pune.asp)

JM road is one of the busiest street in Pune. It serves as the commercial street in Pune.

The primary theme notion that Oasis is putting out is this fascinating spectrum of opportunities to reclaim space along the roadways and reposition them as destination public areas. The roadways are made with broad pedestrian plazas and cycling

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tracks so that people may move about securely. In order to create a connected, cohesive public realm for the city, each street is treated as a public open space with the goal of integrating with all the public land uses adjacent to the street, whether they be a park, religious plaza, destination places, landmark buildings, heritage objects, retail shops, etc.

By streamlining the chaotic parking, more room has been made available for people, allowing for a broader bike lane and sidewalk. The two speeds of walking and cycling are separated by green spaces that act as buffers. Bus stops have been placed to allow for easy movement of bikes and pedestrians.

Both vendors and kids now have designated locations, due to the construction of play areas with rubberized soft flooring at regular intervals between the green buffers. The wide promenade is bordered by the businesses, giving the area more liveliness. Added amenities like better signs, lighting, and seating combine to make JM Road one of the good examples of street design in the nation.



Image 3: Vendor on Streets

(*Source:* Author)

The estimated number of people has a logical relationship with the width of pedestrian paths. This is ensured through background research on pedestrian volume counts and ongoing pedestrian activities. Vending activity is a potent weapon to bring personality and liveliness to the pathway, therefore it's important to look into this potential.



Image 4: People Spilling around bus stop, JM Road, Pune

(*Source:* Author)

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Any roadway or road should consider at least the fundamental needs of all users, including walkers. On this stretch of the road, which is already congested owing to the walkway, the lack of a bus port creates a chaotic scenario.



Image 6: Cycle Lane, JM Road, Pune
(Source: Author)



Image 7: Bollards on JM Road, Pune
(*Source:* Author)

The green buffer created between road and tracks segregates main road and cycling paths, creating more safer tracks. The bollards helps to prevent people taking on two wheelers on footpaths. More strategic provision of bollards should be provided. And the cycling bays are provided to avoid traffic congestion on roads.

Case Study 2: Aundh, Pune

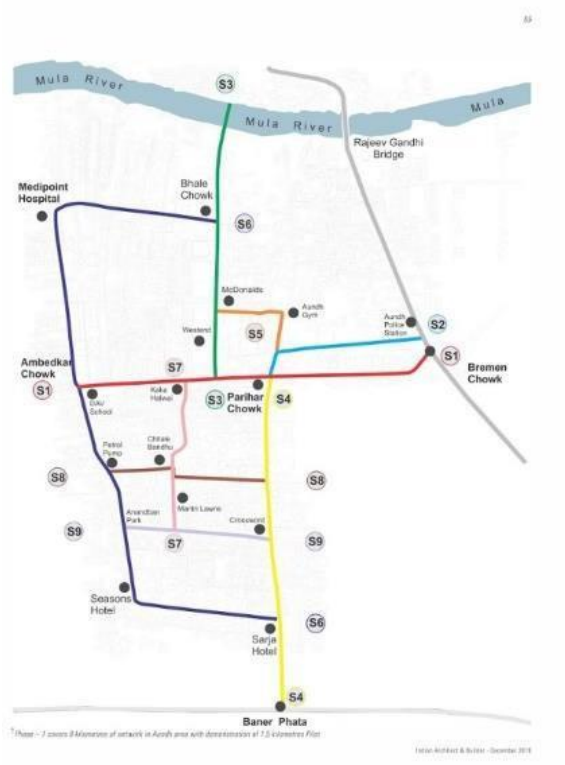


Image 9: Aundh Street Map
(*Source:* https://prasannadesaiarchitects.blogspot.com/search?q=aundh)

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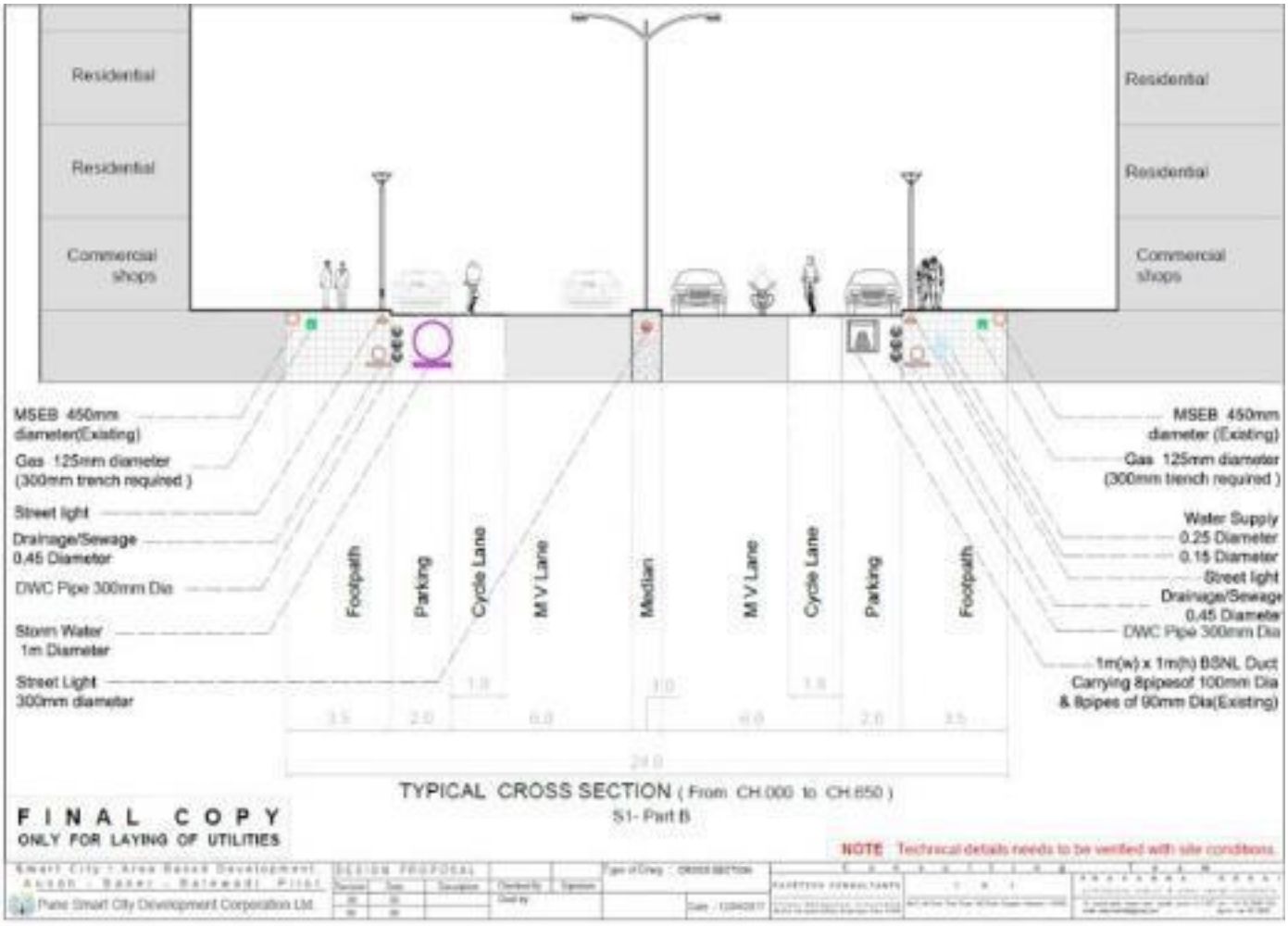


Image 10: Typical Cross Section

(*Source:* https://prasannadesaiarchitects.blogspot.com/search?q=aundh)



Image 11

(*Source:* https://prasannadesaiarchitects.blogspot.com/search?q=aundh)

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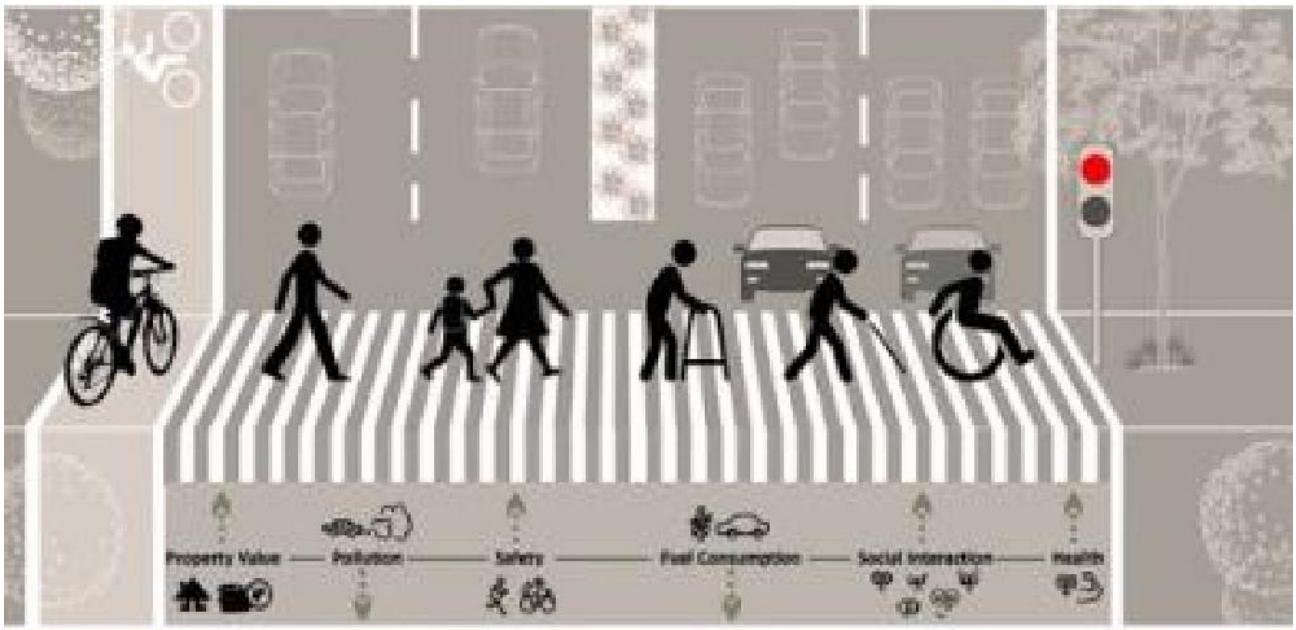


Image 12

(*Source:* https://prasannadesaiarchitects.blogspot.com/search?q=aundh)

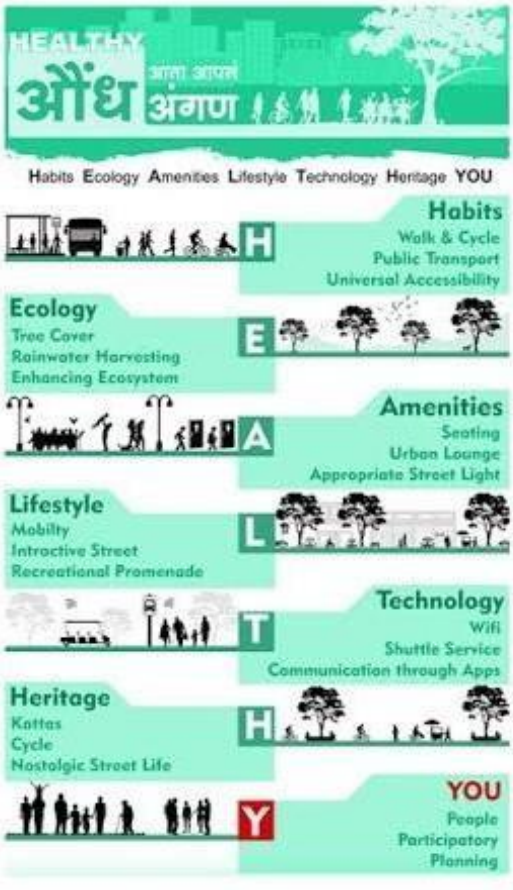


Image 13: Design Approach

(*Source:* https://prasannadesaiarchitects.blogspot.com/search?q=aundh)

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The design has basically embraced the several existing trees that line the length, with care taken to demarcate soft regions around them to allow for development and the perimeter forming seats. Additionally, seats have been added to the pavement, enhancing the stores and bringing life to the area.

The design and mobility proposals include: Walk-friendly streets with continuous, level, obstructions free footpaths



Image 14: Textured tiles on foothpath, Aundh, Pune

(*Source:* Author)

Seating arrangements are provided around the trees to make them livelier and to conserve the trees in the surrounding.

Cycle-safe streets with a dedicated cycle track on DP Road, and marked cycle lanes and traffic calming as required on other streets, in sync with the recommendations of the Pune Cycle Plan.



Image 15: Textured Tiles on Foothpath, Aundh, Pune

(*Source:* Author)

Universal accessible design of streets, which is conducive for people with special needs, and in line with the PMC's Urban Street Design.

'Udaan' Local Shuttle service, plying on 5 routes to provide easy and affordable local connectivity, helping people to leave their bikes and cars at home.

Organized Parking, with spaces clearly demarcated.

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Image 16: Textured tiles on foothpath, Aundh, Pune
(*Source:* Author)

Organized and serviced spaces for hawkers and vendors, in compliance with the Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014.

Improved connectivity to public transport, by providing cycle parking near major public transport bus stops to link to Rainbow BRT and Rainbow Link services, the Udaan shuttle service and easy access by a walk on the new improved footpaths.

Table 1: Walkers Street, Civil Lines, Nagpur

Factors	***JM Road***	***Aundh Pune***
Seating	Good amount of seating arrangement. The street furniture is designed according to all users group. Innovating seating is done. People can even work, talk and spend time there. Concrete blocks are used and painted with warm colors to highlight the street design.	The seating is created around the trees and benches are made of stones. They merge with the landscape of the streets. It is designed with respect to each user group. But mostly elderly people are seen using it.
Parking	Different parking provisions are provided with different signages. There is segregated parking for two-wheelers, 4-wheelers and provided cycle stand. The cycle stand is provided on the footpath.	The parking provision is merged on this street. The parking is provided such that there is a cut out in the footpath so the parking and roads get segregated the pedestrian movement is also maintained.
Footpath Width	The width of the footpath is around 3.5 meters including cycle stand and tracks. The width is more than the requirement. When the traffic increases, people use the footpath hindering pedestrian movement.	The width of the footpath is 1.5–2 m and varies from the nodes. The footpaths are of proper width catering all the pedestrians.
Bollards	Are used to segregate the parking and to prevent motorcycles on the footpath. More no of bollards are required.	Bollards are used to segregate the parkings and to prevent motorcyles on the foothpath. Adequate amount of the bollards are provided with respect to the surrounding residential area.
Cycle Tracks	The cycle track is elevated and surrounded by vegetation, segreagting from the road and foothpath.	The cycle track is marked on the road which hardly anyone uses as its not visible.
Vegetation	The use of landscape is done on the foothpath. The pockets are created at the turning points and entrances to the other sites for the safety of the vehicles. Different types of vegetation is provided near seating space providing privacy.	The use of landscape is done on the foothpath. The pockets are created at the turning points and entrances to the other sites for the safety of the vehicles. The trees are sustained on the site.

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Bus Stop	Bus stops are carved out which increases the traffic.	No bus stop.
Vendors	Not proper provisions for vendors but enough space to sell the items.	No provision for vendors
Universal Accessibility	The footpath tiles are used with various patterns for disabled people.	The footpaths are provided with special tiles which help disabled people. It is also painted so that the common people can also address it.
Shading Devices	For shading, pergolas are used made up of steel sections. And on that, the vegetations is growing adding the essence of liveliness on the street.	No special shading devices are used. The existing trees act as the shading devices.

(*Source:* Google Earth)

Walkers Street, Civil Lines, Nagpur



Image 18: Walkers Street, Civil Lines, Nagpur
(*Source:* Author)

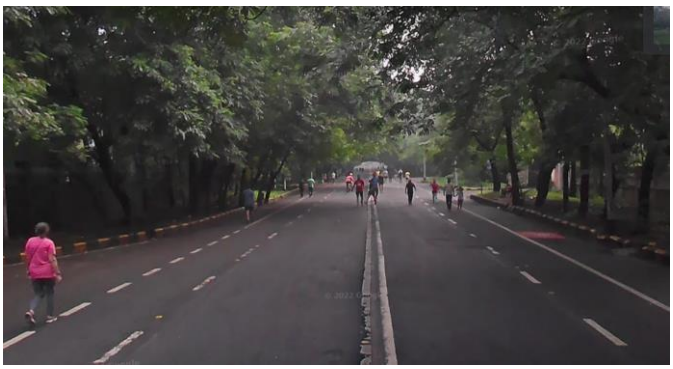


Image 19: Walkers Street, Civil Lines, Nagpur
(*Source:* Author)



Image 20: Various Activities on Walkers Street, Civil Lines, Nagpur
(*Source:* Author)

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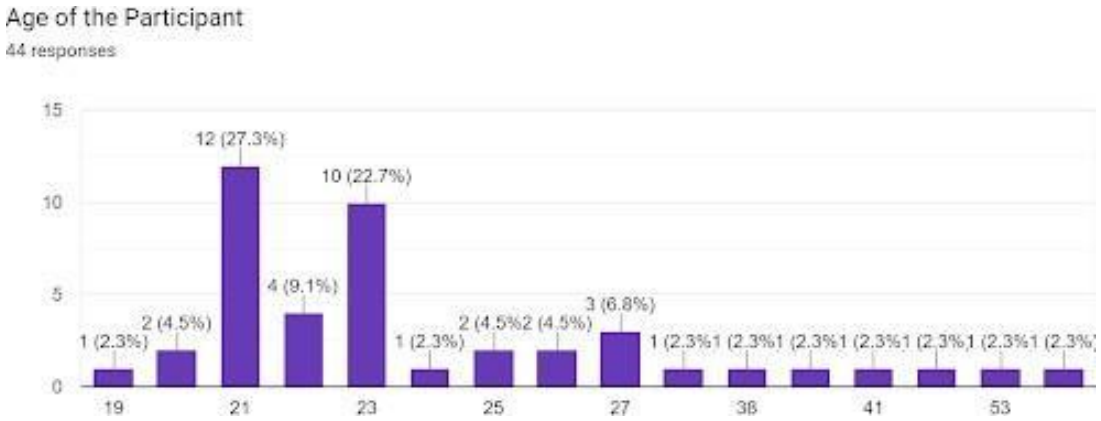


Figure 1: Age of the Participants ′

(*Source:* Analysis on the basis of the survey conducted by the researcher)

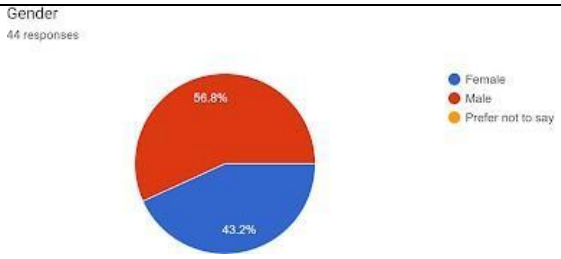


Figure 2: Gender

(*Source:* Analysis on the basis of the survey conducted by the researcher)

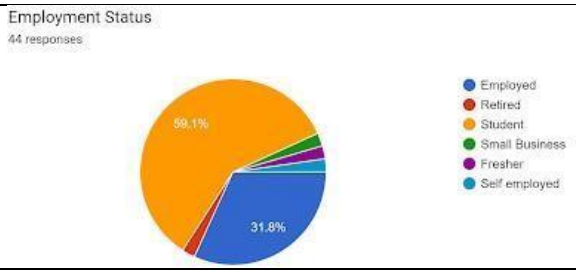
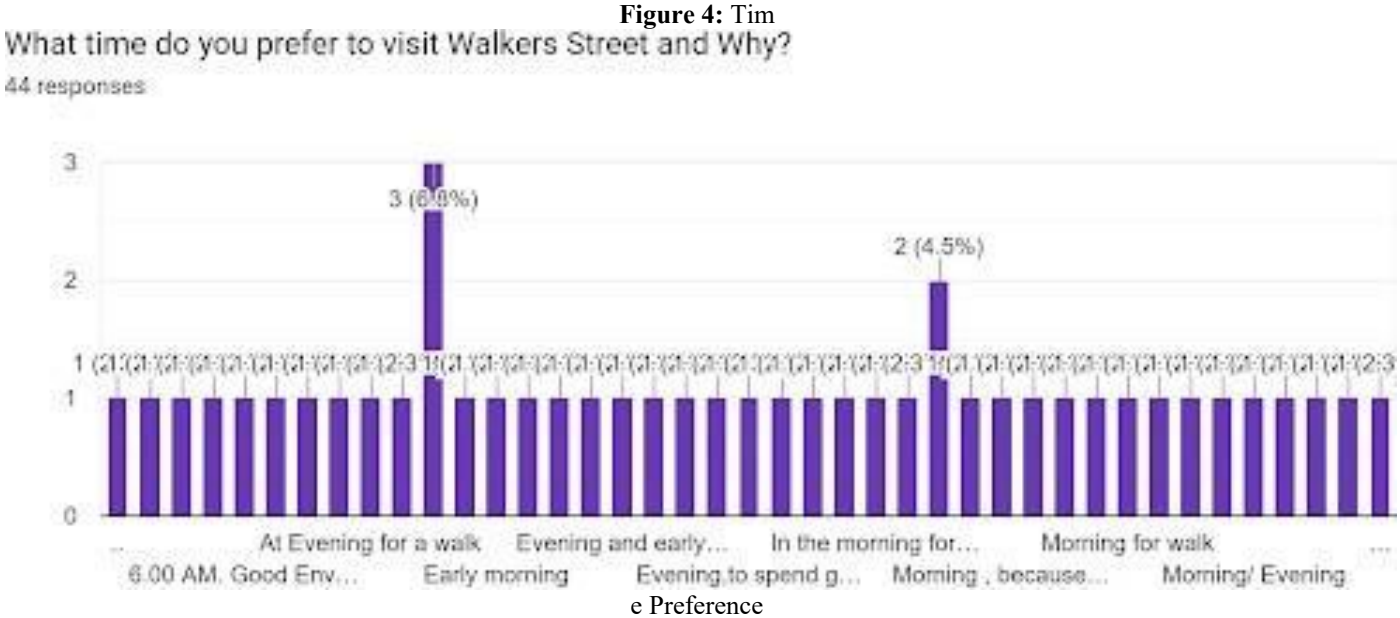


Figure 3: Gender

(*Source:* Analysis on the basis of the survey conducted by the researcher)

Figure 4: Tim



e Preference

(*Source:* Analysis on the basis of the survey conducted by the researcher)

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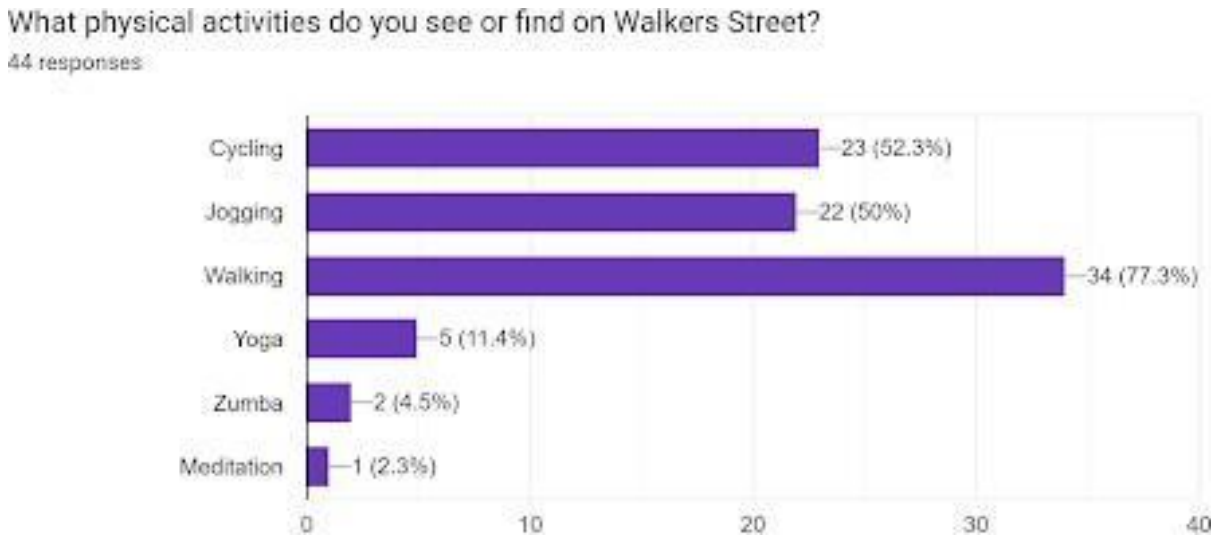


Figure 5: Activities on Walkers Street

(*Source:* Analysis on the basis of the survey conducted by the researcher)

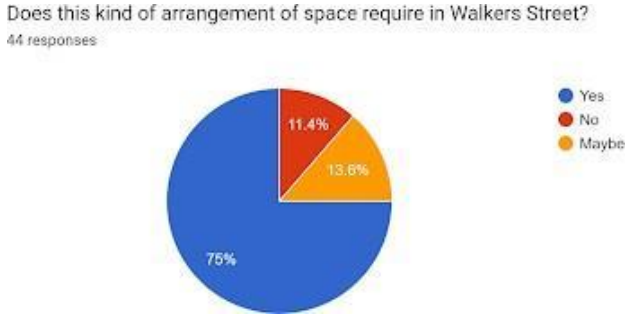


Figure 6: Seating Arrangement Requirement on Walkers Street

(*Source:* Analysis on the basis of the survey conducted by the researcher)



Image: JM Road, Pune

(*Source:* Analysis on the basis of the survey conducted by the researcher)

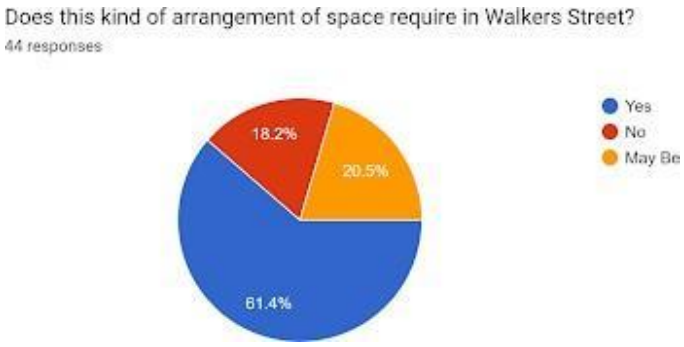


Figure 7: Seating Arrangement Requirement on Aundh Street, Pune

(*Source:* Google Form)



Image: Aundh Street, Pune

(*Source:* Analysis on the basis of the survey conducted by the researcher)

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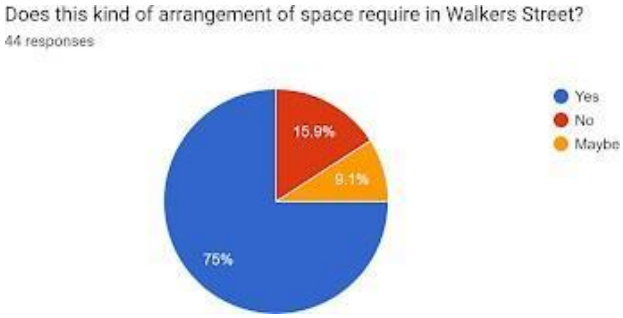


Figure 8: Cycling and Walking Labe on JM Road, Pune
(*Source:* Google Form)



Image: JM Road, Pune
(*Source:* Analysis on the basis of the survey conducted by the researcher)

Walkers Streets is one of the most interactive streets in Nagpur. The street is known for activities occurring on it. According to the survey, people feel safe and relaxed on this street. Due to the lush green environment, the street is cooler than the surrounding areas and thus becomes the attraction point for the citizens of Nagpur.

Various activities like walking, yoga, jogging, Zumba, etc. take place simultaneously. The active hours when people visit the street is the morning and evening time to chill and exercise.

The street is interactive because not only do necessary outdoor activities happen but also social activities take place as green campaigns and initiatives like Happy Streets occur on Walkers Street. What people like about this street is the greenery. It not only soothes the environment but also maintains the temperature even in summer.

According to Figure 7, more street furniture required such as seating places required. After doing the exercise the people require a place to rest. But there are not enough benches or seating spaces at the intervals. Some of them are not even in good condition.

There is an existing cycle track, but rarely anyone uses it. The track is marked on the road but there is not solid segregation between the road and the track is observed. The track marked is now almost faded. People face problems while using it as it's not even visible clearly. According to Figure 8, a cycle track with more barriers and proper segregation between road, track, and pathway should be provided.

5. CONCLUSION

The study revealed that J.M. Road, Pune, and Aundh street, Pune are one of the most interactive streets in Pune. The reason behind it is the provision of proper and clean seating spaces with an adequate amount of parking. Landscape design also has become the most important factor in contributing of the livability of the streets.

Nagpur is growing tremendously and the demand for more public spaces and community spaces is increasing. Streets, being the most public space, need to be addressed. All sorts of activities happen on the streets. Walkers Street is one of the most interactive residential streets in Nagpur. The crowd frequency is also high as compared to other residential streets in Nagpur. The main reason the street is interactive is the surroundings. But to make it more livable provisions like seating arrangements at smaller intervals should be provided. The cycle track should be improvised with proper segregation with respect to roads. Provision for pets and children should also be kept in mind. Since it is growing the need for commercial places is also required. No proper provision for vendors is provided there. More parking provisions should be provided with bollards to ensure no mobile on the footpaths. Walkers Street will change the dynamics of the urban fabric of Nagpur if designed well.

The research revealed that the module used in JM Road, Pune, and Aundh can be implemented in Walkers Street. Both of them have a good number of seating and resting spaces, and proper parking spaces to cater for vehicular and pedestrian traffic. Landscape design should also be the focal point and sustain the trees on the lane which in fact is the main character of the street.

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Relationships of Children's Play Activities with Diversity in the Landscape Elements in Residential Open Spaces in Pune

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ABSTRACT: Community open spaces are the closet to home recreational venues in any urban residential development that are formally reserved for the benefit of the contiguous community. Elements in open space are the important variable affecting the use of outdoor recreational spaces. Urban open spaces are an important part of the city environment for people living in urban areas. Open space is important for getting close with nature and various outdoor play activities, providing an important avenue for social interaction between the children's and the caregiver. The way children view their open spaces, experiences in public space has a lot to talk about the spatial organization and planning of Community open spaces facilities. The purpose of open space is different for different age group members. The value of open space is equivalent to designing built spaces. The Research topic aims to find out relationship between children's play activities and the diversity of landscape elements in the residential open spaces in Pune. Objectives of research topic are to study the different types of landscape elements in residential open space, To find out type of users coming to that open space and To find each element which user are associate with it. Method used for this research is live case studies, primary data collection by observation, visual research method and interview as a tool. Data would be represented in the form of drawings, sketches, bar charts, etc. Designed landscape open space enhances the activities and usage by the residents by understanding the user activities.

Keywords: *Community Open Space, Children's, Caregiver, Play Activities, Landscape, Landscape Elements.*

1. INTRODUCTION

Community open spaces are the immediate close to home recreational venues in urban residential developments that are formally reserved for the benefit of the contiguous community and the children (NBC, 2005)[i]. Different age groups' engagement in recreational activities and landscape design must be supported and encouraged (Natu A., 2018) [ii]. Open spaces provide calm places to stop and think without the city noise and hustle, bustle, and provide a respite from the city. Children's physical, intellectual, social, and emotional growth should be facilitated by the amount and usage of space, both indoors and out. Children's physical, intellectual, social, and emotional growth should be facilitated by the amount and usage of space, both indoors and out. Numerous public health and built-up environmental issues arise as a result of cities' fast urbanization, and these issues have a significant impact on children's environments for growth, child development, and city conflict (Gabriela B., Gisela D., 2017)[iii].

2. LITERATURE REVIEW:

Community residential open spaces are important for all age groups to engage in recreational activities and landscape design must be supported and encouraged (Natu A., 2018).[ii]

2.1 Open Space as Desired by Children

Urban growth often ignores the need for green open space for children to develop cognitive, affective, and psychomotor development (E. Yuniastuti, H.S. Hasibuan, Mar 2019).[iv]

ISBN: 978-93-89934-68-7

2.1.1 *Stages Child Development*

The 5 stages of child development are infant, toddler, preschool, school age, and newborn. Infants develop new abilities quickly in the first year, while toddlers learn to walk independently, climb stairs, and leap in place. Children develop their motor skills at preschooler age (riseservicesinc.org).[v] School age children are competent, assured, responsible, and self-sufficient. Peer interactions are important.

2.1.2 *Schemas*

Schemas are recurring patterns of behavior that give kids a way to explore and express their ideas and thoughts (www.google.com).[vi] The nine most prevalent play schemas are Connection, Enclosure, Enveloping, Orientation, Positioning, Rotation, Trajectory, Transforming, and Transporting (reachformontessori.com).[vii] 3 to 5 year olds create an enclosure around themselves, while 6 to 12 year olds prefer to play outside. 6 to 12 years old is regarded as middle childhood in this process, and children gain important experiences and skills that they can utilize for the rest of their life (Tai *et al*., 2006). Interaction with the natural world is essential for individuals now (Bixler *et al*., 2002; Tai *et al*., 2006; Acar, 2009) [viii].

2.1.3 *Sensitive Phases*

The sensitive phase of development is a critical time for a child to learn new skills and talents, such as language, order, sensory skills, motor abilities, and social skills. During critical time, Children's can quickly learn new skills without realizing it. The most important idea is that after the critical time of development has passed, skills must be taught to the child, which can take more work and lead to frustration and resistance (study.com).[ix]

2.1.4 *Child-Friendly Green Open Space*

The availability of green open space can provide an environment for kids to develop their motor skills, language engagement, and psychological development (E. Yuniastuti, H.S. Hasibuan, Mar 2019)[iv]. Social connection is essential for cognitive growth and requires an open space where everyone can play, enjoy themselves, and learn. Children between the ages of 6 and 12 require more play areas and physical activity opportunities, while 3-5 year olds prefer playgrounds and other play equipment in open spaces (Reis A., *et al*, 2005).[x]

2.2 Open Space as Desired by Caregiver

Parents, grandparents, caretakers, etc. can all be caregivers, and children's attitudes towards the outdoors and environment may be influenced by their caregiver's attitudes and conduct (Julie E., June 23, 2017)[xi]. The planning of the open space must take safety into consideration, and it is important to design a balcony for a residence that faces an open area so that the caregiver can communicate to one another and keep an eye on their child. Activities should also be present for their recreation/exercise while they are supervising their children.

2.3 Landscape Elements

Landscape planning and designs can be used to create an environment that is receptive and responsive to housing growth. Natural and artificial landscape elements such as plants and flora, water, wood, stone, and landforms can be included. Colour and texture are essential elements of design, as they add personality and create a distinct creation. Children can deepen their comprehension of the world around them by interacting with various textures, which helps them develop communication and sharing skills (Julie E., June 23, 2017)[xi]. Playing equipment can be man-made landscaping components.

2.3 Material and Method

Research conducted to study the relationship between "physical and psychological characteristics" and "usage" of residential open spaces produced conclusions. Use is a dependent variable, while types of spaces or facilities are independent. Community open space is the unit of analysis.

ISBN: 978-93-89934-68-7

2.3.1 *Data Collection*

This study examined perceptions and events in a natural setting using observation, interviewing and document analysis approaches from qualitative research. Primary data collection was done using visual research method of live case studies at 4 housing societies in Pune and literature review about children psychology. This study is only limited to the open space in residential housing societies in Pune. Organisation of landscape elements and children's behaviour in those spaces were studied. Visual analysis, photographic documentation, illustration, descriptive analysis and interview schedule and questionnaire schedule were taken. Illustration was done by mapping the activity of children in open space and marking their locations on the base map.

Activity mapping was conducted on all open spaces in morning 8 am-10 am and evening 5pm-8 pm on a week end and a week day. Field notes were taken to record "interaction observations" and primary data collection was conducted by personally interviewing parents and circulating a questionnaire schedule. The information gathered was presented as graphical maps and bar chats. The count data was analysed using bar charts to determine the statistical significance of the connections between landscape features and children.

2.3.2 *Sample Size and Selection*

2.3.2.1 *Age Group*

The formative years are essential for a child's growth due to rapid rates of growth. Early childhood educators regard play as the primary means of addressing children's developmental needs. Nature encounters are essential to early childhood development because they offer rich and diverse sensory stimulation. Elliott's (2010) assertion that "interaction with nature outside is as vital for health and wellbeing for children as daily food and sleep" is supported by these advantages for children's physical, psychological, cognitive, and sensory development. The research was divided into two age groups: preschool age (3–5 years) and middle school age (6–12 years) because they have different needs.

2.3.2.2 *Case Study Sampling*

The study was limited to the residential societies' open recreational space in Pune (India) during the months of July to October in 2022. The limitation was the rainy season. A grid of 2km x 2km was imposed on the map of Pune (core area) and 4 grid cells were selected using **systematic area cluster sampling**.



Figure 1: Location Map

Areas in the selected grid cells were manually surveyed to understand the patterns of residential development. Each cell generally has two or three distinct types of development. One open space was randomly selected from each type of development. Four open spaces were chosen from various locations across the city as an outcome of this sampling process. These varied in terms of the socioeconomic factors of the residents of the residential developments and in terms of the residential developments' physical qualities (plotted or flat, high-rise or low rise). The physical qualities of the open areas, such as their form, the landscape elements they contained, their boundary characteristics, and so forth, varied.

2.3.3 *Materials Provide in the Environment*

Children make up a large portion of those who frequent urban open areas, and the play area's nature is essential for their physical, social, emotional, and cognitive well-being. Natural and artificial landscape elements are two different types of

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landscape components, with natural elements such as plants and flora, water, wood, stone, and landforms, and artificial elements such as fountains, pools, ponds, spouts, fake waterfalls, and playing equipment.

2.4 Role of Caregiver and Interview Schedule

Children's attitudes toward the outdoors and environment may be influenced by their caregiver' attitudes and conduct. To understand this, a questionnaire was created and sent to caregivers, and interviews were also taken while studying. Bar charts were used to categories and quantify closed-ended questions, and descriptive questions were analysed and recorded. Parents and caregivers offer their children love, acceptance, appreciation, encouragement, and guidance. They provide the most intimate context for the nurturing and protection of children as they develop their personalities and identities and also as they mature physically, cognitively, emotionally, and socially (www.google.com) [xii]. The caregiver looks over the child while they play.

2.5 Aesthetic Element and Principle Studies

Landscape design is important for creating visually pleasant public areas for people. Function is more important than aesthetics, but aesthetics still play a big role. Aesthetics studied were both natural and manmade elements. 8 Basic Principles of Landscape Design are unity, **Balance**, **Contrast and Harmony**, **Colour, Transition, Line, Proportion, Repetition.**

4. RESULT

The study's selected spaces were categorised based on their physical attributes, which were used to differentiate the four case studies from one another. A total of 85 responses were collected, 15 via questionnaire survey and 60 via personal interviews with the parents. Warm colours indicate results of 4 distinct case studies, while cool colours indicate results from different parts of Pune residence.

Mothers were more likely to arrive with their children than other caregivers, with 54.2% arriving with a kid who was playing. The majority of children prefer to play every day. Children's preferences for playing outside in natural settings are influenced by their age group, school hours, likes and dislikes, daily schedule, and leisure pursuits. 98% of children prefer to play in the evening due to school hours in the morning, while 2% play both in the morning and the evening that are 3-year-olds children mostly. The percentage of children playing in groups is 74.4%, while 3-5 year olds are more likely to play alone, with a percentage of 3.6%.

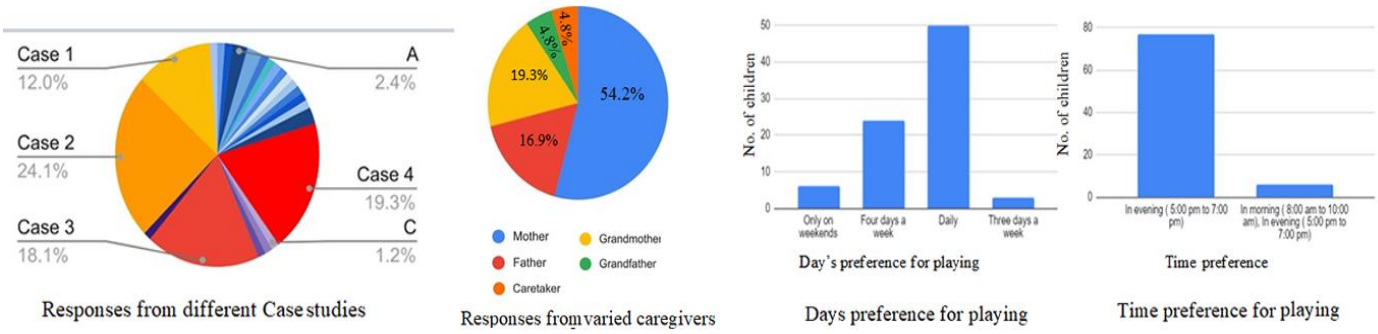


Figure 2: Responses and Preference

The benefit of situating a communal open space in the middle of a neighbourhood is that residents can easily access it and enjoy the view of the open space. Research shows that 73.3% of residences get the view of community open space, while 27.7% do not. The frequency of caregiver came with their child while they are playing in open space was significantly predicted by the age group of child, their schedule, etc. Most caregivers for children between the ages of 3 and 5 preferred to come with a child while they were playing, while caregivers of children between 6 and 12 occasionally came with the child or didn't. 35.2% of caregivers preferred to observe children's activities from a balcony or window, 33.8% from only their residence's window, and 4.2% from their home's balcony when they were unable to come with their child. 22.9% of residents are not satisfied with the exiting open space, whereas 77.6% are.

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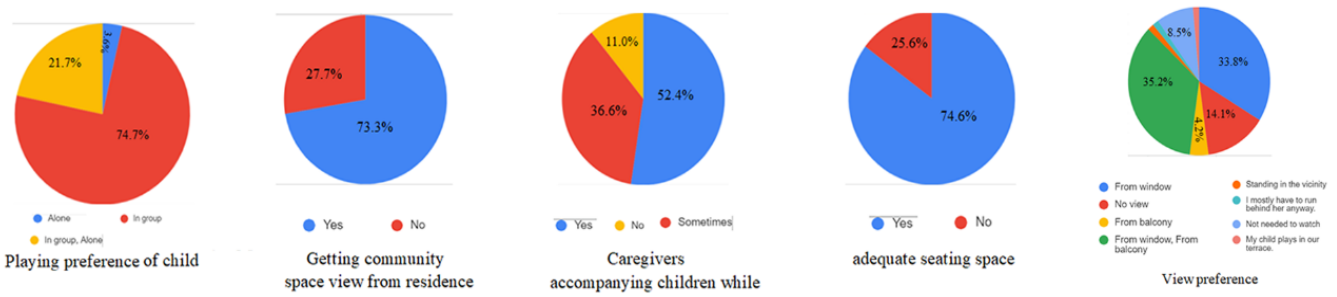


Figure 3: Caregiver's Preferences

During the developing years of their lives, children need environmental experiences to develop their character. Open areas are essential for acquiring these experiences, as they create a direct connection with the environment and help them learn about their surroundings. Landscape elements play a crucial role in development of children, as they evaluate the practical qualities of the plants in addition to their aesthetic qualities. Children use plants for games, hiding, and symbolic play. To achieve these goals, the right species must be chosen based on the space's function and intended use, as well as the activities that will be carried out.

When children were asked if they preferred playing indoors or outdoors, the majority (65.1%) indicated outdoors, while 30.1% preferred indoor n outdoor both. The most preferred outdoor play setting by setting type was open space (88.3%), followed by human influence attribute (61%). 45.5% of children preferred playing with outdoor playing equipment, while 36.4% preferred playing with landscape elements. The majority of children described their overall behaviour in the locations they chose (run, jump, splash, hop, slide, etc.). They also commonly mentioned a particular outdoor activity (for example, listen to frogs, hike, play in the leaves, catch frogs and turtles, fish, hop on rocks, look at nature, walk through the grass, collect things, pick flowers, skip rocks, take pictures, walk on the logs).Non-nature based activities were also indicated, such as play on playground, hide and seek, baseball, jump on benches, ride four wheelers, bike, and sit and rest. Open spaces provide children with the chance to play with other children, and exposure to nature has a significant impact on children's cognitive and affective development.

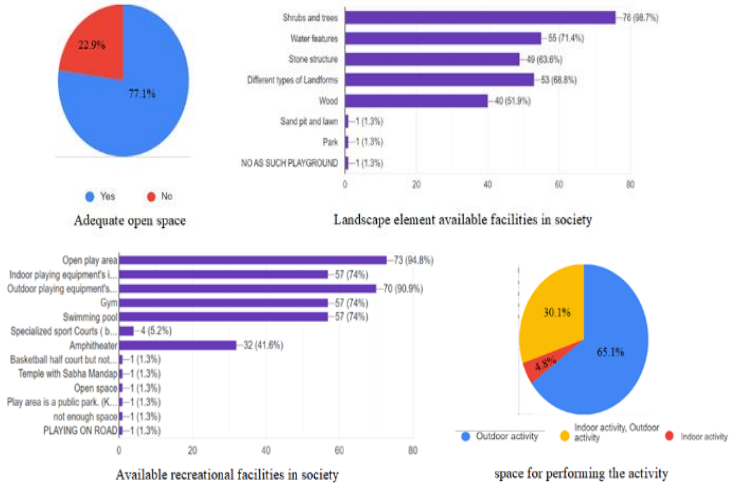


Figure 4: Facilities

As analysis of case A and case B, Children between the ages of 3 and 5 are more likely to enjoy playing with equipment and landscape features, while those between 6 and 12 prefer to play open space. In cases C and D, there is not enough open space for children to play, while in Case D, not every residence has easy access to open space, so most children prefer to play on the road. Overall, children ages 3 to 5 enjoy playing with playing equipment's, while those ages 6 to 12 prefer playing in the open space in their residence society. The surface area of a playing area is essential for the safety of children, and aesthetics, area, texture, street furniture, water feature, lawn, seating components, safety, and overall experiences were taken into consideration.

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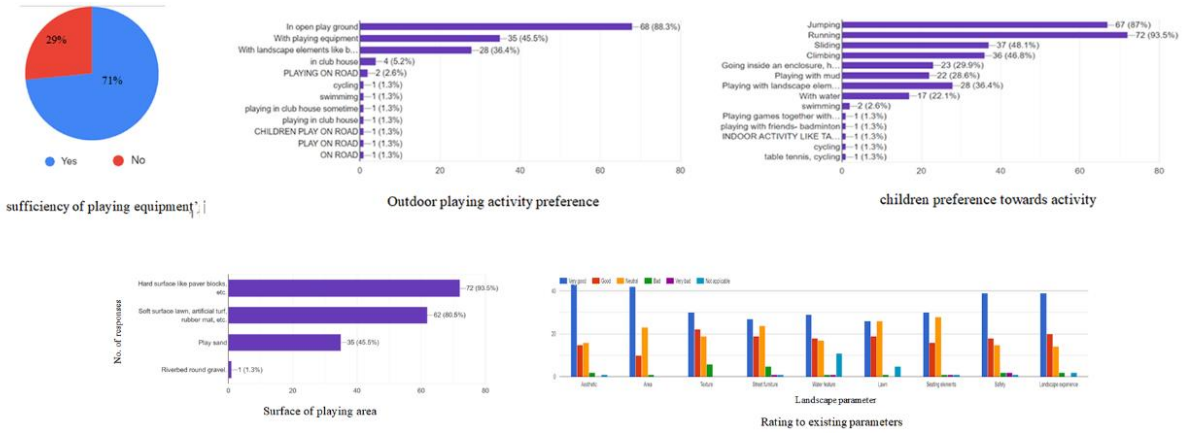


Figure 5: Preferences and Experience

5. DISCUSSION AND CONCLUSION

The children in this research expressed a preference for outside play over indoor play when asked which they preferred. This is in line with other research that shows kids often regard the outdoors as a valuable area to play. However, given that the children in the study ranged in age, there were children who identified with practically every situation. Children's play preferences vary, and they can even shift throughout the same play session. This suggests that there is no one size fits all solution to creating or making available natural play areas that will appeal to young children universally and across a variety of time periods.

This study found those children's preferences for outdoor play settings and their level of affinity toward nature may be independent of how often they are playing in natural outdoor settings. This suggests that a preference for playground activity may not be bad if you have a natural affinity for it. However, the sample is small and homogeneous, and more research is needed to determine how universal and cross-cultural these preferences and levels of affinity are. The self-report nature of the study may also have an influence on the results.

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Problems of Children Raised by Commercial Sex Workers: A Case of Budhwar Peth in Pune

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ABSTRACT: Commercial sex work has various negative aspects. Sometimes due to circumstance of the person and sometimes by one's own wish, most of the time this may lead to unwanted pregnancy and children as a result of such unwanted pregnancy. Children coming from such a background are not accepted by the society; hence these children are either aborted, killed, thrown away or sold to any one offering a price without any background information of the persons taking the child. This may pose a threat to the child's life. The threat may be in the form of physical torture or mental agony. To avoid such incidents and to safeguard such children, there is a need of spaces where these children can be taken care of and help to create a better future for themselves. There is something special in each child which needs to be nurtured and secured. Specialized child care centers are required for such children where in spite of having a biological mother taking care of them are orphans in reality who are alone in nature. This paper highlights some of the issues faced by commercial sex workers and children born due to undesired pregnancy. This paper also talks about the challenges faced by these children and stresses the need of a conducive environment that would enhance their psychosocial wellbeing.

Keywords: *Commercial Sex Workers, Unwanted Pregnancy, Child Care Centre, Psychosocial Development.*

1. INTRODUCTION

Prostitution is quite common in the big cities in India. Despite the prevalence of clandestine prostitution, the situation is dire, and the available statistics on the number of prostitutes in the country are not entirely accurate. Since most crimes related to sexual abuse and the sale of women and children go unreported, there is no complete and accurate picture of prostitution in India; because brokers and attorneys are involved in secret and highly organized crime, which is also the source of many brutal incidents. There are approximately 2.3 million prostitutes in India. Although these figures may seem overly optimistic, actual data from a survey conducted in Bombay (Mumbai) alone shows an alarming number of more than 0.1 million prostitutes in its 12,000 brothels (Surana, 2002). About 20% of women involved in prostitution are under 18 years of age. Sexually abused and trafficked women are usually children (under the age of 18) at the time of the initial abuse or abduction.

According to a survey conducted by the Ministry of Human Resources and Development, only 9% of prostitutes in Calcutta are natives. Delhi provides prostitutes from more than 70 districts. The survey further revealed that 60 percent of the prostitutes interviewed belonged to castes, tribes or backward classes and two-thirds of the prostitutes' families lived below the poverty line. Most rural girls are forced into prostitution. Conceptually, it is clear that most of these prostitutes belong to two groups. According to The Fact Book on Global Sexual Exploitation (1999), they come from a backward community with little education, belong to a lower income group or caste and have no education.

In India and the world, there are concerns about the spread of AIDS and reports of kidnapping and forced prostitution of young girls. Women trapped in debt slavery and prostitution take years to reach freedom (Surana, 2002).

2. NEED OF RESEARCH

Every city is experiencing an increase in prostitution, and it shows no signs of slowing down. As a result, children born into the world are constantly neglected and deprived of society's love and care. According to Maslow (1943), the basic needs of a human—food and shelter; then love and protection is based on hierarchy of needs which resonates with those of a child. Nurturing and showing affection are two other types of specific care giving. Sexual abuse of the children of women

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involved in commercial sex work is quite common. Children are also made to sing and dance for male customers and some are made to serve men sexually (Surana, 2002) There are very few studies on children whose mothers are trafficked or involved in commercial sex work, both globally and in India and hence there is a need to understand the plight of these children who are devoid of a reassuring socio-physical environment.

3. MATERIAL AND METHODOLOGY

The research is based on various studies, data collection and interview, firstly the gap was identified based on secondary data collected. Primary data included the interviews taken by the researcher with the commercial sex workers (CSWs) working in redlight area of Budhwar peth, Pune. According to the interviews, the parameters of challenges faced by CSW's were identified. Through the study of previously published research papers, primary data was collected to corroborate the same in Pune and to gain depth of the issue. The researcher then structured the data to be formatted in sequential manner to amalgamate the relevant study findings based on primary and secondary data.

4. LITERATURE REVIEW

The literature review has been divided into sub sections. From a global scenario of the challenges faced by sex workers. The subsequent subsections discuss the challenges, upbringing pattern, psychological aspects, social issues of the children born to commercial sex workers (CSWs). The literature then narrows down to the local scenario of red-light area of Budhwar Peth, Pune.

4.1 Challenges Faced by Commercial Sex Workers (CSW's)

Street sex work which involves trading sexual services for money or drugs at the street level, seems to be a particularly hazardous and stressful, and is mostly overlooked. In many cases, girls and women who have intercourse without condoms may be forced or lured with extra money to do so. Due to unsafe sex and a lack of knowledge about STDs and contraception, many of the women and girls involved in this trade become pregnant (S. Wayal, F. Cowan, P. Warner, A. Copas, 2011). Despite the high rate of pregnancies among women who trade sex, women in distress do not receive adequate safeguards, protection, or rehabilitation opportunities from the public. Most of these ends in full-term pregnancy and majority of them have children. Women may find childbirth unpleasant as a result of various circumstances and commercial sex trade is carried out in various places, such as brothels, apartments, flats, hotels, hotels, bars, restaurants, parks, barren land, riversides, etc. Teenage girls who are pregnant pay little attention to their pregnancies and continue to trade sex until they deliver the baby. Their guilt and regret are associated with pregnancy and their work, believing that their action are wrong and that they are harming their babies (Sloss & Harper, 2004).

4.2 The Plight of Children of CSW's

Suchard *et al*. (2016) examined prenatal care utilization as well as drug and alcohol use during pregnancy as both can have a significant impact on the birth outcomes of a pregnant woman's children. It is common for children to receive alcohol, beer, or an illegal substance as an over-the-counter drug in milk bottles. Although the duration of their exposure to alcohol and drugs, especially over-the-counter drug, is unknown, it demonstrates the need to provide the mothers with safe childcare options that can also provide them with some degree of assurance that the childcare will not lead to child protective services or law enforcement. (Maria Ramirez Suchard, Diane Vines, Brian Willis, Sara Bubar, 2016)

Hundreds of children live with their mothers in the cities of red-light districts, living in shacks with only one room, seeing mothers with clients. While their mothers struggle to survive, the children are forced to wander the streets or even hide under the bed. They would witness beatings, and might even themselves get beaten. They would live in the fear that, as they got older, they might end up in the same enslavement as their mother. This was especially true in the case of young girls.

4.3 Upbringing Issues of Children of CSW's

As a result of their work schedules, CSW's are often unable to provide their children with the kind of upbringing that involves timely vaccinations, preventative healthcare, adequate nutrition, education, safely, and a comfortable living environment. The children of CSWs receive little social support because they are cut off from their families, who seldom inquire about their

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welfare or well-being. As a result, CSW children experience a wide range of challenges throughout their lives. The evidence supporting the rehabilitation of children living with CSW is limited. They want to place their children in specialized institutions because they are aware that their children deserve a better future. Additionally, they recognize the significance of formal education. As a result, they are willing to let their children be taken away and placed in such facilities. They also anticipate meeting their children on a regular basis through visitation rights (M.N. Chege, E.W. Kabiru, J.N. Mbithi, 2002).

4.4 Psychological Aspects of Children of CSWs

Physical Security plays a role in psychological issues, such as where they live, their risk of injuries, beating and sexual abuse. Girls raised in redlight areas may be more likely to suffer from sexual abuse. Children Frequently become ill due to unhygienic conditions in which they wander the streets unattended and neglected, as most CSWs live in tiny, one-room tenements or in brothels where they also work. Extended periods of partition from guardians combined with close to home hardship make dread in their young personalities. Around them, children are exposed to unrestricted adult sexual activities. Physical and mental insecurities are brought on by each of these circumstances (E.W. Kabiru, J.N. Mbithi, J.J. Bwayo – 2002). Any child's mother is her most important role model. In addition, it is traumatizing for any child to witness their mother sleeping with a variety of strange men every night, some of whom even physically and mentally abuse the child during the child's early development (E.W. Kabiru, J.N. Mbithi, J.J. Bwayo – 2002). The child is susceptible to all of the activities that take place in the brothel because it lacks emotions and care. Many people become rebellious, abusive, and violent as a result of these acts of cruelty and inhumanity, as well as develop feelings of bitterness toward life. Due to rejections and insecurities throughout their lives, these children often acquire inaccurate information about sexuality, people and life ultimately leading to their destruction (E.W. Kabiru, J.N. Mbithi, J.J. Bwayo – 2002).

4.5 Social Issues and Community Approach

Children witness their mothers being beaten, humiliated and sexually abused by the police, and they witness the use of intoxicants, brutality, vulgarity, and emotional depravity that occurs around them. As a result of such situations, children are exposed to alcohol and drugs at an early age. During sex work, their mothers are frequently administer sedatives to the children so they remain asleep (S. Rath, 2020). In order to meet the client's sexual needs, some children are involved in child pornography and in the sex trade, either directly or indirectly, as they grow older. Additionally, youth from red light districts typically lack the necessary qualifications and connections to obtain employment in any other industry. It is very common for girls to follow in their mother's footstep by serving tea, cold drinks, cigarettes, and other beverages to customers and dancing in front of them from an early age.

In 2007, the "Ministry of Women and Child Development" conducted a national study that included children living on the streets, in families, and in institutions, and found severe consequences of sexual abuse. Approximately 53% of these children had experienced widespread sexual abuse. However, the Survey did not take into account the children's vulnerability in the brothel. Children are frequently abused in brothels by men, women, and their own mothers and guardians. Children are frequently subjected to emotional, sexual, physical, and mental abuse by their mothers (S. Rath, 2020).

4.6 Local Scenario of Pune

Located in India, Pune City, Budhwar Peth is the country's third largest Red-light district. It is estimated to contain approximately, 3500 prostitutes and 700 brothels. Child prostitution and female trafficking are also prevalent here. Historical evidence suggests that the budhwar Peth Lanes were used as a red-light district during the peshwa's rule of Pune in the 18th Century (A. Rawat, S. Kumar, 2015). In order to accommodate the nobility in the Peshwa's court, a wada was built. The central old parts of Pune city that have constructions that date back to the Peshwas' reign are in the peth area. In Shukrawar Peth, a chawl is mentioned in official records behind some privately owned '*wadas'*. It was known at the time that these chalws were "red-light areas". Later as markets grew for selling various material the lanes surrounding that area developed. During the 1960s, industries began to grow and more people moved to Pune (A. Rawat, S. Kumar, 2015.

Today, the red-light district is right in the middle of a bustling market, where family-owned businesses and the unorganized sector make up the majority of the economy. The region is divided into distinct "lanes" due to its geology. Each lane is filled with people from the same community or region who have moved from other parts of Maharashtra and other country. The behavior of the children in Budhwar Peth is influenced by gender roles and sexuality, with boys also accepting violence against girls. Budhwar Peth has a community where gender roles and sexuality play a significant role in children's lives. Boys accept violence against girls as part of growing up (A. Rawat, S. Kumar, 2015).

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5. DISCUSSION

To corroborate the findings from the secondary data collection in the case of Budhwar peth, the author interviewed a non-governmental organization (NGO) working for the upliftment of CSWs and their children. The author learned that the community involved in sex work was not only from Maharashtra but other also from other states of India such as Nepal, Karnataka, Andhra Pradesh, Uttar Pradesh, Bangladesh and Bihar; and were forced, cheated or had debt on them which led them in this profession. The women involved in this profession are between 16 years old to 65 years of age. The 16 years old are termed as minors and not allowed to work as they are not adults. Thus, maximum time the police raids help in rescuing these girls. On further inquiry, the author got to about the activities benefiting the sex workers in terms of mental health and physical health. Counselling sessions are held for the CSWs and their children every month. Group counselling are held in a day for around 30–35 ladies. The most common diseases suffered by the women in the area were HIV, Tuberculosis, STDs, Cancer, Skin disease, etc. Further the respondent from the NGO also gave an idea of the statistics of birth rate, gender and challenges faced by the children in the Budhwar peth red-light area such as the number of children's born to CSWs every year ranges from 15 to 20. Some of the ladies keep their children with their family in villages and take care of them by fulfilling their needs by sending money. Around 20% children are staying with their mother as the mother is attached to the children and do not want them to stay away from them. Around 80% of the children are sent away from the area to hostels or child care centers for their better future. Around 20% children who are left in the area are exposed to severe conditions like drugs, alcohol etc. Children left with mothers have to live a life of difficulty such as living in small congested spaces, unhygienic conditions and without any aid in case of problems. The children also have to face humiliation from clients and often witness beating of their mother by brothel owners or clients, they also witness their mothers engaging in sexual activity with various people which raises many questions in their mind thus, affecting their mental health and leaving a negative impact on their mind in their growing age. Witnessing abusive behaviors of their mother towards everyone including their child gives rise to criminal behavior in children. Furthermore the conditions of the children in the redlight district observed during the visit, were similar to those reported by Rawat and Kumar (2015) and Rath (2020). Children are left unattended and fed alcohol and other sedatives so that mothers can attend to the clients. The conditions are serious as during one of the visit incidents such as stealing and other similar crimes were witnessed by the author; which has increased the difficulty for people living in surrounding area. The author also saw a nine-year-old boy looking for customers for his 48-year-old mother. The child was acting as an agent while his mother was sitting in a corner admiring the boy's ability to communicate and persuade people. As a result, boys become involved in the sex trade as pimps, trafficking agents, or both. As Rath (2020) points to the children being exposed to drugs and alcohol at young age. Thus, according to the author to avoid these affects on the future of the children; these children of CSWs from the Budhwar Peth red light district are sent away from their biological mother to a child care centre in Baramati to evade such situations. The children who are sent to care centre are under the love, care and supervision of '*Loco-parentis*' or caregivers. In the authors opinion, however well these children are looked after, they are still "orphans" as in spite of their biological mother being alive, they have to stay away from them.

6. CONCLUSION

Children of many commercial sex workers are brought up in environments that are inappropriate for their upbringing. The study highlights the issues faced by commercial sex workers and their children not only due to the profession in which their mothers are but also due to paucity of space. The negatives of this profession are further amplified when children of CSWs have to witness adult acts as a result of spatial constraints. This further affects their psychological wellbeing as the children who begin to indulge in risky behavior from childhood. Any amount of love offered cannot be considered as a substitute for a *mother's love,* however the future and psychosocial well-being of these unfortunate children are taken care of by the child care institutions and therefore providing a physical environment that is conducive for child well-being is essential.

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I would like to express my gratitude to my guide Prof. Ar. Hrishikesh Purandare and the respondents from the NGO during this process of research whose guidance helped me to complete the study of the paper 'Problems of Children raised by Commercial Sex Workers; A Case of Budhwar Peth in Pune'.

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Impact of Urban Landscape on Social Interactions on Streets – F.C. Road Pune

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ABSTRACT: The urban landscape promotes sustainability and helps create healthier, more liveable, and more beautiful streets and neighbourhoods. Urban landscapes on streets can create various types of experiences for an individual, which would include the characteristics of the street like pedestrians, street furniture, open spaces, parks, etc Furthermore, the urban landscape encourages people to be more active on the street and can influence their behaviour (F, October 2018). The street is a connection between two or more places and helps to connect people with places or things in the neighbourhood, hence creating social interactions. The transformation of a street into a living street is facilitated by the activities that take place in the stretch and also by the socialisation of the people around that street, thus creating a sense of interactive space that allows the user to establish a relationship with the street (Pathak P, november 2021). The main objective of the research paper is to examine how the urban landscape increases social interactions in the streets. For the research, F.C. Road, Pune, was taken under consideration and the social behavioural patterns of people were observed the street was studied concerning its various aspects like physical attributes, the relationship that the people share with it and the pattern of socialisation.

Keywords: *Public Places, Social Interaction, Nodes, Streetscape, Urbanization, Landscape.*

1. INTRODUCTION

Pune is a rapidly developing metropolitan city located in the western part of Maharashtra and is significant in all contexts: physical, social, cultural, educational, industrial, and information technology. Pune is a city that is renowned for its rich culture and glorious past. As we see in the graph, the urban network of Pune is growing upwards, which makes the city and its people more engaged (Pathak P, november 2021).

Social interactions between people are dependent on various factors. The surrounding context of a space is directly connected to people's engagement in the space (A B., 2014). Activities performed in the movement create social interaction between people. Public space plays the greatest role as a catalyst for social change and provides a place for interaction and gathering of people. (F, October 2018). Public spaces are social places where people can linger and interact, and they are intended to be open and accessible to all people. (A B., 2014)

The streets are the lifeline of the city. (Trivedi K, October 2018) Streets play a vital role in various kinds of gatherings happening in every area of the city, and they are an essential part of the city. Not only are they intended to function as a thoroughfare, they have been designed to accommodate people of different kinds and at all hours of the day. (Shuhana S, 2008). The presence of people generates vibrancy and liveliness on the streets. The streets serve as an intersecting link between public and private space, built and unbuilt space. Every street has its own character. A street is identified by its character, by a mental image formed by an individual. Because of their unique characteristics, streets are the sites of the majority of social interactions. (Shuhana S, 2008).Pedestrian walkways, well-designed urban landscapes, built forms abutting roads and parking places all have a great impact on the way our urban streets appear, and affect the process of interaction and relationship among pedestrians, and kiosks are examples of street elements that provide social opportunities for better interaction. (Pathak P, November 2021). These factors add to the aesthetic, social, as well as interactive value of the street. Every street is divided into various nodes, each of which has its own context and offers different criteria for people to engage with. The function of the street changes at every node. However, how street elements combine together determines how a street will be interpreted by users.

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2. LITERATURE REVIEW

In the built environment, streets serve as places where users can gather, communicate, congregate, and move around. Streets are crucial for bringing people together for a variety of events, such as performances, encounters, meetings, or just hanging around. (F, October 2018) They also play a significant role in connecting communities and enhancing social cohesion. However, the design and management of streets can affect people's experiences and perceptions of the urban environment. The quality of urban space is determined by the nature of the streets. This is why designing streets that allow for community interaction and encourage pedestrian activity is important for creating vibrant and liveable cities. When streets are designed to prioritize pedestrians, they become safer and more accessible, leading to increased foot traffic and economic activity in local businesses. (A.M., 2015) Additionally, streets designed with green space and public amenities foster a sense of community and make urban environments more attractive to residents and visitors alike. When streets are well designed, they become more than just a means of transportation; they become public spaces that enhance the urban experience. The redevelopment of streets in every city under the Smart City Mission has begun. (Pathak P, november 2021)

3. METHODOLOGY

Pune is a rapidly growing city in every way. The street network of Pune is also quite vast. Many streets in Pune are being redeveloped under the 'Smart City Mission by the government. The redevelopment of the streets has increased their value of the streets. The major roads which were re-developed under the mission were ITI Road Aundh, F.C. Road, J.M. Road, Pune, etc. These major roads have their character. The components observed that made these streets the living streets of Pune were segregated footpaths, segregated cycling paths, on-street parking, grade crossings at each node, and public transportation stops, all arranged in such a way that they encourage walkability, cycling, and public transportation. (Pathak P, November 2021).

From above these streets, F.C. Road, Pune was selected to carry out the research further 'urban landscape increases social interactions on streets. The reason behind selecting this street was the context of the street. As the street is connected majorly to institutions, commercial complexes, and residential areas, F.C. Road in Pune is a mixed-use street connected to different activities of users. F.C. Road was found to be a complete street by meeting all the requirements for it: user segregation; safe and convenient street crossings; complete mobility on foot, on bicycles, and in motorised vehicles; and safe parking facilities at all times of the day. F.C. Road has both social spaces and network connectivity.

For research purposes, a stretch of 1.2 km was selected where the starting point was from Goodluck Café (Figure 1) to Chaturshungi Road going towards Modern College. The process of research started by analysing and observing different types of activities on the stretch carried out throughout the day that engage people due to which social interactions taking place. The research was done by the method of photo documentation and a survey of users using the streets during the day. The 1.2 km stretch shown on the map was observed throughout the day in three-time slots in the morning, afternoon, and evening. The nodes were classified and evaluated on the basis of their placement, time, user groups, and type of interactions. An analysis was done of different people's and uses of the street, how these spaces are used, and how they affect different groups of people.



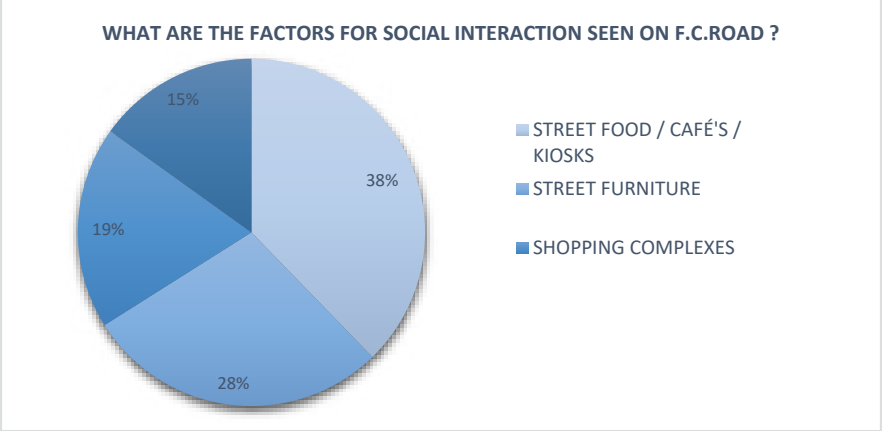
Figure 1: Starting Point of Stretch



Figure 2: Ending Point of Stretch

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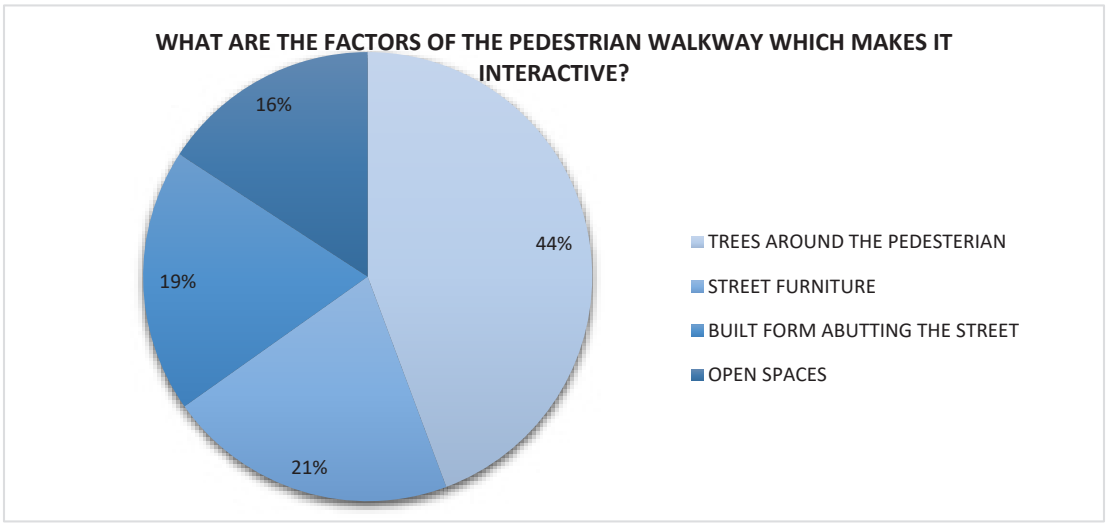
Table 1: Pie-chart



A questionnaire was prepared and interviews of people were taken who were associated with F.C. Road, who often tend to use this street on a daily basis. Mostly, it was observed that the major age group of people were students, as the street was associated with many institutions. The factors that were observed and which were responsible for social interactions on F.C. Road were mainly streetscape elements on the pedestrian pathway, bus stops, built forms abutting the streets, and the kiosks and cafes adjacent to the road. The Table 1 shows the distribution of what were the factors responsible for social interaction seen on F.C. Road? This has made it flexible to adapt to different functions and makes it an active and vibrant place.

Most of the social interactions amongst people were happening on the pedestrian pathway because the street has a long pedestrian pathway which offers a space for people to interact, to relax and linger around the road. The factors that made the walkway more interactive for people were the trees around the pedestrians and the streetscape elements, built form abutting the streets and the open spaces that were adjacent to the road. It was observed that the trees on pedestrian pathways are the most interactive and essential to attract people. As there were many trees along the pathway, so many spaces and places were offered for people to be accommodated in. It was also found that the level of social interaction was higher on the streets due to these factors. The interactions were occurring at the pedestrian pathway and street, where events were happening continuously throughout the day. There were many things for people to look at, to do or even to buy. It was observed that there was higher activity in terms of movement on the streets. The spaces available on F.C. Road offered more space for people to stroll around and they used these streets more often as a part of their daily routine. Due to this factors Streets itself acts as an interactive connective bond between road network and public, which automatically makes an individual to visualize things. The Table 2 shows the distribution of What are the factors responsible of the pedestrian walkway which makes it more interactive?

Table 2: Pie-chart



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Four Different nodes were classified where most interaction was seen between the people:



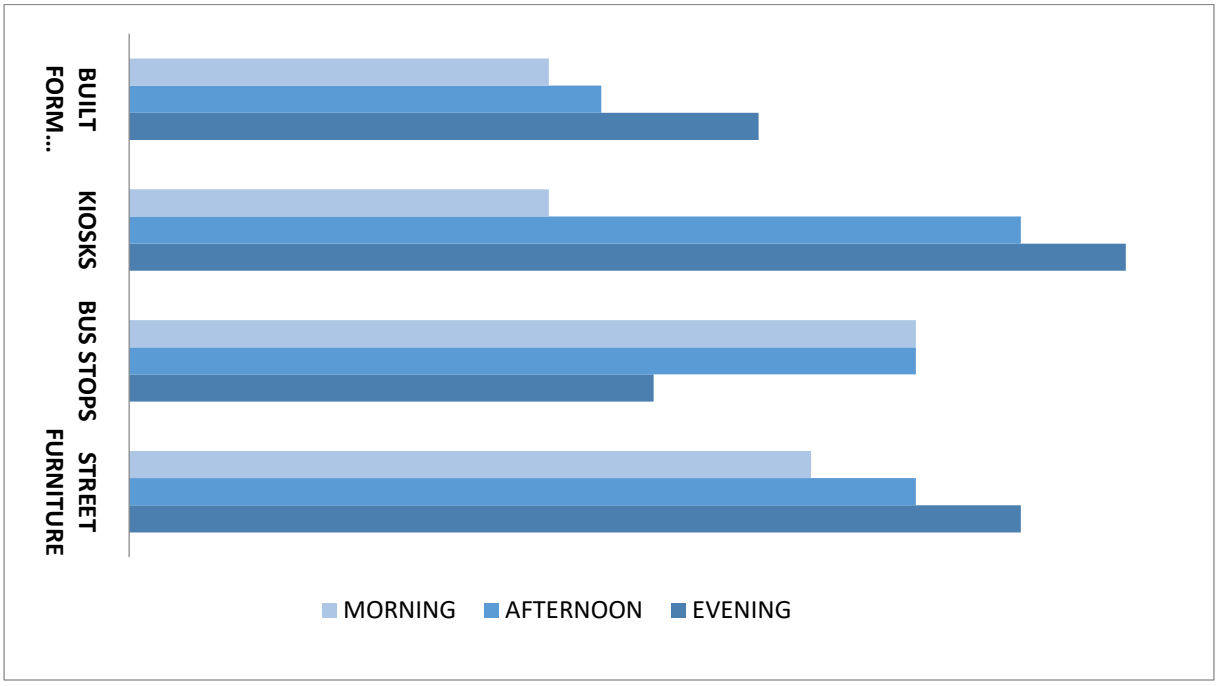
The built form abutting the streets plays a major role as it offers an activity for people to stop and perform. It was noticed that many people were sitting, relaxing, and socialising near the streets. The streetscape elements of the road and the designed seating spaces on the pedestrian walkway make it interactive as it offers a space for people to stop, rest, and chat with their friends while they are on the walkway. Street shopping and food stalls/kiosks were also the main reasons for the engagement of people. Many types of street vendors with a variety of things were selling their products near the pedestrian pathway, which was an activity happening due to the constant gatherings of users of the streets throughout the day after the morning hours. In the morning and in the evenings, people were mainly sitting and chatting while others were eating food and taking refreshments from street vendors. Bus stops were another major attraction for the students who were travelling to different parts of the city throughout the day to reach their destination. It was an interesting node for people's interactions. As seating places were also designed besides the bus stops, extra space was added for people to sit rather than at the bus stops, where students were mostly hanging around waiting for their bus after their college hours on the bus stops and interact with each other.

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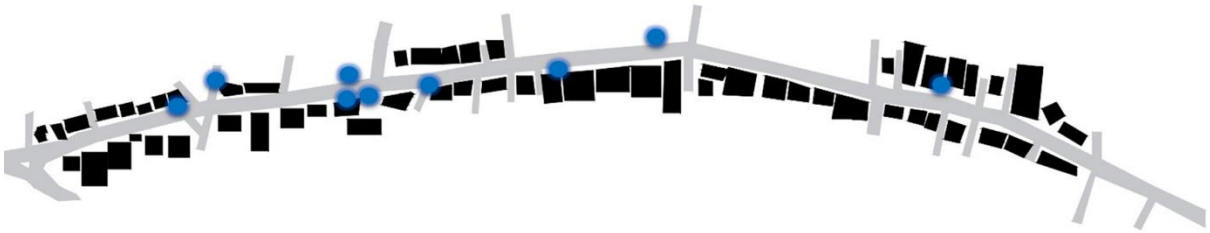
The footfall of people was observed at different slots of the day in the morning, afternoon, and evening. In the morning, it was observed that the density of people on the street was quite low. The flow of people is not as heavy as the morning but has a steady stream. In the afternoon and evening, more people are seen walking down the street and interacting with each other. The highest density of people doing different activities was observed in the evening hours, when the street was more happening. At Kalakaar Katta near Goodluck Café, various activities such as painting and singing shows were organized; food stalls had long lines; hotels such as Vaishali, Rupali, and Wadeshwar had customers waiting outside on the pathways for their turns; and street shopping was seen all around the pedestrian pathway. According to the survey, most people like to visit the F.C. Road in the evening hours as it is one of the most happening places in Pune. The density of people visiting this street is quite higher than on a weekday. As in, the street is classified as one of the most happening and liveable streets in Pune. The street allows you to have a different set of experiences every time you visit it.

The Table 3 shows the footfall of people at different timings of the day (morning, evening and afternoon).

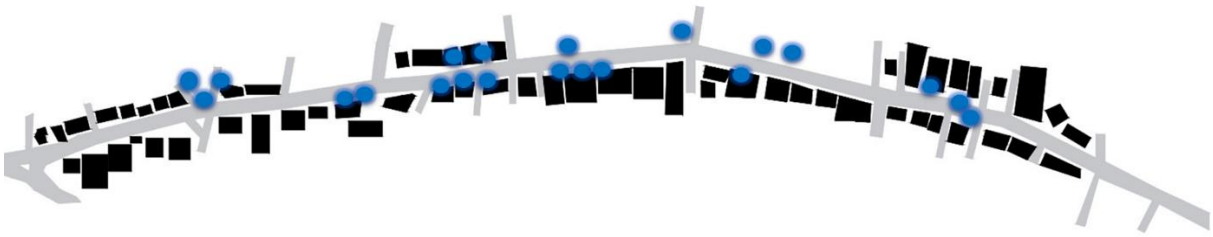
Table 3: Footfall at different time slots



Morning

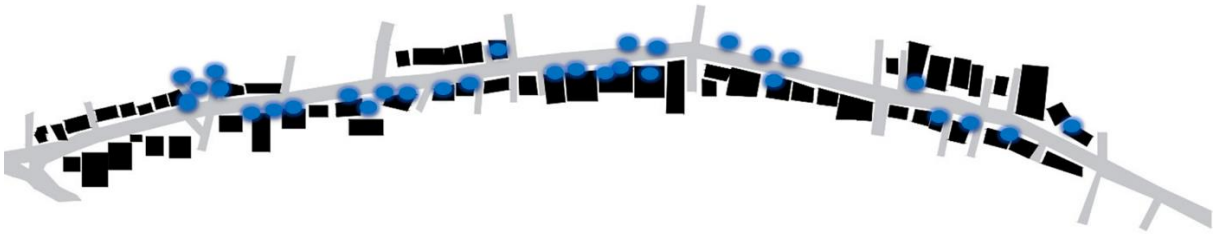


Afternoon



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Evening



One dot equals to 10 people

Figure 2: Footfall at Different Time Slots

4. ANALYSIS

From the above observations, it can be observed that interaction between people or a group of people is directly or indirectly related to an activity going on. The characteristics of the street like streetscape elements, built form abutting the roads, segregation of pedestrian and vehicular activity made it more happening, and the presence of users made the streets more liveable. All the characteristics mentioned made an individual to feel safe on the street. These elements created a lively atmosphere that encouraged socializing, allowing people to converse and connect with one another. Additionally, the presence of street vendors and various cultural events also contributed to the social vibrancy of F.C. Road. These elements also created a lively and buzzing atmosphere, encouraging people to walk around and interact with each other. Additionally, the presence of public art and cultural events also contributed to the social fabric of the area. This study has found that visitors tend to spend more time on the street when the public space attributes are pleasing to the users. Thus, time spent has contributed to the tendency of people on F.C. Road to interact with one another. This suggests that designing street as a public space to be more aesthetically pleasing can promote socialization among community members. It may be beneficial for urban planners to consider this factor when designing outdoor spaces.

More spaces like Kalakaar Katta should be incorporated more into the streets as these nodes enhance many artists to perform and showcase their talents to the people. This type of space should be designed on every street as it will add more aesthetic value to the street as well as the neighbourhood. The sitting area and all of the streetscape elements provided allowed pedestrians to buffer around the street while performing and engaging in various activities. Plazas should be created between the pedestrian walkway and cafes and hotels. People tend to wait in line on a pedestrian walkway, which disturbs the activity of the pedestrian users. The plaza will also enhance the interaction between the users. More seating spaces should be designed near bus stops as the density of people using bus stops throughout the day is high and it should be incorporated because it makes an interesting node for people for social interaction.

5. ONCLUSION

The research leads us to the conclusion that the pedestrian area, streetscaping elements, and the built form of the street play an important role in the functioning of the streets. Making the streets more accessible to the people where different activities of the users of their interest are incorporated makes it more a public space for the people. And more of it adds aesthetic purpose to the street. It creates a safe environment and also offers space for an individual to do different types of activities on the street. The functioning of the street depends on the presence of humans and active communication and engagement with the environment. The pedestrian area, streetscaping elements, and the built form of the street play an important role in the functioning of the streets because they create the atmosphere and provide a means of interaction between people and enhance the spatial and visual quality of the street. Hence, impact of urban landscape on social interactions on streets

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Perception of the Built-form through Meta-theatricality

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ABSTRACT: Meta-Theatrics existed in literature. It is induced through several poetic/literary devices in relation to the spectator. Theatre has a way of interpenetrating the act and audience physically and tangibly for conveyance of narratives. For spaces to announce a story, the former is overlapped in domain of architecture. The research paper looks at the architectural sequences and strategies of three different typologies and how the experience is communicated or enhanced in each. The study is conducted through secondary sources. The literature reviews the various theatre shapes, theatrical devices, elements and phenomena induced in plays or acts performed. Analogous phenomena is studied in realm of built spaces. The paper concludes that narration is a consequence of sequences in both theatrical pieces and architecture.

1. BACKGROUND

Trends in art and architecture are influenced by contemporary socio-political scenarios. These trends also influence the way we perceive ourselves in spaces under constraints of time. These spaces of artistic and historical value, frozen in time, narrate the stories and orders of society and its zeitgeist. The storytelling potential of architecture is the spatial narrative. It explains how the experiential process of navigating constructed environments and deciphering messages contained in architecture can have an impact on the perceiver on a spiritual and emotional level in addition to the physical characteristics of the structure as planned. Meta theatre in architecture is the dramatic composition of elemental form to induce an experience that looks beyond objectivity. Spatial narrative in a space is dictated by meta-theatrical aspects. Meta theatre is a step elevated from normal storytelling; it induces self-reflection and has the spectator speculate the mixture of illusion and reality throughout the experience.

1.1 Aim

The aim of this paper is to understand how the built-form can be perceived and experienced by means of spatial narratives through the idea of meta-theatricality.

1.2 Objectives

The following are the objectives in order to fulfil the above aim:

1. To understand concept of narratives through meta-theatricality.
2. To understand sequence and movement.
3. To understand how receptivity of spectators can be induced and evoked.
4. Analyse the sequencing of spatial narratives architecturally, in the case studies selected.

1.3 Methodology

In order to examine the aspects mentioned above, the study will be conducted through primary and secondary sources. The literature will review the various theories put forward in the field of theatre and by architects, regarding spatial movement. The primary studies will include an examination of three buildings as case studies.

2. LITERATURE REVIEW

In a relationship between literary narrative and architecture, Bernard Tschumi suggests that the unfolding of events in a literary context inevitably suggests parallels to the unfolding of events in architecture. (Tschumi, 1996) In order to

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understand the concept of meta-theatrics, it is necessary to understand the literature discussed about it by experts, related to various aspects:

2.1 Creating an Alternate World

Meta-theatre describes the components of a play that draw attention to its nature or to the circumstances of the performance. For example, an open acknowledgement that the theatre exists and is not mere reality of events. This happens through a conversation between characters by the same actor who played in Hamlet and Julius Caesar that allude the comical reference of Brutus killing Caesar. The audience comically acknowledges the narrative that lifts off layers of realism in a theatre experience. This play within the play acknowledgement by spectator is the realisation that there exists a world beyond the staged plot unfolding in that theatre experience.

2.2 Suspension of Reality

Abel (1963) has emphasized the role played by the aspect of meta-theatrics to create a connection with the audience. There are several methods used in stagecraft to bring this about. Two of the strategies which help to break the façade of realism, also called 'suspension of reality'. They are brought about by the 'breaking of the fourth wall' or the proscenium, and by the use of light to focus upon the action upon the stage or place of performance while keeping the audience seated in without lighting.

The 'fourth wall' is a convention in which an invisible, imaginary threshold separates actors from the audience. While the audience can see through this wall, the convention assumes the actors act as if they cannot (Bell, 2008). The phrase 'breaking the proscenium' or 'breaking the fourth wall' refers to when a performer addresses the audience directly as part of the dramatic production. (Encyclopaedia Britannica, 2022)

Another aspect is the arrangement of performance areas by the actors, in relation to the seating space for the audience (Ray, 2019) and thereby the relationships created between the performers and the spectators. This has given rise to various shapes and arrangements of theatres as (Sharma, 2018).

(a) Proscenium Arch Stage
(b) Arena Stage
(c) Flexible Space
(d) Stadium
(e) End Stage

2.3 Sequential Narrative

Meta-theatre in architecture is materialised by the use of elements, spatial expanse and movement. Just as there are literary strategies for separation and dramatic sequencing used in theatre, such as epilogues, choruses and prologues, the corresponding spatial strategies for sequential progress is experienced by the journey through entry, circulation and exit (Tschumi, 1996). Spatial awareness is enhanced by the use of thresholds and frames. All these lead to a unified intention and progression in a sequence, whether of theatrical scenes or in built spaces. The type of movements and performance quality is enhanced by the physical or tangible space, in combination with the narrative sequence. Thus, it is essential to study the space-time continuum in architecture through movement.

2.4 Spatiality

According to Boffrand (2006), a building expresses through its composition, disposition and structure that announces its destination to the spectator. Bernard Tschumi (1990) further explores the constant interaction and correlation between the formal construction of spaces and the complex activities and events that take place within them. The determining factors are volume and light, which are used to convey size and ease of accessibility or expanse of a space.

The above aspects attempt to address the question of research of how one should design or perceive spaces that either dictates or helps convey architectural narratives of any place. Momentum in performative art is the core device through which narration is a possibility under constraints of space and time. Similarly, in a built environment movement through static spatial sequences, narration becomes evident.

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3. DISCUSSION

Spatial sequences in a built space can be used to create either fixed identities or multiple ones, which can be interpreted individually, depending on their effect upon the spectator. The spaces are determinable sequences, each step leading by movement, offering unfamiliar scenes, re-emerging as new corners of ambiguous spaces. Case studies of three typologies have been selected-museum, church and a garden- to help to understand the spatial sequence through their built forms.

3.1 Museum: *Alte Pinakothek in Munich, Germany*

Alte Pinakothek is an art museum in Munich, Germany. Döllgast, the second architect assigned for the post-war reconstruction of this museum allowed visitors more freedom in choosing their path through the galleries than did the original design by Klenze. Klenze's design consisted mainly of enfilades. (See Figure 1) Enfilades in museums are sequential revelation of architectural features that stirs the curiosity and forces the movement forward. It is an ancient compelling design tool. Enfilade is a way to focus attention and influence emotion in architecture. This is a subconscious effect. An enfilade removes the possibility of a common lobby or a hall through which the decision of moving to the next sequence that lies with user is eliminated. It may create a feeling of being lost in space.

Klenze's enfilades were authoritative in nature with no auxiliary pathways adjoining after every monotone sequence. The enfilade shows one-directional circulation, counter-balanced by the walkway of the loggia.

Döllgast reworked on introducing a democratic path, which was earlier restricted by enfilades. The Alte Pinakothek provided the most radical example of how Döllgast rethought access, circulation, and character. Döllgast broke the enfilade and replaced with a monumental staircase for the entire width of the former loggia in two ascents toward the level of the primary enfilade of galleries. By inserting two new staircases rising symmetrically through the void in the southern elevation up to the main gallery spaces. The staircase broke the monotony of the enfilades and allowed alternative vertical circulation. (See Figure 2)

The enfilade, with its entrances in a row that gave a glimpse of successive rooms allowed movement but without letting the viewer have any hint of the next sequence. Any opening or enclosure, would remain unrevealed until the spectator reached it, and evoke the desire to find a destination at every succession. However, there was also the possibility that the length traversed axially in an enfilade may have disoriented the user in this case and are seen to be eventually discontinued.

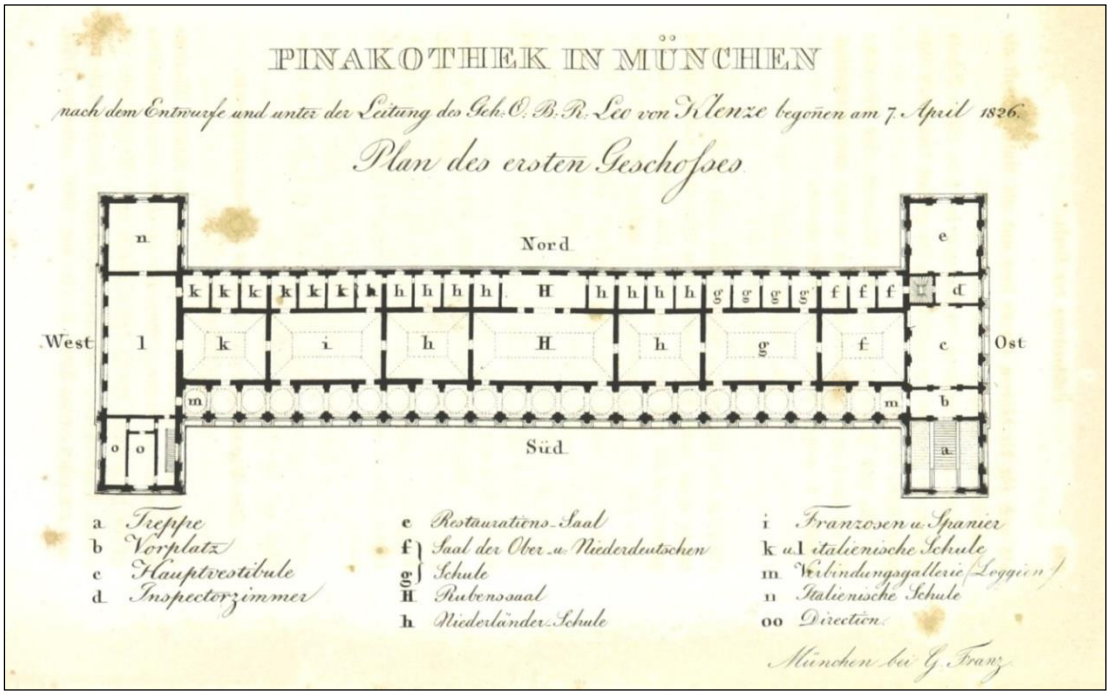


Figure 1: Plan of Alte Pinakothek by Klenze
(*Source:* (SOELTL) Online British Library)

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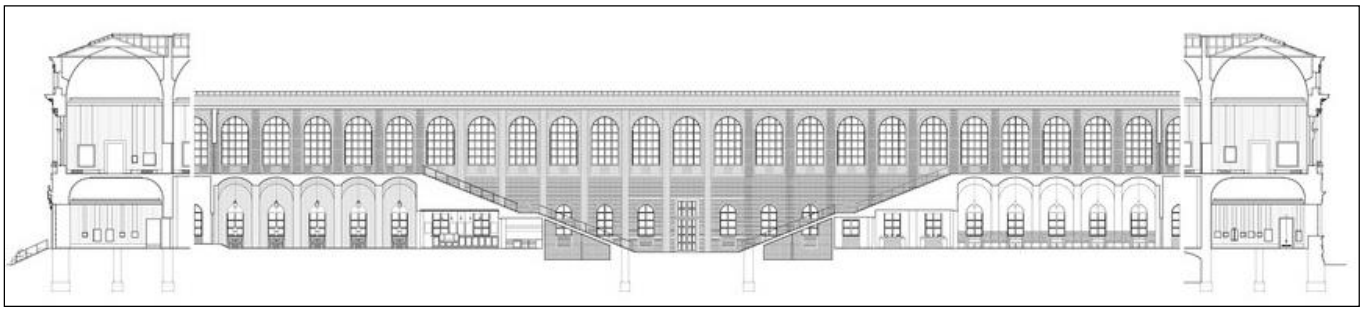


Figure 2: Section of reconstructed Alte Pinakothek by Döllgast

(*Source:* Studio Adam Caruso, 2012)

3.2 Catholic Church: *St. Peter's Basilica in Vatican, Italy*

The spatial configuration of a Catholic church is in relation to the liturgical activities or functions of scared value (Trisno & Lianto, 2020). The architectural strategies directs the devotees as they approach the church, are led to the altar to pray or to the pews to be seated for the service.

There are mainly three spaces required for the devotees' entry and approach towards the altar (Srisadono, 2012):

1. **Narthex:** This is the path leading to the altar. It further consists of:
   (a) **Exonarthex:** Exonarthex is the area that stretches from the entrance of the site to the entrance of the church.
   (b) **Esonarthex:** Esonarthex is the entrance area in the building that is located towards the sacred area (nave)
2. **Nave:** The central passage that leads to the altar.
3. **Altar:** The end of the nave marks the altar. (See Figure 3)

This sequencing of narthex helps to draw devotees to a place in which they start to perceive themselves as separate from their mundane surroundings. These architectural strategies are designed to imbibe focus-and-are responsible for enhancing and maintaining the focus of devotees' thoughts on worship, ensuring they stay completely involved through the process of rites of worship. The sanctuary or altar at the end of nave is the final destination, equivalent to the climactic crescendo in music (ibid.). The entire religious experience is expected to affect followers, encouraging them to seek this experience repeatedly (Sharma & Deshpande, 2017).

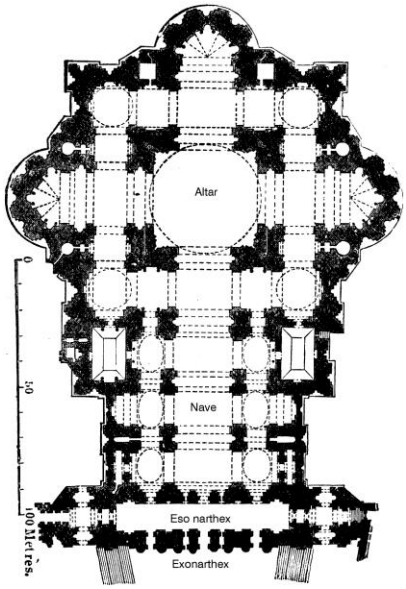


Figure 3: Plan of St. Peter's Basilica

(*Source:* (Clipart ETC), edited by author)

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3.3 Japanese Garden: *Katsura Rikyii in Kyoto, Japan*

Instead of a straight path to the teahouse, the path in the Katsura Rikyii Garden winds or revolves around, so the viewer can take in the surroundings before reaching their objective. Scenes that contribute to and strengthen the story framework are brought into and out of view during the process. The spectator arrives and enters the teahouse through a little aperture at the corner, for which they must bend and enter. The final unveiling of the tearoom can feel both personal and spectacular due to this final manoeuvre, which humbles the user and compresses the expanse of area. Even though they are modest, these movements have major architectural consequences that engage and instruct the performer. Meaning is derived from the movement and is experienced through all of the senses (Sfakiotaki, 2005).

The spatial arrangement used her is called *miegakure* is a Japanese creative space configuration technique. It is a result of restricted site proportions that create spatial depth within the given premises. Miegakure, which translates to 'hide and unveil', uses layers of space that gradually disclose different aspects of the landscape. The viewer's path is deviated and altered so that their movement functions as the stimulus for the landscape's activation. Each component in the spectators' sequence is carefully chosen in order to instruct and guide them along the path. (See Figure 4)

In Katsura Rikyii Roji, or teahouse, this technique is used on a limited scale. A stone path leading to the roji is visible to visitors as they pass through a gate. The gate acts as a barrier between the outside world and the garden inside, and the actor is gently led along the stone walk. (See Figure 5)

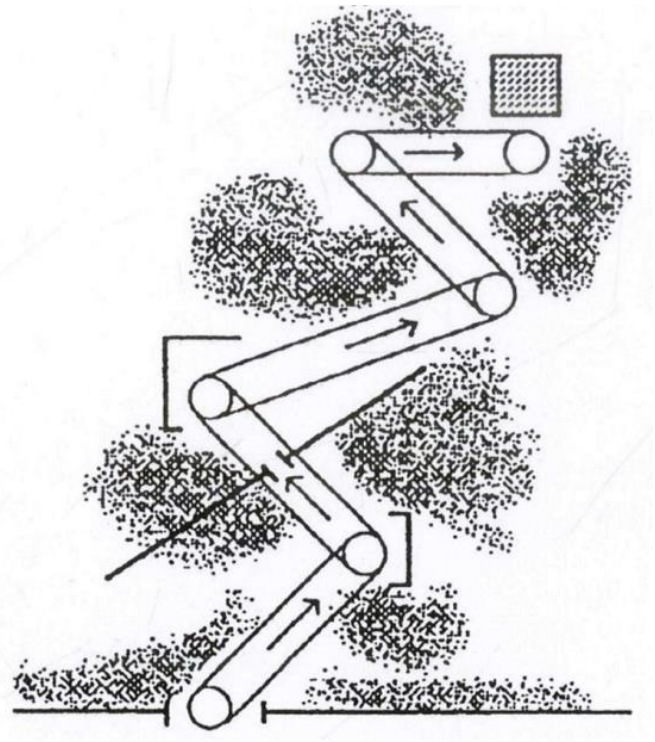


Figure 4: Diagram on Miegakure
(*Source:* Whitley, 2018)

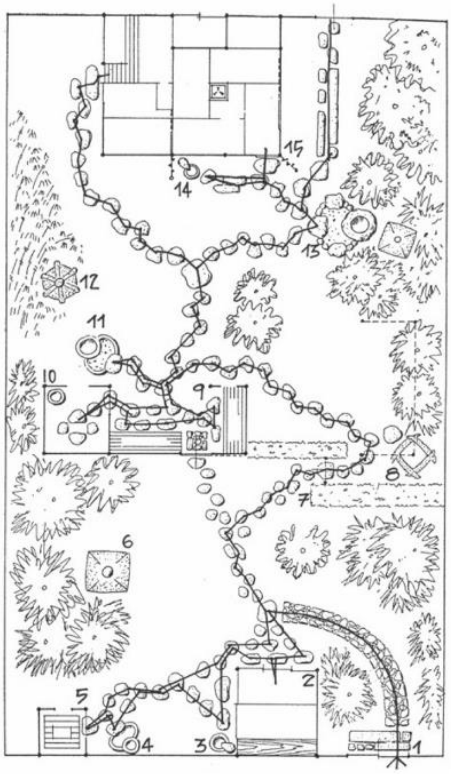


Figure 5: Model Plan of Roji
(*Source:* Sfakiotaki, 2005)

From these case studies, it can be seen that there are several physical strategies that make the sequence of movement evident as spatial narratives.

4. INFERENCE

The experience in a space is a direct consequence of a sequential narrative, triggered through various architectural devices. Each device plays a unique role in evoking a response that can be pre-determined to an extent. The following table summarises this relationship between the architectural strategies, the spatial sequence and its contextual consequence.

ISBN: 978-93-89934-68-7

Parameters	*Typology*		
	Museum	***Catholic Church***	***Koji***
Architectural Strategy	Enfilade	Uni-directionality with Crescendo	Miegakure
Sequence	Recurring room	Axial	Winded/zigzag
Consequence	Orient - Disorient	Withdrawal and Retention	Compress - Expand

These spatial strategies are seen to be analogous with literary narratives.

Enfilades uses recurring sequence to create curiosity. Crescendo uses uni-directionality for direction towards the end destination. Miegakure uses winded path that reveals the expanse of space in gradation.

5. CONCLUSION

Architecture is not restricted to visual art but is rather multi-sensorial. It has different dimensions and elements communicating to each other as well as the perceiver, the definition for space becomes subjective due to the movement of the user. This is the architecture of movement (Schumacher, 1996).

This space-time continuum is possible only by movement; hence, movement is the key, the inevitable entity for the explanation of how we perceive space. The volume of spaces or patterns of a structure are just a part and not the whole experience of an architectural place. The emphasis lies on the movement within the space. Design is communicational. Like theatre, it is composed of elements and space, therefore, consists of territorial distinctions. With each distinction of a part of space comes a distinct interface of communication with the user. Therefore, there is always subjectivity in perceiving the space. The elements and fragments of a composition dictates the spatial narrative.

In an attempt to understand the sequences of spaces through meta-theatricality and story telling that exists in performative art, it is conclusive that architecture also thrives on similar principles. It is unequivocally important to bring attention to the embedded aspect of perception of buildings that seem to have lost the narrative in the contemporary world.

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Planning Play Area in Housing Society with Children

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ABSTRACT: In the urban development of any city, or area, the primary considerations are the amenities and requirements adults need, while the needs of children are often neglected. Spaces are handed over to children as play areas without careful thought given. This often leads to abandoned playgrounds that remain just barren, what is the reason this occurs? Is it because societies do not prioritise good quality space design for children as a public service? It is important to understand that the open space requirements of children are different compared to that of an adult yet, still, we keep providing enclosed spaces like a clubhouse, and space provision for indoor play, which discourages children from playing outdoors. While planning any play area some key factors have to be kept in mind as the level of safety as it will directly affect their independent mobility, along with other factors. While a play area provides key understandings related to health, they also do provide certain values to children while they are in the activity.

Keywords: *Play Area, Housing Society, Children's Perspective, Independent Mobility.*

1. INTRODUCTION

The focus of the research is on the qualities kids favour in a play space in a housing society. Children have preferences for certain characteristics in each place on their own, but some characteristics stick out and are more important to them than others. The standard of living of residents in urban regions is significantly influenced by the housing location. The term "quality of life" refers to a community's overall well-being, which includes the ease and comfort of people of all genders and socioeconomic statuses. These are the years that a city's local authority establishes neighbourhood objectives for each and every home development. In order to achieve these objectives, the local government has developed planning standards for every component of the physical environment that is under their jurisdiction, including infrastructure and services like housing, landscaping, business, open space, and leisure. As a result, the development and expansion of a residential area should not depend solely on the supply of building architecture to produce a harmonious living environment. One of the many important questions is whether it is suitable and successful to create and offer the community children's play areas in residential neighbourhoods. Children play in a variety of places depending on their age, gender, socioeconomic position, and neighbourhood circumstances. We reviewed research that examined the connection between play and the neighbourhood's open places, such as yards, streets, and common areas close to children's homes. Children and teenagers spend a substantial amount of their outdoor playtime in their neighbourhood's built surroundings. Children's outdoor encounters are crucial for their healthy growth on many levels, including physical, social, spiritual, emotional, academic, and cognitive. Planning a play area with children in mind could benefit their long-term growth and increase their play choices in the neighbourhood's open spaces. Children need open room to play, study, exercise, and relax in order to grow and develop properly. This is essential for their cognitive, emotional, and psychomotor growth. Children's play spaces ought to be built in a way that gives children access to both the physical and cerebral spheres of existence. The layout should enhance the space's appeal while fostering a one-of-a-kind dialogue between the players, the setting, and the creator. For the young kid and the future, playing is life.

2. LITERATURE REVIEW

The paper puts light on the issue of the use of urban space by children. The ratio of children to adults is such that only children form a small quarter. Due to this ratio lesser importance is offered to children. Distribution, accessibility, aesthetics, size and quality, and the availability of green space/greenery are all play area qualities that may be important for children's independent movement.

When children are born, their brains have a lot of potential. They also have abilities and abilities that go beyond basic survival instincts. A child's brain holds the key to our society's destiny. Humans have a long childhood to enable their brains to mature to their full potential before being compelled to make decisions and take actions that would define

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humanity's destiny. A long childhood, on the other hand, is a period of intensive activity and growth in all aspects of the mind, body, and spirit. When children reach adulthood, they must not only have a good education, but also a healthy spirit, a zest for life, and a set of beliefs and values aimed at improving life on Earth.

Adult ideas that may or may not be relevant to the children's functioning are frequently used to develop and build spaces for young children. Form, shape, colour, and function are all employed to construct and articulate the spaces within and outside the structure. According to research on children's functioning in indoor and outdoor contexts, a place's worth is defined by its function rather than its shape and colour. To put it another way, adults are concerned with form, function, and aesthetics, but children are concerned with the functions of space rather than the aesthetics.

Children, regardless of the topic, can adapt to any circumstance as long as they get to play. In view of the continuous fast expansion in many cities, how seriously do we take the needs of children? Children's outdoor play and playgrounds have not been recognised as a design issue, and the need for beauty in the play yard has seldom been acknowledged. Independent mobility refers to a child's ability to move freely and actively throughout their environment without adult supervision, and it can help them get enough exercise.

In addition to providing physical exercise, independent mobility provides for the development of practical and spatial abilities, such as the ability to handle risky situations outdoors. The children's living areas outside play environment is crucial for their growth and meeting their fundamental daily needs. Because of their age and maturity, children are generally considered as a vulnerable group in society; nonetheless, the bulk of a child's social skills are built via the relationships and interactions they experience during their youth. Keeping this in mind, it's been discovered that outdoor space design approaches are shrinking by the day; consider the situation of children's play areas in densely populated cities. Hinging to this issue critical thinking needs to be put to our responsibilities toward the needs of children so that their interest in outdoor play does not shrink (Shi, 2016). We investigate how access to playgrounds impacts parent-child social interaction in housing communities in this study. The playground service area, which is a computation of the number of potential playground users based on population density, and the walking distance to the nearest playground were the two accessibility measures we utilised. Outdoor learning is promoted in playgrounds, such as the "Landscapes for Learning" on school grounds. Play area design, according to experts, emphasises and promotes the kind of play activities that are most typically deemed developmental, or what commercial play equipment manufacturers refer to as "play value." Today, we're beginning to recognise the importance of play and a playful outlook on life, both as an essentially healthy human want and as a means of developing and maturing in a complex and demanding environment. Children benefit from play not just in terms of their muscles and physical abilities, but also in terms of their spiritual, intellectual, creative, social, and emotional development. The increasing number of motorised vehicles in residential areas is frequently noted as a deterrent to outdoor play, since excessive traffic speeds and volumes make both children and parents apprehensive of leaving their children alone. Several worldwide studies have also emphasised parents' and children's concerns about their safety in public places. In this study, we examine how access to playground spaces in housing societies influences parent-child social interaction. The playground service area, which is an assessment of the number of potential playground users based on population density, and the walking distance to the nearest playground were the two accessibility measures we utilised. The growing number of motorised vehicles in residential areas is often cited as a disincentive to outdoor play, as high traffic speeds and volumes make both children and parents fearful of leaving their children alone. Several worldwide studies have also emphasised parents' and children's concerns about their safety in public places. When you're playing, you may take risks that might otherwise be too dangerous. Playground design needs a playful attitude toward design, taking risks, and pushing the boundaries of design trends; it also necessitates the risk of appearing irresponsible. Designing a play area should be done with humility, realising that we adults are tourists in the land of children, and we are not experts in their culture or customs. Childhood specialists are knowledgeable about childhood as it is defined by adults, not as it is experienced by children. We may have played as children, but we lack the modern childhood experience. All of the failed attempts to scientifically characterise play demonstrate how difficult and poorly understood it is. It's difficult to get the proper scientific distance to analyse play since it's such an important part of being human. Play used to be associated with children and free time—something individuals did when they weren't working or doing anything essential. There did not appear to be any significant outcomes from the game.

3. RESEARCH METHODS

This study explored the perceptions of elders from housing societies in Mukundnagar, Pune to extend understanding of where children play and why. In this study, we examine how playground access influences social interaction between

ISBN: 978-93-89934-68-7

parents and children in housing communities. The playground place, which is a measure of the number of potential playground users supported by population density, and the walking distance to the nearest playground were the two accessibility measures we utilised. The understanding of children's association to a play area comes from the tangible element of space – 'A Built Setting'. the selection of web sites of interest has been done on the factors of the use of spaces (Available/Provided), in a very setting that has been planned by knowledgeable, to serve the habitants, and have dedicated spaces for children's play.

The key aspects for deriving data are based on 4 main components:

1. Observation
2. Questionnaire
3. Photographic Overlays
4. Drawings



Figure 1: Site Analysis of Housing Society—Provided Play Area

An important think about conducting the research would be understanding children's perspectives, to realize the specified result from the above samples having a form with visuals and providing a scale would be more beneficial to extract data, as they would be more hospitable the concept of images that non-public interactions. The sites of interest are physically inaccessible that the literature in reference was the quintessential a part of conducting the research, for the sites that were accessible observing the alternatives children make are presented and later been bifurcated for enhanced understanding. Each child's play is distinct, as is each play activity. a range of things determine how the sport is played.

Personality, gender, and experiences all play a task within the development of a toddler. External influences include the physical environment, time available for play, other children and adults, the play environment personality, and therefore the cultural attitude toward playing. It suggests that other children have the next impact than previously assumed – even perhaps a greater influence than the others. When analysing or discussing children's play behaviour or educational features of play items, it is vital to recollect that these impacts are intertwined, which play cannot be separated from internal and external factors.

4. ANALYSIS, RESULTS AND DISCUSSION

The involvement of children has multiple layers to it, one of which being the environmental factors like shaded play areas, environmental safety, accessibility, and the role of parents. The environmental conditions are associated with the basic needs of children and the needs for public spaces.

ISBN: 978-93-89934-68-7

Due to the increasing population, the needs rose, and the park is unable to serve the growing needs. Based on this analysis there were primarily proposing three planning factors that could lead to the development of the parks.

A. Needs of children
B. The availability of open space
C. Visibility of play area

The above-discussed factors would help in determining the effectiveness when it comes to the preference of children to play in it.

Forming the base of the argument it is quintessential to understand the current condition of play in some of the selected sites to give a fair idea about the utilisation of spaces available for active free play.

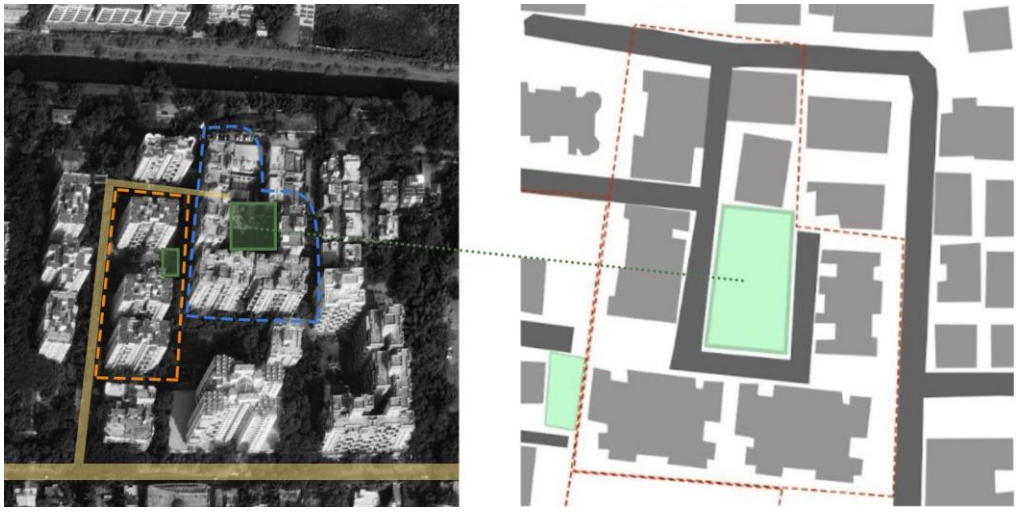


Figure 2a: Site Analysis of Kumar Puram Housing Society—Provided Play Area

A. Kumar Puram Housing Society

This is a planned housing society that has been a mid-rise building complex. The central open space has been provided as a play area for children. It has a small space provided for play equipment like swing, slide and see-saw.



Figure 2b: Kumar Puram Housing Society—Provided Play Area

ISBN: 978-93-89934-68-7

The analysis consists of the general criteria applied to the settlement areas and specific criteria aimed at individual residential areas. The following aspects have been a fixing point in the study of available spaces in the settlements, and have been the key driver towards understanding the preferences of children when it comes to selection of a space to play in.

The selected sites give some clues about the spatial quality and the physical character that the children are drawn to while they play.



Figure 2c: Kumar Puram Housing Society—Chosen Play Area

During the research it was found out that children often chose informal spaces like building lobbies or paved areas that are shaded.

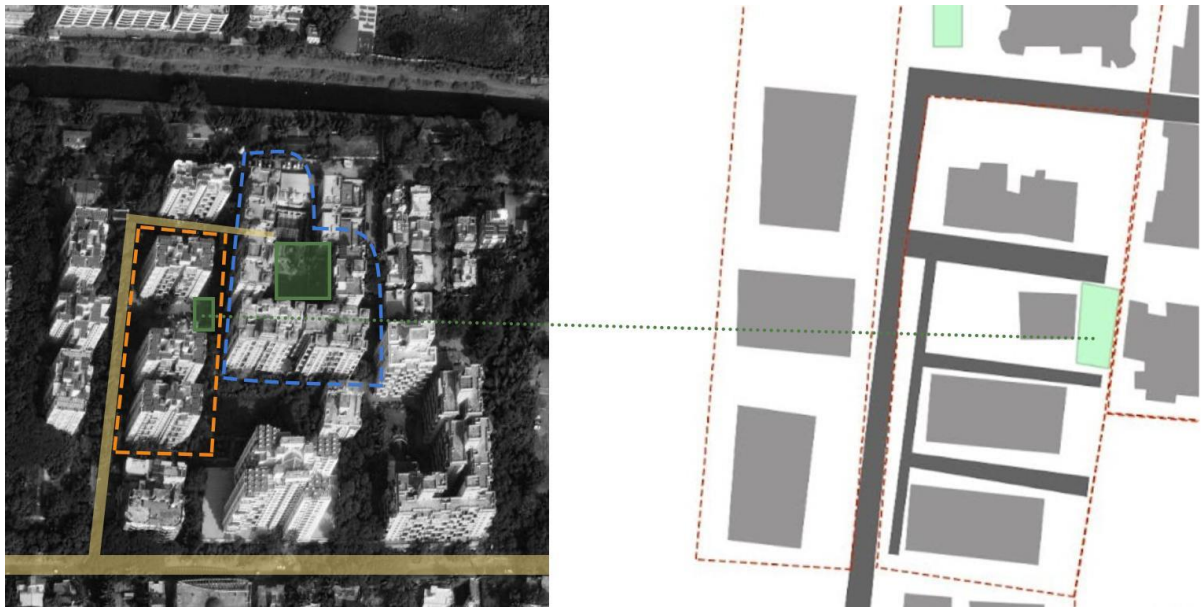


Figure 2d: Site Analysis of Chandradeep Housing Society—Provided Play Area

In the case of the Chandradeep Housing society the setback left for light and ventilation have been provided as a play area for children. The shaded spaces form comfortable zones that block the heat in summers, and in the afternoons. In both the study areas it is a common observation that the informal areas are much more active as compared to planned open spaces because of the comfort of play, shaded areas, lesser restrictions like the timing of play. Despite the observation it is more evident from the study that the open spaces such as a park or garden is what children aspire, if we could provide an open space that has equal amounts of shaded areas, a wider play area, an open space that the children could visit on their own, would lead to better facilitation and utilisation of an open space for children.

In most cities, property set aside for children's play grounds is land that can't be used for anything else. They are the remains of a prior dinner. After all of the buildings have been placed in the most desirable locations, as well as the highways, parking lots, and trash disposal needs have been satisfied, these are the areas that remain unoccupied. Then there's the landscaping, which entails filling up the cracks and building the playground. Adult designers' skills are

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desperately needed to refocus children's play areas, not just in terms of building the underused area, but also far earlier in terms of offering acceptable and desired play situations for children.

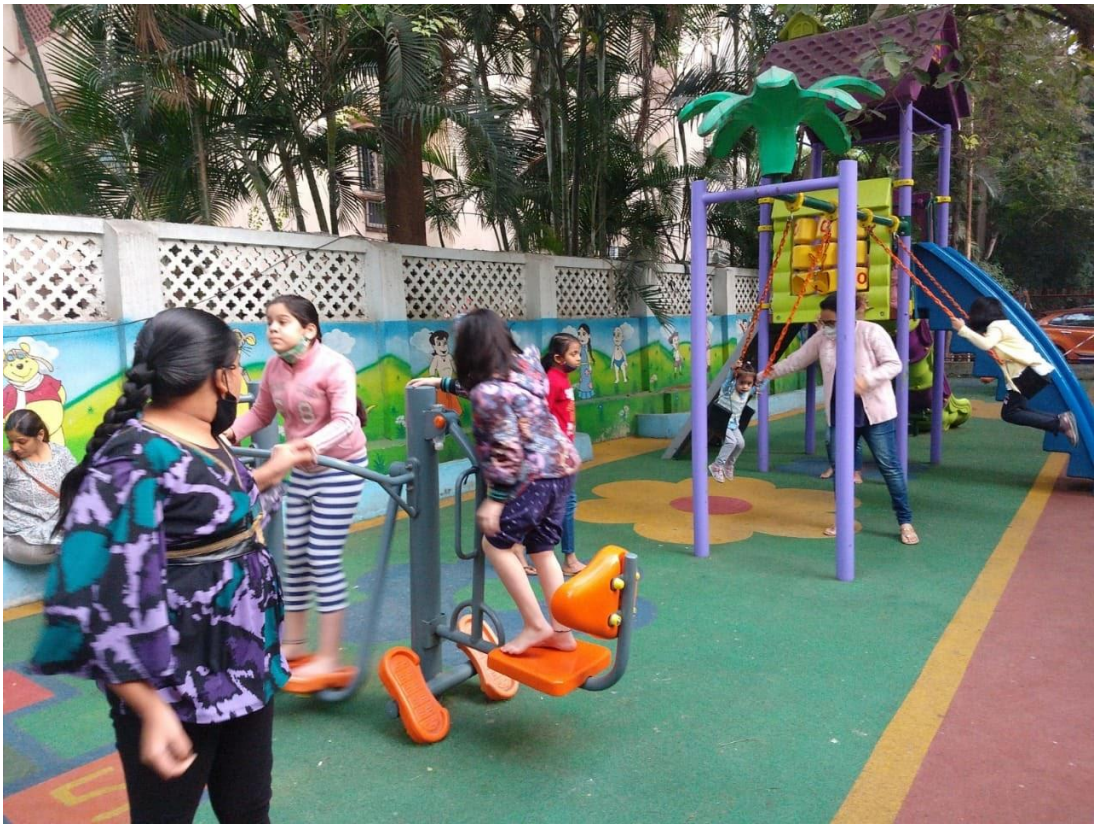


Figure 2e: Chandradeep Housing Society—Provided Play Area

Through the study was the emergence of certain themes:

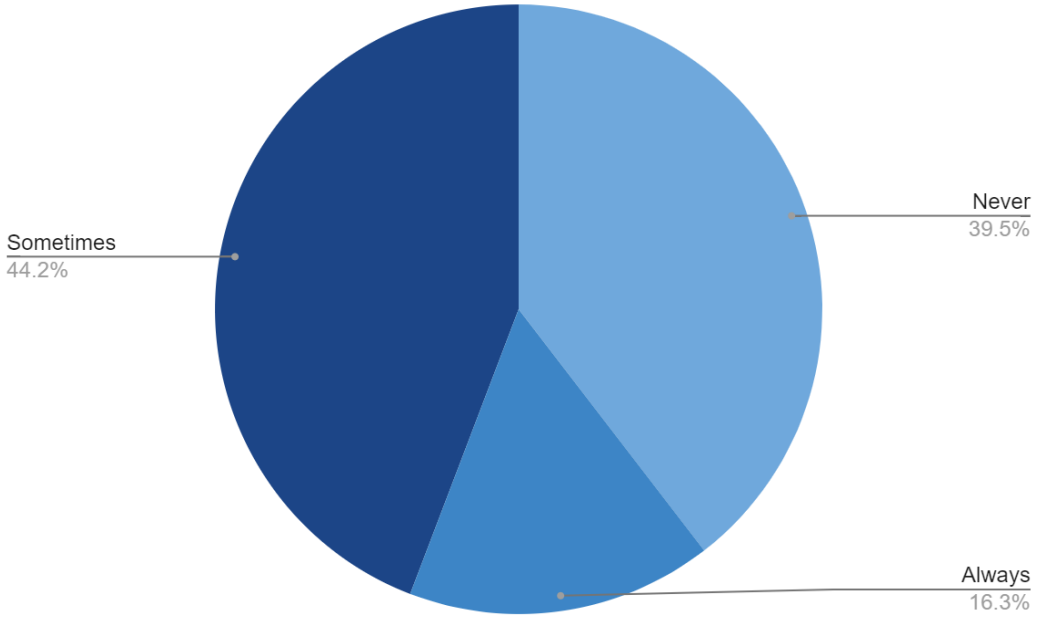
1. **Safety**: Most of the interviewed parents posted with concern about where their children play. Not only the place but also how the children reach the place, such as the building lobby, the paved area in front of the building, etc. along with this concern they also posed a possibility of safety from strangers, and the quality of the equipment used in the parks & playgrounds.

   Through literature study and survey, it has been observed that a certain ratio of children has preferred to visit the parks with someone elder to them at times of play. This could be either for the feeling of safety to have someone around or as a means of transport from their play area to their house.

   Children require risk and challenge in order to acquire skills and competence. Children that are capable can recognise and manage risks. Most children will refuse to participate in a movement activity that they know they will not be able to finish. On the other hand, parents regularly encourage young children to push themselves beyond their limits by supporting them in climbing onto equipment that is too advanced for their age. Injuries may arise because the kid has not had enough opportunity to develop expertise in this sort of movement. To avoid this, make sure that the youngest children have access to challenging movement play, and that play goods for older children are properly labelled with the user's recommended age.
2. **Level of Independence:** The child's level of independence was one of the key influences on their ability to play in places away from where they stay. Younger children (6–8 years) have less independent mobility as compared to the older children (9–12 years). The constrains being cycling to the nearest park, going to get groceries, or going alone on their bike to their friend's house. The younger children needed to be supervised by an adult for going somewhere which resulted in restricted independent mobility. These children were often dependent on their parents having the time and motivation to take them to the park, or any other play area. This factor of dependence was the most frequently mentioned barriers to use of a park.

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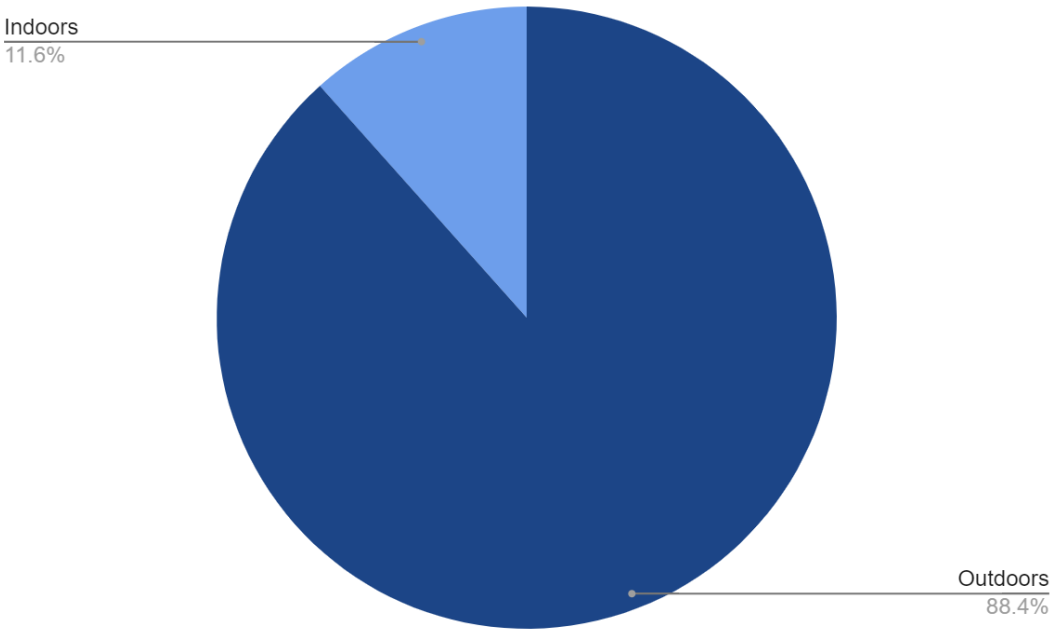
Table 1: Chart Presenting the Collected Data on 'Level of Independence'



The chart shows the different criteria which occur when it comes to the independent mobility of children, the graph states that 42.2% of children could feel more comfortable if a guardian accompanies them to the place of play which is 600m or more. This shows that children of all age groups feel safer and would prefer their guardian sometimes accompany them to the playground.

3. **Attitudes to active free-play:** As against a structured activity in school, an unstructured free-play is dictated by the willingness of the child and the interest of the child to participate in any activity.

Table 2: Chart Presenting the Collected Data on 'Preference of Condition of Play'



The presented chart states the preference of playing outdoor is preferred more that an indoor play. The statistics hint at the willingness of children to actively participate in activities that take place in two conditions, one being outdoors like on an open ground, lawn, playground, etc. or an indoor setting where the space is more homely, familiar, and recognised as comfortable by the children.

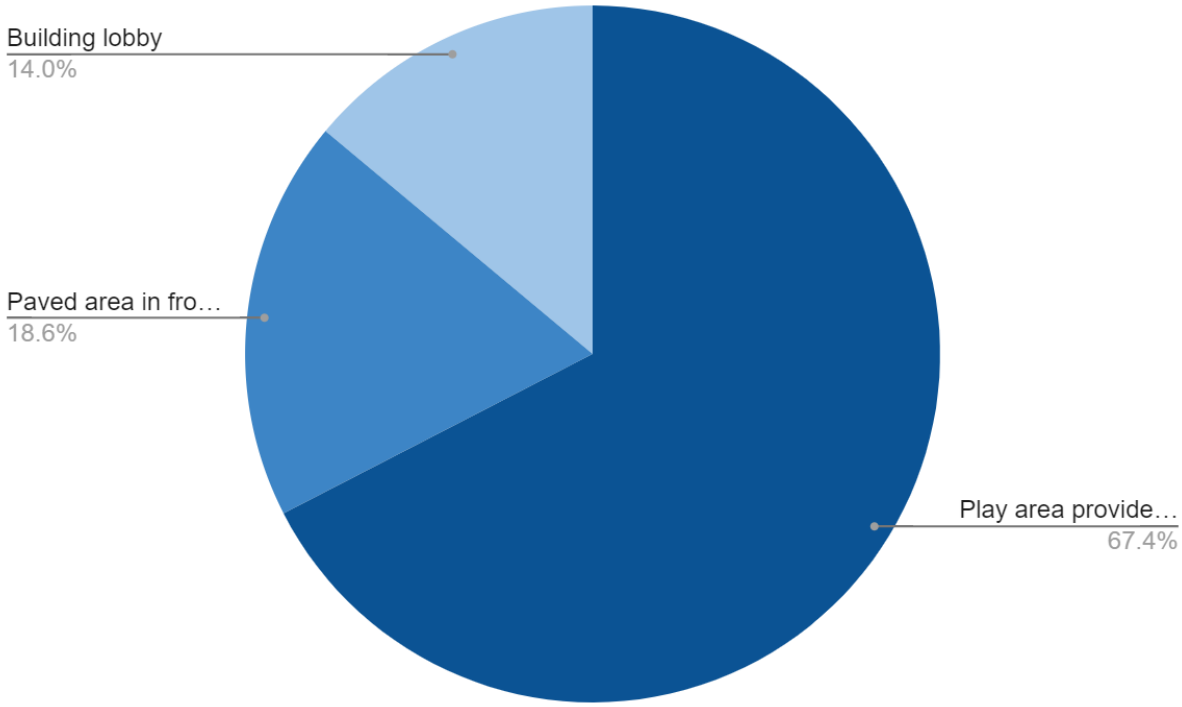
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4. **The Aspect of Climate:** This element refers to natural elements such as sheltered areas, sun intensity, and the climatic conditions in which the children are most comfortable. We have preferences for the environment in which we wish to play/work, as well as a materialistic mindset.

   According to the literature and study findings, children prefer to play in a shaded setting regardless of the equipment. If given the choice, they would rather play beneath a tree or in a building lobby than on an open grass (if not shaded). Finally, climate influences children's attitudes toward play; on a hot summer day, children select a different form of play than on a beautiful winter morning. Natural factors like the presence of a tree, an arcade, a waterbody, etc.

   Sun direction and shade should be considered while placing metal slides, cable rides, some swings, and other playground equipment. To reduce heat build-up, slides in the northern hemisphere should face north or be shaded during midday. Cable rides and swings should be placed such that the low setting sun does not blind the user, making it impossible for them to notice if someone enters the moving area of the play item.
5. **The aspect of Elements, Material & Texture:** While playing, as different sports have different requirements, so do children have selective preferences when it comes to active free play. Their preference to play in space could also be subjected to change depending on the elements surrounding their area of playing, either natural elements like a tree, a bushed fence over a metal/concrete fence, or man-made elements like playing equipment, etc. Children from a smaller age group might prefer to play or spend more time in areas that have been soft scaped, while older children might find a hard surface more suitable to play on, it depends on the interests of children to where they want to play and affects the type of unstructured active play they prefer.
6. **Aspect of Enclosure:** Under this aspect, the scale is looked upon, as to how different scales impact the decision of children to play in it. Just for example a large open park v/s a narrow street, some children may find the park very comfortable or favourable, whereas some might like to play in an intimate space that is packed. While observing children under this aspect it is important to under the width to height aspect of the site under study. The approach here is to redefine the sense of scale from a child's point of view and try to understand how even a small change in scale makes a difference to children and their preference for engaging in unstructured active free play.

Table 3: Chart Presenting the Collected Data on 'Aspect of Enclosure'



Cohesive and parallel thinking of these aspects can be quite interesting while observing the children from a different angle. These aspects form the base of what needs to be seen specifically while considering an open space for children (2–12 years of age).

ISBN: 978-93-89934-68-7



Figure 3a: Aspect of Enclosure—Chosen Area for Play

The literature sources will be of help to bring out the factors of space planning while dealing with children, the factors that are variable, and the invariable factors. While not restricting on the design part the sources could also have inferences from different fields of study like health, medicine, psychology, etc. this branching will be beneficial while observing the attributes of the use of open space.

7. **Environmental Factors/Urban Design:** The availability of open space attached to the place where the child decided their play. People who lived in a house having a backyard preferred their child to play in that space, but people who had a small/unusable/no backyard had no option but to visit public parks. Along with this aspect, children also showed a lack of interest to play on a court because of factors like busy roads, not satisfactory equipment in the parks, and having to drive to the park, among other reasons.
8. **Providing for a Wider Variety of Play Interests:** When most people think of a playground, they envision custom-built play equipment. On the other hand, these locations should be much more than a hodgepodge of mass-produced toys. Play locations should contain naturally growing spaces and/or forests, gardens, open grass for games, and settings for manipulating loose and found objects, as well as dancing stages and cultural/art venues.

4. INFERENCE/CONCLUSION

According to a study, playground safety is linked to the quality of the play area design as well as the amount of play interest discovered there by the youngsters. Compliance with safety requirements does not reduce the frequency of injuries when the play environment offers a choice of demanding play options. Children have been demonstrated to be safer in beautiful play places with a number of different and challenging play alternatives than in unappealing play locations with fewer possibilities. Designers of playgrounds should focus on creating settings that appeal to children and provide a variety of interesting play opportunities. If they do so, they will have done their best for the children at play. These are the kinds of environments in which children may learn about life and what it means to be alive on our planet. Playgrounds are child-life habitats and play area designers should be skilled in both design and knowledge of children's play behaviours.

These are the kinds of settings where children may learn about life and what it means to be a human being on this earth. Playgrounds are child-life habitats and play area designers should be skilled in both design and knowledge of children's play behaviours.

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APPENDIX

1. Questionnaire: Google form Survey

Planning Play Area in Housing Society with Children

I am Preksha Oswal, a 4th year architecture student of PVPCOA Pune, and am working on my dissertation this year. My research topic is ' Planning play area in housing society with children'.The study revolves around the characteristics that children prefer in the play area in a housing society. Implementing children's perspectives into the planning of play areas could be a way of improving play possibilities for children in the local public space and supporting sustainable development. It would be of great help if you could carve out some time to answer the following questions. Thank you!

* Required

1. Age group of the child *

Mark only one oval.

- ◯ 2-3
- ◯ 4-6
- ◯ 5-8
- ◯ 9-12
- ◯ 12-15
- ◯ 15<

2. Where do you/ your child like to play? *

Mark only one oval.

- ◯ Indoors
- ◯ Outdoors

3. How often is the child accompanied by an adult *

Mark only one oval.

- ◯ Always
- ◯ Sometimes
- ◯ Never

4. What time of the do you / your child like to play? *

Check all that apply.

- ☐ Morning
- ☐ Afternoon
- ☐ Evening

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5. Where do you / your child like to play? *

Check all that apply.



☐ Building lobby



☐ Paved area in front of the building



☐ Play area provided by the society

6. Do you / your child feel free while playing outdoor? *

Mark only one oval.

◯ Yes
◯ No
◯ Sometimes

7. As parents how secured do you feel when your child is playing outdoors independently? *

Mark only one oval.

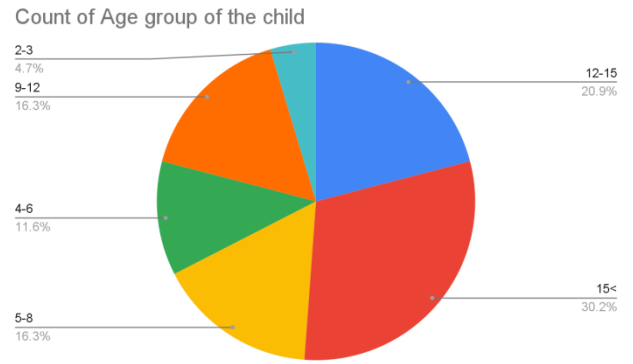
	1	2	3	4	5	
Less Secured	◯	◯	◯	◯	◯	Secured

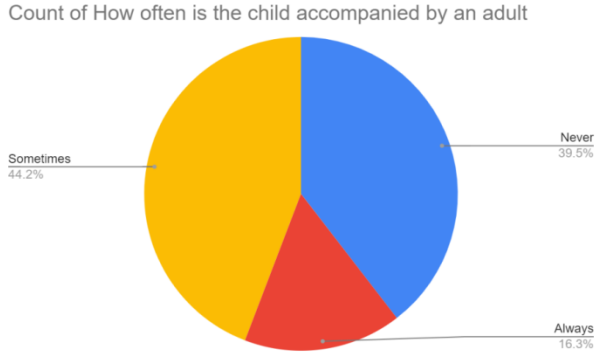
8. Are you satisfied with the current condition of the provided play area? *

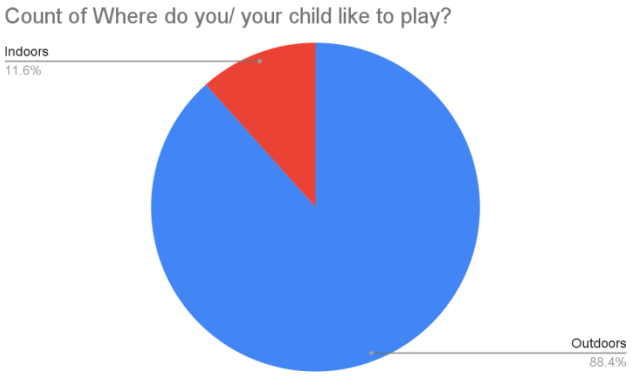
Mark only one oval.

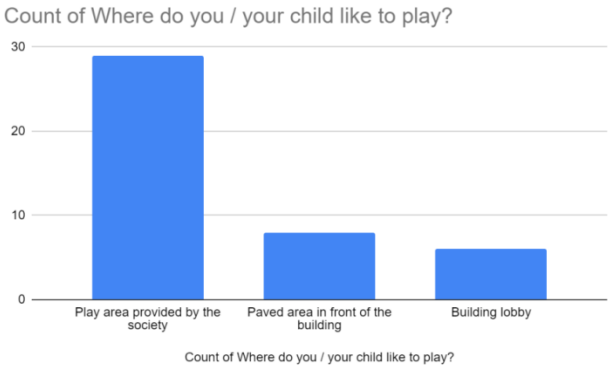
	1	2	3	4	5	
Not Satisfied at all	◯	◯	◯	◯	◯	Pretty Satisfied

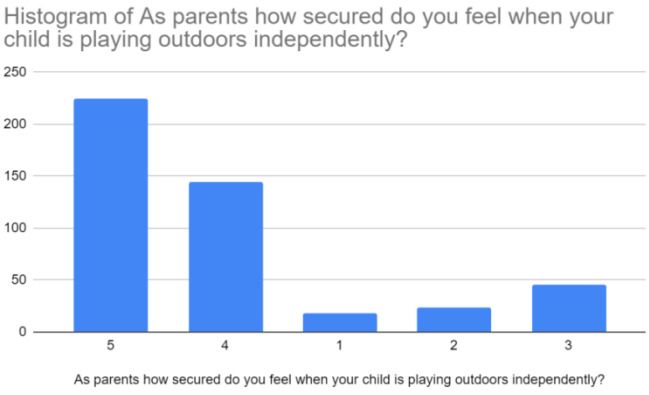
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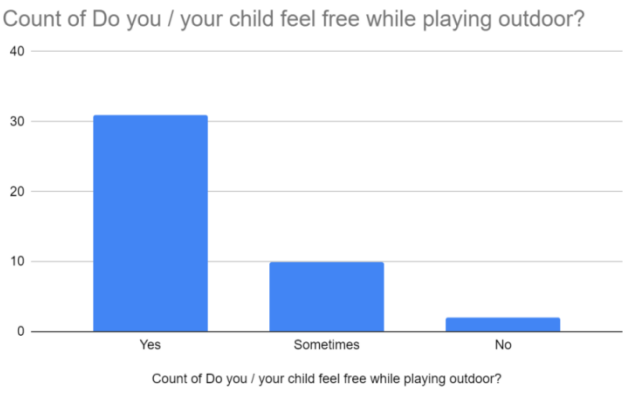


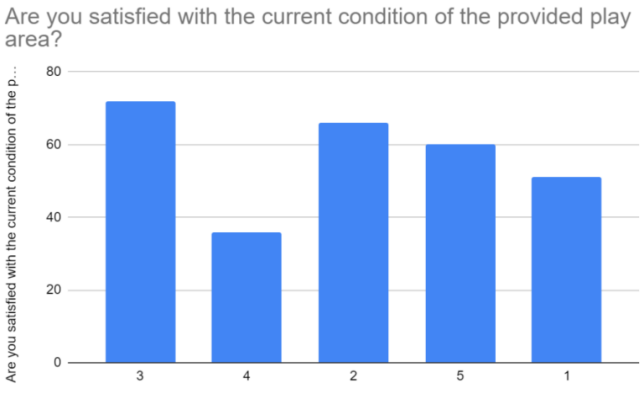


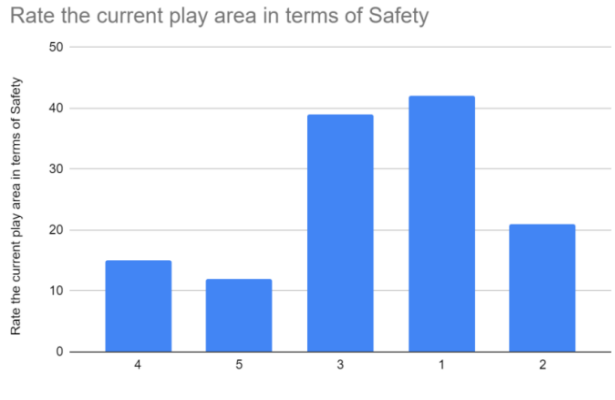




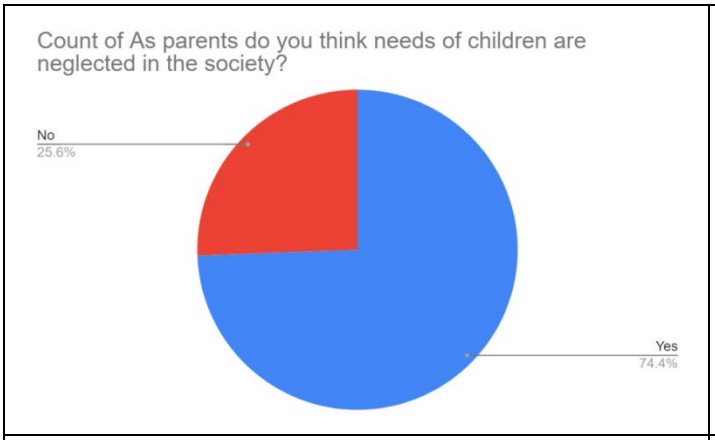


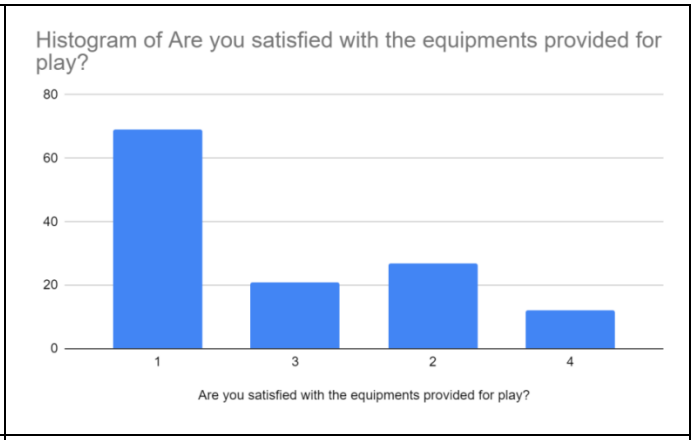


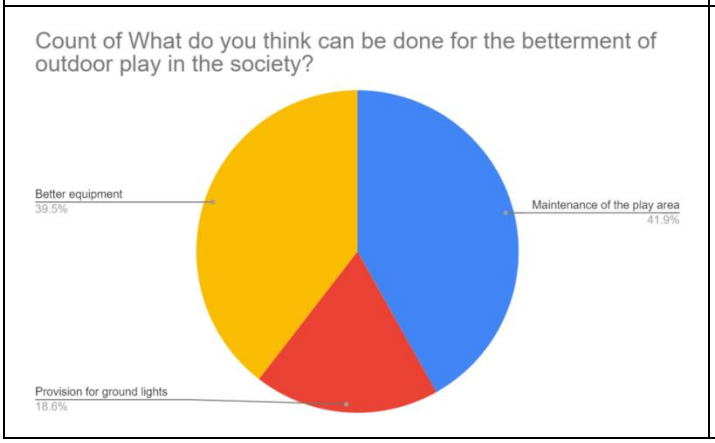


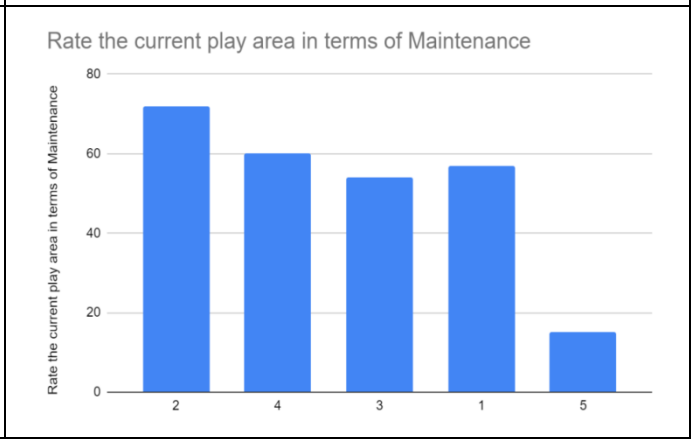


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9. Are you satisfied with the equipments provided for play? *

Mark only one oval.

	1	2	3	4	5	
Not Satisfied at all	◯	◯	◯	◯	◯	Pretty Satisfied

10. Rate the current play area in terms of Safety *

Mark only one oval.

	1	2	3	4	5	
Not safe at all	◯	◯	◯	◯	◯	Very safe

11. Rate the current play area in terms of Accessibility *

Mark only one oval.

	1	2	3	4	5	
Not easy to access	◯	◯	◯	◯	◯	Easily accessible

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12. Rate the current play area in terms of Maintenance *

Mark only one oval.

	1	2	3	4	5	
Poor	◯	◯	◯	◯	◯	Good

13. Rate the current play area in terms of Cleanliness *

Mark only one oval.

	1	2	3	4	5	
Poor	◯	◯	◯	◯	◯	Good

14. As parents do you think needs of children are neglected in the society? *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Maybe

15. What do you think can be done for the betterment of outdoor play in the society? *

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Study of Inclusive Design Attributes in Outdoor Play Spaces in Housing Societies

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ABSTRACT: During juvenility, everyone is the most curious about things happening around us. It is the base of how an individual is shaped. Children are an important part of society as they carry future responsibilities. Spaces often visited in the daily routine impact how they behave; therefore, spaces must be designed in a way that would help their overall development. In their growing phase what they see and feel makes them the people they will be. Inclusive design plays an eminent role in the formative years, this is how the children would learn and try to inculcate those principles in the later part of their life. This research paper aims to study the play spaces and observe their attributes and analyze whether inclusive design is considered while designing. This study would conclude with better elements and an improved approach toward inclusive design in the current scenario. The methodology for this research was done in 2 parts, first visiting the buildings that would be taken as case studies and second, interviewing specially-abled kids to understand their perspective of the play spaces and how that would help in improving the design of the same.

Keywords: *Inclusive Design, Universal Design, Outdoor Play Spaces, Children, Residential Society, Architecture.*

1. INTRODUCTION

During juvenility, everyone is the most curious about things happening around us. It is the base of how an individual is shaped. Children are an important part of society as they carry future responsibilities. Spaces often visited in the daily routine impact how they behave; therefore, spaces must be designed to help their overall development. In their growing phase what they perceive makes them the people they will be. Inclusive design plays an eminent role in the formative years, this is how the children would learn and try to inculcate those principles in the later part of their life. This paper aims to study dthe play spaces and observe their attributes and analyze whether the inclusive design is considered while designing. This study would conclude with better elements and an improved approach toward inclusive design in the current scenario. The methodology was done in 2 parts, first visiting the buildings that would be taken as case studies and second, interviewing specially-abled kids to understand their perspective of the play spaces and how that would help in improving the design of the same. The study is limited to 3 housing societies of varying sizes from Sinhgad Road in Pune City. The study has been carried out only for Group housing Societies, where the number of buildings in society ranges from 3–7. A combination of mid-rise and high-rise housing societies is studied to understand different aspects of the play spaces and whether the Inclusive design aspects are taken into consideration.

2. LITERATURE REVIEW

The literature referred to during the base of this study was based on the spaces visited by children, how spaces affect their psychological growth, the relation of colors and a kid's growth, the universal design of the play areas, and universal design as a significant component for social development. The emphasis given to a child's mental growth is affected by the environment around him, be it in terms of emotional or physical entities. Whenever a space is designed the client and his requirements are to be given the most priority but when it comes to designing spaces for children, a prenotion of what we (as designers) think is right is executed. The children's perspective of the space is often ignored this is supported by many studies that have come to this conclusion.

Universal design still is a concept that needs to be emphasized while designing buildings. Even in the buildings around us, we notice issues related to it. Gradual steps are being taken towards it but this has to be reached a larger audience.

There are public parks for specially-abled kids that abide by all the principles of the Universal design, like Coles Park, Fraser Town, Gayatri Devi Park, Rajajinagar, and M.N. Krishna Rao Park all of these parks are in Bengaluru. But these great initiatives have taken place for public parks.

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The residential play areas need to be focused on. They should also abide by the principles of Universal design. Playing is a developmental need. The lack of such spaces is an unfortunate reality of the cities today. When it comes to children with disabilities, the lack of inclusive play spaces is not only a gross violation of the child's right to play freely alongside their typically growing peers but is also reflective of how indifferent we are, as a community and society, to the needs of children with disabilities.

3. MATERIAL AND METHODOLOGY

Methodology: To conduct the research, two methods have been used for data collection. The first is observing the buildings and understanding the aspects of the play spaces. Second is interviewing specially abled children in the age group of 5–18 years.

- The method for gathering data is based on the observation of the play area in these societies at Sinhgad Road.
- For the observation survey, the buildings are observed on the principles of Universal Design.
- Interviewing specially abled kids, understanding their views on housing societies.

Data Collection: The data collection method was to, first, observe keenly the design of the housing societies and their respective play areas, second, to interview the specially-abled kids.

Data Collection 1: The case studies were done for 3 group housing societies of different scales, which are:

- *Case Study 1:* 2 buildings, G+3 floors.
- *Case Study 2:* 4 buildings, G+6 floors.
- *Case Study 3:* 6 buildings, G+12 floors.



1. Case study 1



2. Case study 2



3. Case study 3

The play areas differ in the areas, that help in reviewing the aspects of the inclusive design on different scales.

Data Collection 2: Individuals are interviewed and asked about their views and opinions regarding these play areas they have visited. The answers would help understand the problems. The impairments that would be covered in this research paper are Ambulatory, Semi-ambulatory, Partial blindness, and Blindness. The four individuals had different impairments, which were the same as above. This helped gain perspective about the different problems they face in the play areas. Some of the answers varied, and some of them matched.

The set of questions asked was as follows:

1. Were the play spaces easily accessible or did they need help?
2. What were the difficulties they faced when they were in a play area?
3. What is their opinion on the existing play spaces that they have visited?
4. How can the design of the play spaces be improved?
5. What do they expect from the play spaces?

- Were the play spaces easily accessible or did they need help?

This part covers the accessibility aspect, i.e., ramps, walkways, pathways, use of tactile lines, etc.

Interviewee 1 (Partially blind): The access to play spaces could be done by themselves. But the need for tactile tiles is realized as they help in navigating properly. The stairs could be accessible but ramps are preferred for an easement.

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Interviewee 2 (fully blind): The entry to the play spaces couldn't be done by themselves. Support from others to navigate through the play space was required. Absence of ramps, difficulty in getting inside the play area.

Interviewee 3 (wheel-chair aided): The access was not easy due to the absence of ramps, even if there were ramps, the slope gradient is usually not comfortable and be managed by themselves. The movement through the play spaces is challenging as the surface on the ground is usually mud.

Interviewee 4 (leg impairment): The need for handrails is necessary, they aid in movement along the levels. Need for ramps and proper slope gradient.

- What were the difficulties they faced when they were in a play area?

Interviewee 1 (Partially blind): The navigation through the area was troubling due to the absence of signage. The steps in the play area have different riser heights which are problematic.

Interviewee 2 (fully blind): The seating spaces throughout the play area should be there. Whenever visited a park, others assisted the interviewee to move around if required.

Interviewee 3 (wheel-chair aided): The movement through the play space is troublesome if the surface is covered by lawn or is simply ground. The level difference inside the play area itself is not designed keeping in mind the ramp.

Interviewee 4 (leg impairment): The Movement is difficult if the surfaces are lawn or something similar. The handrails are not provided to move across different levels.

- What is their opinion on the existing play spaces that they have visited?

The common answer to this question was, even if there are play areas provided, the play pieces of equipment are only for normal use. The physically challenged kids can not enjoy those.

- How can the design of the play spaces be improved?

The overview of the answers indicates that, if the basic principles of the Universal Design are followed, they would automatically be comfortable spaces for the kids to use. These spaces were not very often visited by the interviewees because of the experiences they had to go through.

- What do they expect from the play spaces?

The least expectation from these spaces is accessibility. If these spaces are not accessible, the specially-abled kids are missing out on spaces 'meant for everyone' which does not stand correctly.

4. RESULTS AND DISCUSSION

From the buildings studied, case study 1 had a very poor play area design; case study 2 thought about the aspects of safety and security but the accessibility was difficult. Whereas in case study 3 the levels were worked out well and the accessibility was resolved in a few areas.

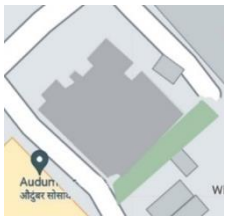
From overlooking all the case studies, one can conclude that Inclusive design should be a mandatory aspect to be covered while designing. The choice of having play equipment that is designed for kids with special needs is entirely upon the client's brief and the expectation of the project, but it can still be of use. The case studies show how differently the play spaces are perceived and worked upon. The one thing that they have in common is the users, yet the outputs are different. Every design has its understanding but the basics of requirements of the space are observed during the analysis.

The Principles of Universal Design:

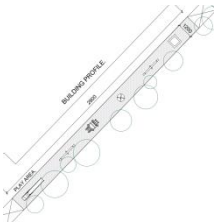
- Equitable Use
- Flexibility in Use
- Simple and Intuitive
- Perceptible Information
- Tolerance for Error
- Low Physical Effort
- Size and Space for Approach and Use.

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Case Study 1



4. Zoning



5. Plan of Playscape



6. Existing Play Space



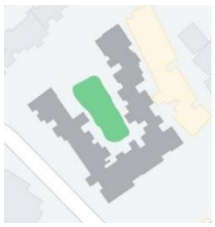
7. Driveway-PlaySpace



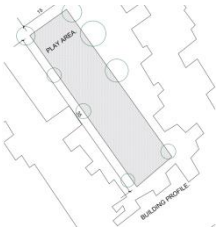
8. Segregation of the Playspace

The Observations were made based on the Universal design principles. Society had a play space that lacked the essence of a playscape. Security wise the location of the play area is apt. as the play area is just behind the buildings. Although there was play equipment, the spatial quality is very. The segregation from the driveway is done by changing the level by 150 mm, the purpose of segregation is achieved but this level difference is not easily accessible by a wheelchair-aided kid. For flooring concrete pavers are used, which would help in the movement; according to guidelines, rubber flooring is preferred.

Case Study 2



9. Zoning



10. Plan of Playspace



11. Existing Play Space



12. Concrete flooring in



13. A part under construction

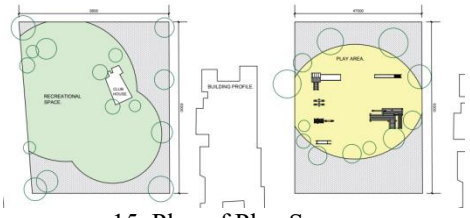
Play Area

The play space is centrally placed, and all of the buildings have equal access points. The space is wide and open, having ample sunlight making it a good place for the play area. There's a dearth of play equipment. The flooring was under construction for certain parts of the play area. The place that was under construction is going to use natural tiles having a rough texture and the rest of the part was cement flooring. The movement of wheelchairs and with the help of crutches becomes difficult if the surface is not flat. As there are no level differences through the play area movement through the same would be easy.

Case Study 3



14. Zoning



15. Plan of Play Space



16. Existing Play Space



17. Ramp Entrance



18. Segregation with the help of curb stone



19. Open Play Space

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The play space is divided into 2 parts, one being with a lawn and clubhouse and the other being a play area with a children's play space and an open play area. The entry to the play area is connected by a ramp. The width of the ramp is 1200 with concrete side supports. This arrangement will aid to move through levels. The preferred side supports are railings because the people using them have a proper grip over them helping to pull themselves ahead. The flooring was noticed in the combination of concrete pavers and rubber flooring.

Universal Design Guidelines: These suggestions are from a guide, Breaking Barriers through play that indicates play equipment and play areas for specially-abled kids. There are live examples like Coles Park (Frazer Town) Bangalore.

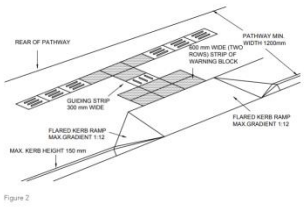


Image A

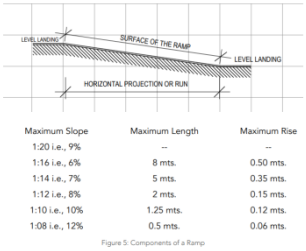


Image B



Image C

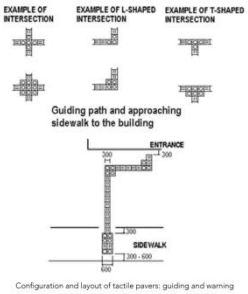


Image D

Basic ramp calculations to resolve accessibility issues, according to the standards. (Breaking Barriers through Play)

5. CONCLUSION

When talking about the play areas in residential societies, that is a place where a kid should feel the safest. These spaces in architectural language stand for safety, joy, and inclusivity. No child should feel left out in the spaces which are meant to be used by everyone. Specially abled kids should feel included in these spaces. The play areas in the garden spaces should be accessible to every individual. These are the spaces where a kid gets to interact with others. In the formative years, this helps in the overall development of a child. The overall development and mental capability have a child expand when they learn about the basic workings of a space. Inclusive design should not have to be treated as an option; it needs to be a mandatory requirement in all building designs.

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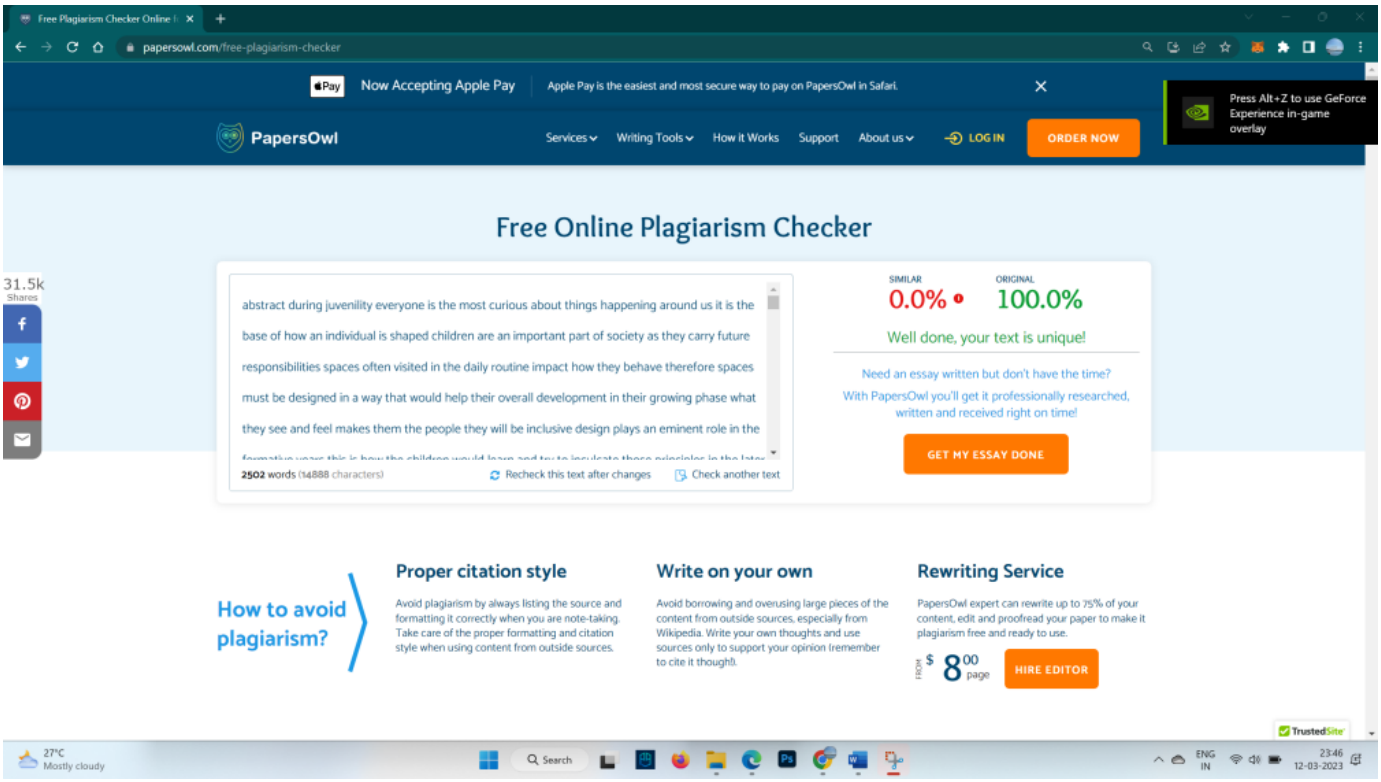
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[7] Images 1–19 are generated by the author.

[8] Image A-D is from the book, Breaking barriers through play.

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Plagiarism Report:



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Perception of Neighbourhood Parks- Post-COVID Scenario

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ABSTRACT: The role of landscapes in our life has long been discussed and explored. This recent pandemic with lockdowns and mobility restrictions changed the human perception of open spaces and landscapes. The role of architecture and design has always played a crucial role in improving the quality of life. Especially after the COVID-19 pandemic, people have stepped out to experience nature and landscapes with a new lens. This paper aims to understand the pandemic's effects on the public perception of local landscapes and how the design should evolve for the future. Has the pandemic significantly affected how people perceive and experience the green spaces around them? This paper would find out the answer to this whilst keeping in mind the possibility of another global pandemic in the unforeseen future. The area of this study is not limited to any particular sites, but broadly focuses on the general notion of the objectives. The conclusions would only be focused on the spatial, design aspect and not the health concerns over the pandemic. The data collection would be carried out with the help of a questionnaire. The goal of the questionnaire is to take a survey about the general perception of the research topic among responders with knowledge of the architectural field. This would help in the generation of a conclusion if/if not the perception of park spaces has changed and what strategies could be implemented to improve the quality of the urban green spaces.

Keywords: *Pandemic Urbanism, Neighbourhood Landscapes, Activity Pattern, Perception of Space, Green Spaces.*

1. INTRODUCTION

The role of green spaces like parks, and neighborhood gardens are integral in the urban fabric of cities today. As per Urban Greening Guidelines, 2014 of Govt. of India a neighbourhood Park is developed at the neighbourhood level for a population of 10,000. The Park is conveniently located within the developed residential areas at walking distance and is planned on an area of 2,000–4,000 sqm. The landscapes promote the quality of life and contribute to any given location's value. They act as buffer spaces and help in the reduction of pollution whilst providing functional spaces for public use. The role of urban landscape spaces in the lifestyle of people is important. They add to the spatial, and socio-economic features of the city. These spaces are often designed as parks, jogging tracks, eco-parks, and gardens. Urban forests reduce noise pollution, and CO2 levels, and provide a habitat for wildlife in addition to acting as temperature buffers by giving shade in the summer and windbreaks in the winter. Urban greening enhances the quality of the city's air, water, and land resources by enhancing water catchment on floodplain surfaces, absorbing air pollutants, and soil stabilization. These parks are often used by people of various age groups as per their needs and activities. These spaces add value to the everyday lives of the people and thus are of importance in urban development. These spaces and their infrastructure must be designed with a sensitive approach-keeping in mind their effects on the environment, people, and climate. Due to their role in the well-being and lifestyle of our lives, these green areas should be designed with proper study and approach. These spaces are an evolving image of the socio-cultural, economic and ecological changes of the area at any given time.

Parks are designed for recreation and can give enormous benefits to the neighbourhood and community by improving.

Several research has been identified, exploring and identifying the needs and preferences as well as the effect of the perception and recreational use of users including parents and children toward park facilities, trails, and its surroundings (Linsey, 1999; Bjerke *et al*., 2006; Arnberger, 2006; Tucker *et al*., 2007) towards achieving a quality park or in this paper it is specified as, Neighbourhood Park. As mentioned, (Lobster, 1995), more research is needed to understand how location, size, and number (Lo, Yiu, and Alan, 2003), design, and management of trails and open spaces affect use patterns, perceptions, and preferences of users.

The COVID-19 pandemic was an eye-opening time for the global population. The COVID-19 crisis has raised questions on central everyday-life aspects that before were rarely considered or indefinitely postponed. Amidst this, people realized the need to go outdoors and experience nature as we were confined to the indoors for a long period. This research paper would

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help understand the general notions of people about their relation to green spaces and their importance in their day-to-day lives. Has the pandemic significantly affected how people perceive and experience the green spaces around them? This paper would find out the answer to this whilst also developing a system that would help designers understand the need for future green spaces, keeping in mind the possibility of another global pandemic in the unforeseen future.

2. LITERATURE REVIEW

Several research studies have been done to understand the role and contributions of park spaces in our day-to-day lives. Studies have proved that these spaces have a direct impact on the psychology of their users.

Assessing the Needs for Quality Neighbourhood Parks (Malek N., Mariapan M., Aziz A., 2011) concludes that this review has managed to reveal important independent and dependent variables which consist of various concepts and can be used to develop quality neighborhood parks criteria. Studies put forth various strategies to improve park conditions after thorough analysis. It mentions various factors contributing to making a green/open space successful. It talks about the very basic need of a neighborhood park and the factors affecting its design and the use pattern of one such park under study. Sustainable Design and Performance of Architecture and Landscape Architecture in Urban Areas (C. Albrecht, U. Poerschke). The study states that there is a high potential for advancing further with possibilities of integrating building and landscape for efficient and comprehensive environmental performance. Therefore, urban spaces designed for sustainability are about accepting adaptation, through the flexibility of systems and programs, without losing sustainable performance, or better, enhancing performance. This paper describes urban green spaces as multifunctional spaces and what role sustainability plays in them. It talks about one such case study which is described in detail the criteria of various rating systems. It talks in depth about SITES and LEED and their positive and negative aspects. Another study The Contributions of Urban Landscape to Urban Life (Polat A., Onder S., Akay A.) focuses on the contribution that the natural and physical environment has in the cities in which we exist. It mentions the importance of urban landscapes in today's urban fabric. The paper describes in detail how urban landscapes have an economic, ecological, and social contribution to our lives.

Many studies have been done to understand the role of the global COVID-19 pandemic in the change in human perception of the basis of life. The pandemic raised many debates and questions about how we perceive our need to be out in nature and how the urban landscape caters to that need. The role of architecture in our lives is objective and has indirect impacts and benefits on the mind and well-being. Learning from COVID-19: the role of architecture in the experience of urban landscapes (Rodriguez M, 2021)—the intent for pursuing this topic of study was the realization, during the COVID-19 pandemic, that professionals involved in city shaping still have a lot to learn concerning the urban landscape. It is manifest that most of the townscapes we inhabit have not yet reached the desirable quality. Their experience shows social inequalities, imbalances between pedestrians and other means of transport, environmental unsustainability, perceptive and spatial conflicts, or identity crisis. This paper puts forth the idea of the interior urban landscape and exterior urban landscape and how these spaces have been must be designed with a more holistic approach. How people now more than ever value the quality of outdoor space and how these spaces should be designed to withstand the course of time.

3. MATERIAL AND METHODOLOGY

The data for this paper has been collected through a phenomenological approach. This paper focuses on human behavior as a response to the social and ecological changes around them. The research method also could be described as qualitative, and subjectivist, as the research aims on concluding based on the behavior and response of the participants. The respondents for the questionnaire, are primarily architectural students and professionals with a background in architecture, landscapes, urban design, and urban planning.

The goal of the questionnaire is to take a survey about the general perception of the research topic among responders with knowledge of the architectural field. This would help in the generation of a conclusion if/if not the perception of park spaces has changed and what strategies could be implemented to improve the quality of the urban green spaces.

The primary method of data collection is a questionnaire that covers questions required to understand the change in perception and data related to the research. The questions were answered completely by a total of 44 participants the data from the same has been discussed and analyzed in the following part.

- The collected data is presented in the form of pie charts and conclusions are derived from it.
- It is studied if there has been any significant shift in perception about green spaces. If yes, what were the categories under which the notion has shifted post-pandemic

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- With the help of the questionnaire data certain guidelines or strategies would be devised to improve the spatial quality and the contribution of these spaces to the urban context.

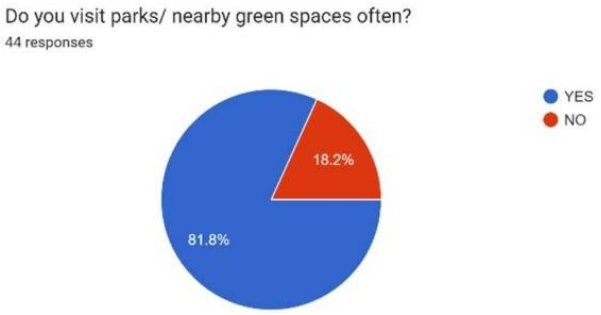


Figure 1

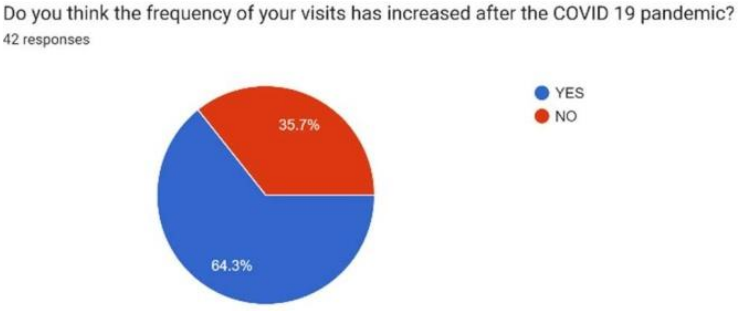


Figure 2

The data collection started with the most fundamental question- if the participants of the research visited the area under study. As seen in Figure 1: 81% of the participants prefer visiting these parks often. This gave the scope to further study the effect of the pandemic and how the frequency of the visit varied pre- and post-pandemic. 64.3% said that their frequency of visits to these park spaces has increased after the pandemic. (Figure 2) This supported the objective and gave the scope to further pursue the study.

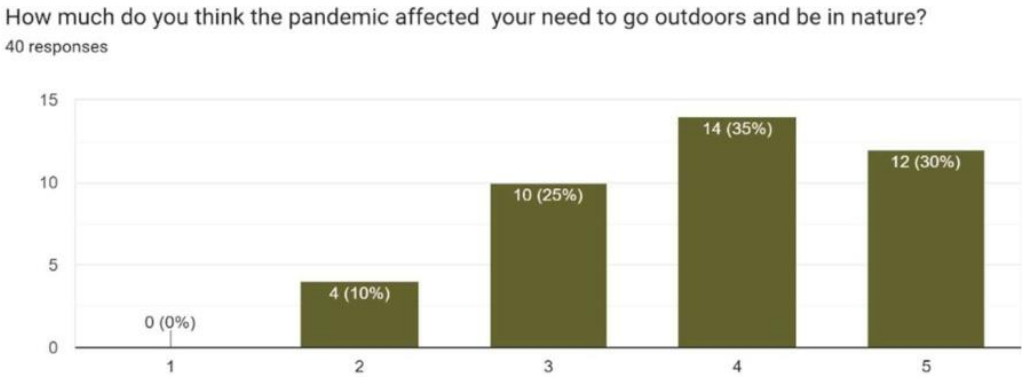


Figure 3

The frequency of visiting these neighbourhood green spaces has been on the rise since after the global pandemic. As seen Figure 3 65% of the respondents felt that the pandemic affected their view and need to be outdoors. This contributes to the objective and assumption that there has been a shift in perception post-COVID.

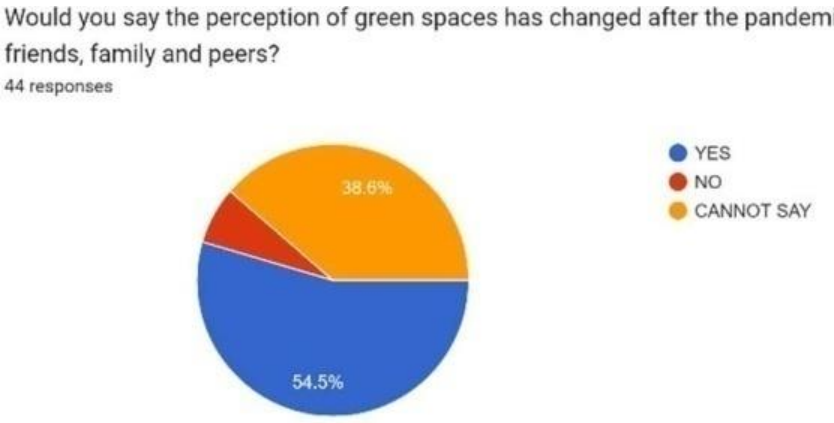


Figure 4

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The above question also considers the families and friends of the respondents. 54.5% of the respondents feel that their acquaintances have a different perspective about visiting neigbourhood green spaces post-COVID.

4. RESULTS AND DISCUSSION

- This research paper aims to understand the shift in the perspective of neighborhood parks, especially post-COVID.
- Furthermore, it would help devise measures to improve these green spaces, and how they could be perceived in case of another pandemic in the future scenario.
- This would act as a guide to making the green spaces pandemic responsive.

Below are the key findings based on the questionnaire circulated among participants:

- The frequency of visits to the neighborhood parks has increased substantially post the global pandemic.
- People perceive the park/green spaces differently as the pandemic forced them to stay indoors. The importance of being out in nature and being able to experience it daily was realized by many.
- These spaces must therefore be designed properly and acknowledged going further. Moreover, the parks must be designed in ways that they would respond to another pandemic situation if/when another such global pandemic occurs.
- The designers, urban planners/designers must therefore create spaces that would lead to better experiences and effects on the populator. They must positively contribute to the health and mental, and physical well-being of the users of these spaces.

5. CONCLUSION

From a planning standpoint, local amenities and employment hubs are more easily accessible and appealing when there is a hierarchy and network of high-quality green spaces integrating residential areas with commercial and other purposes. Green space networks that are well-planned encourage individuals to commute for recreation on foot or by bicycle in a secure manner. In addition, effectively functioning as visual barriers, well-designed urban green spaces act as sound barriers.

As mentioned in the Urban Greening Guidelines by the Ministry of Urban Development of the Government of India-

To sustain/preserve/conserve urban greens in the long run, it is important to integrate them at different levels. Typically, a Master Plan of a city needs to provide green spaces as per the hierarchy. The green spaces may be planned as well incidental. All residential activities must stay within the current or expanded bounds of the urban fringe as outlined in the city's and the region's master/development plan. No permanent structure for residential or other purposes shall be permitted in the agricultural region.

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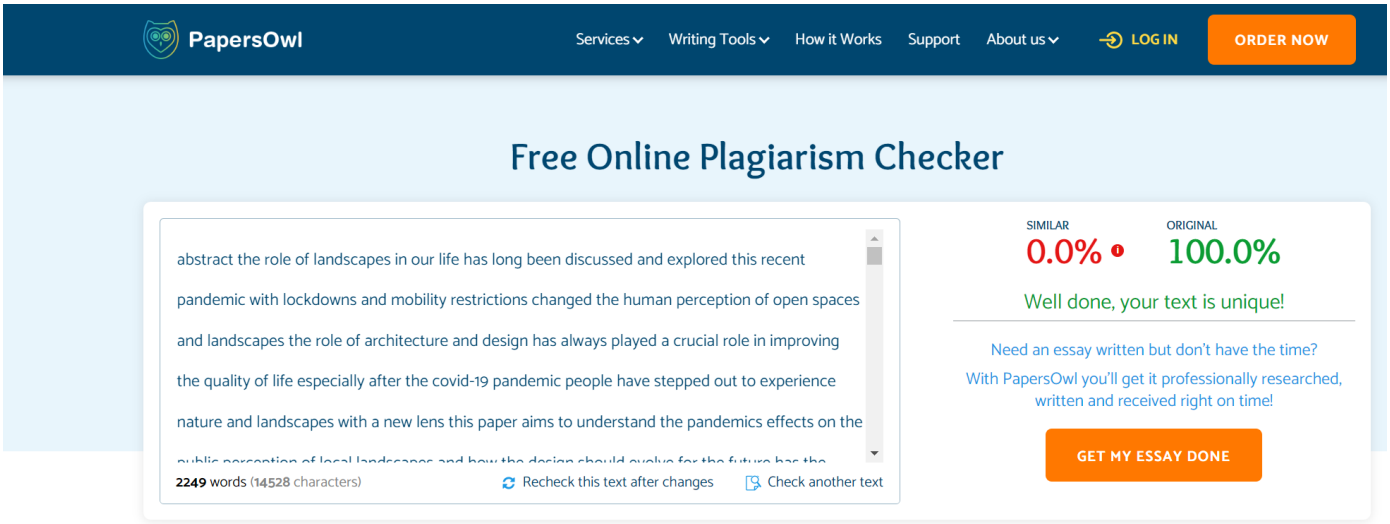
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https://mohua.gov.in/upload/uploadfiles/files/G%20G%202014(2).pdf

[6] All figures in the paper are self-generated made using the responses to the Google forms:
Reference questionnaire (for all graphs and inferences)-
https://docs.google.com/document/d/1fjB_1cz09nb-ecVFjaG_XmsTmyqv-O-CQ_UBJNsPD3w/edit

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Identifying Infrastructural Needs for Employment, Empowerment Centre for Local Community at Khadakwasla, Pune

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ABSTRACT: A local community's economy and ecology in Khadakwasla, Pune is impacted by agriculture. When faced with the loss of farmland due to urbanization, a rural community in Pune, Maharashtra, devised an unconventional solution. Lands are converted and taken over by construction industries. In this solution land owners may get profit but the workers get unemployed causing huge migration and flooding in metropolitan cities. The only solution to this is creating employment in their local area. The farms, markets, and establishments that serve the farms in a certain area are considered in infrastructure. Given its significance on a global scale and particularly in Khadakwasla, Agro tourism is regarded as a means of achieving such sustainable development. It was particularly chosen for this function because of its capacity to house future residential populations from the neighboring Pune City and a huge tourist's attraction. The local population and the relevant authorities will provide the major sources of information. In order to gather secondary data, comparable ongoing projects from adjacent regions will be examined, and an analytical analysis of both primary and secondary data allowed author to determine the project's demand. Infrastructure can also include things like areas for local community social gatherings and festivals, a market, a food court, eateries, and institutions along with the focus on employment generation. In no way does this metamorphosis imply that the locals will leave their homes and move elsewhere. It will draw a lot of tourists, bringing more foot fall to already popular tourist spots like the backwaters of dam, the Sinhagad fort, etc. This project can serve as a development of how an architectural approach may contribute sustainably to the infrastructure and general development of a place rather than simply being a structure made of bricks and cement.

Keywords: *Industrial, Sustainable Development, Employment, Infrastructure.*

1. INTRODUCTION

The industry is presently growing in rural regions, which are also agricultural areas, even though it was first established in the urban centre. A variety of factors contribute to this expansion, including the fact that certain enterprises can more easily acquire rural raw materials and that production prices and employee wages are higher in urban areas than in rural ones. As industrial growth from urban regions spreads to rural areas, it does have a positive effect. Agricultural development in rural regions has shown that it may greatly decrease the process of urbanisation while generating employment and even enhancing the welfare of rural residents. In industrialised nations, economic growth is now driven more by people's demand for "living experiences" and "insight" than by their want to purchase more goods. Due to fundamental changes, primarily the migration of people and economic activity to urban centres, rural societies have invested in the loss of importance of the agricultural industry as the most significant sector in terms of income, resources, and number of customers, as it has been in recent decades. However, this is not universal. The concept of rural development is increasingly complex, going beyond the scope of the market economy and emphasising the importance of preserving and enhancing existing tangible (such as infrastructure, monuments, traditional local foods, etc.) and intangible assets in addition to avoiding over-exploitation of natural resources and landscapes (heritage of culture, traditions, etc.). As here, people from both domestic and international countries come to this kind of tourism to appreciate the nature and greenery, agrotourism aids in maintaining the sustainability of resources. These activities include horseback riding, bullock cart trips, and other modes of transportation, culinary workshops, live experience of cooking food in rural style that do not negatively impact the environment or our capacity to sustain our resources in any manner. Agrotourism boosts the number of agricultural locations around the globe and raises public interest in agriculture can indirectly contribute to a greener, healthier environment. Also, this leads to a rise in the manufacture of organic food products.

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2. LITERATURE REVIEW

India's urbanization concerns are unmatched in size and significance. It is simpler to understand given India's population density and the absence of the requisite social and physical infrastructure to satisfy the demands of the mission. Academics and intellectuals have conducted several more studies regarding industrialization in the countryside in addition to the ones already mentioned. In Bar-research, El's the relationship between employment and income levels as goals of rural industrialization is studied. This study comes to a number of results that are more concerned with the economic policies of a country, such as the fact that a rise in income in a village is strongly tied to an increase in the employment rate of its residents. The expansion of labor in the United States requires both industrialization and intense capital in rural areas (Bar-el, Feb. 1984).

Other studies address the industrialization and urbanization of rural regions with an emphasis on the village and metropolitan areas. In this study, the impacts of farmers staying in rural regions are examined together with the struggle between rural industrialization and urbanization. According to the study, farmers in this circumstance had three possibilities. To begin with, farming still provides employment for farmers. Farmers eventually relocate to the city and then do both.

The guiding concept for economic growth is sustainable development, which also preserves the ability of natural systems to offer the ecological services and natural resources that are essential to the economy and community. A condition of society where living standards and services are employed to try to meet human wants without undermining the dignity and stability of the natural system is the intended outcome.

Sustainable agricultural practices enable the production of crops or livestock without compromising the wellbeing of people or the environment. In addition to protecting persons who work or live on the farm or in the surrounding regions from negative consequences, this also entails protecting the soil, water, ecosystems, and nearby or downstream resources. It entails reclaiming wetlands and converting them into croplands, as well as environmentally friendly farming techniques and smart farming technology that provide a favorable environment for humans to thrive.

Also, it offers a potential to save money for the government as well as time and home productivity, making sustainable transportation spending a "win-win" option (Kothari, March 2021).

3. MATERIALS AND METHODOLOGIES

The author had to study, analyse, and visit numerous similar projects during the data collection process for this infrastructure and development research in order to gather references and gain a better understanding of various types of urban developments. These projects included some of the many well-known ones in Pune and the rest of India, such as Mulshi, Magarpatta, Nanded city, Jamshedpur, Chandigarh, etc. The study of Khadakwasla was examined by the author in terms of land usage, population, issues, and recommendations. Analyze the khadakwasala region's tourist attractions, the government's future plans, and the design of tourist-oriented areas such agricultural workshops and food processing facilities. The author was able to better grasp urbanisation, industrialization, and the revolutionary effects they have on the neighbouring rural regions due to these projects. Primary data was gathered through speaking with the villagers of Khadakwasla as well as by visiting numerous academics, researchers, and other relevant authorities who have examined the ins and outs of the community. The author read a wide range of relevant research papers, news items, infrastructure pieces, and documents for the secondary data, which provided a deeper understanding of the topic.

4. RESULTS AND DISCUSSION

Khadakwasla is situated in Maharashtra's Haveli Tehsil in the Pune district. It is a rural development situated on the outskirts of Pune city. The total geographical area of the village is approximately 800 hectares. It has a reservoir named after the village itself, i.e., the Khadakwasla Dam. It is best renowned for this dam that is built on the river Mutha is one of the primary water resources for the city of Pune. The PMC recently assumed control over this region and as per the Draft Development Plan of Pune Metropolitan Region 2021–2041 government planned the development of such tourists' places in this area in future. According to feasibility factors, plant's location and assessment of its desirability in terms of its distance from raw material sources and market should be less as A local community's economy and ecology in Khadakwasla, Pune is impacted by agriculture. 65% of area is covered by agricultural land which helps in the easy availability of raw material. The only place that plays the role of a tourist attraction is the Dam. People come from different parts of the city and the state to see the Dam and halt along its bank to take a view of its beauty. Monsoon weekends are a

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well-liked period for visitors here to rush off to surrounding locales like Sinhagad Fort or Panshet and Khadakwasla dams to enjoy the weather (Abhiraj Girkar, August 2021).



Figure 1: Showing Existing Land Use Area and Tourist Survey of Khadakwasla (Abhiraj Girkar, August 2021)

Being an Indian village, it goes without saying that residents in Khadakwasla celebrate a variety of cultural and traditional events. As was previously said, the main problem this town lacks are enough room for all of the many functions and activities that take place there. There used to be festivities and functions for the Ganpati festival, but today there is no room for a large gathering in the village due to the unexpected increase in the number of structures in the region. Even if there are rallies, they are held on roadways, which creates traffic-related problems. If events and programmes are properly planned and managed, locals should have the opportunity to demonstrate their ability and potential in the large festivals held during the village's annual festival or otherwise. In order to prevent vegetable merchants from congregating by the side of the road, it is suggested that they have their own town hall, amphitheatre, playground, etc.



Figure 2: Showing Social Issues in Khadakwasla (www.sinhagadtimes.com., 2020)

The Dam is the sole location that serves as a tourist destination. Visitors travel from all around the city and state to see the Dam and stop on its bank to admire its beauty. Weekends during the monsoon are popular times for tourists to leave the city and head to nearby attractions to enjoy the weather, such as Sinhagad Fort or the Panshet and Khadakwasla dams. At the same time, inhabitants of the villages of Nanded, Kirkatwadi, Kolhewadi, and Khadakwasla off Sinhagad Road are having a difficult time because of traffic jams brought on by the inflow. They claim that this is severely affecting their daily lives, particularly the traffic on the busy chowpatty stretch close to the Khadakwasla reservoir. However, a joint committee made up of representatives from the Pune rural police, the public works department (PWD), the forest department, and the Ghera Sinhagad Committee has now decided to close the Khadakwasla chowpatty on weekends and holidays, effective until the end of the rainy season, in order to address the recurrent issue at this location. There are traders that operate stalls where various refreshments are sold. But, selling food is what they do for a living. This sustainable development will provide a space for these vendors in order to address the traffic issue in Khadakwasala.

Locals may promote their handcrafted, organically grown, and other goods to tourists from outside or inside their own country thanks to agrotourism.

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There are five main forms of rural tourism that benefit both tourists and the neighbourhood:

- Nature tourism, which is favoured in particular for its enjoyment value.
- Cultural tourism, which focuses largely on the history, archaeology, and culture of the place.
- ***Ecotourism:*** A form of tourism that promotes natural resources while upholding local culture and the welfare of the community.
- ***Village tourism:*** Tourists can live in villages and participate in a variety of rural activities.
- ***Agro tourism:*** This type of tourism allows guests to experience the host communities' traditional agricultural practises without endangering the surrounding ecosystems.

These tourists cannot remain in Khadakwasla for a day or two to see the hamlet, its beautiful temple, the backwaters, the oldest school in the area, etc. There are no hotels or other accommodations available. This development will have the spaces for accommodation facilities so that visitors can enjoy the and experience the activities for a day or two.

This provides an additional stream of revenue production, one from farming and the other from utilising that agricultural area as an agrotourism destination for the accommodation of tourists and their amusement.

Tourism experiences and food-related attractions have received more attention in recent years. It is not surprising that promoting the tourism sector involves a significant amount of food. This is related, in part, to the tight relationship between various locations and particular food kinds. Tourism has made use of this connection between geography and cuisine in a variety of ways. Food may be used to show visitors around cities, states, or whole nations. The idea of the cooking workshop is based on this one.

The workshops will be sessions that participants in the culinary art class may use to gain new culinary skills and information for upcoming culinary excursions. Tourism destinations may include food. A culinary workshop will aid in establishing links between the growth of a destination's economy and regional and national identity. By drawing tourists to the area and creating a new market for tourism services, a properly planned marketing and development programme will aid in boosting local business (Lvov, 2014).

This will inform the populace of the significance of such sustainable development. Because visitors will become used to the agrotourism atmosphere and sense the benefits of nature. So, people will embrace these methods to make their home countries healthier and more pleasant when they return there.

5. CONCLUSION

A significant portion of India's economy has been based on agriculture. The nation's farmers have suffered greatly as a result of the agricultural economy of the country declining in recent years as a result of increased industrialization and the introduction of manufactured goods to the market. In the midst of these difficulties, agrotourism is one of the industry's saviours since it promotes the preservation of rural India's agricultural areas and promotes them as fantastic travel destinations. Moreover, farming enables visitors to purchase fruits, vegetables, and other goods straight from growers, enhancing their earnings and providing them with social sustainability. This idea helps preserve the local habitat in addition to educating visitors about environmental preservation. By providing agricultural land and the surrounding woods the credit they deserve, these agrotourism hubs help to stop the deterioration of these areas. These attractions are protected from demolition for industrial expansion or urban development since they give the people work while luring tourists. Such development typically includes separate housing in the houses of the farmers; activities connected to still-preserved family traditions and customs; and it allows visitors to have a peaceful stay away from noise, enjoying the company of the locals and the tranquilly of nature.

As a result, the agricultural ecosystem produces both physical and intangible commodities, particularly those that are connected to cultural values, education, food, the environment, and scenery. It will be advantageous to and alter the whole Khadakwasla community and open doors to a prosperous future for the hamlet. Due to the poor quality of the local schools and lifestyle, the residents of Khadakwasla are moving to the city's metropolitan neighbourhoods. The people will be able to utilise these amenities while still living in the village, which will completely alter the situation. It will progressively extend an invitation to more investors so they may join in on the sustainable growth of Khadakwasla.

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Nilyaashram: Home to Education

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ABSTRACT: The research paper intends to justify the importance and need of spaces that can inculcate the traditional learning aspect. Learning environment is an essential aspect for development of mankind. Children nurture in this environment, where they learn to grow together. Such learning environment becomes a space where a child develops an interest or habit to acquire skills. Shaping a child to grow up and be a responsible human is an outcome of these spaces. As mentioned in ancient scriptures, gurukul system of learning focused more on inculcating values, culture and discipline in students. The simplicity of the space played a major role in shaping the mind of a child. 'Gurus', as they used to address them, weren't only teachers or educators, but were the path to a healthy and prosperous lifestyle. In this forward moving era of competition, education is either a business opportunity or a way to build reputation in the society. Initial aim of education being a sacred process to inherit the pre-study of various subjects and techniques to develop certain skills has disappeared. With introduction of grade oriented approaches, creativity of students has vanished. The schools right now are just digitized classrooms between a closely packed infrastructure of a city. Hence, creating environs where young minds can be exposed to multiple opportunities and various life skills through architectural spaces is the need of the hour.

Keywords: *Gurukul, skill-Development, Guru-Shishya Tradition, Alternative Education System, Learning Spaces.*

1. INTRODUCTION

Education is right of each and every individual. Adequate education is the key towards prosperous nation. Education creates opportunities in various fields and also results in over all economic growth. Education is the trunk but how to determine whether the roots are strong or not. Modifications in an international or world wide accepted centralized education system on degree level can be accepted easily and should go the same for primary stages of learning. The modern system of education revolves around technological involvement in the educational practices. Modern learning techniques or school curriculum is more oriented towards the theoretical learning. In recent years, schools are designed with provisions of latest technologies like the screenings, virtual reality, advance classrooms etc. This system enhances the memory of the students. As a result, hidden talents are never brought to exposure. The physical fitness of students are at stake because physical fitness is more than proposing a ground within school premises. Most of students lack the practical approach of life. During times of emergency, they fall short of presence of mind or taking the leadership required at that moment. This interstice formed due to lack of practical education leads to degradation of inner talent or skills, a child possesses. Taking in consideration of a school, traditional schools were designed with open spaces as a major gathering factor. Also learning discipline, respect and an approach towards developing a skillful personality as an individual was taught in these schools. Hence, school should be a learning environment rather than being a centre of theoretical studies.

1.1 About Vedic System of Learning

Vedic education system of India followed a systematic distribution of daily chorus among the students. The gurus classified students among four groups according to the interest, capabilities and excellence about particular field of learning. The four categories were Brahmins, Kshatriyas, Vaishyas and Shudras. Unlike today, these groups were assigned with set of task they needed to fulfill as a member of the society. The way a human body is divided into four parts where the brain maintains the functioning and decision making process, the arms are used for protections, the stomach diminishes the hunger and provides energy for functioning and the lower limbs carry the weight of the body and helps to transport oneself or provide service, these categories were assigned tasks on familiar concepts where,

- **The Brahmins**: were students who were good with chanting mantras, were neutral when it came to give any advice and highly inclined towards adopting a peaceful lifestyle filled of knowledge.

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- **The Kshatriyas**: were students skilled with weapons and defence. They were physically active students and were focused more on acquiring skill sets which could be used for defence and safety.
- **The Vaishyas**: were group of students who were business minded. They focused on learning strategies to increase trades and economy of the kingdom or sectors they lived in.
- **The Shudras**: were the service class which included dancer, musicians and other artisans like potter, masons, laborers, etc.

This system maintained a balanced functioning of various tasks within the school. This system previously was designed for the students to develop their interests and contribute towards having a well administered society. The growth of Indian civilization and culture was significantly aided by gurukuls. Brahmin householders frequently ran gurukuls both inside and outside of villages or cities. Scholars like Grihastha and occasionally even Vanprasthi would draw students from all over. They teach them and raise them in their family for many years.

Constituents of a Gurukul: The analogy of the human body fit perfectly on a Gurukul. Acharya was the head of a gurukul who ran gurukul. The education system at Gurukul used a variety of techniques. Some of these techniques, like learning through memorising, were quite popular and frequently practicsed. However, the Gurukul educational system went much beyond the conventional teaching and learning approaches. It worked with techniques like natural learning, experiential learning, and practical learning, among others. A student's options for learning were greatly limited in the current methods. The process of learning were not restricted to the rooms in the Vedic schooling system. A student's opportunities weren't limited to classroom's walls in a gurukul, though. Instead, they used the surrounding area as a laboratory. They picked up lessons from the Acharya's conduct. They adjusted to whatever environment that is around them.

Types of Institutions: Various types of institutions that were used for knowledge sharing and learning in ancient India:

- Gurukul – where students stayed in the ashram and studied with the Guru.
- Sabha or Council – where experts would discuss & share the knowledge attained by them.
- Tapasthali – These were big gatherings and discourses held here yielded knowledge. Naimisharanya was one such place.
- Shashtrarth: Not an institution but a tradition that helped in the refining of knowledge. India has a tradition of Shashtrarth of at least 18000 years.

The idea of Gurudakshina: Gurudakshina is a combination of two words: Guru known as the teacher, and Dakshnina meaning offerings. The idea of offerening the teacher in returns of the knowledge and time invested to transform a child to a well grown up adult is known as Gurudakshina. The process is conducted out of respect and love for the guru. The disciples happily gift anything asked by their teacher. The ideal example of this ceremony is Eklavya offering his thumb at feet of his guru Dronacharya. This episode of student devoting himself to the orders of his teacher is mentioned in the epic of Mahabharata. (vi)

1.2 Evolution of Learning Environments in India

India is the country possessing the most ancient educational base with exceptional teaching techniques and written scriptures. The way students today, have been aiming to fly to universities outside India to pursue education, this country had been that university in the pre British era where students from all over the world came to the university complexes and temple universities to acquire education. The toddlers were taught how to trace letters with the help of grains mostly rice (iv). This process of learning is known as Vidyarambha or Aksharabhyas which in sanskrit means the start of education or the practice or writing alphabets respectively. This process of teaching was the start of the sacred journey since the teaching and gaining Gyaan or knowledge was labeled as a moral duty of an individual in India.

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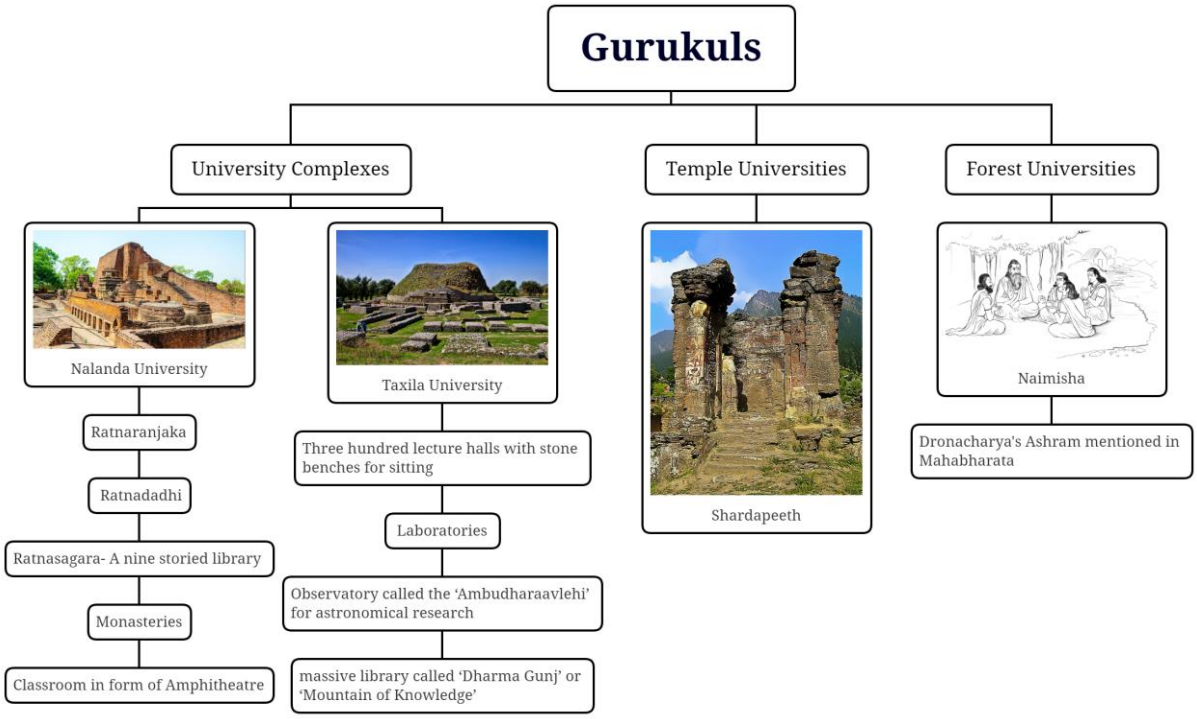


Figure 1: Categorisation of Gurukuls According to the Scale and Typology

(*Source:* Author)

1.3 Decline of Vedic System of Learning: Invasion of Mughal Rulers

The destruction of Nalanda by Bakhtiyar Khilji in 1193 proved to be a fatal incident for the Vedic education system of India. Besides Nalanda, he destroyed universities like Vikramshila and Odantapuri as well. The monasteries were ruined and the students and monks were brutally burnt alive to diminish the wisdom wealth of the country. The library that held millions of books with ancestral knowledge of various subjects was burnt. The library took three consecutive months to completely turn into ashes. This was considered as the most fatal incident in the history of India which costed manuscripts that held solutions to various problems.

1.4 Invasion of British Rulers

Amongst all other invasions, the British invasion proved as most destructive one for many streams of the country. Education and architectural builts were demolished on prior most level with an aim to eradicate the roots of wisdom completely. In 1858, the Indian Education Act was established. Lord Macaulay wrote the document. But before that, he had conducted research on the educational system in this country (India), and even before that, several British had provided reports on the Indian educational system. G.W. Luther was a British officer, while Thomas Munro was the other. At various times, both conducted surveys in various locations. 97 percent of people in North India, according to Luther, and 100 percent, according to Munro, who conducted research in South India. According to Macaulay, India's "native and cultural education system" must be entirely destroyed and replaced by the "English education system" before the body politic of this nation can become Hindustani. He believed in the fact that, when an individual will graduate from this country's British universities, they would be born without a sense of purpose and will work for us (Britishers). Indian education system is one of the oldest education stream in the world. This base of knowledge was considered as a strength of the country. The rate of literacy pre British period was recorded to be almost 100%. In order to establish a longer existence, gurukuls were demolished, original scriptures were confiscated and modified as per the convenience. Also may of the sages and rishis preaching in the oldest universities of India were tortured and killed to erase the root knowledge of the country. Post independence, there were few things which fascinated Indians and continued as a part of their lifestyle. Industries and Modern school were among those. These two proved to be a trend setting factor after independence. It became fashionable to send a child to the convent school and the rest became add on to the history.

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Gurukuls are purely based on the purpose of serving. Serving knowledge, life lesson or a right direction to whoever needed. Gurukuls are an individual entity with strong principles and vision of establishing literacy, self sustainability, independence and humanity. Unlike modern schools, the gurukuls did not have an affiliation to renowned universities. This gap somehow becomes a barrier between quality education and a certified education.

1.5 Current System

The schools are running on a rigid system where the course is divided into primary, secondary and higher secondary education system. Classes grading from one to four are categorized under primary section, fifth to eighth under secondary and ninth to twelfth under higher secondary, forming the 10+2 system. This system has been adopted to balance out the literacy rate in India.

This 10+2+3 pattern is the term given to the framework of the contemporary Indian educational system, which is based on multiple learning levels. It is still in practice in the majority of Indian states today and originates from a National Policy from 1966. In this educational system, pupils are required to start school at age six and complete their secondary school education after 10 years of basic education classes. Following this, students can complete two years of senior secondary school in a stream of their choice from the sciences, humanities, business, or vocational education, which makes them eligible for admission to three more years of liberal undergraduate study at universities. Subjects getting highly concentrated on in the current education system are generally restricted to English, Maths, Science, Hindi, state language and human values.

1.6 Understanding the New Education Policy

The old National Policy on Education, 1986, has been replaced with the new policy. In both rural and urban India, the policy provides a comprehensive framework for education from early childhood through higher education as well as for vocational training. This National Education Policy (NEP 2020) envisions an education system rooted in Indian ethos that directly contributes to the long-term transformation of India, also recognized as Bharat, into an equitable and vibrant society of knowledge by providing high-quality education to everyone. Thereby aiming fir a vision to transform India into a global knowledge powerhouse. The Policy also encourages the institutions' curriculum and methodology in establishing a deep respect for Fundamental Duties and Constitutional values within students and creating a sense of belonging to one's country, hence, deliberately understanding one's tasks and obligations in a changing world. The vision of the Policy is to instill among the learners a deep-rooted pride in being Indian, not only in thought, but also in spirit, intellect, and deeds, as well as to develop knowledge, skills, values, and dispositions that support responsible commitment to human rights, sustainable development and living, and global well-being, thereby reflecting a truly global citizen.

Teaching Principles Targeted by the NEP

1. *5+3+3+4 Structure:* Primary (3 yrs) + Class 1 & 2 will come under Foundational Level.
   Class 3 to Class 5 will come under Preparatory Level
   Class 6 to Class 8 will come under Middle Level
   Class 9 to Class 12 will come under Secondary Level
2. *3 language policy:* Up to Class 5th, the medium of learning will be mother tongue and three other languages to be taught. The three languages will be decided by the state government. English will no longer be given more importance instead of promoting our native languages.
3. *Students have to learn Coding from Class 6th:* As we all are living in a digital era it was the need of time to learn coding and make android applications.
4. *No separation between Arts and Science, academic and co-curricular activities:* It gives the liberty to the students to select their own curriculum and field of interests. Students can opt for literature as well as biology instead of having a fixed set of subjects.
5. *Divyang friendly Education:* The children with disabilities will also study along with other children.
6. The medium of education will be much more digitized and will include software and gadgets.
7. The standards of learning in public and private schools will be common.

This system is a reformation brought into the routines of students which can enhance the experience of learning and make it more meaningful and interesting. Schools no longer will be a centre where strict schedules of syllabus and curriculum would be followed but it will turn into a learning centre which can adapt with the needs of students.

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2. LITERATURE REVIEW

Gurukul was known as the abode of the teacher where students spent their major years living with their life teacher or guru. Unlike today, they had residential spaces designed for them with a vision to create a sense of equality within the students. Hierarchy was maintained in terms of knowledge the teachers pursued and not on bias of post they acquired. Same chorus were continued by teachers and students which included cooking, cleaning, washing etc. This system pushed the shishyas to accept their roles and responsibilities in the household as well as society, resulting in shaping an ideal mindset of the future coming generations. Researchers now have discovered that the Indian Vedic systems that existed prior to invasions and change are quite good in helping pupils learn about the ways of the world and behave in an autonomous, self-assured, and self-sufficient manner. Research into the operation of the educational systems from the pre- and post-Vedic eras has demonstrated their enormous potential when combined with modern technologies. According to research, the Gurukul system of education in the later Vedic era viewed education as a means of achieving spiritual salvation. Students learned literature as well as fundamental information from the Vedas. Phonetics, grammar, astronomy, logic, yoga, ayurvedic medicine, philosophy, and other topics were among the prevalent ones. This prepared the pupils to carry out their social, economic, and religious responsibilities. The teaching approach centred on listening, reflecting, meditating, and introspecting. Further investigation has revealed that the Gurukul system provided free and universal education without the involvement of the state (i). Guru was not only a teacher but Guru is a position given to an individual is capable of teaching life lessons and light up a path for his pupils. Initially, guru shishya relationship was more like a parenting inter phase in absence of parents. This was a result of students and teachers being in same premises. The students always had an elderly hand with them. Gurukul being located in the ouskirts of main town or city, created an internally family within the gurukul premises where every individual was taught to sustain themselves in any situation thrown in front of them. Also, with a vision of their gurus always being by their side helped a child to mature and transform to a real man when he stepped out after the educational phase. The modern school or western system of education has changed this bond into a teacher being the provider and students being consumer. This degradation has adversely affected in inculcating qualities like values, discipline, humanity, brotherhood, etc (v). The Guru, who was in charge of the curriculum, delivery strategies, and evaluations, had a crucial role in the Gurukul system. Instead of following a set curriculum, instruction was tailored to the requirements of each student. The Guru had a significant part in deciding this by structuring the learning according to their evaluations of the students. Throughout their learning time, ethics and morals were a vital factor in all that was done. The fact that the Guru served as a role model for the pupils, however, was the most significant. The opportunity to study under the Guru made pupils glad to be students. Spaces where students can interact with their teachers becomes important. Having the traditional style of schooling demands for complex of varied spaces because of its student oriented curriculum. Hindu society frames India's original ancient native educational system from a wholistic perspective. It dismisses some of the stereotypes and myths that many left-leaning liberals use to criticize Hinduism, some of which include the following: Women may choose to pursue higher education, get married later, or stay single in order to further their education. This option was always available to them. Female education was firmly in style. Women received education in the Vedas, philosophy, literature, math, science, and even the use of weapons. Because shudras and other castes were underrepresented in most Indian classes, according to a British survey, casteism never prevented those from the so-called lower castes from receiving an education. The Indian educational system was far more structured, sophisticated, and advanced, which led to a high demand for Indian teachers in places like China and the Middle East (iv). Indian educational philosophy is a result of historical shifts of cultures and the influx of diversified ideas from other communities, both within and outside the Indian setting. India, like all other nations, has been influenced by many educational philosophies. The Vedic period of Indian education placed a premium on a person's entire prosperity and spiritual well-being, while also recognizing the intellectual and metaphysical aspects of society's divinity. Learning was viewed as a path to the ultimate aim in life at that time which was gaining emancipation, or salvation, which is frequently addressed in almost every religious lecture. Alternative schools of view, on the other hand, highlighted that education should be associated with the development of moral character rather than being considered only as a way of gaining scripture-based intellectual talents.

3. MATERIAL AND METHODOLOGY

Multiple reviews shared on the educational system of India by reputed scholars are referred for the argument. Books promoting the truth based aspect of the Vedic education system are taken as a base source of statements made in the paper. Surveys of potential audience including the parents group, teachers and students of various age groups were primary source of data to raise the debate and come up to a practical result. Also studying the functioning of institutes working on the

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principles of Vedic system as a similar module to derive on a factual proposal to implement the traditional educational system back into the race.

4. RESULTS AND DISCUSSION

A learning environment must promote and enhance the hold on languages and means of communication of pupils. Also developing employ-ability and entrepreneurial skill-sets among the students. Students must be taught the importance of their cultural heritage and understanding their role in nation building. As mentioned in ancient scriptures, gurukul system of learning focused more on inculcating values, culture and discipline in students. They were taught practical approach of life. Subjects like medicine, yoga, geometry, mud sports, astronomy, etc. were practised. The simplicity of the space played a major role in shaping the mind of a child. The concept of learning in India was more inclined towards teaching a child to adopt the idea of self sustainability. Education right now is changed to source of income rather than being a medium to imbibe value and knowledge in a child. As a result, it has changed from being a tool to empower youth around the world to a means for making money. It is also very alarming that the value of both physical and mental health is not stressed enough. The process of learning is becoming burdensome and requires pupils to stay still for extended periods of time. This has caused stress, anxiety, and depression episodes to rise. Nurturing of a child in an environment where moral values like truthfulness, non violence, commitment etc are inculcated is the pressing priority. The need for intervention becomes a must which can match and give justice to a behavioral pattern of a child. Children are free spirited and active in varied ways. Such environs must give them all possible liberty to select the space of creativity they want to explore in. Hence, introducing flexible spaces and practical learning- teaching pattern becomes important.

5. CONCLUSION

Modern schools lack the flexibility factor which the gurukuls possessed. The liberty to select how to teach, when to teach and where to teach are the parameters to be included as a part of educational typology. Gurukuls were minimalist design which was user centric. The skills taught to students at Gurukul enables an individual to be independent as they are taught how to produce the items, comprehend their significance, and prudently employ them. This educational system instil work ethic, integrity, and excellence in its students. The pupils' character development believed to be strong enough to weigh their decisions and respective consequences before arriving to any sort of statement or action. Bought up in a secured environment results in students not getting influenced by any misconception or brain drains. The concept of gurukul education stands on the four pillars of patience, perseverance, perfection, and pleasure, give the pupils the real purpose of education.

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Educational Environment for Autistic Children

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ABSTRACT: Architecture has always had a huge impact on our daily lives, from the way we live and behave around a structure to the way we interact with each other. We believe that architecture has this power and responsibility. We also commit to designing for everyone. What we experienced and learned is designing for individual humans that are capable, able to walk, expressive humans, or for only physically disabled like designing for ramps as universal accessibility or handicapped washrooms. But what can we do for those who cannot control their emotions or are disordered? This is the most ignored part of our society while designing, as it is many times ignored or not taken into consideration while designing.

Autism spectrum disorder (ASD) refers to a neurodevelopmental disorder that is characterized by difficulties with social communication and social interaction, and children with autism need to be in control of their surroundings and require basic design guidelines while designing for them, Evidence shows that even after so much of global developments there are no appropriate laws or guidelines while designing educational environments where children learn to connect and gain abilities. Based on certain examples, it can be observed that few educational institutes are designed for autistic individuals, keeping in mind their needs along with the primary requirement of the structure. Based on these case studies, a few key factors can be identified; which can provide basic guidelines for the construction of buildings for such individuals. These key factors include built to open space ratio, circulation within a building, sense of enclosure/volume within a building, acoustics, spatial sequencing, escape spaces, compartmentalization, transition zones, sensory Zoning, and safety.

Keywords: *Autism, Design for Everyone, Design Guidelines, Educational Environments, Circulation, Compartmentalization, Sensory Zoning.*

1. INTRODUCTION

Autism spectrum disorder (ASD) refers to a neurodevelopmental disorder that is characterized by difficulties with social communication and social interaction and restricted and repetitive patterns in behaviours, interests, and activities. Globally, the prevalence of individuals diagnosed with autism spectrum condition has risen dramatically i.e. 1 in 64. Evidence shows that kids on the autism spectrum are more sensitive to environmental cues, which may impair their academic performance and attentiveness in the classroom. Design guidelines for students with autism spectrum disorder are also lacking in educational environments meant for children around us. It is the space where children learn to connect and gain abilities in educational settings. The ultimate purpose of altering an autistic child's surroundings is to allow them to learn and be self-motivated to attain goals. While developing settings for children on the autism spectrum, it is vital to have knowledge and awareness of how they see the environment, as well as the people and items within it. Bogdashina (2003) and Hinder (2004)

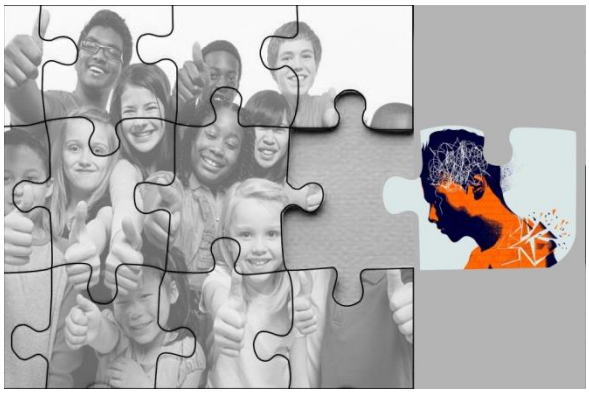


Figure 1: Autistic Kids Not Being a Part of the Rest of the Community

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both do a great job of articulating sensory differences in perception, processing, and response. It's also vital to understand that not every child is affected in the same way or to the same extent. While many children can learn in a standard classroom setting, others require a more personalized and tailored environment. As the architecture of classrooms, units, and schools attract increasing attention, local authorities and their architects are challenged to provide suitable learning environments for these learners.

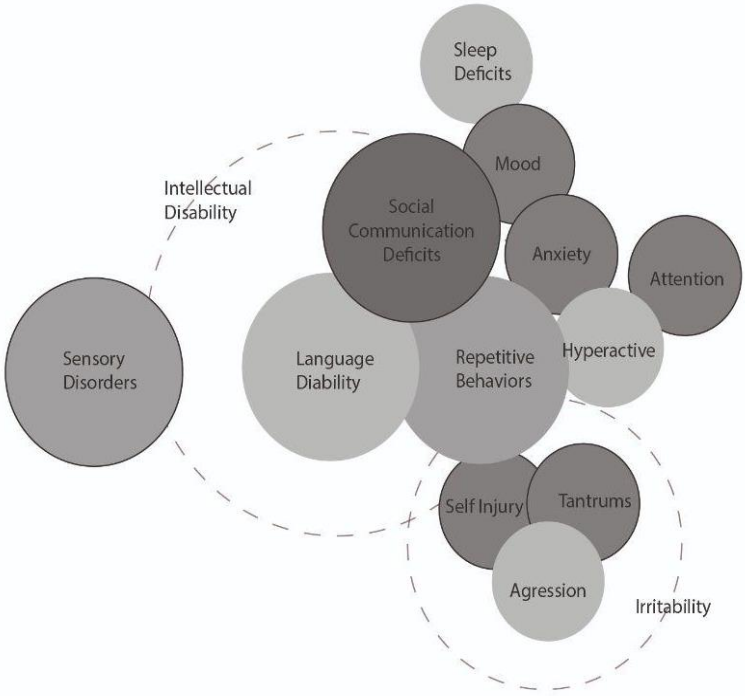


Figure 2: Core Features of Autism and Related Symptoms (data from Autism Speaks)



Figure 3: Difficulty in Concentration



Figure 4: Need Everything Very Organized



Figure 5: Structured Teaching and Tasks Completion

Structured Teaching has been used in the classroom to assist students to learn and complete tasks on their own in a safe environment. Training children in real-life settings is the most effective technique to enhance their social skills. Children have fewer opportunities to experience variety in their families, but they have more opportunities to meet people and learn about their distinct characteristics outside of their homes. They observe what others do, play, and even urge other children to engage in and learn from their activities. This study has intended to get a thorough knowledge of the stages of autism in children, as well as the link and effect of the built environment on their capacity to learn social skills. Understanding both the different levels of Autistic children's conditions and the environmental design parameters allowed obtaining some prevalent design guidelines for building so that even people with disorders can be familiar with the environment, leading to a multi-sensory and holistic approach to educational spaces for everyone through architecture. To promote their development, children will notice and pay closer attention to their environment.

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2. LITERATURE REVIEW

Sepideh Sharif Khajehpasha *et al.* (2017) under the research study 'School Architecture for Autism Children' studied even though surveys in many Asian countries reveal that the majority of care facilities for children with autism are developed by changing the use of spaces such as residences or by putting some temporary boundaries in place, studies show that the environment has an impact on how these children are treated. As a result, the goal of this research is to focus specifically on the autistic child while also researching the conceptual design of the nation's finest educational environments. In diverse contexts, such as rehabilitation facilities for autistic children dependent on the Welfare Organization, the study comprised questionnaires, interviews, and close and direct interaction with autistic children, as well as interviews with their parents and related responsible personnel. A questionnaire was also utilized to measure the child's behavior, movements, and interactions with others. When the study audience (the Autistic kid) has been identified, it is sought to give relevant spatial and physical ideas for developing educational environments and achieving health, particularly creative thinking.

Rachna Khare and Abir Mullick (2008) in their study 'Universally Beneficial Educational Space Design for Children with Autism; the Research Progression' employ a research approach based on environmental and behavior studies to evaluate the influence of specific environmental problems on children for increased access and applicability. There are several stages to this; in the initial stages, children's learning habits in academic settings assisted in the creation of the "enabling environment" for autism, also known as "environmental design parameters." These eighteen design variables are then evaluated to provide an evidence-based body of knowledge for developing autism-friendly and comprehensive educational services. Even though the whole study includes numerous design elements such as observation, survey, and evaluation, the major purpose of this work is to provide the research strategy utilized to identify and evaluate enabling components of the educational environment for children with autism.

Rachna Khare and Abir Mullick (2009) studied the research titled 'Incorporating the behavioral dimension in designing inclusive learning environment for Autism' studied that environmental and behavioral research has been shown to have a substantial influence on architectural practice. The substantial body of research on designing for special groups, accessibility standards, and design specifications focuses on the users' functional demands, as well as the necessity to explore the behavioral parts of the design for people with cognitive impairments. The stages provide a corpus of evidence-based information that architects and designers may employ to develop autism-friendly, integrated educational facilities. The purpose of this study is to characterize the enabling factors of the educational environment for autistic children and to examine how they affect functional performance.

Magda Mostafa (2008) in her research study 'An architecture for autism: concepts of design intervention for the autistic use' studied that even though autism is quite common, no architectural design concepts specific to the disease have been developed for the needs of autistic people. The primary goal of this research is to correct this condition. The researchers created a preliminary framework of architectural design principles for autism through a two-phase examination. Certain behavioral indicators, such as attention span, response time, and behavioral disposition, were to be monitored for the control and experimental group to quantify each child's improvement before and after an intervention. The first outcome came out to be the identification of the most influential architectural design components on autistic people's behavior the second set of results is a synopsis of the first; to develop autism techniques in three areas. The first technique connects architectural components to sensory issues associated with autism to produce design recommendations. In the second section, the hypothetical principles are stated. These suggestions are made as prospective treatments that should be examined further. The intervention research provided a set of specific design recommendations. It will lay the groundwork for the continuous development of autistic-specific design standards, taking us one step closer to more autistic-friendly environments.

Iain Scott (2009) in his research 'Designing learning spaces for children on the autism spectrum' studied this paper describes the author's study of how architects explore and respond to diverse problems. The study looks at the existing corpus of knowledge to discover whether there are any relevant criteria for designing for autism. This includes official legislative guidelines, books, research papers, journal articles, feasibility studies, web-based information, and anecdotal evidence all in one location. To give full knowledge of the design and its particular response to autism, the architects contributed drawings, pictures, briefing notes, and design analysis.

Dr. Beth Saggers and Dr. Jill Ashburner (2019) under the research study 'Creating Learning Spaces that Promote Wellbeing, Participation, and Engagement: Implications for Students on the Autism Spectrum' studied the responses of students to their environments have a substantial influence on their developmental well-being. Learning settings that promote participation, engagement, and well-being benefit all students. Evidence suggests that autistic children are sensitive to environmental signals,

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which may hinder their concentration and academic performance in the classroom. As a result, considering the design elements of learning spaces is crucial not only for effective teaching and learning but also for promoting the health of this specific group of students.

3. RESEARCH METHODS

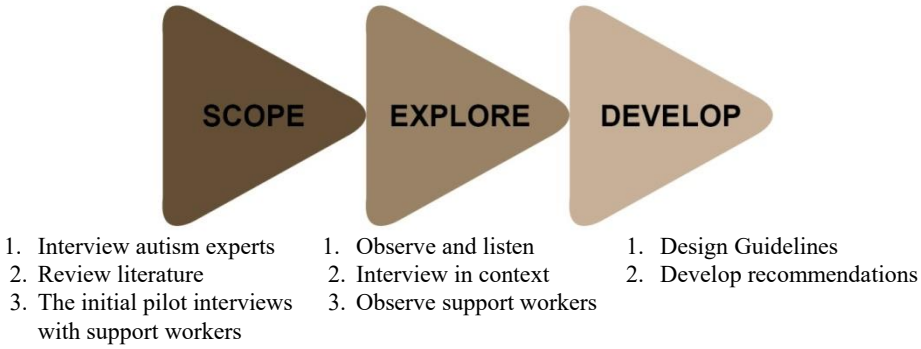


Figure 6: Structure of Research

The primary purpose of the project is to identify environmental characteristics that influence the performance of children with autism, analyse their impact on learning, and then provide a guideline for architects and designers to utilize when constructing autism-friendly educational environments. The field inquiry technique is discreet and considered the greatest way for the population to evaluate the educational needs of children with autism in naturalistic environments. It was a cross-sectional descriptive study of teachers for autistic children, along with interviews with the organization's founders. The purpose was to assess the impact of several architectural characteristics or spatial qualities such as acoustical, visual, textural, olfactory, and spatial function sequencing. These findings imply that architectural characteristics influence autistic behaviour.

3.1 Site Selection

Among the projects selected 2 were from abroad and 4 from India that gave a comparative analysis of the kind of spaces required along with their space syntax and use, institutes ADVANCE School for developing skills of special needs children, Egypt by Magda Mostafa, Eden Institute, New Jersey by KSS Architects, Sankalp School, Chennai by Benny Kuriakose & associates were secondary studies and, Prasanna Autism Centre and Non-profit Organization Management in Pune, Maharashtra. SaaD, Pune, Maharashtra. Umed Parivar in Pune, Maharashtra was the primary study. These programs were developed to help parents deal with the problem emotionally and cognitively, allowing them to be productive and functionally acceptable members of society. These sites were selected because they had autistic kids admitted to them. They qualified the criteria of the research.

Participant observations, informal surveys, discussions with teachers and caregivers, and images were utilized to conduct a systematic manner of qualitative research in which respondents conveyed their most profound thoughts. The discussion was on how autistic individuals reacted to environmental cues. The opinions varied from physical comfort at home to educational settings or day assisted living facilities, as well as the satisfaction of being part of a peer-interacting community. According to the preceding study, an Autistic child's environment is impacted by his or her physical, psychological, perceptual, and social demands.

3.2 Data Collection

The interviews were conducted in an unstructured manner. Unstructured interviews, also known as "discovery interviews," are more analogous to "directed conservation" than structured interviews. It seems as if you're having a spontaneous discussion. The interviewer tailors his or her questions based on the candidate's knowledge. The interview was unstructured but there was a set of predefined questions. These questions were asked and led to an open-ended discussion mainly answering the questions to understand the depth. The questions were framed to extract the most possible from the information provided in the interviews.

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The parameters that were used for the analysis of this data were:

Age and the level of sensitivity towards the surroundings of each of the three students:

- Levels of dependency
- Preferred mode of communication
- Triggers
- Sensitivity to light/sunlight
- Preference toward indoor/outdoor spaces

The responses that were collected were

After the interviews the responses that were collected and understood were:

- Children with autism need spaces that stimulate their sense, even spaces should be connected with green spaces along with all the spaces they are should be safe as they tend to throw tantrums and harm themselves.
- Autistic children need to be under observation every time and every small thing needs to be taught.
- Initial period is the most difficult as institutes need to understand the level of autism and their behavioural patterns.
- Autistic kids have repetitive behaviours and need everything organized and show tantrums when there is a change in setting so institutes need to train them in such matters that have all different types of settings.
- Architects need to understand the spaces required in an autism school and also need to focus on the material pallet along with the need to think on open to build ratio and connection of spaces for better life of autistic children.

The data collection stands crucial as the entire analysis and idea formation stands on this base. Getting information from the stakeholders helps to get a clarification of the requirements and the deliverables expected. Hence the response of the stakeholders from the above points helped ineffective data collection.

4. ANALYSIS, RESULTS, AND DISCUSSIONS

The theories explain how different kinds of environments are required by autistic individuals and how they respond to them, the study also explains the causes of hyper and hypo sensitivity individuals.

Khare and Mullick have been developing a universal design for educational environments based on the needs of an autistic individual. The following design suggestions are based on empirical environmental design considerations of the two authors:

1. Develop a physical framework: Spaces should be designed with a physical framework that delineates various zones for different activities.
2. Enhance visual structure and specifications: organize the visual environment with accurate visual cues and utilize visual cues to demonstrate how to perform particular actions.
3. Adequate space standards: Autistic persons demand a lot of personal space.
4. Create withdrawal zones: peaceful areas where children can withdraw if they are feeling overwhelmed.
5. Improve safety and comprehension by lowering the risks that students typically generate on their own. Places should be organized, with clean, clutter-free routes leading to and from them.
6. Increasing accessibility: Individuals with mobility and balance impairments require a physically accessible building.
7. Offer assistance: There should be ample space in all types of settings to help a student with autism in carrying out their learning activities.
8. Increase durability and maintenance: equipment, furniture, fixtures, fittings, materials, and systems, in general, should be strong enough to endure the abuse that the student would inflict.
9. Reduce sensory distractions: There should be no components in the area that might generate a sensory distraction.
10. Incorporate multimodal stimuli into your environment to encourage sensory integration.
11. Provide for versatility: the environment must be adaptive enough to accommodate a wide range of functional skills and educational paradigms.
12. Provide monitoring and assessment: It is critical to control or monitor kids with the least amount of distraction and intrusion.

Magda Mostafa devised the Sensory Design Theory after being tasked with establishing Egypt's first autism education center. The concept extends on the sensory sensitive approach by suggesting that positively and constructively altering the sensory environment can encourage positive and constructive autistic behavior.

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"Sensory design theory provides a versatile and adaptable instrument that serves as a catalyst for the formation of architectural design needs for architectural contexts based on their sensory qualities, as well as in response to autistic sensory demands," Mostafa explains.

She developed a set of design principles known as ASPECTS, which stands for Acoustics, Spatial sequencing, Escape spaces, Compartmentalization, Transition Zones, Sensory Zoning, and Safety and tackles common sensory environment concerns such as acoustics, texture, and lighting.

1. ***Acoustics:*** The acoustical environment in rooms used by persons with ASD should be adjusted to eliminate background noise, echo, and reverberation. The degree of acoustical control should vary based on the amount of concentration required in the activity at hand within the surroundings, as well as the users' skill level and severity of autism.
2. ***Spatial Sequencing:*** The idea of autistic people demands predictability and regularity. According to the requirements, places must be placed in a logical sequence based on the regular schedule of such spaces. Spaces should be organized to accommodate students' timetables and movement patterns throughout the day. There should be as little disruption as feasible between the pauses.
3. ***Escape Spaces:*** Spaces must be created that give refuge from the overstimulation of the autistic user's environment. A tiny partitioned section or basement in a quiet zone of a room, as well as quiet spaces throughout a structure. These areas should have a neutral sensory environment with little stimuli, allowing the user to adjust to deliver the required sensory input.
4. ***Compartmentalization:*** There has to be a limit to sensory input in whatever location or circumstance. Each component should have a particular, well-defined purpose and have high sensory quality as a result along with minimal details, any unnecessary detail should be avoided.
5. ***Transition Zones:***As they advance from one stimulation level to the next, users can re-calibrate their senses in transition zones. Zones can range from a single node indicating a change in circulation to a whole sensory chamber allowing the user to re-calibrate.
6. ***Sensory Zoning:***As is customary in architectural design, spaces should be organized according to sensory quality rather than programmatic function. According to the maximum permitted stimulation intensity, spaces are separated into high-stimulus and low-stimulus zones.
7. ***Natural Light:*** Natural light should be used extensively, but bright sun, deep shadows, or strong contrast might cause visual overstimulation. Diffuse illumination may be achieved through the use of skylights and clerestory windows.
8. ***Safety:*** Although people with autism may have a reduced awareness of their surroundings and are more likely to injure themselves by falling or hitting the wall or hitting themself with objects around, safety is a bigger concern for them than it is for their neurotypical counterparts.



Figure 7: Neurotypical View Compared to Other Sensory Disorder

Spaces for Hyper and hypo users are been arranged in an altering manner, by keeping similar users separate in server cases. Certain acoustical care is taken into consideration for the hyper-sensitive user. Even lighting strategies are taken into consideration.

Sense	***Hypersensitive***	***Hypo Sensitive***
1. The visual representation and light	Recognition of embedded figures, dislike bright light	Sees outline or seek sensory experience from light
2. Perception of sound	Unable to make a cognitive decision of what sound it is	Create sounds

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Sense	*Hypersensitive*	*Hypo Sensitive*
3. Scent recognition	Heightened sense of smell	Wants to smell everything and lacks in picking up smell
4. Texture, temperature, pressure	Don't like to be touched and maximum use of fingertips	Feels like pain and mostly on the side of self-harming
5. Awareness of one's own body in space	Unaware of body position	Unaware of body portion
6. Sense of balance and motion	Perceive danger from minor changes	Seeks sensory inputs through movement

The case studies selected below are examples of how different kinds of educational environments have been designed keeping in mind the autistic individual, in different parts of the world. Design techniques used in these projects can be identified and used in creating design guidelines for the Indian context in structures catering to such individuals.

5. ADVANCE SCHOOL FOR DEVELOPING SKILLS OF SPECIAL NEEDS CHILDREN

Architect: Magda Mostafa
Location: Qattameya, Cairo, Egypt
Setting: Rural
Context: Stand-alone school
Number of Students: 100
Facilities: Therapy areas, diagnostic center, sports center, sensory garden, hydrotherapy and assisted living for 20 students.

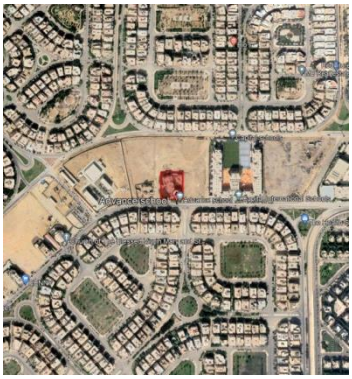


Figure 8: The Location Plan for Advance School for Developing Skills of Special Needs Children
Source: https://maps.google.com

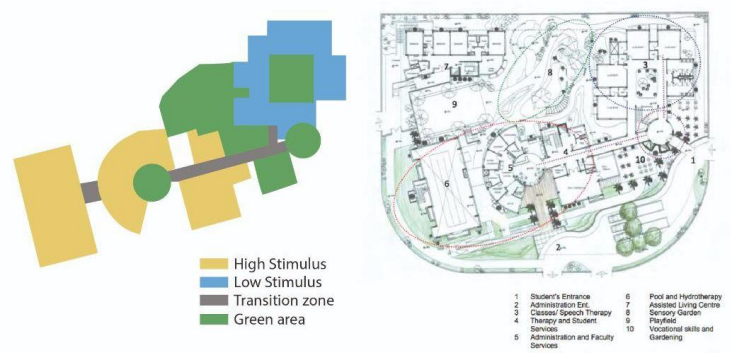


Figure 9: Analysis Diagrams for Advance School for Developing Skills of Special Needs Children

Source: https://www.archdaily.com/435982/Autism-design/525477c9e8e44eff020006f0
-an-interview-with-magda-mostafa-pioneer-in-autism-design-image

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The structure was the first to be built using a sensory design idea', a Special Needs Design Associate. The organization of space, acoustics, texture, color, pattern, and light are built on the basis of buildings as a habitat for sensors and a source of controlled regeneration. Sensory design, spatial sequencing, and integration, flexible sensory space, graded acoustical treatment, and the provision of "escape zones" are all used to arrange the building. A program to add more than a conventional school is included in the structure.

Eden Institute

Architect: KSS Architects
Location: Princeton, New Jersey
Setting: Suburban
Context: Stand-alone school
Year Built: 2012
Number of Students: 55
Ages: 3-21
Size: 38,000 sq ft
Facilities: Kitchens, gymnasium, physical therapy rooms, vocational and education centers, offices, observation rooms, weight rooms



Figure 10: Courtyard Play Area (image by KSS Architects)



Figure 11: The Location Plan for Eden Institute

Source: https://maps.google.com

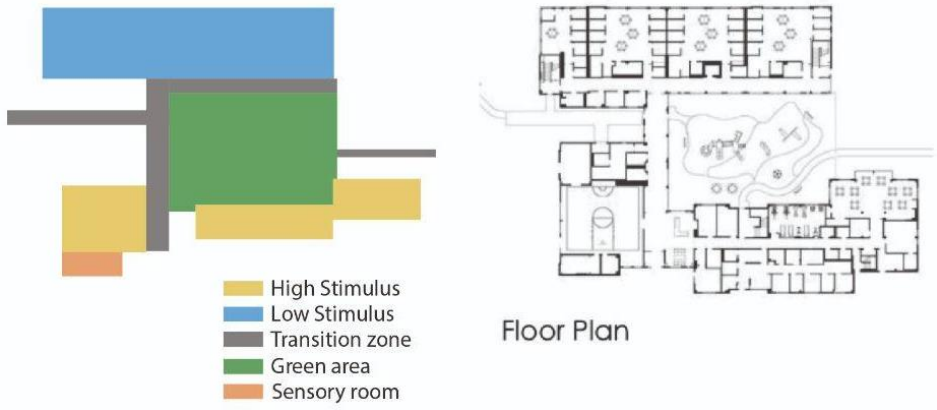


Figure 12: Analysis Diagrams for Eden Institute

Source: https://kssarchitects.com/design/our-work?tags

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The school is on the verge of mixed development. The venue gives teachers and students a strong sense of community, shared sports and event facilities, ample open space, and plenty of ways to travel outside. The school is considered home and office and focuses on its handicrafts and medical care. The house is the main student area and is a living space for students so that students can learn normal jobs such as looking after an apartment or working as a cashier. The Eden Center was designed to create a sense of community among teachers, students, and administrators working with the building. The school is organized around the elements of the program by placing learning areas and school facilities in the northern part of the building and facilities and administrative space in the southern part. The school incorporates several features, such as an extension of the wall-mounted installation to help reduce noise between rooms, the central courtyard to organize the entire building and serve as a device access point, and warm items so that the building does not look cluttered or institutional.

Sankalp School Chennai

Architect: Benny Kuriakose & associates

Location: Chennai

Setting: Rural

Size: 17,500 sqft.

Facilities: Therapy areas, gymnasium, vocational and education centers, offices, observation rooms, weight rooms, sensory garden

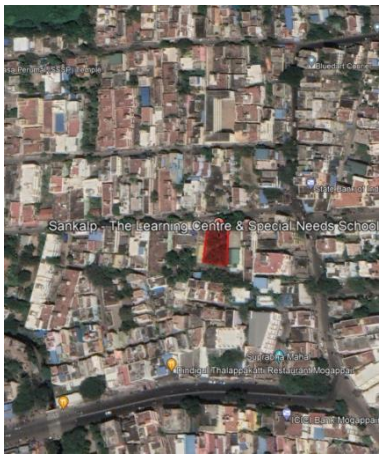


Figure 13: The Location Plan for Sankalp School Chennai

Source: https://maps.google.com



Figure 14: Analysis Diagrams for Sankalp School Chennai

Source: https://www.bennykuriakose.com

ISBN: 978-93-89934-68-7

The main design needed in the construction of the Autism School is that we will need to stimulate the senses. The aim is to balance both the Neuro Typical Approach and the Sensory Design Approach, by creating environments that make them independent to face the world, and adequately sensitive to their needs and requirements. Having relief valves in the classroom or as a common ground between certain classes will also help build a school for Autism. Especially emotional rooms, cozy coves, etc, where students can be left alone to relax are an integral part of such a design. For a child to develop a balanced mental attitude, engaging in activities that involve both sides of the brain can be encouraged in school and the design of spaces for such activities becomes critical.

Prasanna Autism School

Architectural type: Bungalow converted to autism school
Location: Shivaji Nagar, Deccan Gymkhana, Pune,
Setting: dense urban fabric
Number of Students: 19
Facilities: Therapy areas, sports room, sensory area, hydrotherapy.



Figure 15: Classroom Setup for Prasanna Autism School

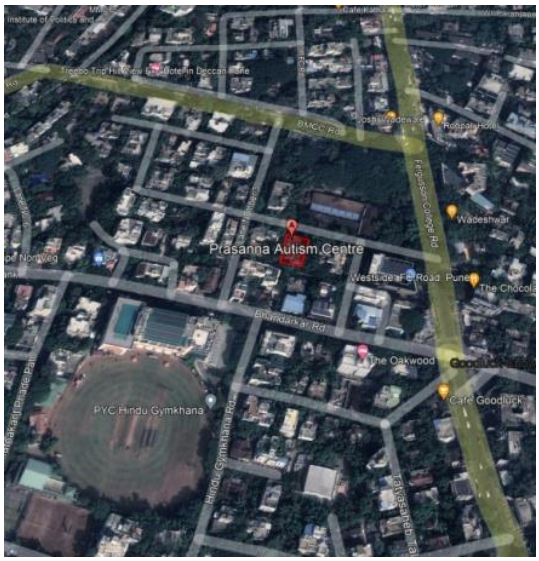


Figure 16: The Location Plan for Prasanna Autism School

(Source: https://maps.google.com)

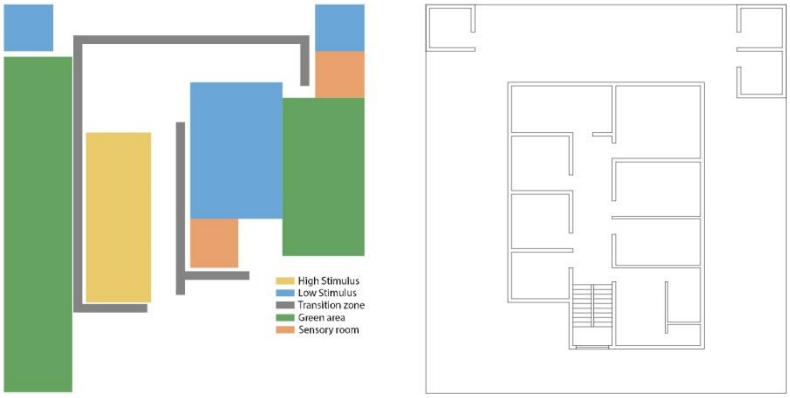


Figure 17: Analysis Diagrams for Prasanna Autism School

ISBN: 978-93-89934-68-7

Saad Foundation

Architectural type: Bungalow converted to autism school
Location: Lane 8, Prabhat Road, Pune,
Setting: Dense urban fabric
Number of Students: 7
Facilities: Kitchens, Therapy areas, sports room, sensory area, vocational and education centers.

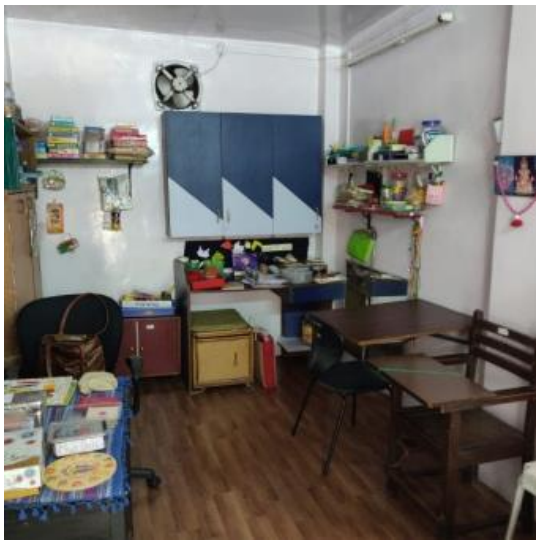


Figure 18: Classroom Setup for Saad Foundation

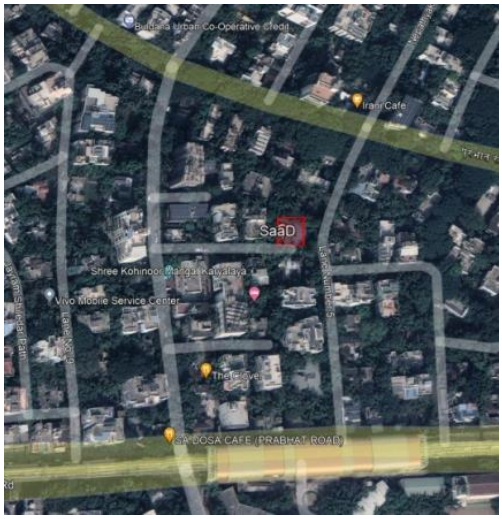


Figure 19: The Location Plan for Saad Foundation

Source: https://maps.google.com

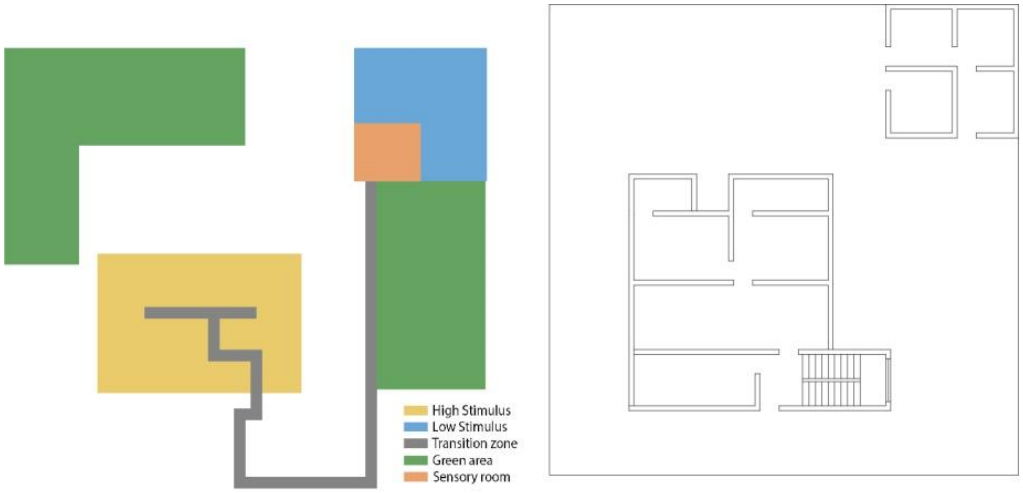


Figure 20: Analysis Diagrams for Saad Foundation

Prasanna Autism School and saad foundations are institutes in Pune which were actually designed as residential built mass but later adopted as autism institutes with some internal minor changes. Facilities that are adopted are majorly sensory areas, therapy rooms, and hydrotherapy spaces along with keeping in mind to keep high stimulation and low stimulation areas apart from each other.

All the school campuses have a similar approach towards design, where high stimulus areas are separated from low stimulus areas with transition areas in between that accelerate all the senses and even the green spaces are connected to its corridors.

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6. CONCLUSION

When designing environments for autistic children, it is vital to have a thorough understanding of their interactions with the environment, people, and objects around them. It is stated that the huge windows allow more light in, causing children to get distracted. As a result, matt plates are used to avoid this issue. The architects want to use retractable curtains to avoid this.

It is necessary to build an adaptive state in such an environment to address the needs of the children in developed places. Such environments, on the other hand, must be designed to both challenge the autistic child's thinking and benefit the child's education. Varied colors and forms can be utilized to improve vision, and different textures on the walls or floors can be used to improve a child's sense of touch. It should be emphasized that using hard surfaces to aid hearing or causing dispersion in audio echo boosts the child's feeling of exploration. It is critical to remember that, to develop physical fitness, the space's furniture must be adequately suited for the children's bodies. Green has also been shown in research to have a soothing effect on autistic children and adults.

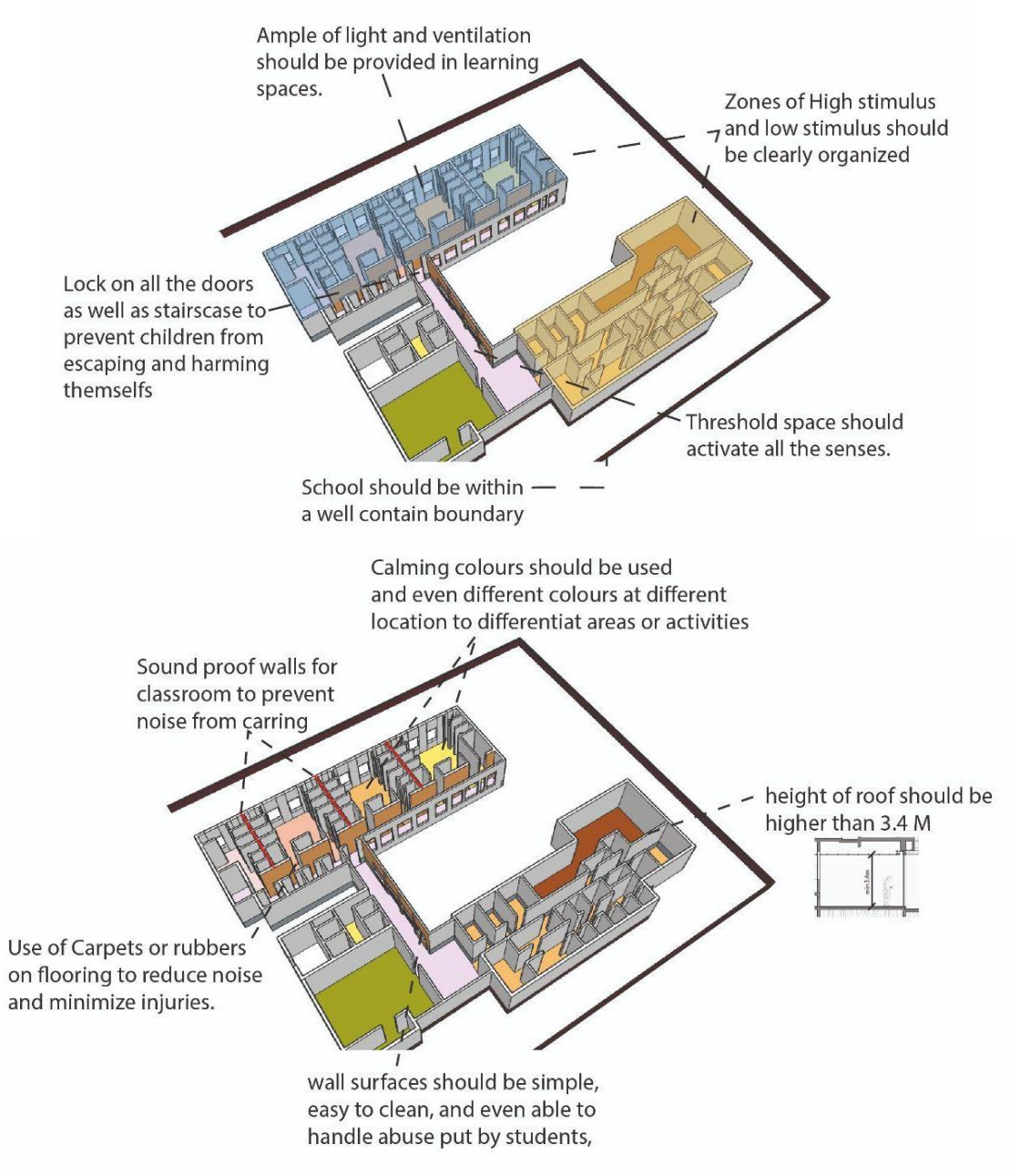


Figure 21: Analysis Diagrams for Spaces that are Required in Institutes

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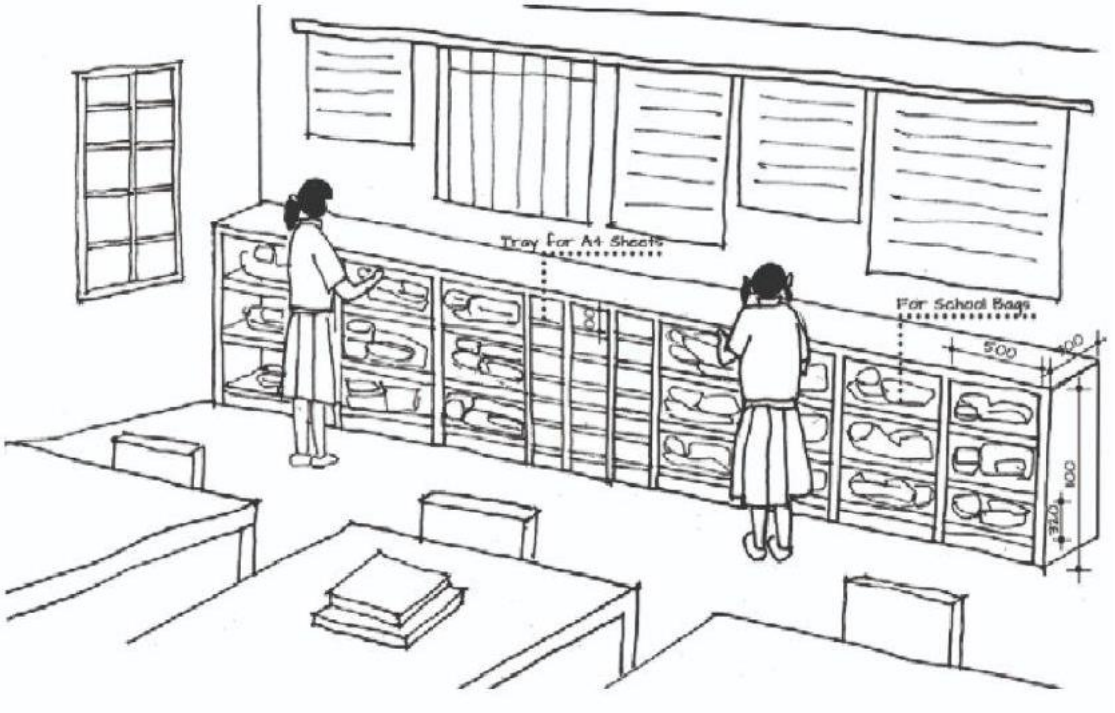


Figure 22: Organized Setup in a Classroom for an Individual to Work in a Particular Manner

According to studies, students enjoy artworks that use electrical and computer components to create a virtual environment. Computers tend to be quite popular even among autistic children.

The needs of an Autistic child for designing educational spaces are:

1. The requirement for regular and uncomplicated surroundings with adequate vacant areas.
2. The requirement for a mix of small and big places.
3. The need to strike a balance between security and independence.
4. Appropriate use of technology to aid learning development in autistic children.
5. Using simple walls and flooring in gentle hues with little adornment.
6. Simple integration and minimization of features in design can help to reduce kid hostility, even the use of furniture should be simple with rounded edges so that they do not hurt themselves.
7. It is preferable to hang paintings of children along passageways, which provide the children with a personal feeling of their surroundings rather than the organizational space.
8. It is preferable to employ circulation areas like halls rather than corridors to connect the places.
9. Corridors connecting spaces should be conned to greens and open spaces so that it stimulates their senses while moving.
10. Classrooms should be smaller than usual, with a maximum of 6 pupils. In addition, the sessions must have fewer locations for one-on-one instruction and smaller groups. It is preferable to separate these classrooms with glass panels so that the child does not feel isolated from the surroundings.
11. Children with autism are unable to process sounds from the environment, therefore a quiet area with very few distractions in the surrounding area is a preferred class area. If the institute is unable to locate such a site and is forced to choose its location in an urban area with large background noise, soundproofing is very important.
12. In terms of built to open space ratio, we can conclude that a large amount of open is essential for every institute and can be used for different forms of therapy if available

It is forbidden to build tight, gloomy, or eerie rooms since they might raise stress, impair operation, promote violent behaviours, and damage interpersonal connections.

These are some sets of guidelines that we can propose while designing and constructing educational institutes for autism for architects and Builders. We should learn to design not only for ables but also consider mentally unable while designing.

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Resource Persons

Mrs. Sunita Lele (founder of Saar Foundation),
Mrs. Sadhana Godbole (Executive chairman of Prasanna Autism center),
Mr. Rajendra Nahar (Founder of Umed pariwar)

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APPENDIX

Question asked during interview

1. In your opinion, what is the best environment for an autistic child?
2. What responsibilities did you have as an autistic caregiver?
3. What do you believe the most difficult aspect of dealing with an autistic child is?
4. How difficult is it for autistic children to shift from one setting to another?
5. What kind of environmental influences have an impact on autism?
6. How can architecture be used to help people with Autism?
7. What sensory stimulations should be present in the surroundings of an autistic children could autism-friendly design improve the lives of autistic children?

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Perception of Colour: Using Architectural Colour Palette as a Psychological Stimuli

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ABSTRACT: Colour is a sensory perception, and as any sensory perception, its impacts are symbolic, emotional, synesthetic, and associative. Thus, Colours and their perceptions are responsible for a series of conscious and subconscious stimuli in our psycho-spatial relationship. This research aims to understand how and why the Colour in Architecture dominates the mental triggers while experiencing a space. The study focuses on the psychological impact of colours used in facades of different building typologies, on a user's experience and mood. This research is a mixed methodology driven research, majorly with a qualitative approach. It is further taken up in three parts inclusive of descriptive research & Case Studies. Some interviews and surveys have been done for the collection of primary data and first-hand observations apart from the secondary data analysis to support the conclusion outcomes. The research concluded on how different colours triggered different emotions and effected the user's moods and what were the associated Visual Comfort parameters that were considered. The research makes available a pre-requisite study for adoption of a Colour Palette for a Political, Religious, or Institutional building typology and provides a scope for further study of relation between Colours used in Facades and the User Experience.

Keywords: *Colours, Colour Perception, Building Façade, Colour Palette, Visual Ergonomics, Colour Psychology.*

1. INTRODUCTION

Architecture contributes significantly to the vivid and colourful environment we live in. The colours used on architectural edifices possess an impactful personality and affect users in various ways. Colour can trigger mental triggers that significantly impact a user's overall perception and experience of a space or place. The choice of colour in architecture is based on static, psychological, cultural, and social factors. These factors demand adherence to protect human psychology and physiological well-being within their man-made environment.

Along with the constructive elements of an architectural object, the application of colours on surfaces influences a user's experience of the space. Colours in architecture are necessary to embellish, highlight, illuminate and separate spaces and to transmit sensations and comfort. The colour of a building facade creates a first impression and influences a person's body, character, behaviour, and mood. To make cautious choices while selecting colour palettes for building typologies, one must understand how colour dominates mental triggers while experiencing a space. Visual comfort parameters are needed to be considered while designing and choosing a colour palette for architectural edifices.

Therefore, this study focuses on the psychological impact of colours used specifically in facades of different building typologies on a user's experience and mood. This opens the opportunity to further study the psycho-spatial relationship with respect to colours. Colour impacts through light, beauty, harmony, mental balance, comfort, and excitement. Considering these factors while selecting colour palettes will help create positive experiences and better psychological and physiological well-being for users within their built environment.

2. LITERATURE REVIEW

2.1 Colour and its Importance

Faber Birren, father of Applied Colour psychology, states that colour is a sensation processed by the brain based on objective and subjective perception (Mahnke, 2020), making it an essential part of emotional expression in a space. Despite cross-cultural interpretation, studies suggest colour is an international language understood by all, with varied interpretation

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mediums. Colour acts as a psychological tool (Dr. Meghamala. S. Tavaragi, 2016) And emphasizes the need for understanding its semantics and psychology.

2.2 Colour Psychology

Every colour observed by an individual has a triple action on the observer which would (1) Influence and draw attention to the colour, (2) trigger a reaction or emotion, since every colour could rouse a particular expression and, (3) build or acquire a symbolic value. Thus, colour's action on any non-colour blind, sighted individual could be positive or negative but not indifferent or apathetic.

Colours significantly affect our emotions and moods (Sevinc Kurt, 2014), with expressions such as "feeling blue" and "seeing red" having direct associations with colour impact. The human mind associates colour chemistry with nature (Dr. Mahwish Mumtaz Niazi, 2015), making potential scenes visible by interacting with the unconscious mind's inherent particles. Moreover, one colour can be associated to different emotions and some emotions can be embodied by different colours (Naz Kaya, 2004)). Different colours change one's mood, and temperature, lighting, and saturation also impact emotions. (Smith, 2007) Colour symbolism is also widely used by writers, poets, and artists in their works. Thus, colours are not just descriptions in language but also give vitality to social settings.

Biological reactions to colour are physical responses to the energy of light waves. Genetic imprinting and personal experiences can trigger these reactions, while conscious symbolism is a result of a person's experiences. (Chudy, 2017) Some associations with colour and emotions are universal, while others are influenced by cultural factors. Colour trends often ignore psychology and ergonomics, and personal relations with colour vary widely. Consulting with users is the best way to establish colour preferences for a project.

2.3 The Perception of Colour in Architecture

Neuropsychology research examines that the brain processes and responds to sensory data from the outside world. (Radwan, 2015) Sensory deprivation and overload, or under- and over-stimulation, can affect the brain's reticular formation, leading to malfunctions in the body.

Suitable colour specification is crucial for visual effectiveness and comfort. The eye's adaptation process is vital for responding to changes in light level. Variations in luminous density can reduce eye strain, improve visual acuity, and increase productivity. The worldwide standard for light reflection ratio in a space is 3 to 1, but increasing the percentage of floor and furniture light reflection can maintain control over stark contrasts.

Table 1: Colour Language, Emotions and Architectural Elements

Colour	Effect	Positive Emotions	Negative Emotions	Character	Ceilings	Walls	Floors
Red	exciting, stimulating	passionate, fervid, active, strong, warm	intense, aggressive, raging, fierce	Red is the most dominant and dynamic colour. The eye red appears closer than it is.	intruding, disturbing, heavy	aggressive, advancing	conscious, alert
Orange	exciting, stimulating, cheering	jovial, lively, energetic, extroverted	intrusive, blustering	Orange is less masculine than red. However, it may appear cheap or without vigour if low in saturation.	stimulating, attention-seeking	warm, luminous	activating, motion-oriented
Yellow	cheering	sunny, cheerful, radiant, vital	egocentric, glaring	It radiates happiness, warmth, cheerfulness, and inspiration and signifies enlightenment, and communication.	light (towards lemon), luminous, stimulating	warm (towards orange), exciting to irritating (highly saturated)	elevating, diverting
Green	retiring, relaxing	tranquil, refreshing, quiet, natural	common, tiresome, guilty	Green is the most restful colour to the eye. Green can symbolize nature but also mold and sickness.	protective, reflection on the skin can be unattractive	cool, secure, calm, reliable, passive, irritating if glaring (electric green)	natural (if not too saturated), soft, relaxing, cold (if towards blue)
Blue	retiring, relaxing	calm, sober, secure, comfortable, noble	frightening, depressing, melancholy, cold	Blue appears to be transparent, wet, cool, and relaxing. Blue will decrease a person's blood pressure and pulse rate.	celestial, cool, receding (if light), heavy and oppressive (if dark)	cool and distant (if light), encouraging and space deepening (if dark)	inspiring feeling of effortless movement (if light), substantial (if dark)
Purple	subduing	dignified, exclusive	lonely, mournful, pompous, conceited	Purple is a mixture of red and blue (the two colours that are psychologically most opposed). Purple can appear delicate and rich, or unsettling and degenerate.	disconcerting, subduing	heavy, overpowering	fleeting, magical

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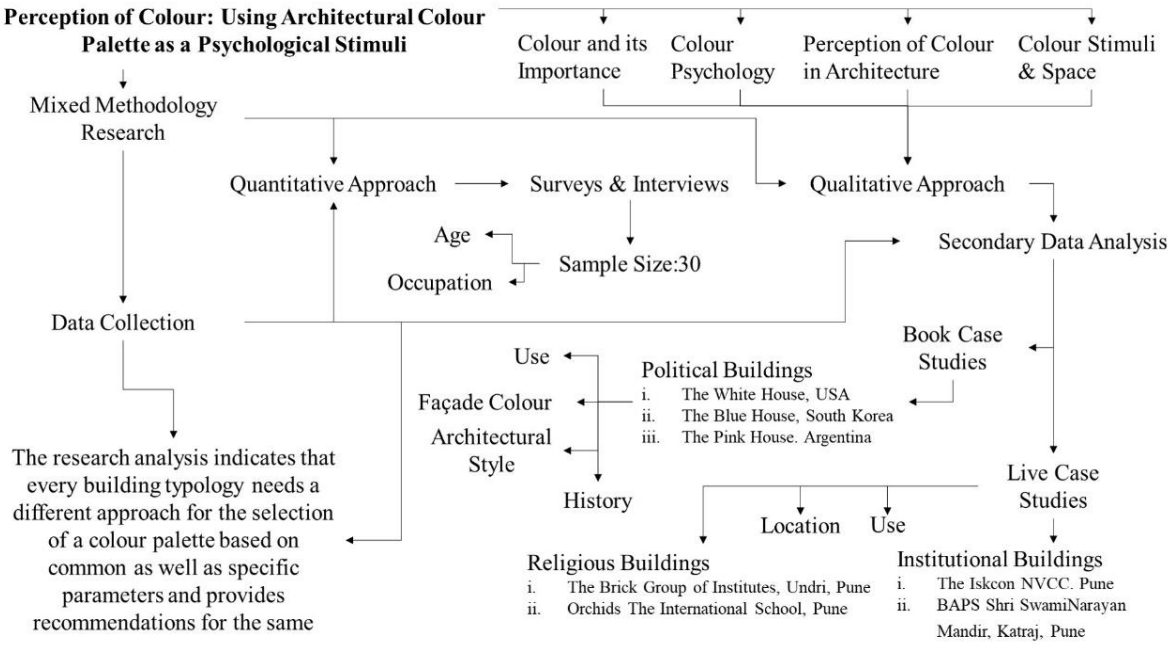
Colour	Effect	Positive Emotions	Negative Emotions	Character	Ceilings	Walls	Floors
Pink	lively, calming (light pink)	lively, calming, intimate	too sweet, weak	Pink must be handled carefully. It is generally considered feminine but depends much on the nuance used.	delicate, comforting	aggression-inhibiting, intimate, too sweet if not greyed down	too delicate, not used very often
Brown	subduing	warm, secure, stable	oppressive, heavy	In certain institutions brown should be avoided since it evokes faecal associations. Wood and stone on the other hand appear very comfortable, and warm.	oppressive and heavy (if dark)	secure and assuring if wood, much less so if paint	steady, stable
White	disconcerting	clean, crisp, bright	empty, sterile	There are a lot of psychological and physiological justifications for not using white as a dominant colour.	empty, no design objections-helps diffuse light sources and reduce shadows	neutral to empty, sterile, without energy	touch-inhibiting (not to be walked upon)
Gray	neutral to calming	neutral	boring	Gray fails to have much psychotherapeutic application. Thus, the current fashion of using it with various accent walls defies all logic.	shadowy	neutral to boring	neutral
	ominous	deep, abstract	dungeonlike, night, grief, death	Black is associated with oppressive power, darkness, and the unknown. In architecture it is often used to make something appear as receding, such as the HVAC in a ceiling.	hollow to oppressive	ominous, dungeon like	odd, abstract

(Source: By Author)

Colour perception depends on placement, context, and lighting. Designers should use colour characteristics as a starting point rather than a final product.

3. METHODOLOGY

A mixed-methodology approach was used for this study, combining qualitative and quantitative methods such as case studies, surveys, and secondary data analysis. Case studies were conducted on political, religious, and institutional buildings, while surveys were used to gather information on the effects of colours on users based on age and occupation. Questionnaires were distributed online to a sample group of 30 – 32 respondents with colour sight to gain insights into perceptions and emotions associated with different building typologies and colour selection. Close-ended and open-ended questions were used.



Flowchart 1: Research Methodology Map

(*Source:* By Author)

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4. RESULTS AND DISCUSSIONS

4.1 Case Studies, Data Collection and Data Analysis

Table 2: Case Studies

Case Study No.	Edifice Name & Location	Image	Building Typology, Reason for Selection & Parameters	Building Façade Information
1	White House, U.S.A.	 *Source: Encyclopedia Britannica*	Political Building: Monotone Colour Selection Technique in Political Buildings 1. What Colours are used? 2. Psychology related to colour. 3. What kind of expression does it have? Impact on the user group? 4. Symbolic value of colour on that building with respect to region and history 5. Establishment as a landmark (role of colour) 6. Role in establishing dominance over space as well as competitors	The White House, the official house and office of the US president, was originally coated in lime-based whitewash in 1798 to weatherproof the soft sandstone exterior. Over time, the mansion underwent changes, with the South and North Porticos being painted in more durable white lead paint in the 1820s. The term "White House" had been used as a nickname for over a decade before Theodore Roosevelt made it official in 1901. The theory that it was painted white to hide fire damage during the War of 1812 is intriguing, despite the fact that it had already been called the White House.
2	Pink House, Argentina	 *Source: Expedia*		Casa Rosada, also known as the Pink House, is the office of the President of Argentina. The structure has a complex history dating back to colonial times. President Bartolomé Mitre used the Customs House as the Government House, and his successor Domingo Sarmiento painted the facade pink and built a central Post Office next to it. (Dean, 2009) The building was extensively redesigned by President Julio Roca in the 1880s, and the entire structure was painted pink to match the original colour. The reason for the initial pink colour is either symbolic, representing the unity of opposing factions, or a technical one to protect from humid climate, using cow's blood mixed with paint.
3	Blue House, South Korea	 *Source: Visit Seoul*		Cheong Wa Dae, also known as the Blue House, is the official residence and headquarters for South Korea's executive branch. The site has been associated with Korean leaders since the 10th century, and by the 14th century, it had become part of the Royal Palace. (Cyr, 2014)The Blue House was constructed on the site of the Palace's back garden, which was destroyed during the Japanese occupation. The name "Cheongwadae" was adopted by President Yun Bo-seon in 1960 to distance the presidential complex from the previous dictatorship and Japanese colonial rule. It references the Blue House's blue-tiled roof, which was reserved for the king in traditional Korean architecture.
4	NVCC Iskcon Temple, Pune	 *Source: Dev Darshan*	Religious Buildings: Monotone and Multi-chromatic Colour technique 1. What Colours are used? 2. Psychology related to colour. 3. What kind of expression does it have an effect on the user group range? 4. Symbolic value of colour on that building with respect to religion and history 5. Identity maintained as a community /institution. 6. Any religious and mythological bias observed in selection of colours	The ISKCON New Vedic Cultural Centre temple in Pune, India, features a red stone and marble construction, giving it a white and red façade. Drawing inspiration from Rajasthani style, the temple is like the one in Delhi. While many ISKCON temples have colorful facades, some have white or a combination of white and other colours. The red and white colour palette creates an emergence from the ground, providing an approachable appearance.
5	BAPS Swaminarayan Temple, Pune	 *Source: BAPS Shri Swaminarayan Mandir*		The BAPS Shri Swaminarayan Mandir in Pune, India, is a fully hand-carved stone structure made of Red and Indian Pink Sandstone, according to ancient Indian Shilpa shastras principles. With a similar architectural style to other BAPS mandirs worldwide, the temple's use of red and pink stone draws inspiration from traditional temples in Rajasthan and Gujarat, providing a warm and consistent aesthetic.

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Case Study No.	Edifice Name & Location	Image	Building Typology, Reason for Selection & Parameters	Building Façade Information
6	Orchids The International School, Pune	 *Source: Orchids I. School*	Institutional Buildings: Colour Blocking and Multi-chromatic Colour usage 1. What Colours are used? 2. Psychology related to colour. 3. What kind of expression does it have? 4. Symbolic value of colour on that building with respect to visual ergonomics and the user group 5. Role in establishing dominance over space as well as competitors. 6. Is the Learning centric environment established with respect to the visual comfort?	Orchids International School in Pune has a contemporary design with a 3.5-acre campus. The grey and light blue painted RCC construction features colorful wooden louvers that create a contrast between the neutral background and colorful foreground. The use of yellow highlights adds pops of colour to the architectural elements.
7	SMEF's Brick School of Architecture, Pune	 *Source: SMEF's BSOA*		SMEF's Brick School of Architecture, Pune is a part of an integrated design campus that fosters inter-disciplinary design. The main edifice is constructed with RCC and Brick Cladding, inspired by IIM Ahmedabad and CEPT University. Its monotone facade portrays discipline and stability, while the form incorporates play as a striking feature.

(*Source:* By Author)

4.2 Observations, Arguments and Justifications

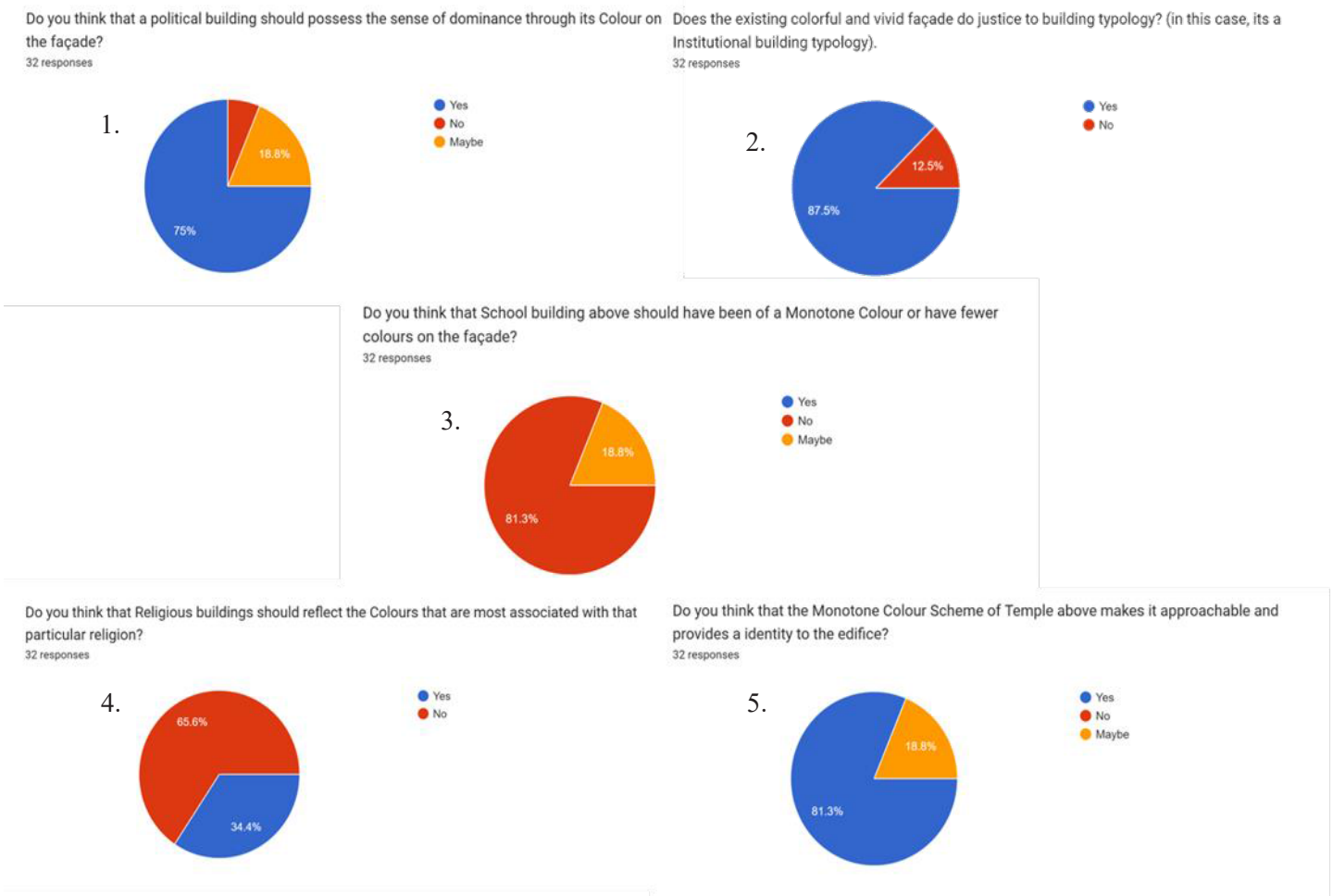


Figure 1 to 5: Data Collection Samples

(*Source:* By Author)

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Colours have a significant impact on the psychological response of people to buildings. Political buildings tend to have a monotone facade that conveys dominance, clarity, cleanliness, and diplomacy. Institutional buildings require different facades based on the user group. For instance, vivid facades work well for primary and secondary schools, while higher educational buildings require a more mature and monotone approach. Religious buildings prioritize the contribution of colours to the experience of the place, with warm, relaxing, pure, and sanctified colours being expected. This provides identity to the building and makes it approachable, regardless of a monotone or a multi-tone colour palette.

As observed in the political building example, 'White House', the colour white not only provides a sense of purity but also dominance to the edifice. But, as per table 1. White colour does not necessarily provide the sense of dominance. This ambiguity is exceptional to building typology since, different factors (like surroundings, political building typology) contribute to elevating the sensory perceptions of the colour white. While the white contrasts with the background and thus looks dominant, the typology of building makes the significance of the colour white essential as it is representative of neutrality, diplomacy and cleanliness.

5. CONCLUSION

The research analysis indicates that different building typologies require distinct approaches in selecting a colour palette based on their specific and common parameters. A research analysis suggests the following recommendations:

- Political buildings should have a monotone colour palette that represents purity, clarity, dominance, and power rooted in history. Colours such as white, Gray, brown, blue, and terracotta red are appropriate.
- For institutional buildings, primary to senior secondary schools can adopt a multi-tone facade with busy contrasts to bring a sense of play, joy, and energy, while remaining attractive and approachable. The use of colours like yellow, orange, red, green, and blue with one or two neutral colours would be best. For higher education institutions, monotone, or dual-tone facades with neutral shades like white, Gray, and shades of brown or terracotta red would suit them well, as they need to project a mature character.
- Religious buildings, particularly larger edifices, should have a monotone or dual-tone facade to create a warmer, more approachable atmosphere while still retaining their importance and dominance. Colours such as red, terracotta, brown, Gray, and white can evoke a sense of relaxation, belongingness, stability, warmth, and sanctity. If necessary, designers can also use contrasting colours like red, green, blue, or pink to highlight specific elements.

In conclusion, designers must understand the effects of colours on building users and consider the building typology's specific requirements. Appropriate colour choices can enhance the space's functionality, usage, and intended significance.

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Exploring 'Borders' as Zones of Transaction

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ABSTRACT: The effect of borders on people and space is a topic of growing discussion in today's globalised and linked society. Through understanding the term 'border' itself, paper tries to understand why are borders formed in the first place, and why any sovereign power and its people turns towards wall as a social construct. The purpose of the paper is to clarify the idea of "thick" and "thin" borders. It is founded on the idea that borders are made up of boundary sets such overlapping geopolitical, sociocultural, economic, and biophysical layers and the outcome of a bordering process. It aims to explain the various functions of borders. That illustrates why border-related projects that just consider the geopolitical component of the boundary typically fail.

Keywords: *Social Construct, Thick Border, Thin Border, Borders, Boundary Sets, Bordering Process.*

1. INTRODUCTION

Merriam- Webster (merriam-webster, n.d.) describes a 'border' as an outer part or edge. Britannica (Border, n.d.) and Oxford (Border, n.d.) describe it as a 'line separating one country or state from another'. But what does a boundary actually consist of? We rarely spend time on it, not that we are obliged to; instead, we drive through it, walk across it, and fly over it. We come across several borders on day to day basis, some are easy to cross and are trespassed daily, whereas some are so rigid that even the idea of crossing them seems difficult. What lies on the other side of it, for most of the borders are geographically, socially, and ethnographically the same, yet it is a popular understanding that what lies on the other side is not exactly the same and in some cases even dangerous.

By identifying, classifying, transmitting, and controlling geopolitical, sociocultural, economic, and biophysical characteristics, processes, and power relations, borders either confirm distinctions or shatter what belongs together. (Haselsberger, 2014) Hence, the Border is no longer just a line that divides, it is a complex phenomenon that is layered with different functions and power dynamics.

By understanding these power relations and layers to the border we understand why borders are never 'perfect fits' (Haselsberger, 2014) and we thrive upon the possibility that the length of border shared between two nations is a more accurate measure of 'geographic opportunity' rather than the sheer number of borders. (Wesley, 2006)

Hence, this research is aimed at understanding physical borders and an exploration into the idea of how they could be transformed into zones of transaction.

2. OBJECTIVES

In order to achieve the above-mentioned aim following are the objectives:

1. To understand the term Border.
2. To examine reasons behind why borders come up and what is their purpose.
3. Looking at types of border and degrees of permeability in each
4. To understand how they function and how they are perceived.
5. To look at examples of various kinds of Borders.

3. METHODOLOGY

In order to examine the aspects mentioned above, the study will be conducted through primary and secondary sources. The literature will review the various histories and theories put forward by architects and researchers regarding Borders, Borderlands and bordering practices.

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4. LITERATURE REVIEW

The terms boundary, frontier, wall, and barrier are frequently used interchangeably with the word "border." All of them suggest limits or indicate division or separation (James Anderson, Liam O'Dowd, 1999) (Haselsberger, Beatrix; Benneworth, Paul, 2010). It has often been used in its different forms, all used to indicate limits, barriers, divisions or separation, their function being the 'ordering of society' (Popescu, 2011) This word 'border' has not emerged from literature but rather as a reflection of cultural nuances of meaning in different cultural contexts, which vary between time, places, languages and cultures.

But, boundaries are often pools of emotions and fears that may be easily manipulated for both liberal and regressive objectives. They are not merely physical, neutral lines (Paasi, 2011).

'Walls between nations are the most eloquent material expression of the human inability to coexist and negotiate' (Iglesias-Prieto, 2017).

G1John Herz discusses that the characteristic of any nation has been its 'territoriality', being identified as a region that is encircled by an impermeable "wall of defensibility" that satisfies the basic human need for safety. Humans make their self-organizational decisions based on how well they will be protected. For people, a territory becomes a "exclusive entity." and so the construction of a wall satisfies human need for security.

Similarly any sovereign power in order to maintain its control over the state harbours the fantasy of absolute and enforceable distinction between 'inside' and 'outside' and this aspiration of a state are complemented by the illusion of impermeability. In a world that is becoming more and more borderless, the idea of containment and isolation as a means of feeling secure drives the psychic craving for walls not just on paper but visible (Brown, 2010).

The need and demand for a wall can also be understood by the inherent relation between walling and Anxiety, ego and defence. Defence arises in response to anxiety about something distressing; this response is triggered by ego. Sigmund Freud (1894), in his paper, *Neuro-Psychoses of Defence* related defence directly to repression. Anna Freud (1936), in her theory of defence, *The Ego and the Mechanisms of Defence* claims that repression is not equal to defence, but is only a part of various mechanisms of defence.

These theories explain the process of bordering in relation to anxiety which leads to an increase in defence. All of these advancements have been significantly influenced by globalisation. State borders were affected by globalisation by becoming more permeable, but it also led to "more rather than fewer borders and has enhanced rather than lessened their complexity." (Popescu, 2011), and made them stricter than before.

5. DISCUSSION

Many studies have been conducted on borders that describe them as 'institutional constructs of state'. However, which often misses the socio-economic and cultural spaces of Borderlands. This is believed to lead to the "Xenophobic Nature" of the wall.

Nations invest so much capital into building such strong and tall walls, It still seem to fail. Why is it so?

The artificial and superimposed nature of borders acts as a hindrance to socio-cultural, and ethnic links and relations.

"Walls won't work because the border has long been a place of connectivity and collaboration. The border zone is a permeable membrane connecting two countries, where communities on both sides have strong senses of mutual dependence and attachment to territory. The inhabitants of this "in-between" place… thrive on cross-border support and cooperation, which have flourished (in diverse forms) over many centuries" (Dear, 2013). Yes, Walls are built to keep the 'ill' and 'dangerous', away, preferably on the other side of it.

Walls /barriers/fences slow down the process of these activities but do not necessarily stop them as they find a way to re-route and transform them into changing their methods. *"You show me a 50 ft. fence and I'll show you a 51 ft. ladder at the border"* (Janet Napolitano). Walls don't just fails, they tend to reroute the issue to be addressed. Hence, it becomes important to understand the Border in the first place.

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5.1 Decoding Borders

'Borders are everywhere'

Hence, the understanding of the border cannot be limited to the edges of the states as evident in wider social practices all around societies, as increasingly in relation to global space. Borders are not merely borderlands but a material manifestation of complex nation-building processes (Johnson, 2011).

The possibilities a border has to offer can be better understood by decoding it in the first place, why does it exist and how it exists.

Rigid borders and border management is born out of some conflict. If we try to locate all these hostile/rigid borders geographically, a corridor of global conflict ca be seen. When a line from the Tijuana-Sn Diego border is extended across the world map, a corridor of global conflict can be discovered that links world's most contested Border zones. These regions are most likely to be affected by violence, vulnerability, poverty, and migration are situated between the Political equator and Climatic Equator (Cruz, 2017)

Apart from geopolitical border, it has two more layers associated with it, emotional and technical landscape.

Bordering through emotional landscape includes National iconography, including national celebrations, and nationalized and memorialized landscapes.

Bordering through technical landscapes includes control and surveillance in order to Border management and control against issues like terrorism and illegal immigration.

The intricacies of the border can further be understood by considering it as a combination of four overlapping sets of Boundaries: geopolitical, sociocultural, economic and biophysical boundaries.

Based on above mentioned overlapping sets of boundaries Haselsberger puts forward two types of borders, Thick borders, and thin borders. If a border has more boundary sets, and if more and more functions are imposed on it, over time, it becomes more rigid and challenging to cross, both literally and mentally, and can be classified as a thick border. On the other hand, "thin" barriers allow for specific types of flows. This does not suggest that the border should be irrelevant or that it should be open to everyone and everything. Despite clearly defining a political and administrative region, a "thin" border also enables many variations of cohabitation to develop and emerge, regardless of state boundary that lies beneath. Cross-border regions such as these represent themselves as a zone of cross-border interactions. Knowing the underlying layers and identifying them may be helpful in a given situation to convert a thicker border into a thin one. (Haselsberger, 2014)

5.2 How to Perceive Borders?

Three key dimensions /potentials of borders/ bordering (Rumforth, 2011)

As "engines of connectivity"

Borders can actively promote mobility rather than restrict it. Borders have the power to unite and divide not just nearby entities but the entire world. Therefore, traditional conceptions of cross-border relationships require updating. The notion that "cross-border encounters are more likely to occur when the 'other side' is easily accessible, in contrast to when individuals reside farther away from the boundary" must also be contested by border academics.

Bordering should not just be the business of the Nation/State.

Regular people, citizens and non-citizens alike, are taking a more active role in the bordering industry. They have taken part in establishing, moving, or even correcting borders. These boundaries are present throughout society and are not necessarily limited to specific nation-states. These bordering procedures are not top-down, state-driven, they are bottom-up approaches. Although this effort does not always lead to boundaries that improve national security, it does give border workers new political and/or economic options: Borders serve many different purposes.

Borders as space for claims-making.

It has been widely recognized to be true with regard to nation-states, as national boundaries are not necessarily set by the central government. The phrase "border worker" can also be used to describe a wide range of claim-making actions, such as

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declarations of identity or citizenship, petitions for freedom of movement abroad, assertions of human rights, and political activism—all of which can be regarded as acts of citizenship. This makes it possible to address bordering not just from the perspective of securitization but also from the perspective of potential for humanitarian assistance targeted at individuals (refugees, migrants) who may congregate at the borders. These three dimensions of the bordering dimension, share some common themes, first, First, it underlines the social phenomena of bordering, and second, it highlights the value of personal experience while negotiating borders, third, it points at the need for vernacularization of borders.

Rumforth further puts forward two ways in which one can perceive the process of bordering.

First, *seeing like a state,* when one sees the process like a state, the border becomes a line of scrutinized defense and becomes a container of the state which then represents national identity and ideology, this process often leads towards de-humanizing the borderland.

Second, *seeing like a border*, when one sees it like a border it enables one to recognize that borders are weaved into the social and political aspects of society. It considers perspectives from those on and at the border as well as from those who shape them. It takes into account that not all borders are to be seen. When one starts to see it as the border, the focus automatically shifts to humanizing the border than isolation and othering, and the process of treating it as "borderlands" that is shared and acknowledges its intricacies. (Rumforth, 2011)

The question hence arises, if borders really are a 'construct', can they be treated as a social construct rather than a line that divides the 'same-ness'?. Can by understanding the intricacies and nature of Borders better, these spaces become a common ground between nations where the exchange of ideas and dialogues happens, and where people meet and celebrate common culture and history.

5.3 The case of the Berlin Wall

The Berlin Wall can be described as "A wall built against freedom of the people of a nation by its own country."

The emergence of the Wal.

During World War II, the Soviet Union allied with the United States, Great Britain, and France to defeat the Axis Powers. Following the collapse of Nazi Germany, each of the winning nations seized control of a particular area of the country. The allies nevertheless found themselves at differences over the idea of a post-war Europe, even though the divide was only meant to last for a brief period of time. As a result of their deteriorating relations, the Soviet Union founded the German Democratic Republic (GDR) in the East and the Federal Republic of Germany (FRG) in the West.

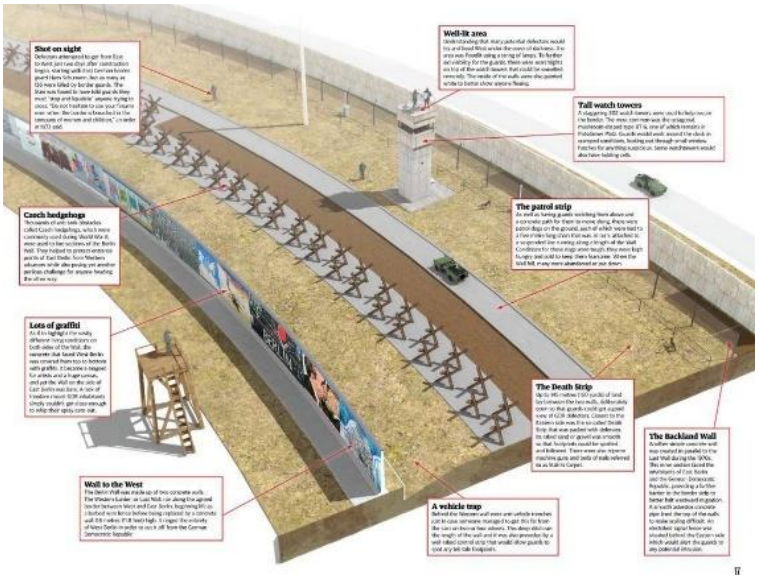


Figure 1: The Death Strip

(*Source:* All about History, The Berlin Wall, 2019)

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Western trade and travel were constrained by the Soviet satellite nations, creating a barrier that was nearly impenetrable, referred to as The Iron Curtain'. Things were particularly tricky in Berlin, the former capital of Germany. Even though the city was entirely located on GDR-controlled territory in East Germany, the postwar accord provided the allies joint administrative control. Due to this open border, the East German authorities were skeptical. In contrast to the East, which provided free healthcare and education, the West offered higher wages, more consumer goods, and more personal freedom.

Around 3.5 million individuals, or 20% of East Germany's population, had departed by 1961.The Berlin Wall was created after East Germany chose to seal off the border in order to prevent further losses.

In the years that followed, the barrier was reinforced with 302 watchtowers, 20 bunkers, security dogs, and even landmines. The death strip, a 100-meter stretch, was activated by a parallel barrier in the back.

The Fall of Iron Curtail.

By the end of the 1980s, significant demonstrations in favour of democratic rights and unlimited travel had been prompted by the democratisation of other Eastern Bloc regimes. East Germany made an effort to ease tension on November 9, 1989, by making it simpler to get travel authorizations. However, the announcement sparked a surge of East Berliners to the border checkpoints in the wall, forcing the guards to open the gates right away. In a huge outpouring of emotion and pleasure, tens of thousands of West Berliners greeted the East Berliners as they walked through. On the wall, people from opposing sides danced while toasting one another with champagne, music, and tears. Berliners literally tore down the wall with sledgehammers, chisels, and other tools.

Not long after this event, the Soviet Union fell. Remnants of this wall still stands today, and acting as a reminder that we are capable of tearing down whatever barriers we erect to restrict freedom. The fall of the Berlin Wall is regarded as a sign that the Cold War is finally over.

Aftermath

Friends of the Environment Germany (BUND) and other environmentalists signed the Green Belt Resolution of Hof about a month after the Berlin Wall came down in December 1989 to encourage lawmakers to establish the so-called Green Belt, an ecologically protected area along the old inner German border intended to symbolically reunite the historically divided land and its inhabitants.



Figure 1: Green Band in a Monotonous Agricultural Landscape, Southern

(*Source:* Bello, 2019)

The Iron Curtain Green Belt initiative demonstrates how a by product of war and struggle may be transformed into a tool for peace and reconciliation among several bordering countries.

ISBN: 978-93-89934-68-7

5.4 The case of US-MAXICO WALL

From the Pacific Ocean in the west to the Gulf of Mexico in the east, the international border between the United States and Mexico travels through a variety of environments, including deserts, forests, rivers, and crowded cities.

Around 65% of the border's 3145 km (1954 mi), or 2072 km (1288 mi), are unfenced due to difficult biophysical barriers including cliffs, mountains, rivers, etc. (Corey & Becker, 2017) (National, 2019)

The border was first established during the American-Mexican War (1858) over the possession of the regions that are today known as California and Texas.

Mexico lost 55% of its area once the boundary was established. Since then, the borderland has become a hotbed of strife for a number of causes, including:

1. Loss of territory.
2. The close proximity of two civilizations that are not completely compatible with one another
3. There are significant differences between the economies, cultures, and geographies of the two nations.
4. The lack of a natural geographic border, which permits the blending of tradition and culture, is a major issue. Separation, therefore, fails in the face of such complexity.

Even decades later, the international border was barely delineated by any stone markers, leaving the boundary wide open. Yet, thousands of undocumented immigrants have entered the US unlawfully throughout the years, which has prompted both Democratic and Republican US Presidents to erect obstacles. Major terrorist acts like 7/11, the attack on New York City in 2001, etc. have also ushered in a time of intensified border security. 2018 CGTN America (Business, 2019) (National, 2019)

However, there have been mixed reactions to this wall, some deem it necessary for National security whereas others feel the wall is a symbol of hate and racism.

The US - Mexico border remains the biggest Border Crossing in the world. A place where, Families Unite, Tourists arrive, Art thrives Commerce is also an important part of this border with tens of thousands of commercial and Private vehicles crossing daily (America, 2018).

Borderwall as Architecture: A Manifesto for the US-Mexico Border

Borderwall as architecture is a crucial re-examination of what the 650-mile physical wall that separates the United States of America from the United Mexican States is, and could be. It is both a statement in opposition to the wall and a forecast for its future. The book takes readers on a journey along a wall that slices through a "third nation"—the Divided States of America—by claiming that the almost 700 miles of the wall provide an opportunity for economic and social development along the border that stimulates its conceptual and actual demolition.



Figure 2: The Teeter Totter Wall

Source: Kirka, 2021.

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This project of Teeter Totter for instance was a harmless experiment, that converts the site of hostility into a site of celebration, where participation of both sides is required for such a collaborative effort to work. This experiment was indeed a success.

Although extreme, Ronald Rael's recommendations allow for a fresh, vivid perspective on the boundary. The studies carried out by his studio allow one to view the border wall as a source of different potential rather of seeing it as a blockage, barrier, or challenge. Some of the proposals in the book do make mockery of the wall, while others respect its presence (Sibi, 2021)

It is interesting to know that most of these proposals are in fact inspired by already existing activities that have happened on the stretch of the border.

5.5 India-Pakistan Border

India has a 7,516.6 km coastline, including island territories, and 15,106.7 km of land borders. Pakistan, China, Bhutan, Nepal, Bangladesh, Myanmar, and Afghanistan are its neighbours on its land borders.. India-Pakistan border stretches for about 3323 km. As mentioned earlier the border line was published on 17 august 1947, after the Independence by Sir Cyril Radcliffe.

The western part of the Radcliffe line which is between India and Pakistan starts from The runn of Kutch in Gujrat, traverse through thar desert in Rajasthan, then through fields of Punjab, and ends at the junction between Punjab and Jammu.

Many people refer to this border as the Berlin Wall of Asia. Since the country was divided into two as a parting present by the British Raj when they departed the subcontinent, on the basis of religion and political whims, it has been one of the politically unstable territories that fall along the Political Equator and a hotbed of instability and violence.

One of the by-products of this border is the No man's land, it is a straddling region between the two countries.

Corrective re-use of Border

The border has been witness to the mass exodus of people during partition. The crimes that have occurred during the event has left scars on both the countries, and the communal differences between the nations has been seen as an opportunity by the nations to manufacture patriotism among the masses through the ceremonies like Wagah border.

Despite the negative and hostile connotations attached to the border, the Border has also seen it being used as a space of congregation and celebration over the period of time. The No man's land changes to serve the people claiming it to accommodate a function that isn't business of the nations but that of its people.

The Border accommodates the meet of Lata Mangeshkar an Noor Jahan the singers of two nations, it facilitates the opportunity for a father and daughter to see each other,if not physically meet. The Border melas are yet another activity that brings people together, and Border haats let people use the No man's land as a space where they earn their bread and butter.

4. INFERENCES

The Literature Review and Discussion demonstrated that borders are boundary sets and that every border is unique, with its own history.

The above table discusses a few of the boundary sets in bordering process, which when coupled together may define the nature of a border. Hence, Borders can be seen as a combination of boundaries and bordering processes. The more number of boundary a border has it becomes more complex and thick making it difficult to cross and manage. However, it is not ideal nor it is possible to completely categorize borders or boundaries as each boundary has a set of different boundaries defining it.

This method of categorizing can however be used to understand the border a little better and helps us address the border issues better.

ISBN: 978-93-89934-68-7

Table 1: Boundary sets in Bordering Process

Border			*Bordering*		*Inference*
Border	***Nature***	***Function***	***Nature***	***Perception and practices***	
Geopolitical	Territorial and physical	Administration and management of territories are frequently included in the demarcation of a piece of land; Defence related to demarcated territory; Territorial sovereignty	Political presence, Political inclusion and exclusion,	Conceptualizing territorial identity;	The territorial identity is often established by 'othering'; The bilateral relations between the parties sharing the Border/Boundary often define the nature of this Border.
Geographical	Borders defined by natural or environmental elements (mountains, rivers,)	The transition between ecological systems, Natural inclusion and exclusion.	defined and if ever shifted by natural and external effects	Self-organization based on adaptability; the representation, practices, and organization are born out of contextual requirements.	Geographical borders often define human/group organization and the organic development of cultural ordering. The need of inclusion/ exclusion and defence is also born out of contextual requirements
Social/cultural		Group belonging, Social and cultural inclusion or exclusion. Protection of group identities and interest.	Establishing who belongs to a group based on certain common ground	Conceptualizing group identities through collective representation; Transfer of knowledge, culture and practices through social memory	Social cultural barriers or borders are not physical in nature but can be rigid to trespass/cross.

Source: Compiled by Author based on Haselsberger's paper (Haselsberger, Beatrix; Benneworth, Paul, 2010)

7. CONCLUSION

Even though there are definite definitions for 'Border', a general border theory appears to be both impossible and undesirable for two reasons. First, the borders of each state have changed over time and are determined by the surrounding circumstances and power dynamics. There is unlikely to be a general theory that would apply to all borders. The complexity of boundaries and bordering is what makes such a theory problematic more than the fact that the borders are distinctive (Paasi, 2011).

Given current world situation we live in a world separated along cultural, economic, political, and social lines, with physical borders serving primarily as markers of spatial differences (Popescu, 2012). Through this paper we discover Borders are made up of overlapping boundaries that serve several, frequently conflicting functions, roles and meanings. Although they appear to be stable, borders change with time. They don't "just happen," but rather are the result of a bordering process in which power elites align certain duties to one specific line in the area. The paper describes how borders are created, replicated, and justified, even after frequent alterations they still have a tendency to solidify in people's minds. (Houtum, 2011)

In order to overcome the negative effects of border, it is important to make it permeable to a certain degree, this does not imply that the border can be open for everything and everyone, as it would make it irrelevant.

To plan a zone of interaction at Border is possible and is being done or at least is being proposed, as seen in the case of Berlin and US-Maxico, but for that to happen it is important to address the geopolitical layer of the border and then address the layers of complexities of the border that makes it unique than the other.

Finding the relational geographies that are now disrupted and could easily develop into breeding grounds of political conflict is required as a second step in combating negative border impacts. New relational geographies should also be created in accordance with the current requirements of the inhabitants of either side of the border.

ISBN: 978-93-89934-68-7

Breaking free from the limitations of existing "container thinking" goes hand in hand with changing the perspective from boundaries to relational geographies. This is challenging, though, because container thinking and relational thinking are in reality connected. (Haselsberger, Beatrix; Benneworth, Paul)

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Analysis of Seat Characteristics on Choice of Seat by Guests in Restaurants in Pune

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ABSTRACT: Meeting up and socializing with family and friends while eating out, not only on weekends but also at mid-weekends has increased in Pune. There are many restaurants that are functioning and serving all over Pune to cater to this increasing demand. Restaurant are designed with interior ambience and spaces around having various types of seating arrangement in order to attract more guests. Restaurants spaces are designed according to their seating arrangements and which accommodate a lot of guests to take care of the financial viability of running of the restaurant. The aim of this research paper is to study the spatial reasons behind the choice of the seating chosen by the guest. The objectives of the paper are to study different types of seating layouts, design and material used for seating arrangement, surface finishes and materials, ambience making elements, type of space (open- semi open space), style and arrangement of seating etc in a restaurant serving snacks. The objectives are spacing of seating, arrangement of seating and material of seat. Stratified random sampling of four restaurants in Pune will be done depending on type of restaurants and number of visitors. Methodology used would be field study observation and using Interview as a tool. Documentation of layout, plans, photographs of the ambience would be the primary data collection. Observation is done at different timings in the morning and evening etc. Analysis of the study would be presented in graphical format and bar charts. People's preferences of choosing a seat will help in better designing of restaurants in terms of space planning and understanding special factors and elements affecting the behaviour of guests.

Keywords*: Ambience, Design, Material, Seating, Observation, Interview, People's Preferences.*

1. LITERATURE REVIEW

Factors that are influencing the guests service quality will help the managers to develop an appropriate strategy to improve guests satisfaction so that they revisit. Physical environment refers to the physical and spatial features of the environment surrounding a consumer activity such as interior, layout of furniture, décor, and artifacts, etc. These physical environmental factors can becoming a driving force for guests to revisit. Guest satisfaction is dependent on factors like food quality, loyalty, service provided, economy and ambience created which will enhance revisiting of regular guest. The spatial arrangement and interior design are one of the important aspects in a restaurant design which comes under the scope of an architect. An efficient and well-placed table and seating arrangement would be highly prominent to guests in a restaurant, where ample amount of space is essential for moving around and seating in comfort. In various typology of restaurants like snack-based restaurant, where people are regular guests daily or weekly. The driving forces for attracting people to visit the restaurant are different. For instance, if a restaurant is popular choice based on the cuisine or food quality then spatial arrangement or seating layout may not be the driving factor. Here, the guests revisit again and again on basis of food; taste. Based on the space or restaurant which has open, semi-open type of seating arrangement/layout wherein the space is more kind of inside and outside the restaurant whether the seating is next to surrounding features matters more while choosing seat as preference in restaurants.

There can be many other factors affecting like the location of seat, surrounding feature by pool, road, etc, seat next to the kitchen, seat next to the live music, seat next to the pleasing view, etc.

1.1 Selection Parameter

Considering/Including following spatial factors while choosing seat can contribute to study further on this topic.

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Table 1: Factors for Comparing

Sr. No.	*Factor*	*Sub-factor*
1.	Landscape	Waterbody, Plantation, etc.
2.	Interior	Lights, colour, theme, etc.
3.	furniture	Type of chair, table, fancy chair, etc.
4.	Finishes	Different finishes on table, chair, etc.
5.	Visibility	Giving a pleasing view
6.	Accessibility	Next to door, pool, etc.
7.	Services	Near the kitchen, away from washroom, etc.
8.	Entertainment	Live music, next to projector screen, etc.
9.	Serving based	Self-service, order and served

2. METHODOLOGY

2.1 Stratified Sampling

The typology selected for the research is based on '*Alakar*'/fine dining typology where the guests spent their most of the time-socializing as well as dinning. Stratified sampling of four restaurants of Fine-dining in Pune has been done for analysing the study of research. Looking the ambience, popularity, combined indoor – outdoor spaces these restaurants were selected for the study.

The selection of restaurants is been done based on the following factors like:

(a) word-of-mouth recommendations from people I know, (b) online reviews from customers, (c) brand reputation and popularity, (e) personal or past experience with the restaurant, and (i) location).

To identify the relative importance among the restaurant selection

2.2 Observation Study

Here observation study is used as the major method of data collection wherein these four restaurants have been observed at the timing where the guests arrived for dinning and have been noted while choosing their seat.

At first, the base plan of the respective restaurant with their interior, sitting layout and type of seat is been sketched, of which restaurant to be visited

The observation is done by sitting at unnoticeable place, from where all guests are noticed and observation of guests while selecting a seat is done

Documentation of Different types of:

- Seating furniture, sitting layout, surrounding feature, Architectural elements.
- Photographs, sketches and notes to be documented.

2.3 Interview Schedule

Another methodology; Interview is used as a tool for getting similar/same responses and to interpret conclusion in statistical/graphical representation so that it becomes easy to conclude for this topic.

While doing this interview it was ensured that their identity and information is kept confidential. The interview are taken at the particular.

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3. CASE STUDIES

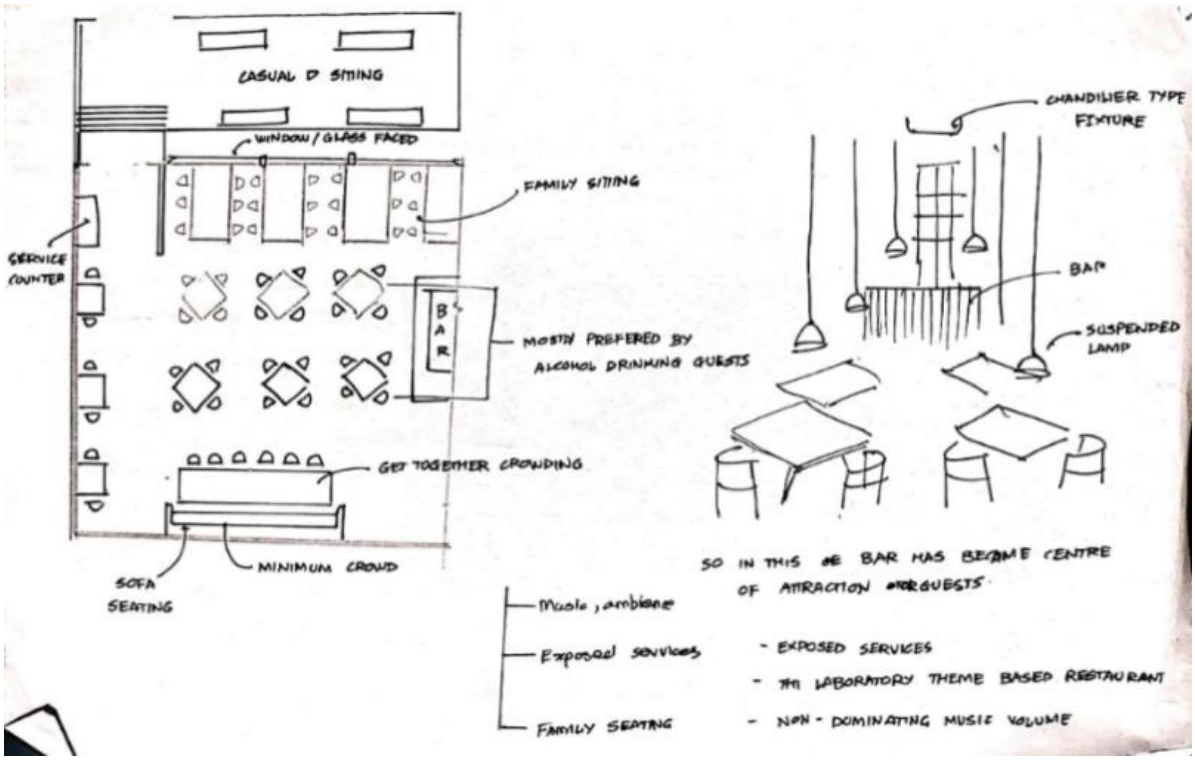
Following are the case studies representing.

3.1 Case Study 01: Restaurant A

This restaurant is popular, as guests who revisit the restaurant on the basis that it is best in their vicinity and for ambience. Architectural elements enhanced the indoor space attracts guests to sit surrounding them. The location of restaurant is closer to multiplex area, mall and it has ample parking space

Layout

The layout of restaurant is such that it has semi-open area outside which acts as waiting lobby. The group seating is in a set of two, four, and one of family or gatherings. It has single entrance and open display bar counter.



Live Sketch of Layout

Interior

The interior; had a theme based on laboratory, the services were kept exposed, the music was non-disturbing.

Furniture Layout/Design

The restaurant chair has back rest and hand rest with soft cushion while for a greater number of guests they have provided sofa seating.

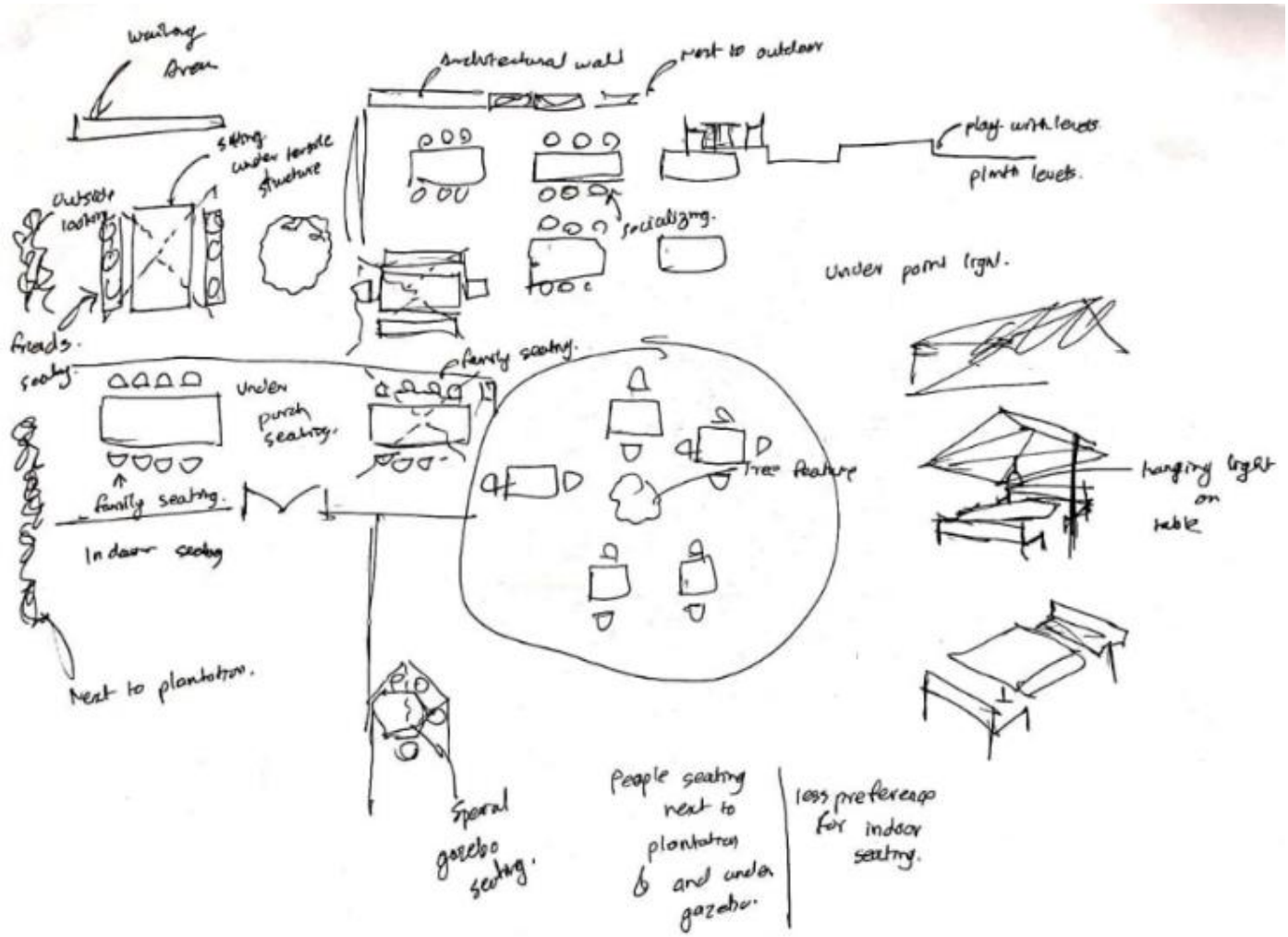
Preference of Seating

Here mainly the guest's preference was on the seat location.

3.2 Case Study 02: Restaurant B

The restaurant is located in the main city where it is known for its ambience.

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Live Sketch of Layout

Layout

The resturant has indoor dinning space as well as outdoor dining space. trees, private gazebo sitting. The seating was in set of two, four, one and six; which were under the porch, next to plant bed, tree, etc. The division of seating was done with the help of planters and trees.

Interior

The space was making the connection between the guests and nature with help of surrounding trees, the flooring was kept dark, use of lighting was at specific areas like on dining table. The tensile structure above dining table creates relation to more openness to the surroundings.

Furniture Layout/Design

The restaurant chair has also back rest and hand rest with soft cushion in combination with adjacent booth seating which was on hard ply surface.

Preferences for Seating

Private gazebo sitting was main element that attract more guests as it was observed while the arrival of guests. The private gazebo dinning seating was first preference of many guests as it was located next to plants and was more private. People preferred soft cushioning seat over the plain once.

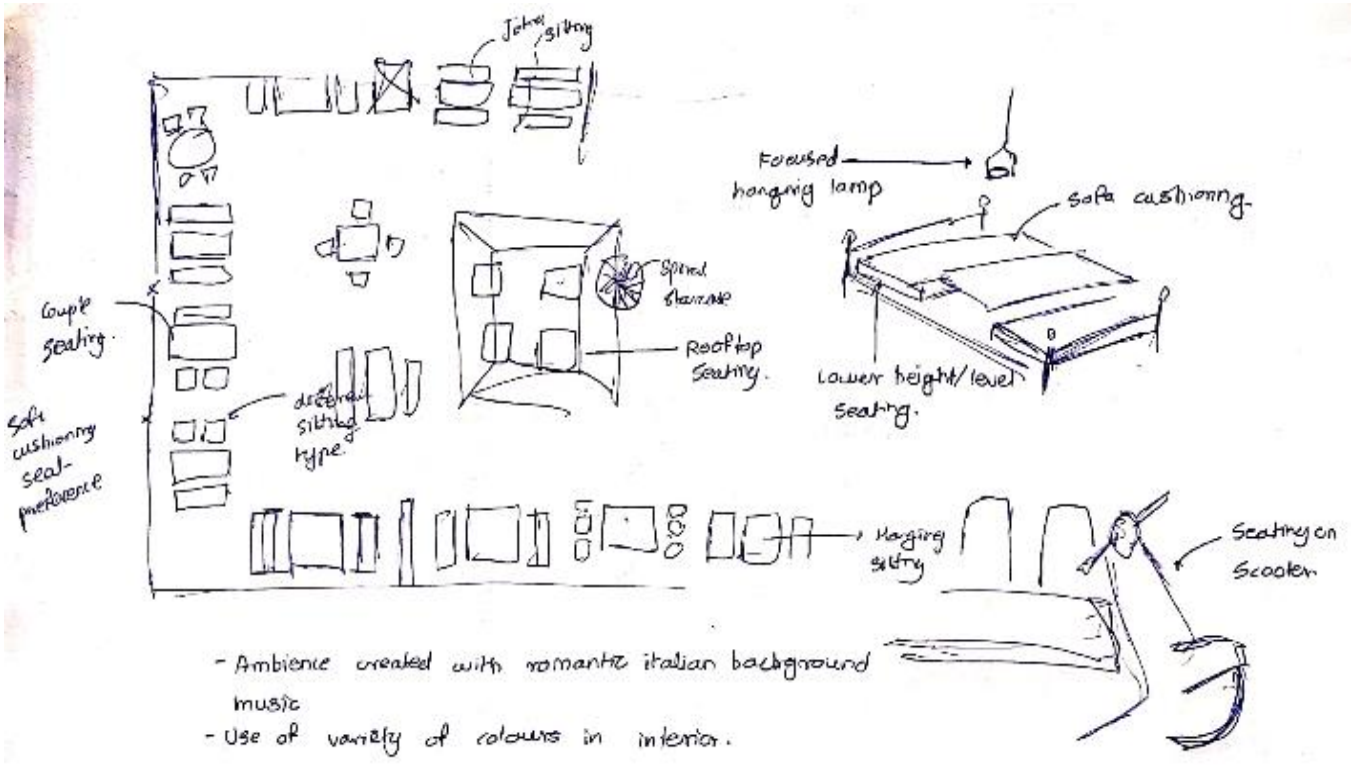
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3.3 Case Study 03: Restaurant C

The restaurant is situated at the top floor of the building. The restaurant has mesmerizing rooftop view of the city.

Layout

The seating was in set of four, six and one where it was observed that the seating which are along the periphery of the enclose space they are been occupied sooner. The periphery and mid court seating was been divided with artificial green lawn mat which goes along the peripher.



Live Sketch of Layout

Interior

The restaurant is a themed based restaurant which based on the combination of Italy-Punjab vibe. There are variety of colours used in the interior. The Italian music in background makes the space more romantic.

Furniture Layout/Design

This restaurant has a variety of many different types of seating with different anthropometry and different surfaces, textures. Most of the furniture used was from recycled once.

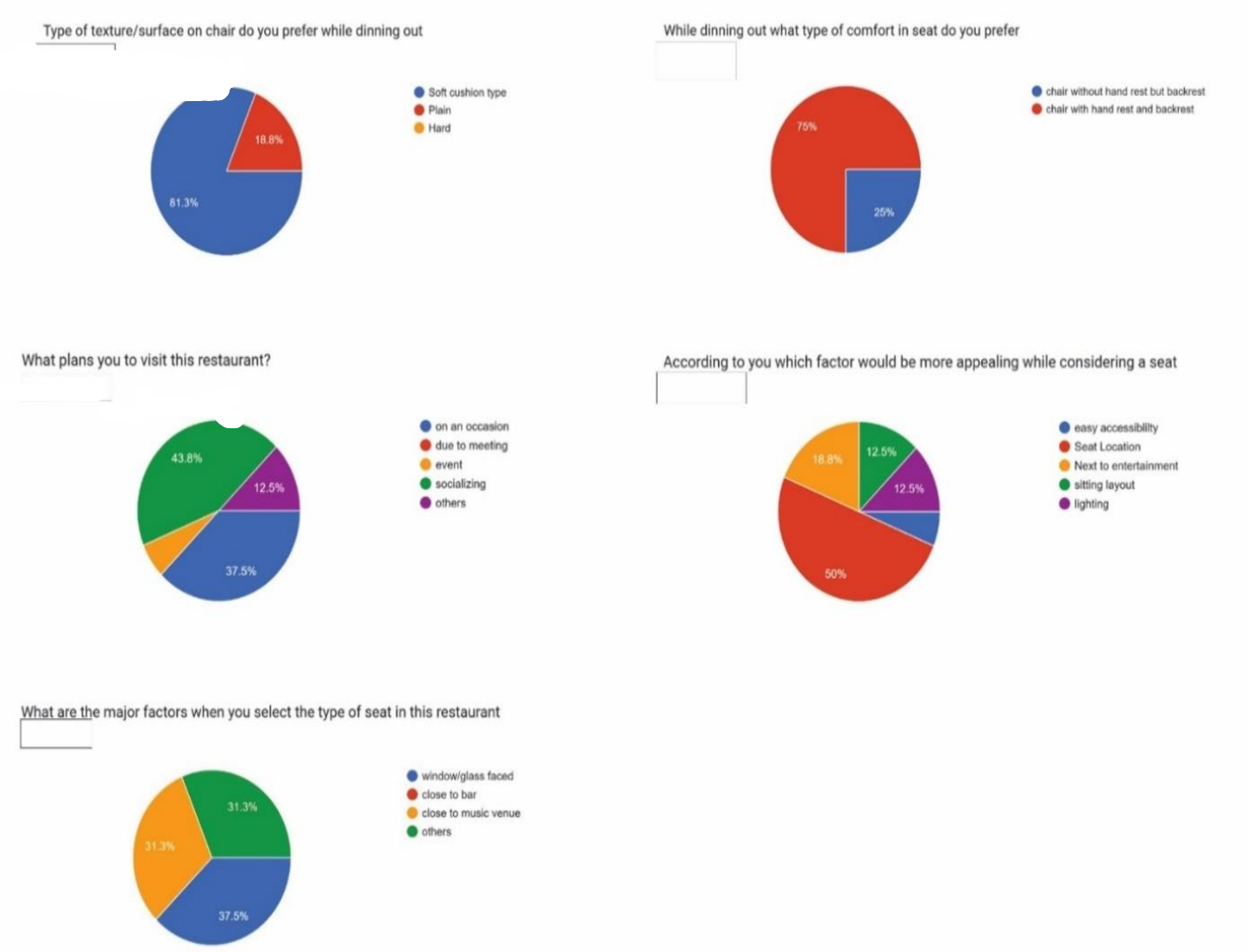
Preference for Seating

Here while selecting a seat, comfort and height became the main parameters as there were different seating options available.

4. ANALYSIS FROM THE INTERVIEW SCHEDULE

As per the analysis of interview questions, following graphical representation helps in getting the desired results that actually influence while selecting a seat in a restaurant.

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5. CONCLUSION

In Pune most of the 70% of guest obtain to prefer seat by Seat Location factor. By analysis of various methods, it has been prominently accepted that the major factor that the guest considers while dinning is the 'Seat Location' wherein the factor of 'Lighting' also plays a hand-by-hand role with it. Other factors may vary according to restaurants, ambience, food, etc. but in all of them 'Seat Location' becomes most preferable vital factor. While observing and concluding it with the comfort factor, guests like wisely; where there a chair with soft cushioning surface as well as hand rest and back rest adding it, is the most preferred option for the guests while choosing the seat. On the other hand, in the places wherein the restaurant is popular for the food/ambience/service guests do not prefer to choose a seat rather they would likely select the seat which is available at that time. Here again 'Availability of seat' becomes new considering factor to discuss on.

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MUD Architecture: Why Not?

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ABSTRACT: Man has evolved with nature from the day humanity existed. The life cycle of man and nature is known very well and its interdependency is such that one cannot survive without the other. The cohesion of both man and nature today is proved to be important in all walks of life and this relationship is today is being exploited with respect to all aspects of our needs. Exploring this cohesion, the construction industry has flourished from the existence of human settlement. The archaeological excavations and studies show how the use of natural resources for settlements have been evolved. All these factors of human settlement under one roof promotes what we call today 'Sustainable Living'. The term might be introduced recently but, the practice of sustainability has been there since the beginning of mankind. The building technology has been responding and evolving with the needs and demands but it has failed to acknowledge the nature and its resources which is why now the concept of sustainability has emerged. Existence of sustainability is nurtured deeply by technology and has come into existence due to its need hence, these roots and solutions of sustainability lies in the roots of existence. With so much efforts taken today for building sustainable houses, materials play an important role. Mud has proved to be one of the most efficient and sustainable material in the past and even today. But, why is mud as a building material becoming extinct? This paper reviews sustainable architecture and its aspects with respect to mud architecture and understanding their architectural pedagogy.

Keywords: *Relative Sustainability, Construction Materials, Mud Architecture, Human Psychology, Modern Technology.*

1. INTRODUCTION

Sustainability is a process; it is a way of lifestyle to be adopted. Sustainability in any aspect does not wipe the slate clean, it reduces the impacts and the damages that has already been made; it avoids creation of additional problems to the already existing environment. 'It is vital that we learn to live in what is present around us and stop digging our own grave.'

The concept of sustainability has been divided into absolute and relative sustainability. Absolute sustainability is the assessment in comparison with environmental capacity, whereas relative sustainability is concept of choosing least harmful option from the comparative assessment of different options available for the same issue or concern. For example, relative sustainability includes an assessment of environmental impacts of different materials available and choosing the most ecofriendly material. It is however known to us that the environmental impact at any given stage cannot be absolutely zero. Our existence in nature itself denies the concept of absolute zero. Absolute sustainability has remained a theory for various decades now. Whereas relative sustainability is a life cycle which we are trying to preserve or slow down today because of our extensive and carefree behavior.

When we talk about sustainability, not doubt that environment is the major parameter but, it is not the only factor. Sustainability has three main components and it important to satisfy all the three in order to achieve it. The three components are namely Social, Environmental and Economic. Food, shelter, clothing are three basic necessities of man out of which, shelter and its needs have drastically changing in today's world and are causing the major impact in terms of material, land use, technology. Housing many a times determines one's standard of living. To lower environmental impact compromising with one's standard of living will in turn reveal new sets of issues pertaining to the 3 components of sustainability. So instead of finding absolute solutions, finding relative solutions which will not compromise the standards but provide solutions would prove more useful.

We know that, sustainable materials are nothing but the materials which are environment friendly and are obtained from nature itself. Sustainability of material focuses on the entire process including manufacturing to the end result, which is often called as 'grave to grave'. This explains the importance of material in achieving relative balance. The housing sector has evolved ever since and had been using eco-friendly materials until the discovery of concrete and other technological

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advancement were made. We started from using shelters which were easily and readily available in nature like the caves and later we shifted to using different materials which were available to make our own shelter according to our own needs. This led to many innovations and discoveries for satisfying our greed.

1.1 Research Question

The transition and shift due to innovations have seen the use of variety of material but, mud is one such material which is widely use even today. But why has its use deteriorated over a period of time and is it viable as building material in future?

1.2 Design Objective

Understanding the relative differences between the two very similar concepts of sustainability is the first objective of the study. Gaining deep knowledge of mud and acquiring information about its history, construction techniques and carbon footprint is the focus of this study.

1.3 Aims

The paper aims to understand why did mud architecture start to deteriorate:

- Understanding sustainability and how sustainability is affected by use of material.
- To study mud as a construction material, its evolution and properties.
- To study, how can sustainability be achieved by using mud along with technology and
- Study alternatives to incorporate mud as a material in urban context.

2. LITERATURE REVIEW

Mud was the earliest form of construction material which dates back to, almost 2000 years. The archaeological evidences have proved that it was used in most of the civilization for constructions as well as other purposes. Many of the civilizations have been built on the banks of the river due to availability of mud, fertile soil. It has been performing as adhesive for mankind, helping him to stay rooted with nature; this developed a spiritual connection between man and mud. Learning the origin story and understanding its behavior may get us closer to the goal of reviving mud architecture.

Having a peculiar property that, when dried it strengthens but while it comes in contact with water or moisture, it erodes or collapses; mud has always managed to standout as building material. But eroding element of the material was a major issue found, which is why different civilizations adopted various approaches according to the climatic conditions to use it in construction. The region with abundance of leaves, straw started using these along with mud to hold it in place and increase the binding strength. The lack of availability of stone in many areas forced into creation if sundried mud bricks.

Mud as an architectural material indicates the development patterns of various communities through the process of urbanization. They developed and made the necessary development in this particular architectural style as per their needs. This solution seemed to accurate and sufficed the requirement of user during that era. But as the development in other streams took place the architectural requirement changed drastically; this sudden change of requirement seemed much more difficult in mud architecture due its auxiliary issues.

Mud started to become a vulnerable material when it could not satisfy the demands of new age. Due to low moisture resistance, it gets damaged easily by wind, rain and flooding. It proved to be relatively fragile during natural calamities. The low tensile strength of the material causes it to fall apart easily and also it can be breeding ground for bacteria. Roof construction using mud was very difficult due to all these properties and it required high maintenance from time to time. Mud earth is very ideal for keeping the inside cool in the summers but, due to the low thermal resistance, heat cannot be trapped inside which in some cases was an issue. As people explored, they found new issues which directed them to the use of new material which may or may not be sustainable but it acted as a solution for the current scenario.

In spite of number of difficulties in mud architecture we still have some place reserved in our heart for mud architecture. This bond of ours with mud runs very deep in our veins. The construction technique has greatly affected our emotional response and altered how we perceive spaces. According to human behaviorists we find it very difficult to cope up with changes which has an emotional background. This exactly is a reason why the concertation of our mud architecture has adversely impacted on those connected to sense of these earthen structure.

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2.1 Why Should Mud Architecture be Revived?

Mud is a versatile material and can be used in various forms from internal spaces, external building to using it as a construction material. It is economic, practical, functional as well as aesthetic. The characteristics of mud are such that depending on the mud available and the availability of a supporting material and technology, different types and uses can be demonstrated. The ancient use of mud does not contribute or have a huge impact on nature nor does it cause deforestation, pollution by any means of fuel consumption. There are many advantages of mud over other construction material such as

2.1.1 *Energy Consumption*

The energy, fuel used in extracting mud and using the same is very less as compared to the other materials like cement, concrete, bricks because mud is obtained naturally and can be found in abundance in most of the regions.

Table 1: Unit Energy Consumed Depending on Quantity of Various Materials

Building materials	Quantity	Unit Energy (kWh)
Cement	Sack	50
Concrete	Cubic meter	400-500
Fired brick	Cubic meter	1000
Adobe	Cubic meter	5

(Energy consumption data of various materials retrieved from center4affordablehousing.org/wp-content/uploads/2019/04/mud-architecture.pdf)

2.1.2 *Recycling*

The recycling process of construction materials is very expensive and requires lot of energy consumption whereas; mud can easily be recycled while retaining its properties as it was obtained. There is very less fuel and labor which is required to do the same.

2.1.3 *Abundance*

The availability of soil in abundance is debatable in many cases but, in most of the places in India there is soil available and, various kinds of soil are used in construction like the red mud can be used to make bricks.

2.1.4 *Demand*

There is a huge demand in the housing sector for utilizing the resources in the urban as well as rural areas and hence it is very essential to give the best effective and sustainable solutions to limit the impact on environment.

2.2 Adoption of Mud in Construction

The evolution of mud is a huge part in the construction technology and helps us to analyze how people earlier developed this industry based on their problems and finding solutions to those. Use of mud in construction and its issues are very well justified but usage did not stop, it evolved by adding or finding solutions. There are different techniques to still use mud in spite of its drawback because the environmental impact and the comfort provided by mud is not found in other materials.

2.2.1 *Cob*

Cob is a building material which is combination of sub-soil. Cob is a construction technique to use mud. It is the one of the most inexpensive and easy to learn techniques and also it does not contribute to pollution or have any environmental impact as such. It is also completely recyclable and therefore sustainable. Cob is basically a mixture which contains 25–30% clay with around 70–75% sand and straw. This was basically done to increase the strength of mud and also it hardens and shapes well after it is dried out. These techniques do not require skilled labor but is an intensive process. The materials used are all locally available therefore, no transportation is needed.

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Figure 1: Use of Cob in Construction

(Example of cob used in construction retrieved from thearchinsider.com/mud-an-eco-friendly-construction-materials/)

2.2.2 *Adobe*

Adobe is a popular mud construction technique used. They are mud bricks which are sun-dried and hence do not consume fuel unlike the traditional clay bricks which are produced in kiln. Adobe uses 25-30% clay, 70-75% sand water and other organic materials, manure, straw, etc. the mixture prepared is poured into a container to obtain the desired brick shape and then they are sun dried for few days. While drying, they are sprinkled with water to retain some moisture. These are very beneficial and have great thermal mass.



Figure 2: Use of Adobe in Construction

(Example of adobe used in construction retrieved from thoughtco.com/what-is-adobe-sustainable-energy-efficient-177943/)

2.2.3 *Rammed Earth*

Rammed earth is similar to cob construction it uses earth, lime, gravel, etc. but, unlike the cob walls, they are more uniformed in widths because they use framework. It consists of 15-30% clay, the rest is a mixture of sand, chalk, lime and gravel.

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2.2.4 *Wattle and Daub*

This is another integrated technique to use mud along with other stabilizing materials. Wattle is actually a woven lattice and daub is a mixture of mud with other binders, aggregates. The binders like clay, lime, chalk hold the soil together. Aggregates provide stability and strength. Straw, hay such materials prevent shrinkage and flexibility. It is one of the ecofriendly types of construction.



Figure 3: Use of Wattle and Daub Type of Methodology in Construction

(Example of wattle and daub used in construction retrieved from thearchinsider.com/mud-an-eco-friendly-construction-materials/)

2.3 Integration of Modern Technology in Mud Architecture: Stabilizers

The issues arising with the use of mud were tackled very well by combining them with other materials, stabilizers. When there were cases where the mud available is not suitable enough the soil is manipulated by adding some stabilizers to it. The stabilizers

- Enhance property of soil
- Increase the tensile strength
- Increase the shear strength
- Reduce the shrinkage

3. CONCLUSION (TIMES NEW ROMAN 11)

Survey was conducted between architects as well as students pursuing architecture to study and analyze the use of sustainable material in construction and also to review the perspective of use of mud in current modern scenario.

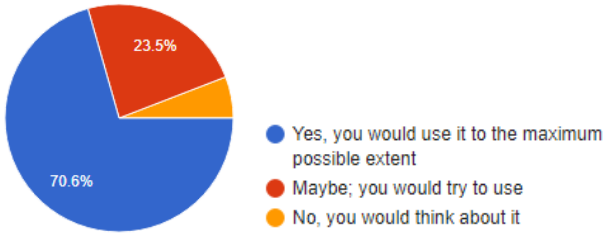


Figure 4: Result of Survey Conducted Showing Percentage of Use of Sustainable Material in Design

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The survey results conclude that maximum people (70.6%) people would try and incorporate sustainable materials in their design but, why there is a gap between theory and the practical application and one of the main cause could be lack of awareness of the alternatives and technology that can help us achieve sustainability.

Technological advancements are boundless but no advancements can change the original properties or characteristics of a given material. In case of mud, we can stabilize it and can alter it to our use but we cannot complete change its original property i.e., inducing tensile properties required for long span construction is merely just a hypothetical concept. Hence, here we bring in the concept of relative sustainability.

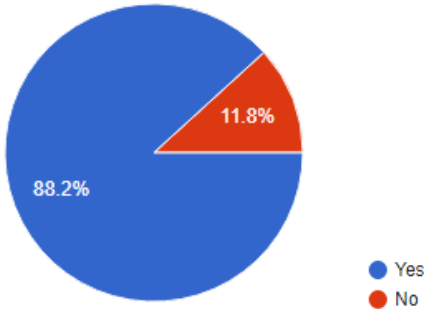


Figure 5: Result of Survey Conducted Showing Percentage of People Agreeing to the Concept of Relative Sustainability

Knowing its restrictions in high rises, we cannot promote use of mud in long span structures. But, using it in small elements and introducing it with alterations in technology where ever possible, may change todays scenario and have potential to create very evident and remarkable achievements.

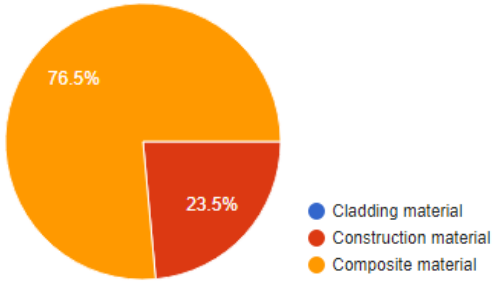


Figure 6: Result of Survey Conducted Showing Percentage of People Using Mud in Different Forms

The survey also finds that 58.8% people feel that mud bricks are not sustainable when compared to other alternatives that are currently available as it mostly uses the top soil. This is because today more people agree with the concept of relative sustainability which is still emerging. Keeping in mind relative sustainability in mind, from this survey we conclude that people want to use mud as a primary construction material along with modern technology but it is also evident that there is less awareness about these advancements and alternatives.

3.1 Modern Alternatives of Mud as a Material

1. *CSEB (compressed stabilized earth blocks)*

The CSEB are blocks used in construction which are manufactured using local soil and stabilized along with small amount of cement (upto 5%), sand and water. As compared to the baked bricks which consume lot of fuel and emit carbon, these are a great alternative which can be adopted. The blocks are formed by compressing in Press which are manual or motorized and then cured to achieve compressive strength. The advantage of these blocks is that they can be manufactured into desired form and customized according to the use. Also, the top soil can be saved as these are made using the deeper soil. The design mix is formed after analyzing the local soil that is available. The CSEB blocks allow us to build thinner walls which generally are not possible using soil.

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Figure 7: Use of Compressed Stabilized Earth Block in Construction

(Example of how the Compressed Stabilized Earth Block in construction are made retrieved from Compressed Stabilized Earth Block)

The advantages of these blocks are:

- These help in building local economy and are cost effective.
- They reduce the cost of transportation required.
- When compared to burnt clay bricks, they are 16% cheaper per sq. Meter.
- They require 50 to 60% less mortar
- They save the time required for shuttering and also it does not necessarily require plaster.
- This brick provides a unusual ability of absorbing the atmospheric moisture which results in creating a comfortable habitat for the users.

Life Cycle

The maintenance cost of CSEB blocks after construction is very low. These blocks can be kept exposed, they do not require plaster. The compressive strength and durability of the structures is proven to be similar to the burnt clay bricks. These blocks are recyclable and are also decomposable. After demolition, if left as it is, the bio-chemicals of the soil will destroy the soil cement mix within 10–20 years and CSEB blocks will be back to its cradle stage.

Limitations

- Generally used for load bearing structures or filler walls, it is not suitable for high rise.
- Very less compressive strength.
- To have best quality blocks, soil of that region should be tested and then the design mix should be customized.
- The laborer needs to be trained.

Table 2: Comparative Analysis of Various Types of Blocks

Product and thickness	Number of units (per squar meter)	Energy conception (MJ per square meter)	Carbon dioxide emission (kg per square meter)
CSEB	40	110	16
WIRE CUT BRICK	87	539	39
COUNTRY FIRED BRICK	112	1657	126
CONCRETE BLOCK	20	235	26

(Energy consumption data of various materials retrieved from center4affordablehousing.org/wp-content/uploads/2019/04/mud-architecture.pdf)

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Irrespective of the scale at which sustainable materials are used it has relevance when we look at it as a whole. Every material will always have a set pair of advantages and disadvantages which changes with growing the research and technological advancements. To increase advantages of this materials it is important that we promote these advancements. So the question is still relevant; why not mud?

'Change is important, irrelevant of individual assessment, at larger scale every change has an impact.'

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Development of a Hill Station: In the Organic Town of Gangtok, Sikkim

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ABSTRACT: Gangtok, the capital of Sikkim, is situated at the foot of the young fold mountains of Kanchendzonga. The beauty of the place as well as the topographical stability has been tampered with due to the careless urban growth by the inhabitants of the place. Structures have emerged along the capital's linear National highway 10 which has caused crowding and urban sprawl. This research paper aims to understand the impact of urbanization as well as the reason for the uncontrolled organic growth of the hill station which may further lead to consequences such as the loss of cultural identity and congestion in the already compact town of Gangtok.

Research relating to the similar topographical features has been made which brings to light the comparative state of the capital with other such places. The research also highlights the various guidelines which were created to better the conditions of the capital. Accordingly, an understanding through research and analysis has been made as to whether or not the guidelines have been followed. The methods used for research includes case studies and reference to documents created as a master plan for Sikkim. Qualitative research through interview, surveys and polls, and quantitative surveys through the reference of various data and papers have been made.

Keywords: *Urban Sprawl, Impact of Urbanization, Guidelines and Byelaws, Hill Station, Development.*

1. INTRODUCTION

Construction in a hill station surrounded by mountains needs careful and guided building techniques. Landslides or earthquakes are always dangerous, especially infragile lands such as the state of Sikkim in India. Development of such a fast-growing state is inevitable hence the construction in such lands should be carefully monitored and the growth should be controlled.

Currently, the once-green organic state of Sikkim is on its way to becoming a green hill station at par with the polluted concrete flatlands. There are major problems that are in dire need of a solution such as the unmonitored erection of non-earthquake resistant buildings and also the danger of loss of identity of the culture of Sikkim owing to the concrete jungle it is developing into.

1.1 Urbanization

Urbanization refers to the concentration of human populations into separate areas which might be caused due to various reasons including migration for work opportunities etc. This settlement ultimately leads to the transformation of land for residential, commercial, industrial and transportation purposes. It can include densely populated centers, as well as their adjacent peri-urban or suburban fringes. Also when a majority of the community turns from an agrarian-based society to an industrial economy and from a homogeneous society to a large heterogeneous mass it is termed urbanization. Uncontrolled growth of urbanization can lead to something called urban sprawl.

"Urban sprawl, also called sprawl or suburban sprawl, the rapid expansion of the geographic extent of cities and towns, often characterized by low density residential housing, single use zoning, and increased reliance on the private automobile for transportation." (i)

1.2 Aim

To study the uncontrolled growth of the RCC building and haphazard expansion of built structure in Gangtok since post-merger of the Kingdom with the country of India in 1975 through extensive research and analysis.

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1.3 Objectives

1. To understand the root cause of the sudden spurt of a planned town to an urban settlement.
2. To analyze the effects caused due to uncontrolled urbanization, on the people, environment, landscape and culture.
3. To provide solutions based on case studies, comparison, the urban development department, and the general ideas of the public.

Scope and Limitations

The study has been carried out to understand the spurt of the RCC structures and analysis of Gangtok. This research paper only aims to deal with the development of the capital Gangtok in terms of the past and current construction methods and its impact on the terrain and not the entirety of the State.

Background Study

Sikkim lies in the zone 4 category out of the earthquake zones. Zone 4 is characterized by high-intensity earthquakes and the places lying in this zone can experience earthquakes in destructive magnitudes of 8 and above.

Heavy constructions in the fragile soils of Sikkim can cause a double-fold threat to the looming destruction that an earthquake can cause. The town of Gangtok is the most urban out of all the other places in the state and the most dense, proper planning schemes have not been implemented yet though guidelines regarding the same have been mentioned in the papers of the "Master plan" of Sikkim drafted in 2014 under the JNNRUM scheme.

These concrete block constructions mostly defy the bye-laws stated by the government and are still to date not catered to. The diverse identity of the capital is buried under this concrete jungle and causes a threat to do the same to the peri-urban and the village area.

Following the footsteps of other nations such as Bhutan and Bali, a few reforms can be implemented which can safe guard the cultural and the traditional identity of the state.

2. LITERATURE REVIEW

As stated in the research paper about the urbanity in Sikkim, the eastern district is the most settled with about 80% of the population in the Urban area. The problem of migration is increasing in Gangtok town due to the stream of unemployed and under-employed migrants from other parts of the state. This leads to a major problem of shortage of houses, water scarcity, traffic congestion etc. Thus, sustainable development planning is required based on the fundamental principle of optimum land use. (ii)

In the master plan of Gangtok, 2014, the geological survey has explained that the soil in Sikkim mostly consists of schist and phyllits, these rocks are not strong enough to even be used in the construction industry. These minerals are more susceptible to erosion and weathering.

The population expansion is such that in 3 decades from 1991–2021 there has been an increase in population by almost 2 lakh people and according to the Master plan the population of Gangtok by 2041 is likely to double leading to a whopping 4 lakh people. It is also said that the present area of Gangtok can likely hold only about 10% of this population. For the rest to fit in the boundaries will have to increase.

In the CMP papers of Sikkim published 7 years prior to the master plan, a satellite town of Ranka was already suggested catering to the above problem but it has yet to be implemented. (vi)

3. METHODOLOGY

The present research paper consists of qualitative, quantitative and descriptive data based on primary and secondary data collection.

Table 1: Phases of the Research Paper

Phase 1	History, Urbanization, Demographics, Present conditions, Survey
Phase 2	Solutions based on the problems mentioned

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PHASE 1

Population and Growth

Sikkim lies between Nepal in the west, Bhutan in the east and China in the North and the north east. In the south it shares its borders with West Bengal in India. Sikkim was a protectorate of India where India assumed responsibilities with the Kingdom for external affairs, defense and strategic communications of Sikkim.

Between the years of 1961 to 1981 the number of towns in the state surged from 1 to 8 (ii) but it is after the merger of Sikkim with India in 1975, the population of the state increased drastically. The present population of the town is 2,80,896. Mentioned in the table below are the projected population of the town and the housing units required.

- Population Projected for year 2041 : 5,26,704
- Additional Population by horizon year 2041 : 2,98,569
- Present Housing Shortage (No.) : 11,081
- Need for housing units between 2018 and 2041 : 59,359

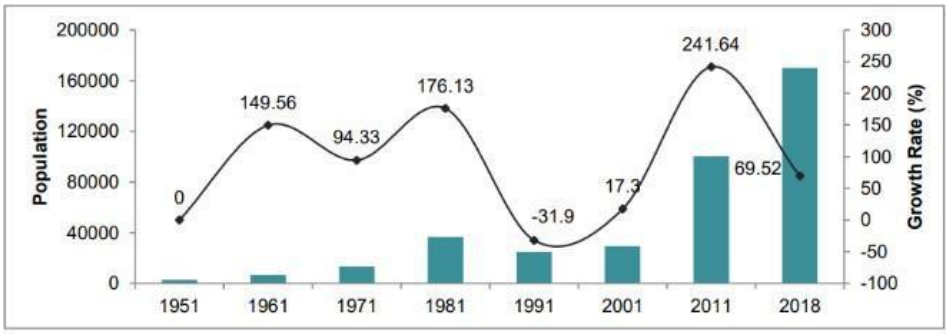


Figure 3-1 Population and Growth Rate of GMC
Source: Census of India, 1951-2011 (DESM&E, 2018)*

Figure 1: Graph Showing the Urban Growth of Gangtok

The outer boundary of Gangtok Municipal Corporation (organization taking care of sanitation as well as the licensing of shops) along east runs from Tashi Viewpoint-Himalayan Zoological Park, Bulbuley up to 2nd mile Check Post along JN road. Along South it starts from the Dichiling Jhora follows Roro-chu up to Seti pool steel bridge along Ranipool – Pakyong road. Western boundary runs from the confluence point of Roro Chu with Rani Khola runs along the Rani Khola till Takste Jhora near Penlong. Northern boundary runs from Taktse Jhora to Tashi viewpoint along North Sikkim Highway. Gangtok is a linear city that has developed along the arterial roads, especially National Highway 10. (iii)

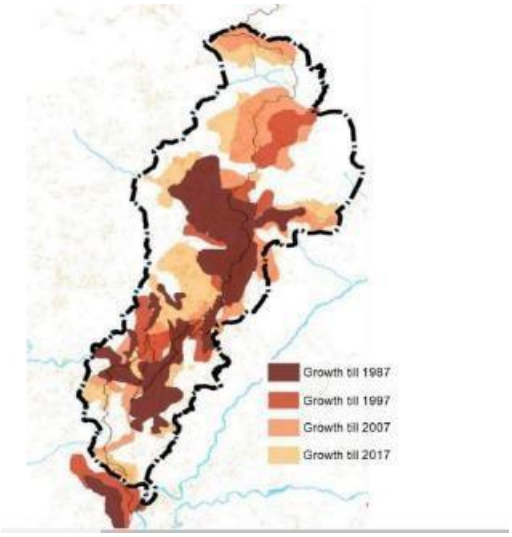


Figure 2: Graph Showing the Urban Growth of Gangtok

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The total area covered by the GMC (Gangtok Municipal Corporation) is currently 15722.59 hectares. At present according to the Master plan (Master plan oct 2020 page 25) Gangtok has been divided into 17 sectors following the Jnnrum reform out of which Shyari-Tathangchen, Tadong, Dara gaon, and Arithang are the most dense.

Most of which falls under medium low – medium high landslide prone zone. 17 wards fall under urban area.

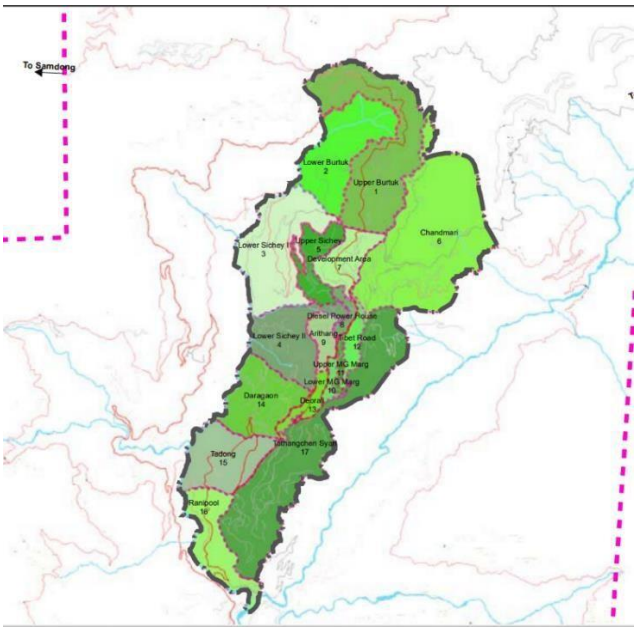
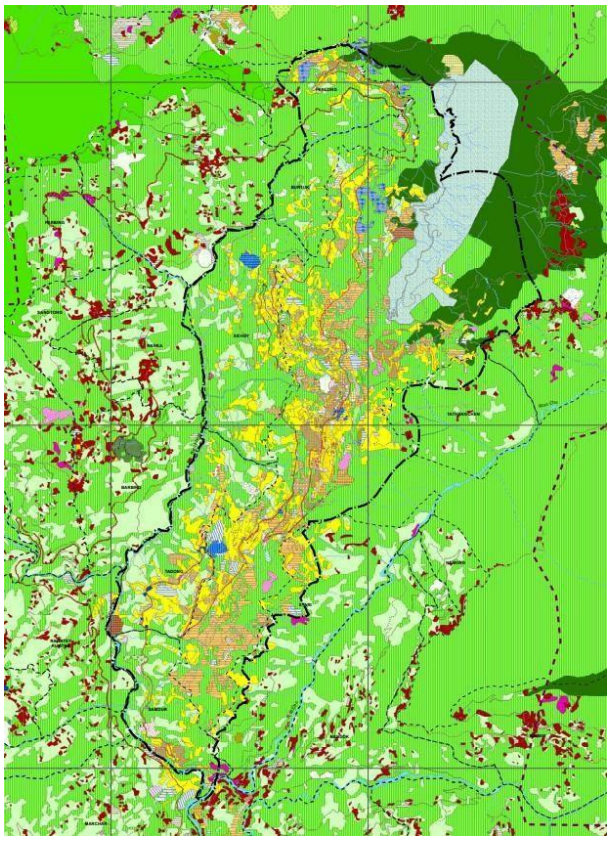


Figure 3: Figure Showing the Wards of Gangtok



Land Use Map of Sikkim, 2018

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Some sectors and their population are provided below in Table 2.

Table 2

	Areas	***Population***
1.	Syari-Tathangchen	11,028
2.	Dara Gaon	9,605
3.	Arithang	8,212
4.	Burtuk	7,166
5.	Chandmari	6,177

About 90.93% i.e. 14297.42 hectares of the total Gangtok Master Plan Area constitutes the undeveloped land use, which is under agriculture, green area, water bodies, wasteland specific land use, eco sensitive areas and vacant land. Majority of land in the undeveloped land use category consists of land under green area, which is predominantly under tree clad/plantation area. Out of the total, agriculture land constitutes about 13.47% of the total Gangtok Master Plan Area. Large percentage of undeveloped land use in the Gangtok Master Plan Area is primarily because of the inclusion of large areas of rural character in addition to the existing city area. Land is very scarce resource in Gangtok, only 9.34 ha of vacant land is available that is less than 1% of the developed land.

Geography

Most of Sikkim, including Gangtok, rests on Precambrian rocks which contain foliated phyllites and schists; slopes are therefore prone to frequent landslides (iii). Surface runoff of water by natural streams (*jhora*) and man-made drains has contributed to the risk of landslides. According to the Bureau of Indian Standards, the town falls under seismic zone-IV (on a scale of I to V, in order of increasing seismic activity).

The rock consists of phyllites and schists and therefore the slopes are highly susceptible to weathering and prone to erosion.

Urbanization

Factors determining the urbanity of states in India:

1. They should have a minimum of 5000 people.
2. Atleast 75% male workers are engaged in non-agricultural activities.
3. Minimum population density of 400 persons per square kilometer.

   Percent of Urbanization: PU = U/P × 100

   PU = Percent of Urban

   U = Urban Population of an area. P = Total population of an area.

   U = 1,70,000 and P = 228136 (Master plan Gangtok 2014)

Hence the Percent of Urbanization in Gangtok is 74.51% in comparison to the other areas of Sikkim. Effects of Urbanization as a whole.

PROS

The rise in the economic activities in all the sectors and rise in the literacy rate play important roles in the urbanization of the state.

Towns and bazaars act as large hubs for economic activities.

The rural products are brought into town and are sold.

Urbanization allows more people to have access to environment-friendly facilities and services at affordable prices.

Growth of Tourism

Urbanization gives rise to innovation, including green technologies.

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CONS

Research Paper: Problem of employment, environmental pollution, congestion and transportation, shortage of housing and solid waste disposal.

- Lack of natural spaces and planned natural spaces.
- More traffic issues.
- Shortage of housing
- Solid waste disposal waste in Gangtok

Effects of Urbanization on Architecture

If not planned properly it could lead to the loss of identity of a space.

Maintenance of Structures

Clustered settlement in a space can lead to there not being enough places to breathe.

Specific to Gangtok

As mentioned only 9.34 ha of vacant land is available which is less than 1% of the developed land. It is predicted that to accommodate the projected population, the city will have to compromise the areas under agriculture and vacant land and increase the density in existing developed areas. The areas lying beyond municipal limit need to be explored and possible areas for future expansion needs to be identified. On the other hand, the rural part of the planning area has not seen much of a development as compared to its urban counterpart. Areas which come under undeveloped areas are as follows: (iii)

1. Agricultural land
2. Water bodies
3. Wastelands
4. Green and eco sensitive areas
5. Tree clad area
6. Vacant land

The Gangtok master plan area lacks planned residential colonies and the organic growth has resulted in urban sprawl and inefficient utilization of land. Although the city has existed for a few decades now, the urbanization has been taking place in haphazard manner on and along the major road corridors.

The existing density of developed area is 160 pph and for the next 20 years, it is assumed that at the rate of 200 pph,

30% of the additional population of persons will be accommodated within the existing (already) developed area. This rate of PPH indicates congested growth of the city including outgrowth.

The urbanization could have grown drastically after the founding of various departments, after the need of labors, after founding of universities such as SMIT, SMU (1995–96) etc.

Many factories such as the wai wai factory, RKS fabricators (Steel manufacturers), Yuksom breweries (Beer manufacturing companies) have come up since. Even small towns like Lachen and Lachung attract people from various other parts of India. (2006–2003). Hydropower industry also played a big role in the attraction of workers.

Sikkim had been a focal point for the people from Nepal and Tibet and also a place for opportunities for people from various parts of India. The population in Gangtok itself drastically increase due to the migration of people from rural to urban areas.

There are Broadly 2 Users: Permanent and floating. Most permanent settlers (apart from people holding a COI of Sikkim) have come to Sikkim because of its:

1. Scenic beauty
2. Employment
3. Their ancestors have been in Sikkim since age old times.
4. Refugee & Immigrants
5. Trade

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Floating Population

The floating population refers to people who leave their permanent home for work, study, etc., and go to live and work in a different place:

1. Tourism
2. Business
3. Students

According to the migration status of people, 68% were native residents of Gangtok and 32% migrants. A small survey indicated that their ancestors had come to Gangtok in hopes of job opportunities, some had come for trade and a few other for their interest of moving to a hill station. (iii)

Urban Features: Mostly wooden and Ikra houses were seen in the state capital before and after the merger with India but RCC buildings were also already in the capital by that time. According to sources, Gangtok never had a proper town plan to develop into, people took the opportunity to build small shops and stalls in areas most convenient to them which led to the haphazard growth of the town. (UDHD Department)

It is stated that the soil in Gangtok is deemed to be prone to frequent landslides where surface runoffs and Manmade drains contribute to the risk of the same. The master plan 2020 of Sikkim refers to the following areas as landslide-prone as well as earthquake-prone:

(a) A portion of Tathangchen b. A portion of Syari
(c) Most of Arithang
(d) Most of Chandmari
(e) Most of Burtuk and Bhojoghari

Referring to a document published by the UDHD department on the 12th of February 1996, the following areas were classified as unsuitable and unsafe for further construction of human habitation

(a) Tathangchen
(b) Chandmari
(c) Panihouse
(d) Arithang
(e) Bhojoghari

Yet there is noticeable growth of infrastructure in the said areas, and technical interventions have been taken to stabilize the lands so that the construction could commence in the areas.

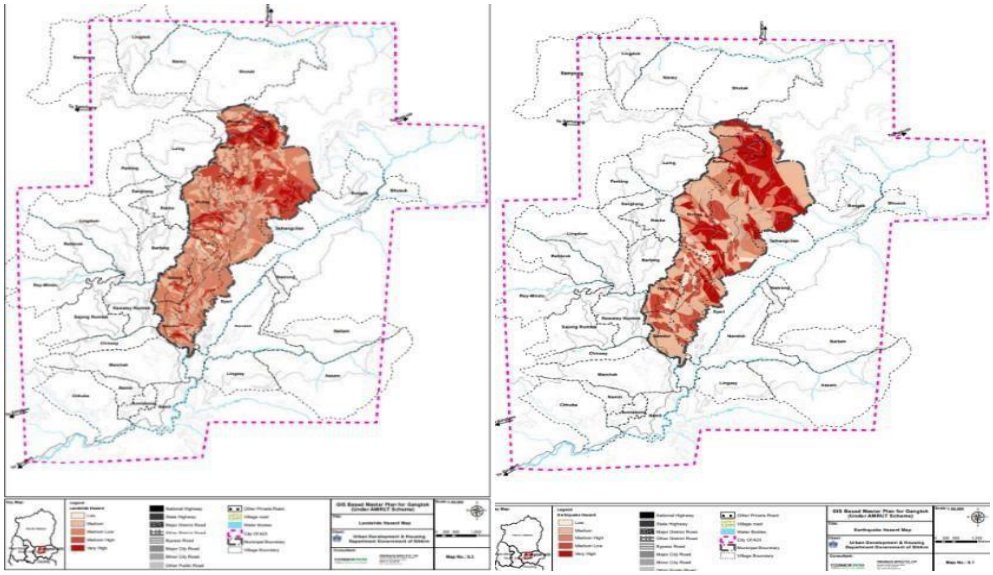


Figure 4 and 5: Showing the Earthquake and Landslide- Prone Regions. The Majority Ranges from Medium-Low to High

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In addition to these the bye-laws laid down by the UDHD department state the following

Stability zone	Admissible number of floors
1.	5 ½ storeys
2.	1 ½ storeys
3.	3 ½ storeys
4.	2 ½ storeys
5.	1 ½ storeys
6.	No construction is allowed.

From the UDHD Department Official Page (viii)

These bye laws only act as a thumb rule for the common people to use, there are many factors affecting the height of the buildings including the FSI etc.

Observations and Case Studies

There are no setbacks as written in the rules, the buildings are directly abut to the main arterial roads present. Figures 6 & Figure 7 are some photos showing 5+ storey buildings and no setback buildings in landslide and earthquake-prone areas.



Figures 6 & 7

It was found out that the people do not take the help of engineers to construct their buildings. A lack of knowledge based on construction safety has led to multiple multi-story non-earthquake-resistant structures.

A 14-storey mall is currently under the process of construction (*Figure 8)* in the sensitive regions of upper Arithang against the wishes of most of the residents of Arithang and other parts of the town. Voices and concerns have been raised.

The concern about this multistoreyed building had such a widespread impact that the NGT (national green tribunal) issued an interim stay order calling it an "illegal" construction. (x) A hearing was issued on the 2nd of March before the NGT Eastern Zone Bench in Kolkata The case was dismissed stating that the SEAC (State level expert Appraisal committee) had approved of the construction taking into consideration various factors including the EIA, disaster safety, sanitation, effect on site etc. The construction has commenced since then.

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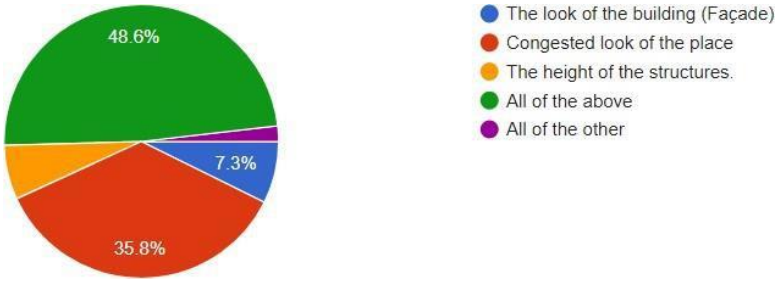


Figure 8

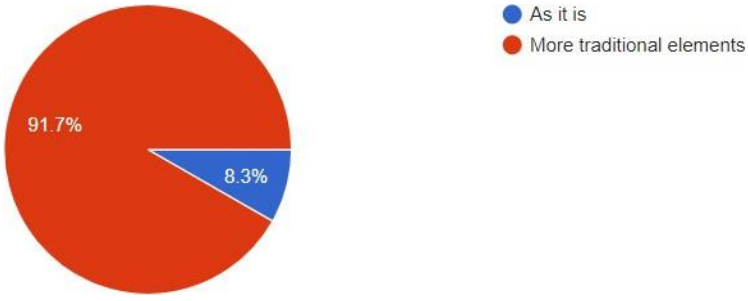
In a recent poll held, there were about 100+ responses of people who are from Gangtok and the people who have visited Gangtok at least once and there was an overwhelming response concerning the infrastructure of the town.

SURVEY

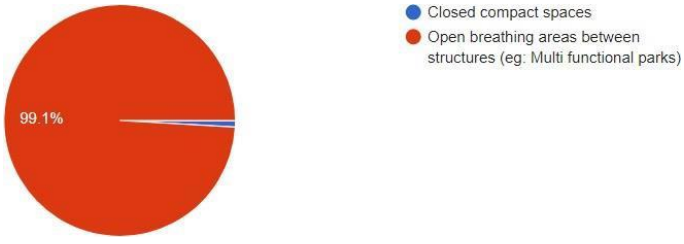
Graph 1: Most Prominent about the Town



Graph 2: What Kind of Spaces would they Prefer

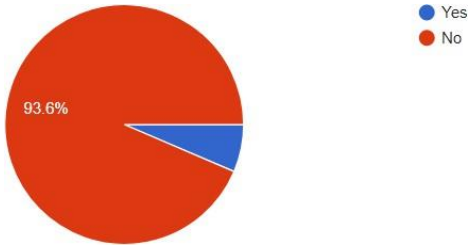


Graph 3: How they would Like to Experience the Town



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Graph 4: If there are Enough Open Spaces



The streets of Gangtok not only look congested but also the concrete mass completely tarnishes the rich cultural and traditional identity of the state.

PHASE 2

4. RESULTS AND DISCUSSION

Gangtok can always take inspiration from successful schemes already implemented in other parts of the world such as Bhutan and Bali. In a few Bhutenese villages, the families are trained to entertain the tourists, keep the facilities clean and to take care of the tourists, in this way they generate revenue and the government supports this by offering tax holidays to residents who comply with these norms (viii). In this way the tourists experience the culture and tradition of the place, help generate revenue, decentralize the tourist movement and hence reduce the load on a few main spots in the main town. The façade of the Bhutan high rise as well as low rise showcase elements of the traditional Bhutenese craft. In a similar manner, the native people of Bali build homestays and welcome the tourists, allowing decentralization and generation of revenue.

Gangtok too has taken a step towards this as we see a lot of home stays emerging in the village and peri-urban areas of the town.

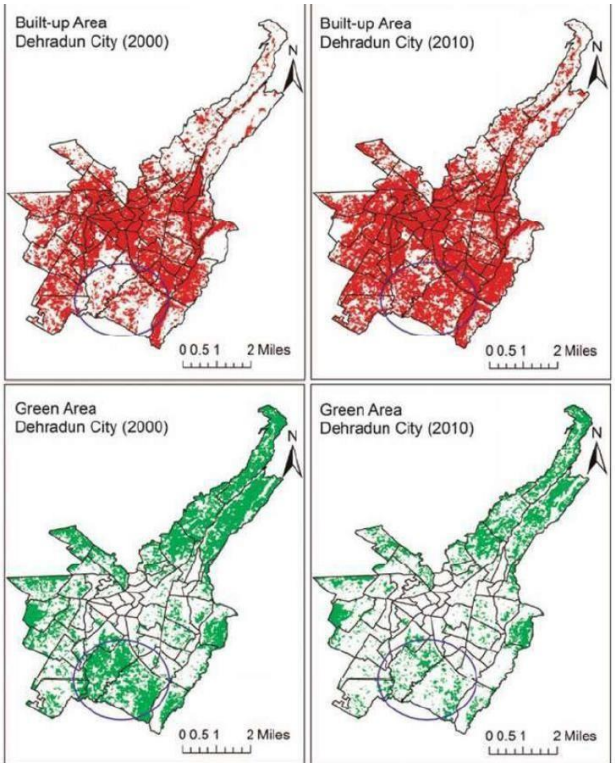


Figure 9: A Comparative Study of the Growth of Built Up Areas and Decrease of Green Area between the Years 2000–2010

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Comparison between Gangtok and Dehradun

Parameter	*Dehradun*	*Gangtok*
Area	36000 hectare	15722 hectare
Population (2011 census)	569,578	1,00,286
Population (2011 census) Population growth in 2 decade (1991–2011)	160%	276.54%
Future expansion of the city	Dehradun urban area is growing at a very high rate and soon it is going to extend more in surrounding agriculture land and may be in the list of metro cities in near future.	It is expected that, around 10% population can be accommodated by infilling within the existing city but for the remaining additional population, the city has to be extended beyond the present city limits.

The MDDA (Mussoorie Dehradun Development Authority) covers about 36000 hectares of land, almost double that of the area covered by the GMC which covers an area of 15722 hectares. Dehradun known to be a very popular hill station in India was first created so as to reduce the footfall in the near capital of Delhi, soon due to improper planning, the urban population started sprawling into the agricultural land around the area.

There has been an increase in the population drastically this was majorly due to the immigration of people from within the state of Uttarakhand itself. Due to such factors Dehradun has faced environmental deterioration.

Master Plan 2025 indicates all the land use zones (divisions) such as Residential, Commercial, Industrial, Public and Semi-Public and Other uses. Details of major Land use changes are given below:

1. To accommodate more residential houses large areas under agricultural land has to be compromised.
2. To accommodate more commercial and industrial areas residential areas has to be compromised.
3. Land under green belt and nallas converted for residential development purposes (iv)

Poor standards of quality and life have been observed with increase in pollution due to this haphazard planning (iv).

“There should be a larger role of the public for planning and designing the urban land use pattern and other associated activities to have a healthy urban environment for a good quality of life” states the research paper in the “International Journal of Environment”

In Dehradun, the green agricultural fields cultivating Basmati rice and the canal system passing through Dehradun city, developed for irrigation, have been compromised with and have been converted into concrete jungles. In a way Gangtok is already on its way to becoming the next Dehradun, if the agricultural lands are compromised soon we will see the deteriorating condition of the fresh air and clean water.

A major concern is the lack of open spaces, improper planning, and narrow roads which lead to heavy traffic flow in Gangtok itself. People are in dire need of open space and multifunctional parks, these will not only act as a pause point amidst all the concrete jungle but also a lung of the community it serves. People have raised concerns about the height of the buildings and congestion, the bye-laws are already laid down regarding this addressing all their relevant concerns but they are simply not made aware of them.

Decentralization and polycentric (ix) planning are proposed by the architects of Sikkim and were also laid down in the Master plan draft 2041. Ranka (14kms away) and a few other towns have been proposed to be the satellite towns but a lack of amenities to hold a large population was observed. The concept of satellite towns can be seen in the CMP Vol. 1 document published in 2010. The plan has been on hold since the proposed date.

An old not maintained public school was present (Figure 10) and a few mixed-use structures were observed. The road condition to the village was not satisfactory to accommodate traffic. The proposed satellite town plans for the construction of a community commercial center have been mentioned in the Master plan 2020 Draft proposal.

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Figure 10

Ropeways as means of connection have also been proposed (ix), in addition to this funicular transportation could also be used.

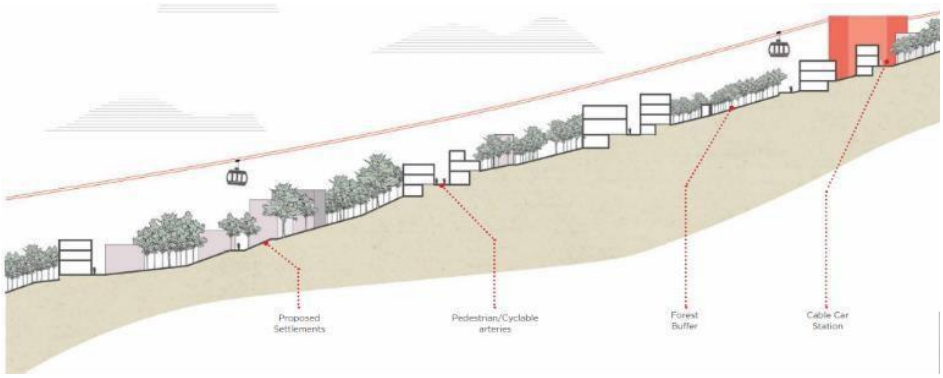


Figure 11: Ropeway System

5. CONCLUSION

Many schemes have been introduced for the betterment of planning in Gangtok, the already congested state of the capital is difficult to tackle with presently but other places in Sikkim can take the example of it and better their planning process to make itself a more suitably developed place. No matter how beautiful the hill station might be, it is still a challenge to construct in a slope region. The culture and tradition of the state should always be maintained and not masked by the concrete façade of the structures, it is after all the unique identity of one's home. It is though still something to work on, to finally establish if the capital can still be a home to people who are satisfied by the way it functions.

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Evolution of Workspaces with Respect to Technology

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ABSTRACT: The workplace has evolved significantly over the years with the advent of technology. Advancements in technology have enabled the transformation of traditional workspaces into digital ones, allowing employees to work remotely and businesses to operate globally. The first technological advancement which had the most impact on the that transformation of a workplace was the computer. It allowed businesses to automate manual processes, increase productivity and efficiency. With the advent of the internet, businesses were able to communicate and share information in real-time, making it easier to collaborate and work remotely. Cloud computing and mobile devices have further transformed the workplace. Employees can access work-related information from anywhere, anytime, and on any device. The aim of this study is to understand the evolution of workspaces with respect to corresponding evolution in technology used in offices. The study will primarily review literature in order to understand the aspects, changes, and evolution of a workspace regarding technological advancements in order to examine the aforementioned aspects which will be portrayed by examples from history. The study shows that technology has transformed the workplace, making it more agile, efficient, and flexible. The future of work will see further advancements in technology, enabling businesses to create new job opportunities, increase productivity, and create a better work-life balance for their employees.

Keywords: *Offices, Workplaces, Taylorism, Industrial Revolution, Co-Working, Technology, Digital Disruption.*

1. INTRODUCTION

A workspace is a physical or virtual area that is used for work-related activities. In a physical sense, a workspace can refer to an office, a cubicle, a desk, or any area that is designated for work-related tasks. In a virtual sense, a workspace can refer to a digital environment or platform that is used for collaboration and communication, such as a shared online document, project management tool, or video conferencing software. It can be individual or shared, and they may be designed to accommodate specific types of work or industries. For example, a laboratory workspace might be designed with specialized equipment and ventilation systems, while a creative workspace might have an open floor plan and a variety of tools and materials for artists or designers. An individual devotes, more than one-third of your life at work.

A workplace is an essential component of work life. It provides a designated space where employees can carry out work-related activities. It creates a physical environment that is conducive to productivity, concentration, and collaboration. A workplace that is safe, healthy, and comfortable can contribute to overall employee well-being. This includes ergonomic furniture and equipment, appropriate lighting and ventilation, and adherence to safety regulations and guidelines.

The workplace, which includes all interactions between workers, co-workers, organization and the physical place itself, is characterized by continuous adaptation to changes in technological, culture, technology, and political and economic contexts. The offices of the first half of the 21st century are no longer just buildings where everyone congregates, but spaces like homes, with a local coffee shop, library, parks, pavilions, gyms, etc brought together along with the actual workspaces.

The first offices were mainly connected with royal courts and for running businesses, all over the world. The office workers would have a place to sit, whether on the floor or on elevated seats. The 'desk' would depend on the technology mode of implements of the output- whether stylus on a clay tablet or reed on papyrus or ink on paper or the more recent typewriters and then computers with printers.

But it was not until the Industrial Revolution in the 18th century, that mechanized technology led to changes in the organization of jobs and tasks in an enclosed space. Consequently, the plans of office arrangements have undergone changes from strictly segregated divisions, such as the 'bull-pen' to semi-open offices with cubicles to open floor plans, to the contemporary shared co-working spaces. Modern business and technology show that the way employees work - and where, when, why and with whom—have evolved over time. After the COVID 19 pandemic, 'work' evolved beyond any

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conceivable recognition as compared with the workplace of the previous five decades, and made it practically virtual, with rampant use of technology, with almost no need of a physical location.

1.1 Aim

The aim of this study is to understand the evolution of workspaces with respect to corresponding evolution in technology used in offices.

1.2 Objective

The following are the objectives in order to achieve the aim:

1. The understand the change in workspaces with time.
2. To understand the role and impact of technology.
3. To co-relate the variations in workspaces with the corresponding technological.
4. To examine the history of office design.

Limitations: This study does not include the effects of socio-economic conditions, nor does it differentiate between the offices required by different sectors. Instead, it has dealt with the office space as generically utilized for paper work and communication purposes after the Industrial Revolution.

2. LITERATURE REVIEW

The literature reviewed falls under two heads. The first will look at changes in workspaces with time and the second will address contemporaneous technology used in workplaces.

Tseng (2018) elaborates how workspaces have been separated depending on the type of work done. For example, the first dedicated office building of the Old Admiralty Office, which was for centralized office work for the British, was established in London, England in the year 1726, at the start of the Industrial Revolution. Its purpose was to handle the rising amount of paperwork. It contained meeting rooms, which are used today, to manage massive amounts of documentation by the Royal Navy. On the other hand, intellectual work was designated separately which also allowed for coordination with the more mechanical workers or clerks who worked in concert in the same room under adequate supervision.

The changes that have occurred in the planning of workspaces over time has been discussed by several scholars. In Workplace Design Revolution, Inside-out Urbanism, Gou (2016) explained the panoptic arrangement as the earliest and primary kind of workplace. Here, the household and the working occurred within the same physical space. The separation occurred with the drastic change of practice where ‘work’ shifted from the household to a separated workplace. Gou attributes this as the inception to the earliest developments in the design of the interiors of workplaces.

Often, experts attribute changes in design to events or evolution of technology, which need to be accommodated. Many corporate office spaces ensured pleasing interiors, conducive to the users’ mental and physical wellness, coupled with technology for long-distance collaboration. In his article, Lakhani (2022) talked of how ‘black swan’ events, like, the World Wars or the 9/11 terrorist attack, bring many changes in the way we work. He quotes the example of the COVID 19 pandemic which brought about ‘working from home’ and a post-pandemic rise in co-working offices with coffee shops, library, pavilions, etc.

Anthropologist, Nold Egenter connects evolution in technology to changes in the built environment. His research, Architecture and Habitat Anthropology (2004), there is an evident connection between the technology known to man and the designed built form. The Industrial Revolution brought about many such developments which helped offices, to be located away from the manufacturing units like the invention of AC’s, electrical lighting and the telegraph system (Kotak, n.d.). Elevators facilitated the accommodations of offices in skyscrapers, and ease in communication took away the need for offices to be located near the place of manufacturing.

3. METHODOLOGY AND MATERIAL

In order to examine the aspects mentioned above, the study will be conducted through mainly secondary literature review to understand the aspects, changes and evolution of a workspace with respect to technological advancements. These will be demonstrated through examples.

ISBN: 978-93-89934-68-7

4. RESULT AND DISCUSSION

'Work', refers to activities undertaken by an individual to achieve a specific set of objectives, it can be paid, unpaid, daily or infrequent activities or is basically to do something which needs physical or mental effort in order to achieve something. It is the foundation of the economic system-in all civilizations. The institutions that provide for the production and distribution of commodities and services make up any culture's economic system (Pizag, 2005).

For productive output from daily work, one needs an appropriate and a stable workspace where one works at a desk in an office and a workstation. This is an area where work of a particular nature is carried out using a desktop computer.

Designing and setting up a workspace with the goal of enhancing worker performance and safety. The way a workplace is designed has a big impact on how productive employees are. A key component of ergonomics is maximising space utilisation through equipment placement, incorporating the human factor into workplace design, and efficiently integrating the workplace into its surroundings. The design should emphasize creating a secure and pleasant atmosphere while also promoting intuition and teamwork.

4.1 Early Office Spaces

The initial modern offices were noteworthy for their design focused on speed and the adoption of a rigorous and ordered workplace that resulted in employees sitting in endless rows of workstations with managers in surrounding offices called 'bull-pens' where they could observe the workers. Such offices which grew in popularity throughout the early 20thcentury, followed the principles of Taylorism, a methodology created by mechanical engineer, Frederick Taylor, who sought to maximise industrial efficiency. He believed that a task could be streamlined and optimised to boost efficiency. He suggested assigning a worker to a specific job that suited their skill level and then training them to perform that job in a precise way.

Following this, the idea of workspaces with open floor plans emerged in the 1950s in Germany. In order to promote collaboration among the company's employees, two consultants, brothers Eberhard and Wolfang Schnelle, created the "office landscape," a room without any walls, unobtrusively furnished, and accented with greenery. The open-plan office immediately won over businesses with its low-cost ability to extend the workspace's surface area and it established itself as a standard feature in service businesses, insurance companies, banks, and architectural firms (GA Smart Building, 2016).

The decades-long evolution of the workplace has given rise to the inventive and flexible workspaces of today, where business meetings take place at Starbucks, in collaborative workspaces, or from cosy home offices. The tremendous changes in the way we work and what we demand from our office environment have fuelled and advanced the growth of office design. The introduction of new technology and tools, changing staff needs and work models, and the shift from an industrial to a knowledge-based economy have altered the paradigm of how and where and how workspaces work for us, but the key factor commonly noted with time is the advancement of technology and with it the type of work, as the requirement of work changed, the workspaces also evolved accordingly. Technology has altered how various companies function, changing everything from goal accomplishment tracking to communication methods. It is understandable that many firms rely on the utilisation of these technology-driven advancements because it has so many advantages. Several cutting-edge tools and technologies can be found in the workplace today, many of which are intended to empower businesses by streamlining and tightly integrating their internal operations.

It is also seen that this typology of work, has also affected the design of the workplaces. The kind of work that used to take place within homes earlier, such as spinning and weaving, due to technology, now took place in factories because of the requirements of energy supply and volumes of manufacturing essential. Division of labour had been traditionally based on age and gender of the workers. The nature of labour underwent a dramatic shift: as towns grew, new specialized vocations in manufacturing, trade, law, medicine, and defense rose, hence the requirement of dedicated formal workplaces started to rise. The user had to work sitting on the ground or a bench, with a desk or platform, as per their rank.

With growing statecraft and its increasing intricacy necessitated the creation of permanent records, which fueled the growth of writing and book-keeping which led to more compartmentalized arrangement of workspaces in the region. The main offices of the courts of royalty or holders of civic posts, dedicated workspaces would be an extension of the existing households. They would attend to the central figure and his business. Hence, the word 'court' may also be applied to the coterie of a senior member of the nobility (Duindam, Kunt, & Artan, 2011). The court travelled with the king wherever he went. The setup of a working court would require a dedicated book-keeping space, place to sit as per the ranking of the

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advisor, lawyers and the consultants and the public. A team of members were there to keep literal records of the sessions of court, they use to sit on the floor, and had a raised platform for writing, and were mostly seated near the king or chief (ibid.)

The Industrial Revolution during the 18th and 19th centuries saw the expansion of telecommunication, railways, insurance and banking sector. The telegraph and the telephone revolutionised communication. Once the lightbulb was commercialised in 1800s, the length of theaverage workdayincreased. Apart from the millworkers required for production in factories The number of clerks required to conduct business grew steadily. Most desks at the time were top-heavy, with paper storage bins extending above the desk-work area to give the impression of a cubicle and provide some degree of privacy for the workers (Encyclopaedia Britannica, 2023).

The evolution of technology where big-scale machines was brought in for mass production of goods and services created a lot of jobs in both service and technical industry, led to the rise in the number of dedicated and separated office space (as seen in figure 1) for workers as different sound and visual barriers had to be created for efficient working.

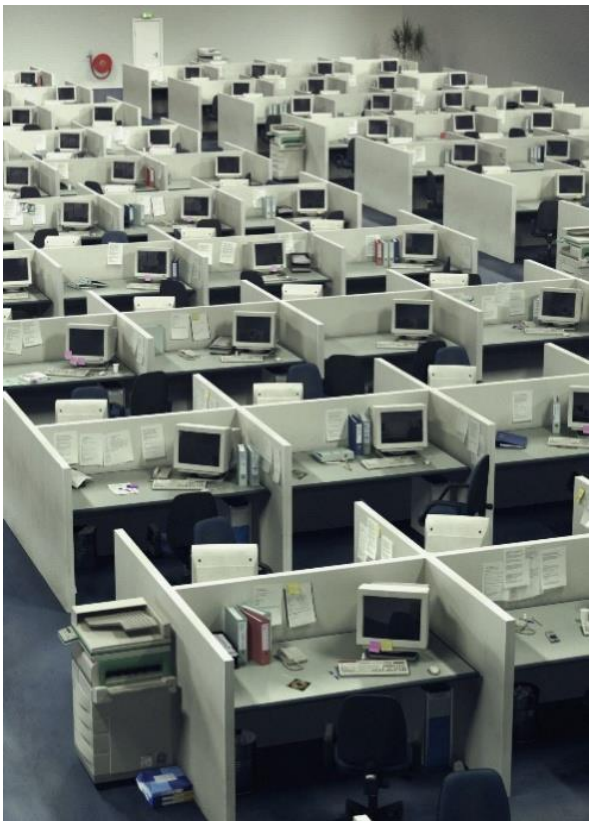


Figure 1: A Sea of Cubicles

(*Source:* Tseng, 2018)

Office employees were successfully liberated by industrialization, who reduced their allegiance to the merchant to considerations of compensation only. Domestic households and family-based businesses both vanished, and staff members transitioned to official employment. On the other hand, mass production necessitated the division of labour, which resulted in distinct organising responsibilities and labour division at the workplace. Transferring offices to bigger spaces and hallways and customising the office layout to purposes were made possible by outlawing small-scale and open activities like inventing and keeping products, both of which were typical of scriptoria, chancelleries, and buildings. As industrialization progressed, workplaces were built in tenements and industries.

Post-industrialisation, division and specialization due to mass production gave rise to different work spaces, all under one large umbrella of a working environment. With this, working methods and spatial quality of the office, both changed. As observed in figure 2, the type and scale of space changed the way users occupy space, as did user circulation. From a cluttered planning, it became an assignment-based division of space.

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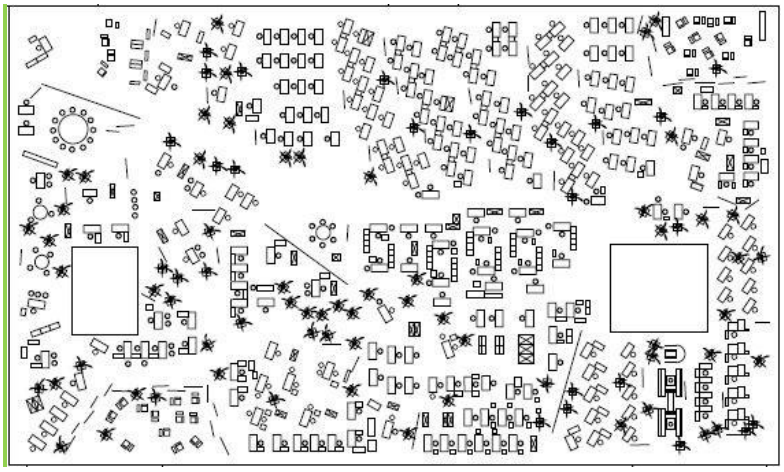


Figure 2: The Organic Flows of the Office Landscape, Depicted in Quickborner Group's Office Layout, Bild Und Ton

(*Source:* Tseng, 2018)

4.2 Taylorism

The ideas of Taylorism, a technique established by the mechanical engineer Frank Taylor to maximise industrial efficiency were followed by open floor plan offices, which increased in popularity during the early 20th century. However, it neglected to address human and social factors, instead focusing solely on ensuring businesses got the most output of their employees (Chen, 2022).

Although the idea of Taylorism increased productivity and was proved to be an efficient system of working, it tends to make the office workspace alienated and dominant by technology. The office space (see in Figure 3), comprised of steel, glass and it started blurring the lines between interior and exterior spaces, using reflective surfaces and open-plan designs to create a sense of fluidity and interconnectedness. The building's vast open spaces, its long, winding corridors, and its labyrinthine layout which made it difficult to differentiate between the type and the function of the that space and which in-turn disoriented and frustrated the users, highlighting the dehumanizing effect of modern architecture with technology (Tati, 1967).



Figure 3: Office Setup after Taylorism

(*Source:* Pinterest)

By the 1950s offices looked more like 'manufacturing' floors, as there was new technological advancement of smaller machines which made communication easy for everyone around the world. The advanced printers and the fax machines came into the picture, by which, with the help of least communication, people could work together. The predominance of women in an office space place grew with jobs of receptionist-typist-stenographer, as new methods of tele-communication were established.

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As time progressed, the 'action offices' or the 'open floor plan offices' were created in the 1960s, a three walled room meant to be open but still providing each individual employee privacy, this advancement helped in compartmentalising the positions of different heads in companies and created more employee space with time (Condeco, n.d.).

The 1980s saw computers beginning to gain popularity in offices, signalling the dawn of the most technological revolution that would permanently alter the workspace. Generation X began to enter the workforce, bringing with them new ideas that aided in the gradual deconstruction of rigid corporate structures and hence was known to be the era dominated by corporate culture (Chen, 2022).

As stated by Bakshi (2018), with the wireless medium gaining popularity and advancement, there was even rise in the architectural construction technological development, with glass and concrete being used inside the offices as partition, the workspaces became more aesthetic, open and saved a lot of space which in-turn improved the overall development of the offices. With the end of 1990s and the world wide web was made public, which changed a lot of jobs and types of working around the world, as new opportunities presented themselves into the world and was open to all the public with the access of the world wide web.

Shared office spaces in the last few decades of the 20th century in metropolises due to expensive realty costs with shared infrastructure such as a telephone, typewriters, reprographics and reception services.

4.3 The Millennials Era

The year 2000, the era of wireless technology starts, millennials have taken over the workforce by the 2010s, holding several leadership positions at global corporations throughout the world. Collaboration, community and the equality characterise office setup, (as shown in figure 4), an example of modern office, and culture in the 2010s was pushed by the co-working setup companies like We Work, which was in control by offering places for individuals from various organisations and industries to work, collaborate and network.



Figure4: Millennial Office Floor Space

(*Source:* Bannan, 2019)

With time, the technology evolved, the business module changed and with that came into the concept of shared, collaborative or co-working spaces, the concept which was majorly derived by change in open floor plans, division of spaces with viable materials, and flexibility in working style and bringing different types of people and nature of businesses started working in one common space together (Gripenstraw & Saini, 2020).

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Workspaces again took a hit with COVID-19. The requirement of workspaces went down to the minimum, with technological advancement, a user could work from home, changing the entire workplace requirement, cost analysis and working of businesses. Work-place-less, is currently the most preferred way of working, showing efficient results in production of work and saving a lot of time and money for certain business modules (Gou, 2016). Although after the pandemic ended, many organisations went back to 'work', but now workplaces became *location-agnostic,* (Lakhani, 2022). This meant that the user had the freedom to select his or her own place of working or where their day-to-day office should be, as the idea of work-from-home was very desirable for many users. This led to increasing demand for satellite and boutique offices. Enterprises increasingly opened satellite offices in metro and Tier-II cities.

When employees were separated by distance, shared office spaces made use of technology to guarantee inclusivity. Co-working operators used cutting-edge technological tools to make the workflow seamless with adequate privacy and cyber security features. These tools included high-speed internet access, uninterruptible power supplies, advanced building access through QR codes and sensor systems, and virtual conference room reservations. Similarly, advanced video conferencing tools made collaboration easier and livelier.

In his article in *HT-Tech*, Batti (2021) discusses the many changes that have been introduced in the way people work and how businesses need to adapt to the changing work environment in order to ensure that employees continue to perform at their maximum potential. Companies are constantly shifting to newer and transformed digital platforms which cause a digital disruption, for which they continually devise digital reinvention plans and revamp their IT eco-systems. This helps them to not only to manage digital disruption, as well as realise the potential of advancing digital technology. This inevitably affects the spaces in which such activities take place.

5. CONCLUSION

Inference: From the above study, it is seen that offices have evolved over time due to many reasons: social, industrial and technological, among others. The changes have been manifested with respect to arrangement of divisions of work, status, type of work, and with new materials and technology, as seen in Table 1.

Table 1: Change in Office Workspace and Its Technology Over-Time

Time Period	***Type of Office***	***Technology***
Before 1500s	Admiral offices and storage space of royal Courts and agriculture practices	Durable storages and non-mechanical farming equipment
1500s	Scriptoriums	Printing Press
1600s	Renaissance 'bottega' (workshop)	Cotton gin, seed drills – Mechanical hand tools
1700s	Individual chair space workstation—The old admiralty office—first dedicated office	Elevators and Railway networks (This came to India in 1853)
1800s	Industrial Revolution—First multi-functional organisations	Gas-lamps, manual typewriters, mimeograph machines
1900s	Taylorism—The scientific management	Electric lights, telegraph lines, landlines, and Dictaphones
1950s	Burolandschaft—Office Landscape	Air conditioning, payphones, storage cabinets, fluorescent lighting, and typewriters
1960s	Action Office—Bullpen Offices	Portable calculators, microphones for taking notes on the go, fax machines, laser printers, and copiers
1970s	Ergonomics—Open plan spaces	Advanced portable calculators, floppy discs with more storage, printers, and photocopiers
1980s	Decentralized Workspaces—Cubicle Farms	CDs, email, large desktop computers, pagers, and cell phones in cars
1990s	Tele-commuting—Expanded Cubicles and shared spaces	Email, laptops, PDAs, cellular phones, dial-up internet, and document scanners

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Time Period	*Type of Office*	*Technology*
2000s	Co-working Spaces—Flexible Working	3G, Wi-Fi, laptops, cellphones, Google, social networking, teleconference software, and acoustic planning are all examples of technology
2010s	Virtual Collaborative Offices	Digital signs, cloud storage, software as a service, 4G, and artificial intelligence
2020s	Hybrid Working	5G, wearable computing, virtual reality, augmented reality, and the web of things
2020s to post-COVID 19	Flexible- Remote- hybrid- spaces	Virtual Interactive, nano-tech devices

(*Source:* Compiled by Author)

Remote working, virtual collaboration, and self-organizing team structures are three significant instances of how the post-COVID world has expedited changes that were already taking place inside the office landscape.

Transparency, quick contact, and information sharing will help business executives realize their full potential in this decade. This implies that in order to benefit employees, the workplace setting will need to be improved. It is predicted that the flexible working concepts that were widespread in the previous decade will be substituted by a mix of activity-based, hybrid, and agile working approaches. These approaches bring together technologically administered and human-centric design to give workers more freedom in where they work.

With time, it is expected that the digital environment in flexible office spaces will use more such cutting-edge tools like augmented reality (AR) and virtual reality (VR), which are expected to make virtual collaboration more engaging, as hybrid work is probable to increase over the coming time. This would also promote shared infrastructure in the commercial industry**.**

Change in technology with time will always lead to the change in space, not just spatially but even functionally. The new modern era will bring in more user-friendly, sustainable, green and flexible spaces, yet there are some industries which might not all cater to advanced technological methods for setting up their offices. All the development and evolution in technology will always be time driven, in order to reduce the wastage of time and resources for working.

Conclusion: The process of evolution of the office space is accelerated due to growth and development of technology. Employees enjoy more flexibility to choose where, when and how they want to work. Such spaces are meant to enable workers to optimize their productivity. This stands in stark contrast to previous times when the highest possible level of production was expected regardless of the quality of spaces that workers were in.

This paper has shown that the workplace has constantly changed over time. It has been quick to respond to meet the demands of the contemporary workforce and for improving production in fluctuating economies. Further changes will eventually be determined by newer technologies to come.

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Study of Natural Lighting in Reading Spaces of Institutional Library (Sinhgad Institute Central Library, Pune)

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ABSTRACT: The library is the space of gaining knowledge. Users need comfortable environment for undisturbed reading. This environment includes natural light. Natural light influences the users productivity. This research is conducted to investigate availability of natural lighting in reading spaces of library. This study focuses on current situation of natural lighting at central library of Sinhgad Institute, Ambegaon, Pune. Mixed method approach is used to conduct this research. Questionnaire has been used to collect data as a quantitative method and lux meter has been used to collect the data as a qualitative method. The variables in this study are independent variable (natural light) and dependent variable (reading spaces, users comfort).

Keywords: *Natural Lighting, Library, Standard Illuminance, Daylight Intensity, Mixed Method, Lighting Design.*

1. INTRODUCTION

The term library is refer as a collection of books and reference material as well as the physical space where it is kept. Libraries are often been classified on the basis of their collection and materials. Public libraries offer their collection and services to all members of the community, while institutional library serves more specifically the students, teachers and the staff of academic institution.

Natural lighting creates lively, comfortable and exciting environment in indoor places and directly affects users and their work. Effective use of natural lighting system in library ensures to reduce the visual fatigue of readers and also improves the mental and physical health. It helps students to be more comfortable and productive. At the same time poor lighting can harm the ability of staffs and students to function.

1.2 Aim

To investigate the natural lighting in the reading space of library according to the Indian Standard Code of lighting.

1.3 Objective

1. To document the reading space.
2. To conduct user's experience about natural lighting in the reading room.
3. To check actual Lux available.
4. Give solution to improve natural lighting.

1.4 Research Questions

Is natural lighting available in reading area of library sufficient for users?

1.5 Hypothesis

H1: Natural lighting in library affects the users productivity.
H2: Effective use of building elements in library helps to achieve the visual comfort for users.
H3: Building's physical appearance mediates the relationship between natural lighting and users visual comfort.

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1.6 Scope

The scope of this study is limited to 2nd floor of this Central Library building.

1.7 Limitations

The research will be limited at Central Library of Sinhgad Institute, Ambegaon, Pune.

1.8 Type of Research

The research is conducted with mixed method approach which is as follows:

- ***Quanlitative research:*** Lux meter will be used to take light intensity and reading.
- ***Quantitative research:*** Questionnaire will be provide to library users and ask them to evaluate the questions on the data provided.

2. LITERATURE REVIEW

The research work in this paper is focusing on daylight intensity, visual comfort, glare and shading devices. The database is taken from the Library of Universities Budi Luhur, South Jakarta. This research provides a daylighting design solutions in the form of shading devices to solve glare problems and achieve visual comfort. (Sri Kurniasih, Ingitt Musdina, S.S.Y. M., 2020)

The research in this paper is focusing on the energy-efficient design, climate, illuminance and natural lighting. The database survey is taken from the Shandong Women's University's Library. The study reveals the present situation and existing problems in the library and trying to give the reference for the design of natural lighting in the library of Jinan. (Zengzhang yang, 2017)

The work in this paper is focusing on lighting, library and resource usage. The database is taken from the library located in South India with number of seating 98. This research paper is the study of library resources usage in terms of natural lighting and investigation of how natural lighting affects the users from using library resources. Research paper concludes that lighting influences the resource usage. (Thangaraj, Balaji, 2014)

The research work in this paper is focusing on cooling, human comfort, natural lighting and ventilation and public library. The database is taken from the State Library Gombe, Nigeria. The study reveals the current condition of lighting and ventilation in library and user's opinion about it. (Lembi, Umar, 2020)

3. METHODOLOGY

3.1 Methodology

Research method of the study is both quantitative and qualitative. An institutional library from pune is selected as a case study. The data analysis is performed by providing questionnaires to library users and their replies has been used for quantitative analysis. As for the qualitative method with the help of lux meter light intensity is taken at the all the tables in the reading zone of library.

4. DATA ANALYSIS AND FINDINGS

4.1 Study Area

The Sinhgad Institute Central Library has a rich collection of books which consists Architecture, Pharmacy, Engineering Management and Computer Studies. It is a 5 storied building which accommodates over 3000 users at a time and each floor is having a built-up area of 1145 Sq. Mt.

Building Name	:	Central Library
Address	:	101, Sinhgad Institute Rd, Ambegaon BK, Pune, Maharashtra-411041
Building Area	:	5730 Sq. M.
No. of Floors	:	5 Floors

ISBN: 978-93-89934-68-7



Figure 1(a): Location of Central library, Sinhgad Institute, Pune
(*Source:* https://www.google.com/map/search/Central+Library+Ambegaon)



Figure 1(b): Central Library
(*Source:* Author)

The objective of this research is the study of 2nd floor reading area. The floor area is splitted into 3 sections.

a. Architecture Library b. Pharmacy Library c. Reading Area

The floor plan and appearance of the building are shown in Figure 2.

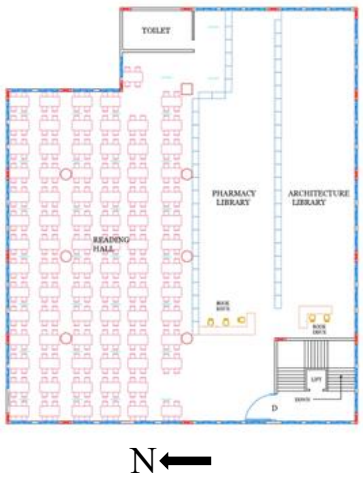


Figure 2(a): 2nd Floor Plan
(*Source:* Author)



Figure 2(b): Left Side View (East)
(*Source:* Author)



Figure 2(c): Lighting Conditions on 2nd Floor of Reading Room
(*Source:* Author)

The reading room of 2nd floor experiences most glare along the side of the building facing east and north. Although the reading room has 22 windows. 12 windows in east direction, 6 windows in north direction and 4 windows in south direction, but it is still assisted by artificial lighting which is using tubelights. The total no. of seating provided in reading area is 84. The structural system has circular columns.

4.2 Quantitative Data Collection

Questionnaires were provided to the library students and asked them the questions. The data is collected in the morning, afternoon and the evening, Survey is done with 60 students.

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4.3 Questionnaire Data Analysis

According to the questionnaire survey 70–80% respodents are of the opinion that library:

1. Lighting is inadequate (Natural and Artificial both)
2. Need for new lighting design (Natural and Artificial both)

4.4 Qualitative Data Collection

The light intensity reading has been taken using **Lux meter** at each reading table. Readings are made at 3 times a day 9:00 am in the morning, 12:30 pm and 04:00 pm in the afternoon during month of September 2022. As per the Indian Standard Code the standard illuminance of reading spaces of library should be between 300–500 Lux. Three readings has been taken on 19th September 2022.

Table 1: Lux Meter Readings

Lux Level	*1–199*	*200–399*	*400–599*	*600–799*	*800–999*	*1000–1199*	*1200–1399*	*1400–1599*	*1600–1799*	*1800–1999*	*No. of Tables as per IS code*
First Reading (No. of tables)	63	13	03	00	00	00	01	00	00	00	10
Second Reading (No of tables)	67	08	02	01	01	00	01	00	02	01	05
Third Reading (No. of tables)	73	06	03	00	00	00	01	00	00	00	03

(*Source:* Author)

First Reading (09:00 AM)

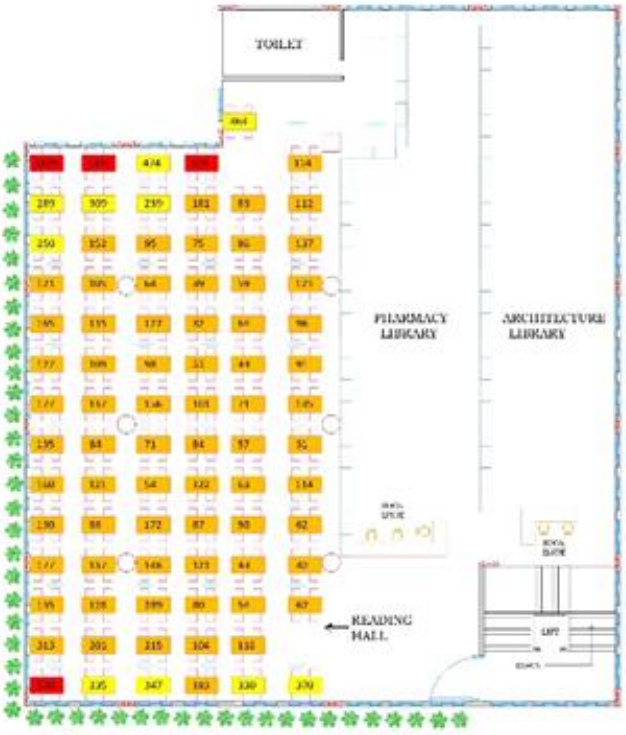


Figure 3(a)

(*Source:* Author)

Second Reading (12:30 PM)

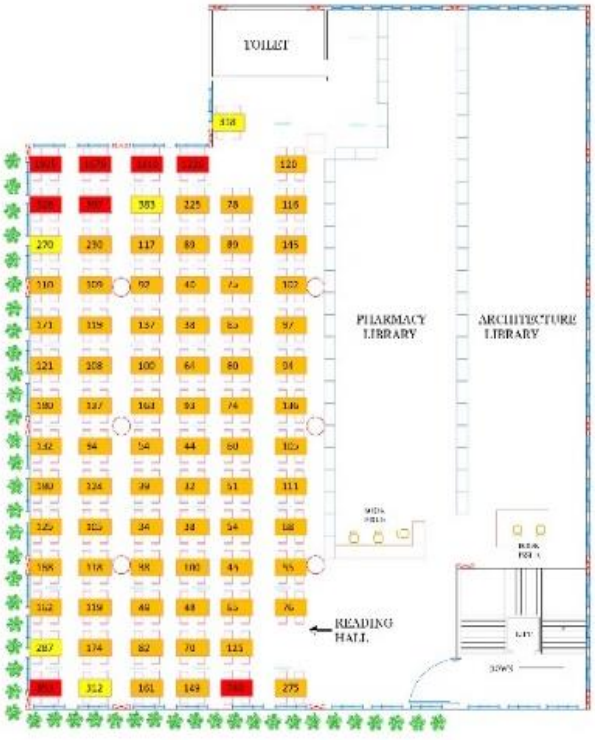
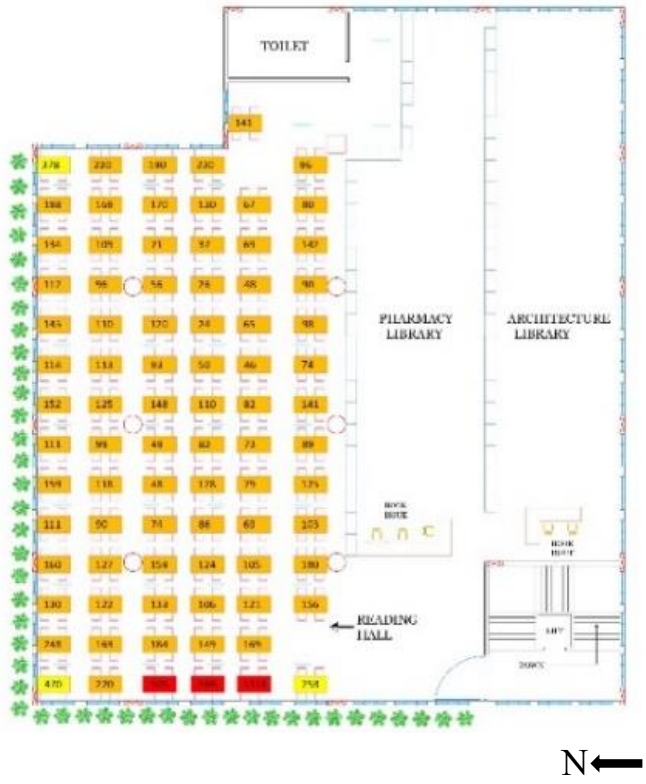


Figure 3(b)

(*Source:* Author)

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Third Reading (04:00 PM)



Color Coading:

- Adequate Lux Level 300–500 Lux
- Inadequate Low Lux Level 0–300 Lux
- Inadequate High Lux Level 500–2000

The reading taken in Lux meter shows that, very few number of tables are getting proper natural light.

Figure 3©
Source: Author.

5. CONCLUSION

Based on data analysis taken in the library reading room at the 2nd floor of Sinhgad Institute Central Library, the conclusion can be drawn as follows:

- The readings taken in the reading area of library with the help of lux meter shows that as per the Indian Standard, almost 80% of tables has very less illuminance.
- According to questionnaire analysis many students were not comfortable about the natural light available in reading area of library and was on favor to change the design for proper natural light.
- Hence, the analysis has proven that the daylight quality on second floor of Central Library is inadequate, poor and not suitable for users.

6. SOLUTION

Choosing the right color palette for library walls can increase the natural light in library. Adding new furniture and accessories at proper places which can help to get natural light. Paint or covering the overhangs. Two sides of the library are surrounded by the branches of trees which are blocking natural light coming inside library area, so trimming these trees a little can solve the major natural lighting issue in library. The future scope of this research is to solve the natural lighting problems in reading area of library with the help of above solution.

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Land Use Map a Case of Varanasi

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ABSTRACT: A land use map is an essential graphical representation that displays the different ways in which the land in a specific region is utilized. It offers a comprehensive overview of the diversity of land with various zones and provides crucial information on the changing nature of land over time. Varanasi, located in the state of Uttar Pradesh in India, is a diverse city where people of different age groups, states, and cultures come to witness its historical significance and religious diversity as well as its architectural features expressing its uniqueness of land use. Varanasi is also known by its other names, Kashi or Banaras, which are recognized worldwide and different people call it three different names. The land use map of Varanasi is unique and distinctive due to the compact living style near the ghats. These areas are primarily utilized for residential purposes, while the streets are used by business people to attract tourists. The differences in the land use map of Varanasi can be easily seen from satellite images, highlighting the critical role of the population in shaping the map. This land use map is utilized by various authorities to understand the city's development and make informed decisions about its growth and control of development. It provides valuable insights into the utilization of resources, infrastructure, and other critical factors that impact the city's overall development. The land use map of Varanasi reflects the city's historical significance, cultural diversity, and the changing nature of urbanization. It is a vital tool for urban planners, policymakers, and decision-makers to develop effective strategies and policies that focuses widely on sustainable growth and development. All in all, a land use map is a crucial tool that provides an overview of the different ways in which land is being utilized in a specific region. The land use map of Varanasi is unique in its way, reflecting the city's historical significance, cultural diversity, and the changing nature of urbanization. It plays a critical role in the development and control of the city, providing valuable insights into the utilization of resources, infrastructure, and other critical factors

Keywords: *Zones, Ghats, Satellite Images, Development.*

1. INTRODUCTION

Varanasi, situated in the state of Uttar Pradesh in India, is a city of immense historical and cultural significance showcasing through people, their mindset, beliefs as well as living style and housing typologies. It is renowned as one of the oldest continuously inhabited cities in the world, having preserved its rich cultural heritage over thousands of years. This is only possible because of the great presence of historically rich and important temples as well as the presence of people with the beliefs. (Chourasia, n.d.)

These maps are valuable tools for urban planners, environmental specialists, and decision-makers, as they provide insight into the impact of human activities on the land and the environment. (Ranjan Yadav, n.d.) it displays different categories of land utilization such as Residential, Commercial, Industrial, Agricultural, Untamed area, etc.

The land use in Varanasi is diverse and complex, reflecting the city's rich and cult heritage. The city is divided into several distinct neighborhoods, each with its unique character and purpose. The densely populated urban core of the city is characterized by narrow, winding streets and densely packed buildings, while the outskirts are more sparsely populated. The feel that the streets, temples, Ghats, and architectural typologies have are remarkable in their way. The core area of Varanasi has people of different religions where we don't have any doubt but the unity and the open feeling of people are remarkable. (Singh, n.d.)

One of the key features of land use in Varanasi is the presence of numerous ghats or series of steps leading down to the river. These ghats are of great cultural and religious significance, serving as a place for ritual bathing, prayer, and pilgrimage. These ghats are also an important part of the city's economy, with many residents coming to purchase goods and services. The city also has an industrial sector, with numerous factories producing a wide range of products.

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This city is also famous for its educational background because Varanasi has world-famous schools and colleges including IIT BHU (Banaras Hindu University), Central Institute of Higher Tibetan Studies (Deemed University), Indian Institute of Technology (Institutes of National Importance), Mahatma Gandhi Kashi Vidyapith, Sampurnanand Sanskrit University and other colleges. The plan of BHU is very identical and unique and its presence in the land use map is identical.

2. STUDY AREA

Varanasi, Kashi, or Banaras all three are the name of the same city in Uttar Pradesh, India with great historical and cultural presence in the air of the city. (Singh, n.d.) Varanasi's land use is characterized by a mix of residential, commercial, and religious structures. It is bounded by the latitudes 25.32754°N and 25.20652°N, and longitudes 82.87302°E and 83.04623°E. (Bijoor, n.d.)

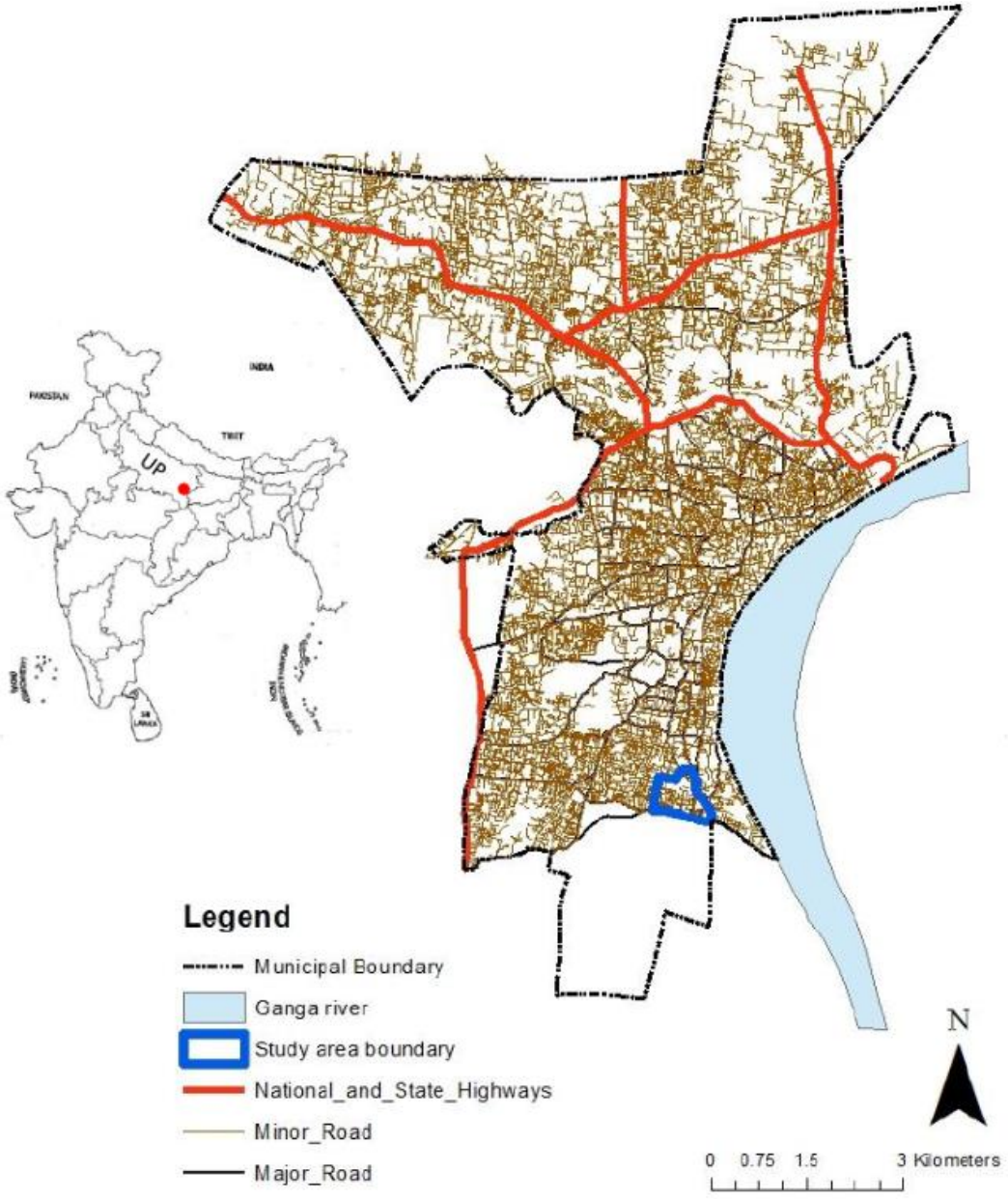


Figure 1: Location of Varanasi

Source: https://www.researchgate.net/figure/Varanasi-Municipal-Corporation-area-and-study-area-locations_fig2_362147285

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The old city of Varanasi is predominantly residential, with densely packed housing and narrow, winding streets. The homes are often multi-story and built around courtyards, with shops and small businesses located at street level. The commercial areas are primarily located along the Ghats, the series of steps leading down to the river Ganges, where goods and services are traded and offered to pilgrims visiting the river for religious rituals.

The figure-ground relationship in Varanasi reflects the city's rich cultural heritage and its evolution over time. The old city, with its narrow, winding streets and densely packed buildings, forms a busy and intricate ground, while the religious structures, with their impressive architectural styles, form the dominant figure in the city's landscape. The newer parts of the city, on the other hand, have wider streets, larger buildings, and more open spaces, creating a clearer figure-ground relationship. The figure-ground relationship in Varanasi is complex due to the city's ancient origins and its current development.

As per the 2011 Census, the population of the Varanasi district is 3,676,841, out of which Varanasi city alone has a count of 1,435,113. The below diagram will show the population changes from the year 1931 to 2011.

Year	Population	Decadal Population Growth (%)
1931	207,650	
1941	266,002	28%
1951	355,771	28%
1961	489,864	38%
1971	671,934	26%
1981	773,865	25%
1991	1,030,863	33%
2001	1,202,443	17%
2011	1,435,113	23%

Figure 2: Population Changes and Growth in Varanasi City from Years 1931 to 2011

Source: https://www.academia.edu/30082041/A_Study_of_Varanasi_City_from_1993_to_2016_Documenting_Changes_in_Land_Use_Using_Remotely_Sensed_Data

3. LAND USE MAP

A land use map of Varanasi shows how the land in the city is being used for different purposes such as institutional spaces, residential spaces, commercial areas, waterbody, and green spaces.

It helps in understanding the city's physical structure and helps in urban planning. The map provides information about the distribution of different types of land use in the city, which is useful for decision-making regarding land development and management. The land use map is a valuable tool for city planners, policymakers, and developers to make informed decisions about the future growth and development of Varanasi.

The below map provides information about land use maps with color codes for each type of space. This map is prepared by taking information from the GPS database. (Kumar Jaiswal, n.d.)

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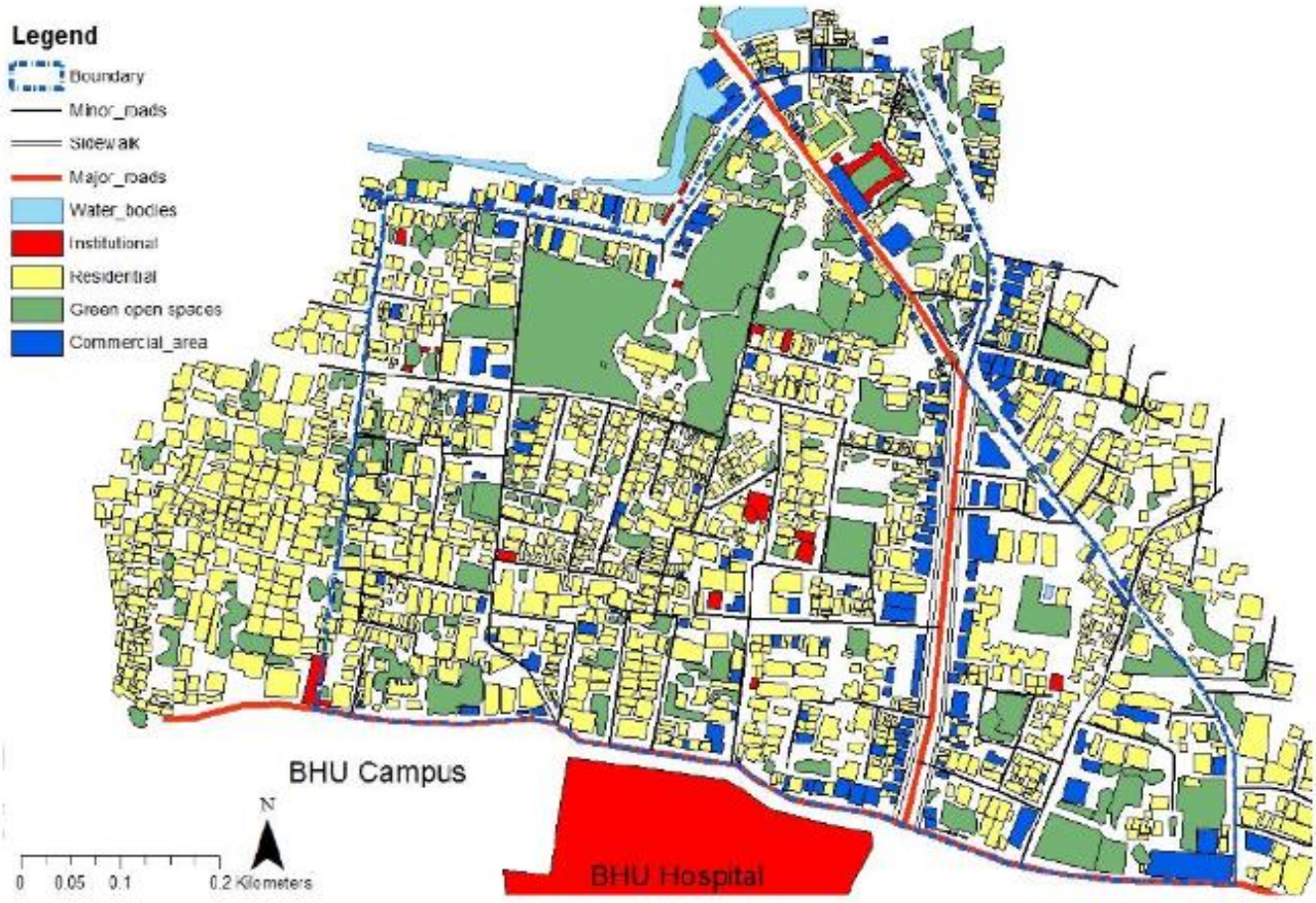


Figure 3: Land Use Map of Varanasi

Source: https://www.researchgate.net/figure/Digitised-and-validated-landuse-map-of-the-study-network-in-Varanasi-The-study-area-see_fig1_334535557

The land use map of Varanasi is unique in many ways and differs significantly from other cities due to its historical and cultural significance. The spaces near the ghats in Varanasi are used primarily for residential purposes, with a very compact living style. These areas are densely populated, and the streets are utilized by business persons to attract tourists. This unique land use map is due to the city's religious and cultural significance, which draws people worldwide. The narrow streets show their architectural style

4. PERSONAL INTERPRETATION

A Land use map of Varanasi is unique in its nature. As per the deep observation of the land use map of Varanasi, we can find a relationship between population, historical and cultural significance, time, and complexity of housing structures near the ghat (which we can call the core of Varanasi). The increasing population shows the need for space which is needed for residential purposes. Rather than this, there is an increasing need for hotels and restrooms near the ghat which will be a positive and supportive aspect for tourists. In the core area, several problems can be marked on the land use map. These problems include fire safety and firefighting, health emergency services, ways for especially abled people, public drinking water, crowd management, etc. Here we get an idea that the study of land use in Varanasi is very crucial because addressing these challenges will need great timing, efforts, and extraordinary creative schemes of professionals involved in planning and development. As per the data, we can see that tourist attraction is increasing rapidly because of development, urban interventions, and popularity all over the world. so there is a chance that the coming time will need to provide space and provision to facilitate tourists, commercials, and trading as much as possible. To address these problems of essential living services we need to free up some spaces for redevelopment. So, for this, we need to understand the land use maps as well as

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the psychology of people living in the core of Varanasi. This is a great reason that makes the land use map of Varanasi unique and diverse.

In conclusion, land use maps are the data provided by GIS tracking through satellite. This land use map is crucial to make any type of development in a region. Therefore, the land use map of Varanasi is different in nature because of its diverse, compact, and historical significance. To make any development there should be a ground survey of Varanasi.

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Sensory Environments in Learning Centre for the Visually Impaired Children

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ABSTRACT: Architecture has largely become art of printed image and is often looked at perceived entirely through visual senses. The masses tend to live on the surface, caring only about appearances and thus, the retinal image is the only way any structure, built form or space is perceived through in this age of social media and print media surge. Other non-visual senses like touch, smell, taste and hearing must be activated in order to instill a multi-sensory experience and establish a much stronger connection to the spaces.

Perception of space is additionally challenging for people with blindness or severe visual impairment. Incredibly high number of people suffer from visual impairment due to causes that are avoidable or treatable, and the rest require intervention at early stages of their childhood in order to function properly in the later stages of their life. This can be achieved by enhancing the rest of the senses of the children with varying visual abilities to the best of their potential. The research focuses on the elements of such multisensory spaces that enhance and stimulate the non-visual senses in case of visually impaired children. The research also covers the multisensory education module with respect to an inclusive learning environment.

Research Limitations: Presently, primary limitation of the intervention shall be for children with varying visual abilities aged from 0 to 15 years. This age group is currently stated as one of the highest affected age groups from visual impairment, after senior citizens above 60 years. The key elements of sensory environments is the primary factor under consideration while researching about the lifestyle and education methodologies for the visually impaired.

Keywords: *integrated education, Multi-sensory, Pedagogy, visually impaired,*

1. INTRODUCTION

The spatial perception for the visually impaired is considerably varying from the visual perception of the sighted individuals. Individuals who are congenitally blind cannot perceive space through descriptions of form, volume, and colour as well since they have no prior experience with it. They can only perceive volume through sound and touch. People with moderate visual impairment or partially visually impaired people use large forms and colour to assist in navigating themselves through their environment. Without immediate visual recognition of space, the visually impaired build up the shape of the world around them using their remaining senses. This successive method of cognitive space forming creates a sense of awareness in their environment through piecing together sensory perception. Using aural and tactile qualities along with simplified visual layouts and geometries can reinforce spatial awareness to ease the stress that the visually impaired endure navigating unknown spaces.

1.1 Identification of Research Questions

- Are there restraints to experiencing architecture visually?
- What is the current state of multisensory education in India?
- How does multisensory education affect academic performances?

1.2 Aim

- This study intents to look into methodologies and solutions for improving the quality of life for visually impaired
- It aims at looking into the major causes of visual impairment, major masses of people affected, and the ways that could be implemented in order to reduce these numbers.
- It intends to look into multisensory environments as a tool for causing a shift in academic performances

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1.3 Objectives

- To study the prevalence of visual impairment in India, and to understand the major factors causing it
- To study the interrelation between non visual senses and spatial perception
- To study the multisensory environments in built spaces, and the effects they have on visually impaired children

1.4 Scope

- There is a need for proper diagnostic facilities at an early stage in order to prevent the impairments further.
- In cases where visual impairment can't be cured, rehabilitation facilities help the children to utilize their non visual senses to the full potential and the necessary life skills as well.
- Multiple Methods must be simultaneously used in order to balance the academic excellence of the children and their all-round growth as well.

1.5 Limitations

Presently, primary limitation of the intervention shall be for children with varying visual abilities aged from 0 to 15 years. This age group is currently stated as one of the highest affected age groups from visual impairment, after senior citizens above 60 years. Another limitation is the changing visual impairment demographics and medical professionals who are available and willing to help such children.

2. LITERATURE REVIEW

2.1 Contribution of Five Human Senses Towards the Perception of Space (Hadjiphilippou, 2013)

This particular research paper gives insights on the knowledge about importance of human senses in architecture, environment and space and how the senses help the people to use the non-visual abilities in order to experience a certain space. The built environment is of prime importance that affects the human senses, memories and emotions. They also help in gathering additional information about the surrounding space. The relationship between the senses and spatial elements is also of vital importance while designing spaces for non-visual abilities.

2.2 Academic Excellence Through Multi Sensory Approach: A Model for Classroom Teaching

Many kids who are academically behind others are not interested in learning new information as they are forced to improve their long-term memory. One of the key ideas of impact when students leave the classroom to study is Multi sensory education. This study specifically focused on the benefits of the multi-sensory approach on classroom teaching. Learners are the beneficiaries of the given information in the classroom, these may include different skills, knowledge or experience at a particular duration. Learning style is generally divided into three different types such as Visual Learning, Auditory Learning and Kinesthetic Learning. Individuals who learn better by using his or her visual organs are called visual learners. Visual learners use their eyes effectively in the learning process and enjoy learning. Individuals with auditory learning style will always have better comprehension if the information giving or classroom teaching will be done in the form of an oral way of presentation.

2.3 Eyes of the Skin

Pallasmaa, IN EYES OF THE SKIN examines the way we experience things and find meaning in them. It is intrinsically associated with architecture. He argues that all human interaction involves projecting fragments of the self onto others. and distance, and invites unconscious peripheral vision and tactile imagination. Shadows offer a range of sensual spatial experiences that would otherwise have very different characteristics.

2.4 Importance of Lighting to the Experience of Architecture (Fontenelle, 2008)

This research paper explains the importance of light and how it directly affects the perception of spaces. This also includes an interesting take on light in different forms that impact human senses and provoke different moods and atmospheres. This also dicusses the seven terms for the light in space by visual experience.

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2.5 Architecture and the Senses (R. Ragavendira, 2018)

This research paper defines the connection between architecture and human senses. As introduced in the initial stages, senses play a vital role in the designing of various built/open spaces. This paper establishes the connection between architecture and and various senses and further explains the various methods of perception and the reasons for incorporating all the senses while designing spaces in order to alleviate the user experiences.

2.6 Conclusion for Literature Review

Vital aspect that must be taken into account is the minimizing of ocular centrism and making architecture less dependent on retinal images. This requires elaborative study regarding the multisensory environments, and spatial perception methodologies for the visually impaired. The academic performance is also uplifted by the use of multisensory environments, which helps the children to not only learn, but also retain knowledge.

The co-existence of children with varying visual abilities is beneficial for both. The visually impaired children are not abruptly thrown off into a world of sighted people, causing chaos and years of redeveloping their lifestyles, and this also increases awareness about blindness and visual impairment amongst the sighted children making them sensitive towards these issues. This calls for an integrated environment that merges the livelihoods of normal sighted children and visually impaired children.

3. MATERIALS AND METHODOLOGY

Stage I: The first stage of research is about obtaining information regarding the key elements of the topic.

(a) Gaining a thorough understanding of those with different levels of vision, as well as researching their requirements and way of life
(b) Understanding how spatial perception varies amongst people with varying visual abilities
(c) Studying the educational approaches for children who are blind or visually impaired as well as the most recent technological developments that support them
(d) Understanding what is multi-sensory education and how does it affect learning in early ages

3.1 Methodology

(a) Refer to research papers, journals and books written on above mentioned topics
(b) Conduct interviews of:
    - Medical professionals who have been working in the field
    - Educators/Teaching professionals who have work experience in the field
    - Parents/immediate relatives of people with varying visual abilities
(c) Case Studies of centers for people with visual impairment

Stage II: The second stage of the research focuses on the need and justification for the design intervention that caters to the needs of the people with visual impairment or blindness. This is done by studying about the prevalence of visual impairment and their causes.

Stage III: The last stage of the research focuses on the architectural aspect of the design intervention. In this case, the various elements that help in improving spatial perception for people with visual impairment are studied in detail. The Wayfinding methods, Integration of children having varying visual abilities along with other children in an urban setting and relational spaces are some of the key factors to be considered.

4. RESULTS AND DISCUSSION

Architectural designs all too frequently rely more strongly on the visual one. Regrettably, the other senses are routinely ignored. This is unfortunate as architecture may have a significant impact through the senses. A successful piece of architecture can address historical, customary, or modern cultural tendencies. It does not disregard the senses.

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4.1 Auditory Perception-Perception of Auditory Signals

Sound stimulation occurs when the movement or vibration of an object causes pressure changes in air, water, or other elastic media surrounding the object. This increase in density leads to a local rise of atmospheres superimposed on the atmospheric pressure. Any object emitting audio signals creates a pattern of alternating high and low-pressure areas in the air as adjacent to it, and the air molecules influence each other

4.2 Current Scenario for Auditory Perception amongst the Visually Impaired

Spatial hearing and vision have a complex relationship. Early theories suggested that visually impaired individuals may develop superior spatial hearing abilities to compensate for their visual impairment, or conversely, exhibit spatial hearing impairments due to lack of calibration of their visual system. The currently available evidence suggests that both claims are likely correct. Early blind people show as good or better accuracy than sighted people when they are required to localize a sound source in the horizontal plane, but they are less likely to localize a sound source in the vertical plane or have difficulty locating auditory stimuli. It is inadequate for things like estimating absolute distances

4.3 Avenues of Implementation-Spatial Nature of Sound

The direction of the sound aids listeners in sorting through these many sources to create a mental image of the locations and occurrences. Binaural hearing produces depth by combining information from the left and right ears, much as how human binocular vision creates depth by integrating two pictures (one from each eye). A person with normal hearing may distinguish between two voices when seated at a dining table due to the sounds' distinct positions as well as their various frequencies.

- **Role in Wayfinding**: Auditory elements play a vital role in wayfinding and navigation for the visually impaired. Thus, flora like bamboo stems or seedpods that make noise when wind passes through are often used in sensory gardens. Trees that shed seasonally are also planted at such places that their shedded leaves shall make a crunching sound after a person walks over.
    1. *Linear Path:* Straight path with sequential spaces along the route.
    2. *Radial Path:* With multiple linear paths starting from a single focal point.
    3. *Spiral Path:* Single continuous path originating from a single focal point.
    4. *Grid:* Grid arrangement of spaces with parallel path set intersecting at regular intervals.
- **Composite:** A combination of two or more of above patterns.

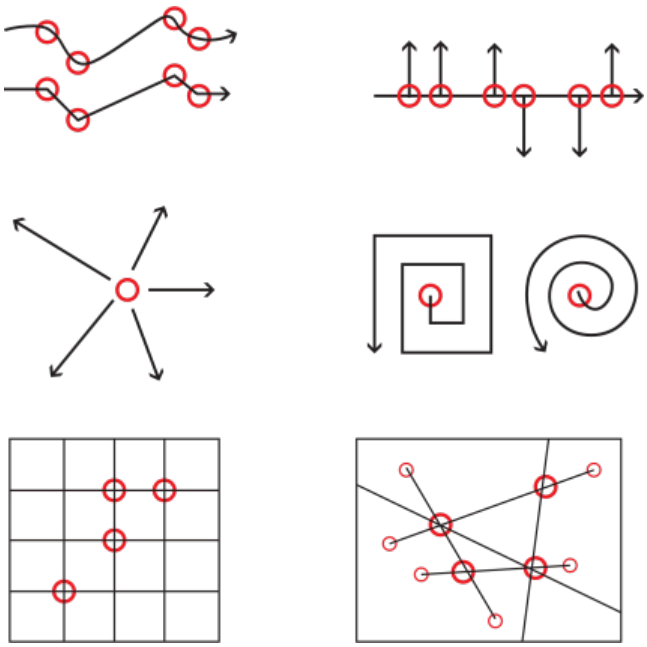


Figure 1: Circulation Patterns for Visually Impaired

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(*Source:* Author)

- **Stimulate Hearing:** Plants that encourage harmless creatures like hummingbirds, chirping crickets, buzzing bees can also be proposed in the vicinity. The constant background noise also stimulates the sense of hearing further.
- **Sound as an Experience**: Architecture and sound are both extremely important in shaping each other. The nature of a certain space is perceived by sound vibrations and echoes for visually impaired. Extremely large volumes of spaces tend to confuse the person while extremely low roofs could also trigger fear. However, any experience can be dominated by sound, i.e. buzzing or alarm sounds or continuous traffic sounds can add to the chaos whilst soothing music or silent tunes can stimulate a calm and peaceful feeling.

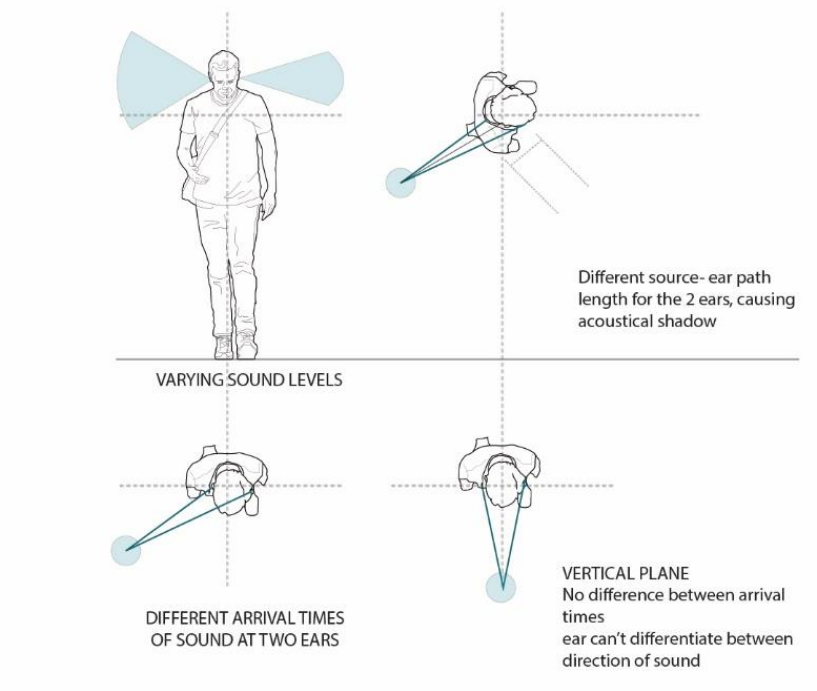


Figure 2: Spatial Quality of Sound

(*Source:* Author)

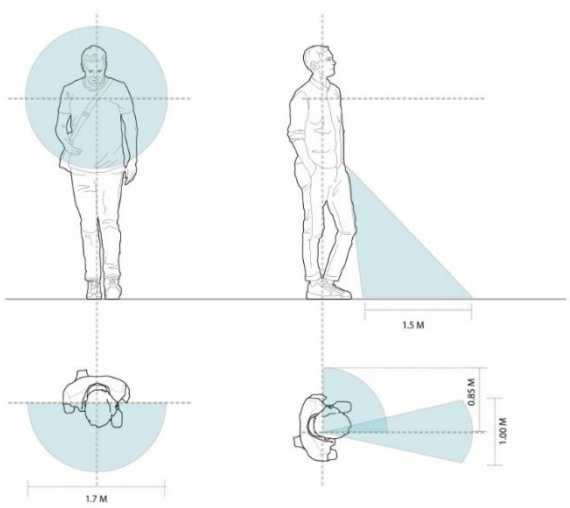


Figure 3: Ergonomics for Placements of Tactiles Cues

(*Source:* Author)

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4.4 Tactile Elements: Perception

Texture perception relies on both spatial and temporal cues. **Spatial cues** are evoked by relatively large surface features, such as ridges and grooves, and can be felt both when the skin is moved over the surface features and when the skin is pressed against the features. These cues give a sense of the different shapes, sizes and distributions of these surface elements. Examples of spatial cues are the perception of rough textures such as braille, or the texture you feel when you touch the tines of a comb.

Temporal cues occur when the skin moves over a rough surface like fine sandpaper. This cue provides information in the form of vibrations that occur as a result of the skin moving over the surface.

Tactile Signages: Signage must be accessible to the visually impaired and partially sighted. It is generally considered appropriate for tactile symbols to consist only of raised letters. However, for those who read Braille, Braille is much faster and easier to read than stereo. In some regions, it is recommended to include embossed text or Braille on signage identifying rooms and areas such as auditoriums, cafeterias, washrooms, elevator floors, and so on.

Signage should be maintained at a certain height and distance from the door to which it is mounted. Raised tactile lettering should contrast in color with the background. The color of the sign should contrast with the surrounding walls, and the text on the sign should not only be tactile, but also have high contrast.

Given below are the guidelines that are vital while designing spaces that rely on touch as a primary non visual sense:

- **Specialization of Touch:** The human body's surface is made up of many different regions, some of which are located inside the mouth, nose, ears. The receptors in our fingertips gather hyper-detailed data about the things we touch. Other regions of the skin convey impressions in lower resolution.
- **Layered Nature of Touch:** Intellectually, one can pick apart the different materials that make up how something feels, but the embodied brain swirls those elements together into a unified perceptual sensation.
- **Social Impact of a Touch:** Touch-based communication techniques, such as finger spelling and item exploration with the hands or feet, are used by deaf-blind people. A deaf-blind person can better see their surroundings by drawing a diagram of the room's components on the back of their hand.
- **Active Nature of Touch:** Different surface offer different types of stimulation to the skin. Inflated "wiggle cushions" and therapeutic balls are products designed for kids and adults who find comfort in physical motion. Users can shift, bounce, and move while seated on surfaces with springs. Additional stimulation is provided by seats with prickly, hairy, or rough materials.
- **Touch is Capable of Instilling Emotions:** In various studies, experiments were carried out by making people touch warm and cold objects and thereafter noting their emotional responses. In many cases, people holding the warmer object were seen to have a positive emotional affection as compared to the ones holding the colder object. Physical warmth thus translates into positive emotions.

4.5 Olfactory Elements: Perception

Theoretically, people can currently sense at least one trillion different scents, but no one has made a firm statement on how many smells a person can distinguish. There is no consensus on how smell functions, in contrast to hearing and sight, whose mechanics and molecular biology have been thoroughly mapped throughout the course of the twentieth century. Given below is an research based experience wheel for the various emotions stimulated by various smells.

4.6 Landscape

This chapter on the landscaping for the visually impaired extends the previously developed standard for universal design, child-friendly design, and treatments that support people with sensory processing problems.

1. Usage of objects that serve multiple purposes while paying attention to the sensory needs.

   It is found that natural elements had less aversive effects than man-made elements. They also create much more imaginative game props. Elements such as seating walls can create haptic experiences, user rest areas, and navigation or boundary elements to public spaces. Grass and bamboo act as barriers in semi-enclosed spaces while providing tactile interest, visual and auditory stimulation.

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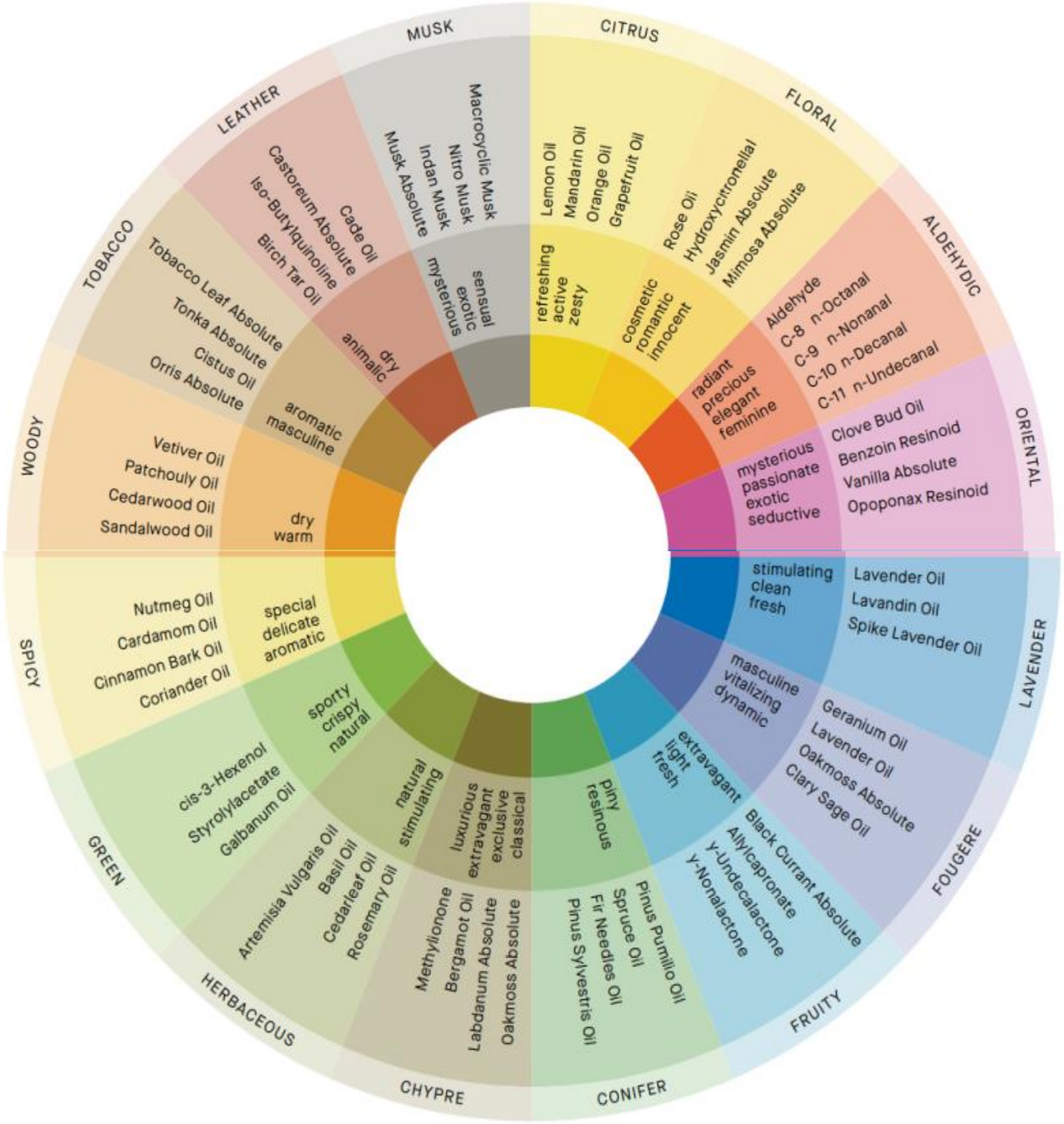


Figure 4: Olfactory Senses

(*Source:* The Senses: Design Beyond Vision)

2. Creating spaces accessible to users of all skill levels and physical dimensions:
   One of the main problems of the visually impaired is the lack of understanding of the environment, often associated with cognitive problems. Using signage that is tactile relief or simple iconography rather than complex language is just one way to create legibility in these spaces. It is also important that the user is aware of the space intentions.
3. Use materials that maintain strength and integrity for intensive use:

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The visually Impaired are often too expressive to receive the sensory feedback they need. These materials must withstand heavy use. Using stronger botanicals such as herbs can provide additional sensory stimulation. Wood that can split should be avoided as it can pose a safety hazard.

4. Creating environments that give users a sense of control and autonomy:

   Just as readability of the environment is important, the ability to control space becomes very important for children with sensory processing or modulation disorders. Providing a way to control the environment through alternate entry and exit routes when existing areas are overstimulated, and providing elements used in self-regulation strategies to focus or remove additional stimulation is important. It provides multiple ways to interact with the environment.

   This associates the environment with multiple senses that extend beyond the basic five senses to the proprioceptive and vestibular regions.

Safety: Safety and ease of navigation are important when designing gardens for the blind and visually impaired. Poisonous plants should be avoided.

Smell: It is important to choose your fragrance carefully. Strong scents can be unpleasant for people who are blind or have a sensitive sense of smell. With targeted use, this scent helps the blind find their way in the garden and of course ensures a pleasant olfactory experience. Botanicals to consider for scent such as honeysuckle, lavender, violet, spearmint and chocolate.

Sound: A birdbath with beautiful chirping birds or some water elements are some useful sound elements. Choosing flora that makes noise when the wind blows, like bamboo stalks shall also be helpful in navigation. Many seed pods also make interesting noises, and the late-season leaves make a pleasing noise underfoot. Chirping crickets, or chirping hummingbirds stimulate your sense of hearing

Touch: The Garden of the Senses provides a wonderful opportunity to explore the sense of touch. There are plants and flowers with interesting textures such as pussy willow and hyacinth. Some plants, such as scented geraniums, give off a scent when touched. For example, geranium, lemon balm, mint.

Flavor: Edible Flowers add another sensory dimension to your garden. Examples are Primrose, Hibiscus, Pansy. Berries, fruit trees, vegetables, herbs and spices are also great additions. When planting edible flowers, fruits, herbs, and spices, keep them separate from the rest of your garden. This is especially important for VI or visually impaired people who may not be able to distinguish between edible and non-edible plants.

4.7 Assistive Technologies

Access to information and communication for people with vision impairment and blindness has been significantly improved because of smart phones, speech recognition technology, and accessibility features in operating systems.

4.8 Smartphone Apps

Smartphones are not yet fully accessible to the visually impaired, and to solve this problem, the accessibility app Simple Eye for the blind was created. With the use of sound, vibration, and tactile devices, the software enables smartphone use for people who are blind or visually impaired. The app delivers vocal output of the content on the screen and accepts touch movements on the phone's screen as input. It makes sure that only one element is displayed on the screen at once, and a voice narrates which element is visible. This also makes it possible for users to interact with the UI without having to search for buttons by using straightforward, touch-anywhere gestures. Users of the app can make movements on any part of the screen, regardless of where they are on the screen.

4.9 Smart Cane

Those who are visually impaired frequently use white canes to guide them. The conventional cane, however, has some drawbacks and can only assist a blind person in detecting hazards on the ground and up to a very short distance. As a result, blind people frequently run into parked cars, projecting branches, and other objects, greatly limiting their movement. To solve this problem, the SmartCane device was introduced. An electronic walking assist that attaches to the top fold of the white cane. Users of the device may see any obstruction above the knee from a distance of three meters away thanks to the use of ultrasonic waves. After that, the device vibrates to warn the user of any obstructions. Additionally, it begins to beep, and as the user approaches the obstacle, the noise becomes louder.

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5. CONCLUSION

As the science of brain plasticity advances, architecture may take advantage of new insights and devices. Human senses basically collect data from stimuli (such as light or sound) and feed it to the brain, where it is compiled and interpreted. By placing spatial sensory features, architects can guide the occupants through the functional and aesthetic rhythms of the places created. Buildings for all senses help more users and enhance their experience.

ACKNOWLEDGEMENT

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Wind Induced Parametric (Computational) Design

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ABSTRACT: Parametric style is widely explored in the current era of architecture, followed by generative, computational, and algorithmic design. A style that expresses artistic or technophile exuberance. Aesthetically and formally, it represents a style of Avant-garde.

Certainly, the potential of parametric/computational design has a much bigger and more crucial role to play in designing future structures. In this research paper, the Parametric approach is used to build a climate-resilient structure where environmental engineering and optimization techniques are explored. It covers the parts where Artificial intelligence and genetic algorithms are involved in designing and conceptualization. The main agenda is to come up with a form that is best suited for areas experiencing heavy winds or cyclones with the help of a Parametric algorithm coupled with CFD (Computational Fluid Dynamics). CFD simulations help to visualize the impact of external forces (majorly wind) acting on the model.

In contrast to traditional ways of designing buildings, this method of making performance predictions at the conceptual stage gives out the most optimum result at the end.

Keywords: *Parametric Design, Computational Design, Genetic Algorithm, Artificial Intelligence, Shape Optimisation, Simulation, Wind Analysis.*

1. INTRODUCTION

In the climate change era, a rise in sea level temperature has led to many calamities such as disturbing wind waves, storms, cyclones, heat waves, cold waves, and so on. Therefore, it has become important for architects to address these issues at a very conceptual stage of designing. The warming of the Indian Ocean has contributed to the development of cyclones in northern. Indian Ocean waters due to overheated waters.

The most serious threats to Indian Oceans are those that spring from super storms in the ocean. Cyclones as destructive as Amhpan, Nisarga, and Tukatae have threatened the Indian Ocean in recent years. There has been an increase of 1.2 to 1.4 degrees Celsius in SSTs leading to cyclogenesis in the Arabian sea in recent decades compared to four decades ago. As a result, many settlements are destroyed, and people are forced to relocate each year.

How does it impact Architecture?

It is a known fact that architecture is greatly influenced by wind flow as well as the wind's ability to shape the surroundings. The shape can help Diffuse and Deflect any kind of prevailing winds striking its surface.

The concept of wind-induced parametric design refers to the use of computer simulations and mathematical models for analysing and optimizing the design of a building or structure in order to minimize the effects of wind on it.

To minimize wind-induced forces and improve the overall stability and safety of the building or structure, computer programs are used to conduct virtual wind tunnel tests and adjust design parameters such as the shape and size of the building or structure, the location of openings, and the placement of wind breaks and other elements.

In computational/parametric modelling, it allows exploring environmental engineering and optimization techniques with the help of tools like Grasshopper (GH) + plugins in Rhinoceros where it demands necessary parameters. The environmental script (ladybug plugin) is connected with a form-finding tool (kangaroo plugin) that gives us different forms for different wind ranges. We further develop the shape using simulation tools like butterfly CFD to read through the problems and identify flaws in the shape of the structure.

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The principles of Aerodynamics and Computational fluid dynamics (CFD) have become important in defining parameters for form finding. Further advancement is done using Artificial Intelligence (Galapagos for GH) and Genetic algorithm for design optimization.

1.1 Research Question

Can we use computational design and AI in architecture for generating shape/ form for areas prone to heavy winds and cyclones.

2.2 Aim

The use of computational design tools, such as computational fluid dynamics, to facilitate improvements in resilience to cyclones in coastal areas along with other climate factors.

2.3 Objective

1. The research will be carried out in areas that have been affected by hurricanes in the past and are at risk of further weather damage.
2. Documentation of existing houses and colonies for better understanding of their lifestyle and architecture.
3. Studying the wind patterns and analysing the wind data during cyclones.
4. Applying all the data into use by using tools like grasshopper butterfly CFD analysis to come up with an algorithm.
5. The algorithm will further guide the design process and will lead to a design solution for cyclonic resilient architecture.

2.4 Scope

The process will help in finding an optimal shape and form for wind conditions acting on tall buildings to bridges, stadiums and dwellings.

Computational tools can help to develop a precise model for cyclone resilient structure with visual representation of the wind striking on the structure to identify flaws and improve their safety stability and overall performance.

Computational knowledge can also be applied to material study and optimizing the other environmental factors.

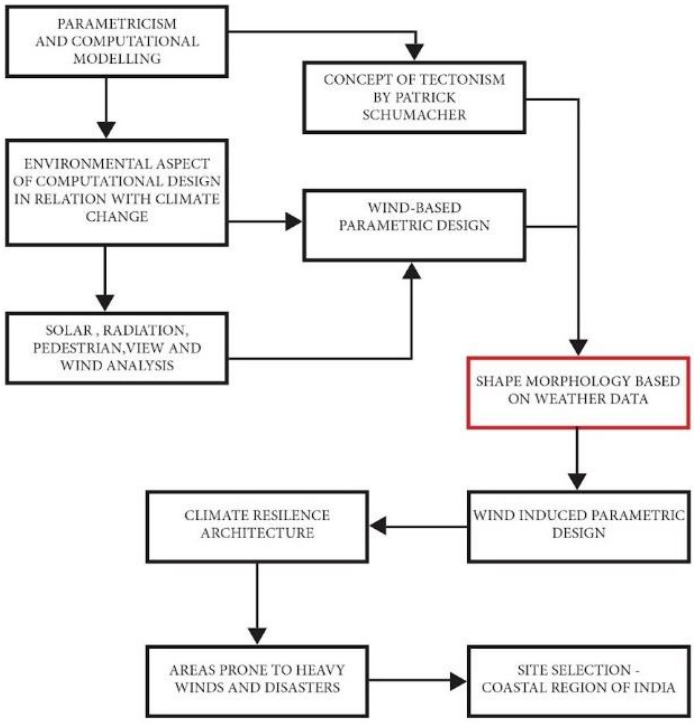
The prototype can be optimized in many ways to sub types in which the parameters can be tweaked to different site requirements.

2.5 Limitations

The time required to compute a single simulation is high, it can take up many hours to get the desired result and hence is very time consuming.

The data can be less accurate at this level of research. Basic logics have been used. Intensive research and high-end software can be used to improve performance.

RESEARCH FRAMEWORK



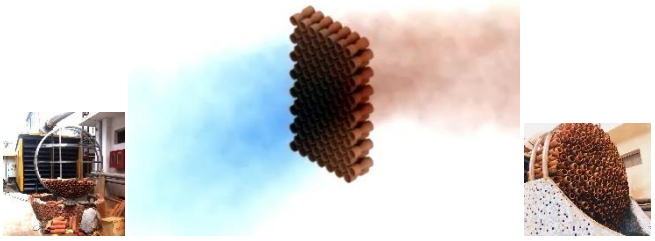
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2. LITERATURE REVIEW

2.1 Environmental Aspects of Computational Design – *wind driven form finding.*

Computational design is a tool that helps designers to explore complex parametric forms mostly inspired by nature(bio-architecture), the behavioural patterns of organisms, the flora, and fauna and bring it to reality with the help of computational design software like rhino and grasshopper.it not only helps us to make generative designs but also to stimulate them in real-time. If seen on a larger scale these innovations in designing methods are adding to a sustainability factor for example the "coolant" researched and designed by ant studio in Delhi to cater to the harsh climate. The coolant takes up the form of a beehive made up of clay (inspired by bees).fig1- shows the color change when it flows through claypots. The form was replicated and generated using the grasshopper which gave them accurate results of the flow of wind across the structure.

In order to prove the design working CFD simulations were used to visualise the output.



Renzo piano's Jean -Marie Tjibaou Cultural Centre in New Caledonia has around 10 cases or "kernels" enclosed with tall husk-like enclosures made of curved laminated wood. It is built to balance the pressure difference between outside air and the hut in order to maintain proper ventilation and wind speed with the help of louvers. Figure 2 - View of cultural center and kernel.

CFD simulations were generated to look for pressure distribution on the kernel and hut. They could point out the problems and further design improvements were made.

On similar grounds, MOFA studio from Delhi has designed wind pods Figure .(Goa assembly – Artist hub) to harness warmer winds and decrease the temperature as the wind travels through these pods, maintaining the overall microclimate of the place. Grasshopper and butterfly CFD is used to visualise the wind flow.



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In wind based parametric design in climate change (author) has talked about Combining performance criteria such as climate factors with architectural design ideas and blending them into an architectural masterpiece. An aerodynamic structure is designed in between the silos for public activities and energy generation. The wind data is incorporated with parametric definition, a form/shape is generated with the help of plugins and is run through CFD simulations. The process is repeated till the desired result is obtained.

As the design is dealing with wind and its flow, basic wind flow diagrams and aerodynamic study is coded as part of the parametric definition. (Figure 3)

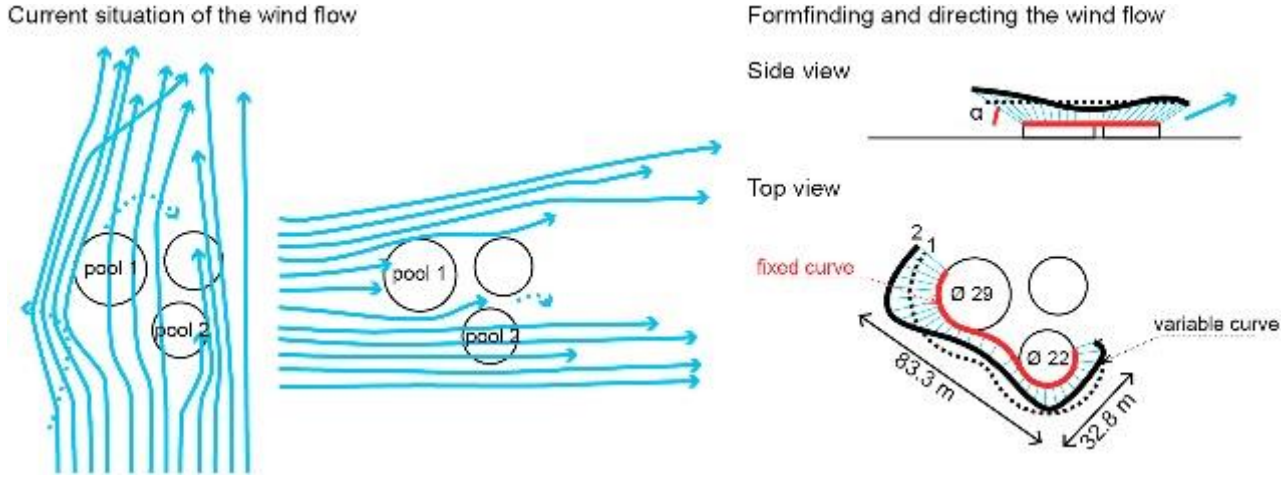


Figure 3: Flow Diagram

2.2 Form Finding Through AI and GA

Angelos Chronis in paper () has explained optimisation method of a free form structure that deforms itself on basis of wind load and uses genetic algorithms to result in best optimised shape.

2.3 Goal – Optimise a Free-Form Surface to have Minimum Stress from the Wind

Artificial Intelligence in Form Generation

Galapagos for grasshopper is an optimization (AI) tool where it reads the data as genome connected to numerical component and fitness to the end data where the result is calculated. A graphical representation is seen for every change in shape and several different shapes are generated as per the parameters.

What is Genetic Algorithm?

GA is mimicking the natural selection process through the population of candidates that represent a solution to the given problem by assessing their fitness and reproducing their genetic material.

2.4 Process

1. An initial population of surfaces is randomly generated by the GA.
2. For each member of the initial population the CFD domain is pre-processed and the internal boundaries are defined.
3. The simulation engine runs until it converges, and the fitness of the member is evaluated as the mean wind load on the surface in each time period.
4. The fluid domain and the internal boundaries are reset.
5. When the whole of the initial population has been evaluated and ranked, a new member is generated by the GA and steps 2 to 4 are repeated for each new member. Figure 4.

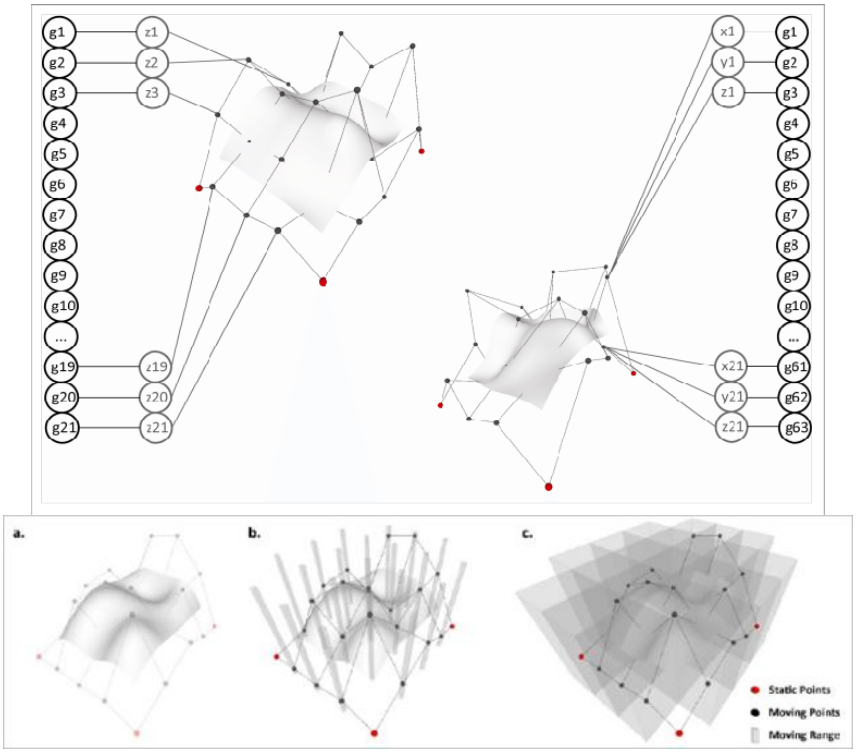
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2.5 Results

In both cases the optimization process was successful in optimizing the performance of the surface, steadily decreasing the wind loads, though not reaching its full potential, in the given timeframe.

2.6 Conclusion

The above study has developed a process to build a prototype for a specific wind condition and then optimising it to best possible outcome in form of shape. This can be used in other areas with different wind requirements and speeds and a shape with a similar approach can be generated.



2.7 Anatomy of Hurricane Resistance House

The above research talked about wind driven form finding with the help of algorithmic modelling. Now the focus is on making a cyclone resilient structure with a similar approach. To start with the parameters, basic anatomy of a cyclone resistant house studied.

2.8 Dome—The Eye of the Storm

The infamous Florida's dome house made up as Monolithic domes, as opposed to square or rectangular ones, are preferred for hurricane/cyclone resistant homes because of their aerodynamic form, which diverts the swing proportionately and has minimal impact on the building. Because of its smooth surface, the dome's surface sustains less damage from the wind. Another

In the last 40 years ago, Daltect House Figure has specialized in building hurricane-resistant homes. In order to make hurricane-resistant houses, they follow a comprehensive approach:

1. Unique -Round shaped house
2. Material Twice as strong
3. Customed design house in accordance with its surroundings
4. Sustainable

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2.8.1 *Shape*

1. No side of a structure can experience enough pressure from wind to cause it to collapse.
2. The best roof pitch (6/12) for reducing lift and deflecting wind.
3. The most effective structure for transferring environmental loads is circular.

2.9 Material

Machine rated 2400 psi framing lumber used in trusses and walls.

Five Ply 5/8" plywood sheathing used instead of OSB on exterior walls, roof and floor. Reinforced windows with impact glass prevent wind and water from entering the home.



3. CONCLUSION

The eastern and western coastlines of India are always susceptible to cyclones every year, and the site chosen for the study is Alibag and Murud region in the western part of the country. The city was not prepared for Nisarga, and the research strategies can be used to make it ready for future cyclones.

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Energy Efficiency Retrofit—Need of the Moment?

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ABSTRACT: The building sectors consume the most energy worldwide. The energy consumption of the existing buildings is substantial than the buildings that will be constructed in future. Greenhouse gas emissions are estimated to go up 3.3 times by 2050, in Residential and Commercial and Institutional buildings in India. So, to reduce the energy demand and to restrict the increase of global temperature, carbon dioxide emissions reductions need to be reduced. To achieve these targets, building sectors will need to employ set of strategies which include net-zero carbon buildings, high rates of energy efficiency retrofits in buildings, deployment of centralized and decentralized renewable energy sources, etc. Against this background, this paper focuses of the advantageous benefits obtained as the existing buildings are converted to energy efficient buildings. Energy efficiency retrofit is the process of installing and/or replacing parts of an existing building, employing one or more Energy Efficiency Measures (EEMs) to maximize occupant comfort and reduce energy use in a building.

Various case studies were studied to identify the benefits and feasibility of energy efficiency retrofits. Though it is a lot easier to construct an environment friendly building, the concept of retrofitting can't be ignored. People are now becoming aware of the importance of decarbonizing buildings and have started adopting the retrofit strategies. Developers, building owners, and tenants are now willing to implement retrofit measures to achieve energy-efficiency benefits of reduced energy use, cost savings, increased worker productivity, higher asset value, and market advantage, etc.

Keywords: *Energy Efficiency, Retrofit, Energy Efficiency Measures, Greenhouse Gas/Carbon Emissions and Decarbonizing.*

1. INTRODUCTION

The energy consumption of existing buildings is far more significant and is expected to go up by 3.3 times by 2050 than the buildings that will be constructed in the future. The total greenhouse gas emission by different sectors is as shown below.

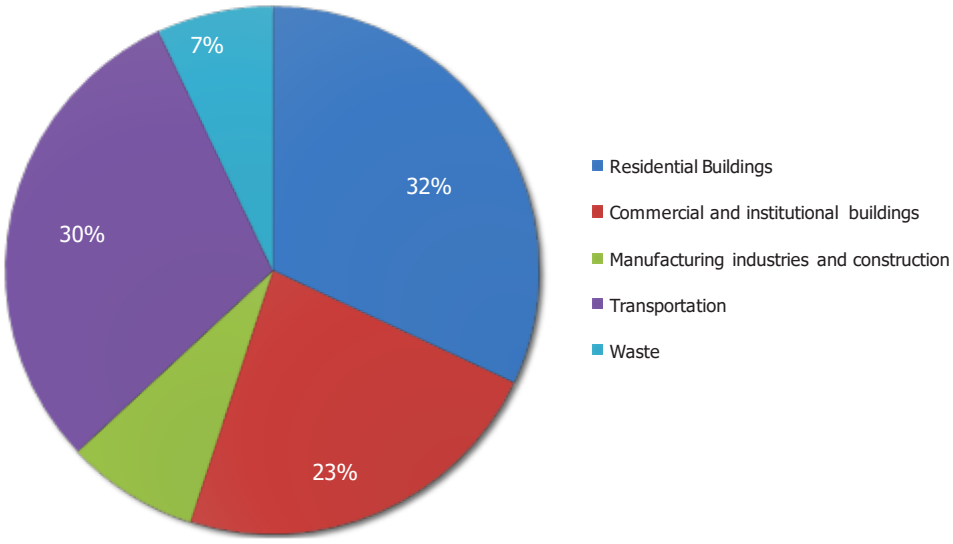


Figure 1: Total Greenhouse Gas Emission by Different Sectors

(*Source:* Primary Data Analysis based on 2019 data – WRI India & Environment Status Report 2020)

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The existing built environment accounts for about 40 per cent of the world's total energy consumption. In India, they are responsible for using 30% of the country's total power output, with their use of electrical appliances, lighting, refrigeration and water heating and air conditioning units. Currently, for India, it estimated that nearly 25,000 MW can be saved by implementing end-use energy efficiency. With current targets for energy savings, reduction of consumption, and environmental impact, it is necessary to carry out energy retrofits to modernize installations and their management. Retrofitting older buildings is the need of the hour and by updating older buildings, owners will be able to not only save money on operating expenses, but also increase the value of the property on the market." – Design Everest. Retrofitting or refurbishment is described as work required to upgrade an aged or deteriorated building (Ma *et al*., 2012). According to USGBC, green retrofit is defined as "any kind of upgrade of an existing building that is wholly or partially occupied to improve its energy efficiency and environmental performance, reduce water use, and improve the comfort and quality of the space in terms of natural light, air quality, and noise, all of which is done in a way that is financially beneficial to the owner". Incorporating energy-efficiency measures in new and existing buildings will help India achieve a reliable energy future and save money while addressing the threat of climate change. Energy efficiency retrofit is the process of installing and/or replacing parts of an existing building in order to make it more energy-efficient. They can be carried out for many different reasons; to ensure the longevity of the building or structure, to reduce the long-term operating costs of heating and cooling, or to reduce the level of CO2 emissions as a result of heating and cooling. The retrofit requires implementing new energy-efficiency technologies in an aging office building with ongoing operations. Energy retrofits may employ one or more energy-efficiency measures (EEMs) to maximize occupant comfort and reduce building energy use. In this paper, we evaluate the various benefits associated with the energy efficiency retrofits to verify whether energy efficiency retrofits are need of the moment? The objective of the research paper is to study the advantageous benefits (especially in terms of cost savings) obtained as the existing buildings are converted to energy efficient buildings through various case studies. Though it is a lot easier to build an environment friendly building, the concept of retrofitting can't be ignored.

2. LITERATURE REVIEW

The energy consumption, greenhouse gas emissions have been an alarming issue and a matter of concern worldwide. Governments all over the world have collectively pledged to slow down these consumptions and emissions through the Kyoto Protocol and Paris Agreement. But despite all the measures taken the world is already facing the consequences and it is expected to get even more worse which could eventually bring an environmental catastrophe. Therefore, the concept of energy efficiency retrofit needs to be considered. With respect to these rising concerns, the Brihanmumbai

Municipal Corporation (BMC) has responded to the climate crisis with the Mumbai Climate Action Plan (MCAP). "The Mumbai Climate Action Plan is aligned to meet the goals of the Paris Agreement limiting global warming to 1.5°C. The evidence-based policymaking and stakeholder consultations that have led to the shaping of the MCAP will help Mumbai become a climate-resilient city." (Shri. Uddhav Thackrey, Mumbai Climate Action Plan, 2022). The Table 1 (below) shows the key strategy goals for the ambitious scenario for Mumbai that are stated in the MCAP.

Table 1: Strategy Goals for the Ambitious Scenario for Mumbai

Target	***2030***	***2040***	***2050***
% Share of total grid electricity from renewables	50%	70%	90%
% of total residential buildings with solar PV installed	10%	20%	40%
Residential water flow technology in buildings (% low flow fixtures)	20%	40%	60%
LED lighting in commercial and residential buildings (%)	100%	100%	100%
Commercial cooling system technology (% of high efficiency chillers)	38%	59%	80%

Source: Mumbai Climate Action Plan.

The Mumbai Climate Action Plan identifies the key gaps in the energy and buildings sector and identified that "Neither have any targets been set for decarbonizing Mumbai's grid, nor are there any mandatory polices in place for achieving energy efficiency in the existing and new infrastructure." So in order to ensure thermal comfort, few green building

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strategies and passive design strategies have been identified and integrated in MCAP, 2022. The Table 2 (below) represents the strategies integrated I the MCAP, 2022.

Table 2: Approach to Decarbonize Mumbai's Grid and Make Buildings Resilient

Increasing the proportion of Renewable energy in Mumbai's energy mix	• Grid Decarbonization • Distributed Renewables
Improving energy efficiency in new & existing infrastructure	• 100% transition to energy efficient streetlighting, public & traffic lighting systems • Retrofitting • Transition to electric stoves & water heaters
Promoting green buildings	• Strengthen & ensure ECBC compliance • Certification by established rating agencies • Undertake a demonstrative zero carbon municipal building project • Value-chain approach to decarbonize buildings & construction
Integrating passive design strategies to ensure thermal comfort	• Ventilation, cool roofs, green walls • Alternate building materials, building form & density

Source: Mumbai Climate Action Plan, 2022.

Energy Efficiency (EE) is a proven and cost-effective measure to address rapidly increasing global greenhouse gas (GHG) emissions. There is a great potential for improving EE across energy consuming sectors, particularly in our country. However, this potential remains largely unrealized due to the technical, financial, economic and institutional barriers to EE Implementation. (Roadmap for Incorporating Energy Efficiency Retrofits in Existing Buildings, TERI) Therefore, in order to survive today, one must stop the ruthless exploitation of the environment, and move towards an energy efficient trajectory by choosing to walk the sustainable path. Though it is a lot easier to build an environment friendly building, the question of retrofitting can't be ignored because existing buildings consume 40% of the total energy globally. Retrofitting an existing building can oftentimes be more cost-effective than building a new facility. Retrofit of buildings may deliver both direct economic benefits (e.g. reduced costs of building heating and cooling) and indirect benefits (e.g. enhanced property value or rental level of existing buildings, improved comfort level of living) (Lloyd *et al*., 2007, Santamouris *et al*., 2007). Since the indirect benefits are hard to quantify, it is difficult to translate them into monetary terms. Thus, indirect benefits are rarely taken into account in current literature when calculating EER benefits (Stanojević *et al*., 2010). The calculation of direct economic benefits is usually associated with an analysis of the potential for energy savings in existing buildings. Companies and organizations like Colliers and JLL, etc. have also invested and researched related to energy consumption, greenhouse gas emission issues and stated that occupiers' preferences have changed and occupiers are now actively exploring and looking forward to smart buildings with modern amenities that provide better operational efficiency and enable collaboration and hence, highlighting the importance of energy efficiency retrofit to existing buildings to improve the operational efficiency, lower operational costs and rental appreciation (by approx. 20%). Ramesh Nair (Chief Executive Officer, Colliers) states that "Overall, the real estate sector has the opportunity and the capability to redefine our urban spaces, upgrade our cities to new standards, and going green while reviving the spaces."

3. MATERIAL AND METHODOLOGY

As depicted in the Figure 2, to begin our study gaining information about the existing energy consumption, greenhouse gas emissions and carbon footprints etc. was carried out. A lot of newspaper articles, research papers and literature review were gone through to identify the issue which helped determine the aim, objective of this research paper. In order to analyse the benefits of energy efficiency retrofits, various case studies were studies to learn and study the advantages each building achieved by undergoing the retrofit. To conclude better different typologies of buildings were studied which included different territorial context, ages of construction, demographics, site context etc. For each building various parameters were considered for comparison mainly to analyse and compare their costs and benefits in terms of energy efficiency improvement/savings, and payback period and trying to obtain general indicators that could be useful for comparing

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different interventions on different typologies of buildings. Four various case studies in India were studied to identify the benefits of energy efficiency retrofits.

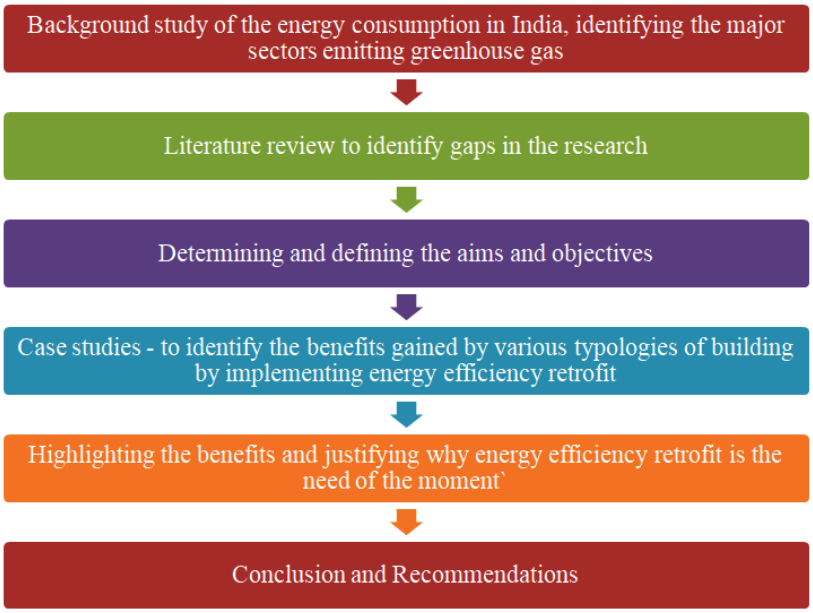


Figure 2: Methodology

Source: Author.

4. RESULTS AND DISCUSSION

The first case study Godrej Bhavan, Mumbai, India is a 3,826 square meters (41,185 square feet) 6-storey office building built in 1972 and upgraded in 2010 to include energy efficiency, sustainable features by upgrading the existing lighting, replacing the heating, air-conditioning and ventilation systems. The Figure 2 (below) shows the benefits achieved in terms of energy savings. It represents the energy-saving performance of Godrej Bhavan in two years after the retrofit activity compared to the baseline set i.e., the year 2009-2010. Under the actual electricity bill scenario, the payback period for the building was 4.7 years.

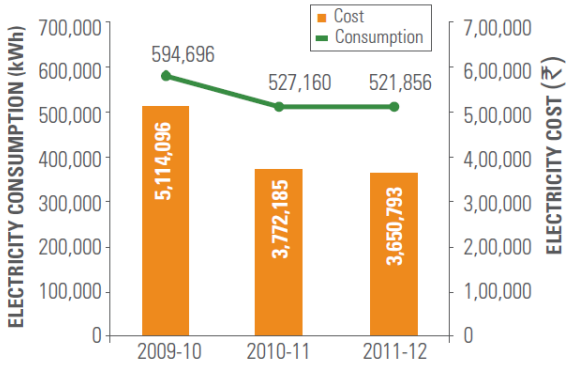


Figure 3: Annual Electricity Used and Electricity Costs for Godrej Bhavan (2009 to 2012)

(*Source:* www.nrdc.org)

The second case study is the Mahindra Towers headquarters, Mumbai, India, an office building with building area of 18,430 square meters (19,8277 square feet), constructed in 1985 and retrofitted in the year 2009. With an overall investment of Rs. 18,90,000 ($39,375) for implementing all the energy conservation mechanisms (ECMs) that focused on improving efficiency in lighting and cooling systems, the Mahindra Towers had an impressive payback period of less than half a year.

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The Mahindra Towers saved 543,108 kWh and Rs. 40,73,310 ($66,200) from March 2009 to = February 2010. (www.nrdc.org). The Figure 3 (below) total incurred cost of retrofit and the cost savings achieved from energy savings immediately after the retrofit in the first year.

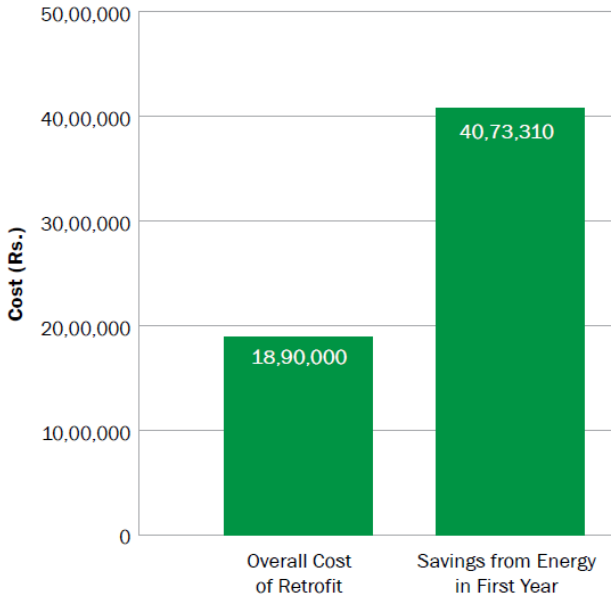


Figure 4: Cost of Energy Efficiency Measures Compared to Savings in the First Year of Retrofit

(*Source:* www.nrdc.org)

The third case study is ITC Sheraton, Delhi, a five-star hotel with a building area of 9850 square meter (106025 square feet) constructed in 2000 and retrofitted in 2007. The hotel comprises of 220 rooms (executive, deluxe and presidential suites), multicuisine restaurant, banquet hall, swimming pool, shopping arcade, lounge bar and board room. The building deployed certain energy saving measures which resulted in a approx. 10% energy savings in the fiscal year 2008-2009 and another 5% savings approx. in the next fiscal year.

The fourth case study is the Paharpur Business Centre, Delhi a 4,645 square meter (50,000 square feet) of office space which has received numerous certifications for its exceptional indoor air quality and energy efficiency. The main aim, focus of this building is associated with the employees i.e. the health, wellness and happiness of its employees. The building has a strategically placed indoor plants, installed greenhouse on terrace that helps circulate fresh air after removing toxic particles from the ambient air and pumps it into the air-conditioning system, replaced the CFL bulbs with LED lights, installed solar panels on the roof tops, etc. The building intensively focuses on every aspect of an employee's life- air, water, nourishment, light, and fitness. These measures not only helped and benefitted the employees but also resulted in increased productivity of employees, energy savings, improving the indoor air quality index, etc.

The learnings from the case studies proved that the energy efficiency retrofit not only provides tangible benefits but also provide intangible benefits. The energy efficiency retrofits definitely lead to energy savings which directly decreases the operational cost and reducing the electricity bills. The benefits that were identified from the case studies are as stated and explained below:

1. **Reduced energy bills:** Retrofitting old buildings has always guaranteed energy savings as compared to the existing usage hence, reducing the electricity bill costs.
2. Increased energy performance.
3. **Lower Operational Costs:** Energy efficiency retrofits will reduce the operational costs of the building.
4. **Rental Appreciation:** With every year passing and increasing pitfalls of climate change, people are now becoming aware and realize the importance of saving the resources and keeping the planet green. Occupiers are now preferring and exploring smart buildings and therefore, implementing energy efficiency measures will help improve the building performance which will lead to rental appreciation by approximately 20%.

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5. **Attract more tenants:** Occupants are willing to pay more for energy-efficient, smart buildings that leverage technology to reduce their carbon footprint. Therefore, energy efficient buildings will attract more tenants.
6. **Competitive positioning and way of marketing:** With the strong competitions that are faced today, energy efficient buildings will help owners stand out in the market because, they spend a lot less on energy than their competitors. After undergoing energy efficiency retrofit, building can apply for green certification which could be a way of marketing the building, again making the building stand out in the market and therefore improving the competitive positioning.
7. **Easier, cost – effective operations and maintenance:** Buildings with smart systems have a better energy performance, technology and management. Building Management System will allow engineers to access most sensors remotely.
8. **Energy consumption and carbon benchmarking:** As an environmentally conscious building owner, one needs to benchmark the energy consumption and evaluate the operational energy consumption. Benchmarking will help owners practice energy efficiency retrofits at various stages and consider getting a smarter retrofit.
9. **Improved productivity/productivity boost:** While retrofitting one may check the energy levels, ensure efficiency of equipment's, maintain thermal comfort levels, etc. which are directly or indirectly linked to employee productivity. Once these things are in place, the employee productivity will also increase.
10. Reduced carbon footprint/ carbon emissions.
11. **Appliances help save water:** As a part of energy efficiency retrofit, when equipment undergo energy audit and ensured for operational efficiency the equipment that use water will help save water.
12. **Protects the environment:** Since, energy efficiency retrofit offer energy savings and the carbon footprint of the buildings also reduce therefore, protecting the environment.

A well-designed comprehensive energy retrofit, is a good financial investment for the company in long term for energy and non-energy costs savings. At the same time, it contributes to the reduction of the GHG emission to mitigate the climate change impacts as well.

5. CONCLUSION

Day by day the usage of electricity increases globally due to the ever-increasing demand in the developed and developing countries. One of the fast options to save the energy is to undergo energy efficiency retrofits in the existing buildings and help save energy and also reduce greenhouse gas emissions. Although the initial cost of implementing the energy conservation/ efficiency measures could be high but offers huge benefits in the long-term. The current trends in energy supply are not environmentally and economically sustainable enough, and with the growing and rapid development is increasing the load and hence, energy efficiency retrofit could be considered as a possible solution to address these issues and help reduce the carbon footprint and green house gas emissions from the existing buildings. Further study needs to be done on the challenges that will be faced while implementing the energy efficiency retrofit to existing buildings and also the drawbacks of energy efficiency retrofit needs to be studied. Research on what typology of buildings could be retrofitted, what will be the ideal time for conducting these activities and how can they be retrofitted needs to further be carried out to formulate an energy efficiency retrofit framework that would ease the process and lead to actively implementing energy efficiency retrofits to existing buildings.

"Energy Efficiency (EE) is a proven and cost-effective measure to address rapidly increasing global greenhouse gas (GHG) emissions. There is a great potential for improving EE across energy consuming sectors, particularly in our country. However, this potential remains largely unrealized due to the technical, financial, economic and institutional barriers to energy efficiency implementation. Therefore, in order to survive today, one must stop the ruthless exploitation of the environment, and move towards an energy efficient trajectory by choosing to walk the sustainable path. Identifying this challenge and realizing operational efficiencies for their organizations, the Indian corporate is progressively undertaking numerous energy efficiency measures in the building sector." (Roadmap for Incorporating Energy Efficiency Retrofits in Existing Buildings, TERI)

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Impact of Migration in Shaping the City of Mumbai

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ABSTRACT: The capital of the state of Maharashtra, Mumbai, is situated on the western shore of the Arabian Sea. The city had already developed a reputation as a city with a diverse range of languages and cultural expressions by the early 20th century. A variety of groups from the north, east and south of India were drawn to Mumbai by the city's economic growth in the late nineteenth and early twentieth century. The colonial capitalism encouraged economic development no set plans for the future development of the city itself dependent on colonial needs as they had the monopoly over all trade and manufacturing activities. No set plans for the future development of the city, led to unequal urban expansion in response to these colonial needs. For many critics, Mumbai served as a symbol of what is achievable despite the odds. It represented the paradigm linked to the successes of colonial and post-colonial India in the fields of economics and culture. The research paper looks into the relationship between migration patterns and city's growth by navigating various events in the city's past and its response to them. Controlling the population surge has always been a problem since land is a finite resource and past trends sheds light on how successful it has been in tackling this. The paper concludes with the understanding of the strong interdependency between migration patterns and policies ensued as a consequence which have been responsible for making the city what it is today.

1. BACKGROUND

The shape of Mumbai completely changed in physical, economic, social and cultural sense after the British East India Company came into the picture in 1668. In the years following, the city saw the establishment of a major trading port, multiple land reclamations and setting up of different industries including the textile mills which created job opportunities and drove people from villages to the city.

Mumbai has expanded thrice in the 1900s (as seen in Figure 5) to accommodate mass influx at times of distress migration (motivated by extreme economic deprivation, natural and environmental disasters, or forms of gender and social oppression perceived to be intolerable) and to better govern this increasingly linear stretch of a city. The first being in the years following Independence and post-Partition population surge. When the city's economy saw a dramatic transition beginning in the 1940s, over two-thirds of the city's inhabitants lived outside the city boundaries between 1941 and 1971 (Patel & Masselos, 2003, p. 8).

With each population upsurge, the city became a shelter for migrants of all types, from Maharashtra's economically backward regions, as well as other states of the country. Though the migrants have been among those responsible for the flourishing of Mumbai, their presence has directly impacted the housing policies as well as the physical expansion of the city to accommodate the growing population. This has always remained an issue since, for the city.

1.1 Aim

The aim of this paper is to understand the course of Mumbai's history, it's physical growth due to the factors of migration patterns and the ensuing development of policies.

1.2 Objectives

The following are the objectives in order to fulfil the above aim:

1. To study the migration patterns due to various events and developments that affected Mumbai.
2. To understand the socio-economic setup and the corresponding policies affecting migrants.
3. To examine the growth of the city because of migration and economic growth.

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1.3 Methodology

In order to examine the aspects mentioned above, the study will be conducted through secondary sources. The literature will review the various histories put forward by architectural historians and economists regarding the contribution of migrants to the growth of Mumbai and the corresponding policies affecting them.

2. LITERATURE REVIEW

In order to understand the past of the city, it is necessary to understand the literature put forth by experts.

The city of Mumbai has been subjected to various changes over the course of history as a consequence of various events and development which have made the city what it is today. Mumbai, a city originally made up of seven islands along the west coast of India, was initially inhabited by fisherman called the Kolis. Under the rule of the Shilahaar Hindu rulers of Puri (810–1260 CE), the islands became a part of the maritime trading network of the northern Konkan ports. This international trade drew in a swarm of businessmen and mariners, including Hindus, Muslims, Arabs, Persians and Jews as explained by Kulkarni (2016): *Prosperity came, and since then, Bombay has been a magnet for migrants, from the arrival of the Arabs of the Gujarat sultanate in 1348, to the Portuguese in 1534 who became the Roman Catholic converters of large swathes of Mumbai's population, to the English in 1661.*

The migrant groups ranged from the Gujarati-speaking trade and artisan communities and Parsis, who were weavers, shipbuilders, carpenters, brokers, Bohri, Khoja, and Kutchi Bhatias to various other communities, including the Bene-Israel Jews from the Konkan peninsula, the Baghdadi Jews from West Asia, and the Armenian tradesmen from Surat, respectively who came looking for refuge from the stressful conditions. When India gained its Independence in 1947, Bombay became the country's financial centre, and more than half of its residents were migrants (Kulkarni, 2016).

The socio-economic condition of Mumbai was strongly impacted during the British rule. Large scale trade to maximize profits for imperial gain and the establishment of the textile mills in Mumbai after the 1850s drew migrant workers into the city in search of jobs. Thus, the city's economic growth as a result was accompanied by a growth in its working population. In response to this growing population, Bombay Development Directorate (BDD) was established in 1920 and was responsible for providing more land for housing and constructing for 50,000 tenements on reclaimed lands. The tenements included structures called chawls that were built in close proximity to the industries to accommodate the labour at nominal rents (Me Mumbai, 2018).

Corresponding governmental policies arose out this set-up. Pugh, in his *Housing and Urbanisation: A Study of India* (1990) states that 'Some inherited policies from the past were adding to Mumbai's housing problems, rather than facilitating a way forwards. In particular, rent controls were leading to long term restrictions on housing supply and the continuous deterioration of the rental stock.' Due to the failure of the textile mills and the expansions to the Rent Act, Mumbai became the slum capital of India as a result of this expanding population. Real estate became scarce, land prices shot through the roof, and there was no affordable housing. When first-time migrants lost access to chawls, illegal slums replaced them as the default housing option.

In order to understand the growth of Mumbai, it is essential to simultaneously examine the migration patterns, along with its economic growth. Migration groups were drawn to the city by the growth of trade and the allure of money. Native partners and collaborators had moved to the city when the British built their posts. The rise of the colonial economy allowed Mumbai to change from a trading post to a manufacturing centre. The hub for the export of cotton from the interior had previously been Mumbai. Soon after, it established its own spinning and weaving factories, and as a result of the multilateral trade agreements that British imperialism was drafting, its products were shipped to China. These mills were built by Indians using money made through commerce. The establishment of the mills sparked a second wave of migration among mill workers. A little under 800,000 people called Bombay home by the end of the nineteenth century (Patel & Masselos, 2003, p. 6).

The expansion of the city's economy at each step was backed by the successful fulfilment of the newly created roles taken up by the migrant workers and traders.

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3. DISCUSSION

The city of Mumbai with its diverse mix of cultures and communities has been built by migrants since the beginning and thus, has acknowledged their importance for the working of the city. The study has been carried out under the two headings of:

3.1 Events Associated with Migration

This section focuses on the events which led to mass migration into the city of Mumbai at different points in time and tries to look into the social, economic and geographic background that led to these movements.

3.1.1 *Mumbai Port and Opening of Suez Canal*

Mumbai was a centre of maritime trade with Persia and Egypt in 1000 BCE, hundreds of years before the Portuguese invasion and British colonization even began in the 16th and 17th centuries respectively. The Mumbai port enjoys the geographic advantage of natural deep water harbour of 400 square kilometres protected by the mainland of Konkan on its East and Island of Mumbai on its western coast. It's biggest advantage over other ports of India, in international trade is that it is closest to the Gulf countries, East Africa and Europe. The opening in 1869 of the Suez Canal, which greatly facilitated trade with Britain and continental Europe, contributed to Bombay's prosperity. It shifted the import and export trade from the east to the West and the British viewed the port and surroundings as the 'Gateway to India' (British Library, n.d.).



Figure 1: Map Showcasing Alternate Route after Opening of Suez Canal in 1869

(*Source:* IAS Gyan)

3.1.2 *Colonial Trade*

The rise of the colonial economy allowed Bombay to change from a port city to a manufacturing centre. The establishment of the mills triggered migration among mill workers. The growth of manufacturing did not entirely change the city's focus on providing services; it remained largely a port city with vast networks into the hinterland from which it imported raw materials like cotton and opium and eventually sent back spun yarn and, much later, textiles. As a result, even though the city became the home of corporate and financial institutions as well as the stock market, their direction remained rooted in imperialist values.

3.1.3 *Bubonic Plague of 1896*

The rapid increase in population and lack of sanitary living situations ultimately cost thousands of lives when the bubonic plague hit the city in 1896. The authorities were reluctant to acknowledge the severity of the issue because they were aware

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of the negative effects it would have on trade, particularly the quarantine requirements placed on ships leaving the port. A better understanding of the transmission of disease from 1898 substantially benefited attempts to battle the illness. The broad use of a new vaccination and slum-clearance initiatives contributed significantly in eradicating the disease. Yet the effects of the pandemic were still horrific. It spread to several other locations, with the Punjab suffering the most. It didn't start to slow down until the early 1920s, by which time it had killed at least 10 million people in British India (National Army Museum, n.d.).

3.4 Independence and Indo-Pakistan Partition

From one side of a new border within the former British province of India to the other, 12 to 15 million people left their homes in August 1947. Riots, several fatalities, and a massive migration wave were all brought on by partition, the impact of which was felt in Mumbai as well.

3.1.5 *Globalization*

The number of jobs connected to producer services because of globalization increased in Bombay in the early 1990s. By 1994, Bombay was the location of 41% of domestic air traffic and 61% of oil-related jobs in India. This airport handled 64% of exports and 75% of imports for the nation. Throughout the 1970s and 1980s, employment in business and financial services had grown by 43%. Mumbai received 60% of the country's customs revenues and 25% of the country's income tax receipts. A quarter of the country's outstanding credits were held by its banks, which also held 12% of the nation's deposits. From 203 in 1991–1992 to 694 in 1993–1994 there were new offerings listed on the Bombay stock market (Patel & Masselos, 2003).

At the same time, Mumbai's portrayal as 'the City of Dreams' in cinema reached the masses and invited people into the city in search of jobs and a better life. This had both positive as well as negative impacts. Although it allowed to fill in these newly established roles, greatly contributing to the national economy, it created a large scale housing crisis.

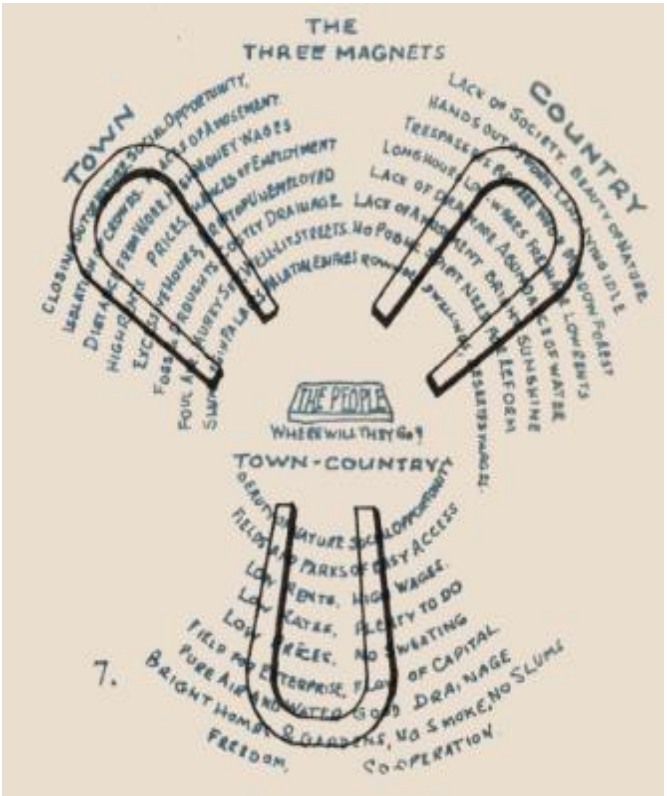


Figure 2: Illustration on The People, Where will they go?

(*Source:* Marg, XVIII, 3, June 1965, p. 78)

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3.2 Policies

The above mentioned events pushed for a change in the functioning of the city ranging from physical expansion to policy level changes. One of the major concerns with rising population is to find a way to accommodate them in sanitary, livable conditions and smooth commotion within the city. This section discusses some of these changes and their impact on the city.

3.2.1 *Chawls by Bombay Development Directorate (BDD)*

Concerns over the plague epidemic led to planning in Bombay. In 1898, the City of Bombay Improvement Trust was founded with the goal of removing poorer residences from the city's core. By 1918, Trust plans had forced the eviction of 64,000 individuals, but only 14,000 had been rehabilitated. These homes, which ranged in size from 100 to 200 square feet, were built by mill owners to provide housing for the labourers adjacent to their mills. As Mumbai expanded, the labourers began relocating their families into the city to live in these chawls. (NCERT, 2023)

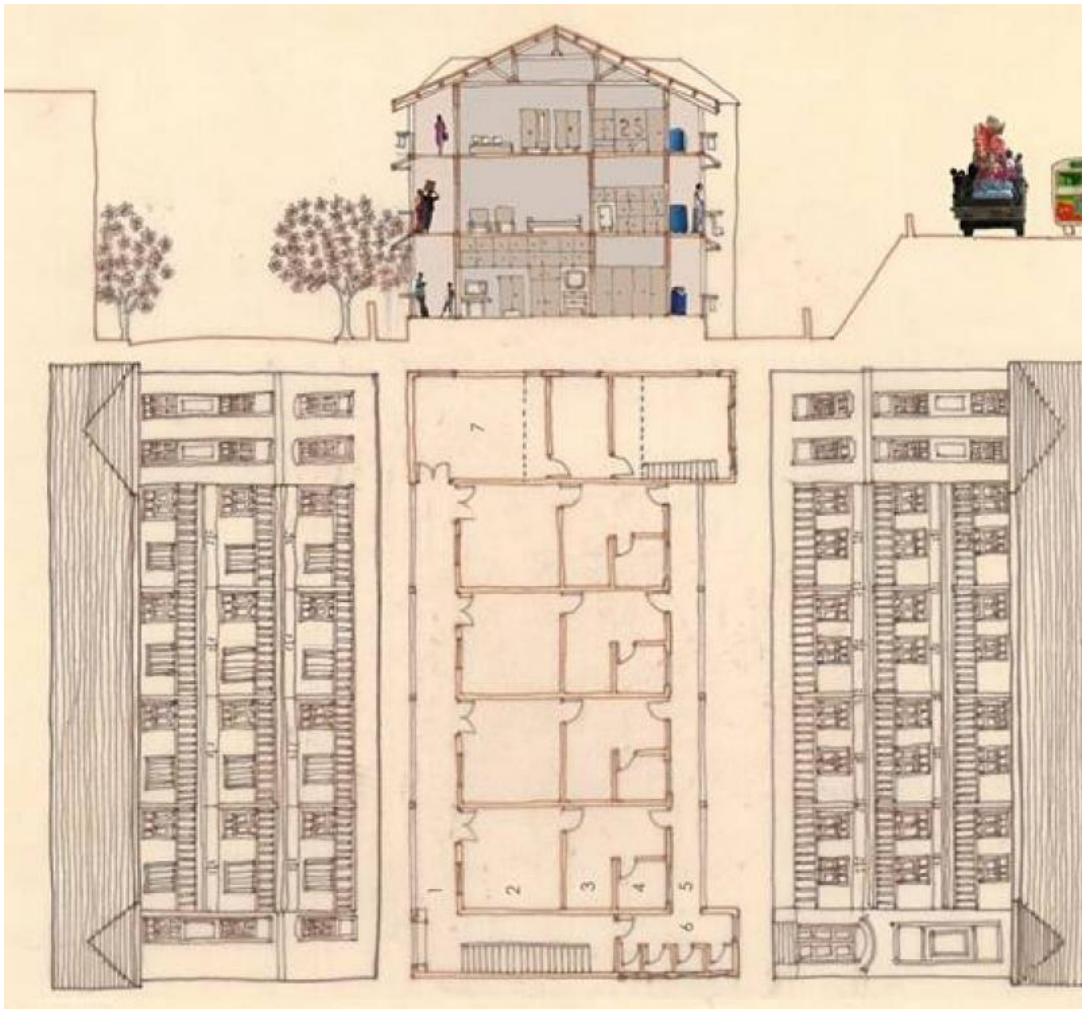


Figure 3: Typical Configuration of a Mumbai Chawl

(*Source:* Chawls of Bombay, Sahapedia)

Chawls were multi-story buildings that had been constructed in the 'native' areas of the town at least since the 1860s. Similar to the tenements in London, the majority of these homes were held by private landowners like merchants, bankers, and construction companies seeking rapid methods to cash in on worried migration. Several landlords took advantage of this circumstance and built chawls, as rent was a profitable source of money for them. There were smaller, one-room tenements within each chawl that lacked private toilets (NCERT, 2023).

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3.2.2 *Rent Act*

A Rent Act was introduced in 1918 in an effort to keep rents affordable, but because landlords removed their properties from the market, it had the opposite effect and led to a major housing crisis.

Similar was the impact of the 1948 Bombay Rents, Hotel and Lodging House Rates Regulation Act. In an effort to keep rents down and save tenants from eviction, this Act set rent freezes at 1940 levels. Nonetheless, its long-term outcomes followed the neoclassical (orthodox) economics-predictable pattern (Pugh, 1990). Tenements suffered from poor maintenance, a significant shortage of rental housing due to profitability issues, and renters being stuck in a reasonably affordable but unadaptable housing alternative. The Legislation did not benefit every tenant. While some may have been able to afford higher standards and some may have encountered more crowded conditions than would have been the case with higher housing supplies, these were not offered in the market. Furthermore, the lack of new formal building home ownership housing and public housing prevented them from being available in the larger housing system.

3.2.3 *Bombay Town Planning Act Vs. World Bank's Intervention*

As the population grew, housing options became even more limited. The Bombay Plan actually took a second look at the advancements made in housing by cooperatives, public housing organizations, employers, and the private sector. The decaying tenements became even more crowded as a result of the supply being unable to keep up with demand and need, and squatter communities grew.

There are significant economic and administrative problems with the eradication and reconstruction strategy for slums. The administration of the rehousing and redevelopment provisions is cumbersome, very expensive, and lowers the supply of low-income housing (Pugh, 1990). It isn't surprising that the measures implemented in Bombay did not significantly improve housing welfare for locals; rather than being specifically related to Bombay, they were more a reflection of the deficiencies in the theory and practice of the town planning profession. These shortcomings persisted well into the twentieth century. The 1915 Bombay Town Planning Act and the more recent 1954 Town Planning Act are two other examples of traditional town planning that were ineffective. The engineering and construction requirements in land development and building were the 1915 Act's primary objectives. These requirements were frequently much above what low-income households could reasonably pay. Such issues weren't really resolved until the 1980s, when the World Bank began to prepare its involvement in the housing changes in Bombay. The 1954 Town Planning Act had expanded town planning in the interim. It demanded that local governments create development plans or master plans for their whole districts. Development plans were released by the major municipal bodies, such as the Bombay Municipal Corporation. Though they were quite far-fetched and often didn't really take the political and economic situation into consideration. These included declarations of physical goals for things like transportation, sewage, drainage, and other public sector supplies. They were cut off from organizational capability, market realities, and public sector budgeting. The entire idea of the World Bank rules, in contrast, is that planning is connected to executive power and budgets, and action is required rather than merely suggested. In terms of housing, the outdated planning papers typically echoed the accepted knowledge from the nineteenth century, namely slum clearance concepts.

3.2.4 *Physical Expansion of City limits after Partition*

During the time of British rule, the formal limits gradually stretched to accommodate for the rising settlement on what had been the town's peripheries. The boundaries were subsequently increased as the city grew, with expansion being a consequence of natural growth and were not in any way planned. Colonial capitalism encouraged dependent economic development and unequal urban expansion. By the time, British rule ended, the Bombay Municipal Corporation, later renamed Brihan Mumbai Municipal Corporation (BMC), controlled the territory of Bombay island, with a separate administration in charge of the neighbouring suburbs on Salsette island from Bandra onward.

In order to ultimately include the entirety of Bombay island as well as almost the entirety of Salsette island, the Bombay municipal borders were further increased in 1950, 1957, and 1965 (Patel & Masselos, 2003) (as seen in Figure 5). In this way, area that was not even remotely urban—land with farms and villages—was included inside city borders because it was thought that growth would take place there or that there would be an influence on and strong ties to the city. The effective city was no longer contiguous with the defined city by the time the Bombay municipality had finished this process of expansion in the middle of the 1960s. It was smaller because a large portion of the defined area was not even remotely urban, and it was also more diffused because commuters were still making daily trips into the city even at that time from outside the new and extended limits.

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Figure 4: Islands of Bombay, 1670

(*Source:* Marg, XVIII, 3, June 1965, p. 34)

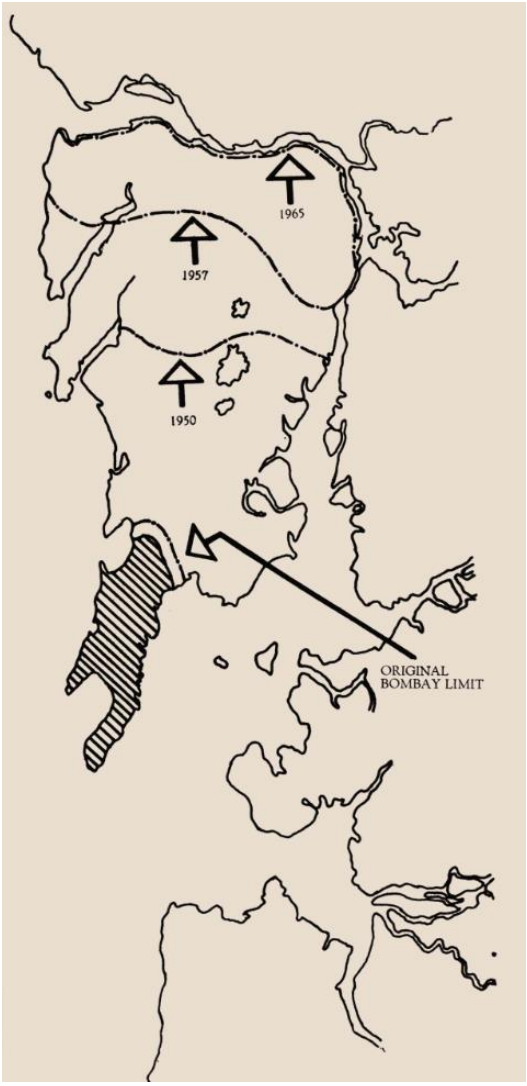


Figure 5: Bombay Municipal Limits, 1987

(*Source:* Marg, XVIII, 3, June 1965, p.78)

3.2.5 *Plans to Decentralize*

Instead of a satellite town, Charles Correa envisioned a sizable, autonomous New Bombay. He understood that saving a city that was expanding at a deadly rate would require nothing less. The population of the city doubled between 1951 and 61; it would rise by 80.8% over the following ten years. He, Shirish Patel, and Pravin Mehta created the blueprint, and the City & Industrial Development Corporation (CIDCO) was established to give it shape. 2.1 million people could contentedly live in New Bombay (Karkaria, 2015).

It remained a dormitory town instead, and an unsuitable one because the suburban railway lines were not expanded, largely because the state administration did not relocate its offices there as intended.

3.2.6 *Neo-Liberal Policy of the 1990s*

The city began implementing neo-liberal policies in the 1990s, which led to the beginning of privatization and elevated the middle class while widening the social divide between the lower and middle classes. *Vision Mumbai: Transforming Mumbai into a World-Class City* was a proposal published in 2003 by the international consulting company McKinsey & Company. In addition to endorsing this proposal, the state government launched its Mumbai Transformation Project 2003 to

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Table 1: Timeline Showcasing the Changes in the City and Various Contributing Factors

Years	1850's - 1900's	1940's - 1970's	1980's	1990's	Present
Political Scenario	Setting up of Bombay Port and cotton mills.	End of British rule. Independence and Indo-Pakistan Partition. Setting up of BMC.	shut down of mills and consequent riots,	Globailization, privatization and potrayal of Bombay as a city a dreams in media together became the major pull factors for migration	Development of regions beyond Mumbai's boundary like Thane and Navi Mumbai allows further settlement and habitation while the increased connectivity via roadways, railway and metro lines allows them to stay connected with the city. Rise of business hubs beyond limits of Mumbai still attracts migrant workers.
Socio-economic Conditions	The rise of the colonial economy allowed Bombay to change from a trading post to a manufacturing centre. Soon after, it established its own spinning and weaving factories. These mills were built by Indians using money made through commerce. The establishment of the mills sparked a wave of migration among mill workers. A little under 800,000 people called Bombay home by the end of the nineteenth century.	- Bombay became a shelter for migrants of all types. Migration from Sindh and what is now Pakistan inundated the city after Partition. - the economy of the city had radically changed: a city that combined industrial and commercial activities in its physical heartland had been reshaped into a commercial and service centre surrounded by restructured industrial production dispersed to ever more remote locations.	During the strike, the majority of the private mill owners had sub-contracted cloth production to Bhiwandi, the power loom centre on the outskirts of Mumbai. Therefore, the mill owners were less keen on running the mills after the strike was over.	- Families who were uprooted and met the 1995 cut-off date requirements were rehoused in tightly packed groups of tenement-style apartment buildings (each apartment having 225 square feet of space), which have been springing up in the marshlands on the edge of the city. - widened social divide between the lower and middle classes.	
Policies	Concerns over the plague epidemic led to planning in Bombay. In 1898, the City of Bombay Improvement Trust was founded with the goal of removing poorer residences from the city's core. By 1918, Trust plans had forced the eviction of 64,000 individuals, but only 14,000 had been rehabilitated. These homes, which ranged in size from 100 to 200 square feet, were built by mill owners to provide housing for these labourers adjacent to their mills.	- Formation of the planning commission. The main function of the planning commission was to asses our economy and accordingly formulate Five Year plans. - Attempt to decentralize Mumbai by making New Bombay an independent town.Greater Mumbai proposal to decentralize but partial failure due to reluctance in shifting the established government agencies in South Mumbai.	- DCR 1991 > The state government brought in Development Control Rule 58, which states that mill owners can sell his mill's land by fulfilling following rules: a. BMC should be handed 1/3rd land , b. MHADA to get 1/3rd land. Out of which half land should be given to housing projects for mill workers. c. 1/3rd land is to be developed by Mill owner - Slum redevelopment act	- Neoliberal Policies> privatization > change in by-laws > rehabilitation policies to clear up land for profittable development	
Housing/ Settlement	BDD was established in 1920 and was responsible for providing more land for housing and constructing for 50,000 tenements on reclaimed lands, establishing live-work culture in the city. Worli Scheme, completed in 1922. 120 Acres on the west side of worli road was reclaimed and was used to house 1,00,000 people	- Rent Control Act for protection of tenants and owners - Bombay Town Planning Act - Trust based housing schemes and refugee camp - Slum demolition and rehabilitation - World Bank's intervention in low-cost housing	Forced to work in factories set up outside city boundaries, misbalance in the live-work culture.	Creation of Vertical slums, tightly packed low-cost housing with inadequate amenities.	
Physical expansion	During the time of British rule, the formal limits were gradually stretched to accommodate for the rising settlement on what had been the town peripheries. The boundaries were subsequently increased as the city grew, with expansion being a consequence of a change and not in any way preplanned.	expanded thrice in the 1900s to accommodate mass influx at times of distress migration	-	-	
Impact/ Role of Migrants	- The rise of trading activities through the Bombay Port post the decline of Surat port attracted traders and businesses to move to the city and created more job opportunities for the working populace. - The mills and their success was dependent on the workers that migrated to the cities post its setup.	-Post Partition mass influx from northern India and Pakistan > set-up of various trust based housing units for the migrants who came to the city with less to no financial backing. - Increased need for jobs to accommodate the migrants	loss of livelihood as a consequence of shut down of mills	The shift from secondary to tertiary sector attracted migrants in great numbers, especially from within the state to join the service sector and reap the benefits of private jobs but large co-operations set immorably low wages for the workers to maximise profit.	

(*Source:* Author)

turn Mumbai into an 'International Financial Centre' with world-class infrastructure, citizen-friendly services, and business-friendly atmosphere (Jha & Kumar, 2016). In order to make at least 60% of the land used by slums available for commercial use, the *Vision Mumbai* plan placed a strong focus on slum rehabilitation.

On the other hand, the city's transition from secondary to tertiary sector and the consequent decline of the manufacturing industry, which was being aided by the process of globalization, had increased unemployment—between 1981 and 1996, the total number of unemployed increased by more than twice that amount—and had widened social and economic disparities between the new upper class and the workers, the majority of whom were then forced to make a living in the unorganized sector of the city. (Patel & Masselos, 2003, p. 18)

Since then, it had become commonplace for slums to be periodically bulldozed. Families who were uprooted and met the 1995 cut-off date requirements were rehoused in tightly packed groups of tenement-style apartment buildings (each apartment having 225 square feet of space), which have been springing up in the marshlands on the edge of the city. Those who did not meet the requirements were left homeless. Those who migrated to slums after 1995 are subject to further penalties under the Slum Act of 2001. (Jha & Kumar, 2016)

The above discussed sections shed light on the interdependent relationship between the events that encouraged migration and the changes in the socio-political and economic conditions of the city. It is also important to note that each new policy thus devised completely changed the face of the city and the lives of those living in it.

4. INFERENCE AND CONCLUSION

The above Table 1 compares the changes brought on by different political events, in the socio-economic conditions, policies, housing/settlement typology, physical expansion of the city- and their impact on migrants and migration. It starts from 1850's when the city experienced a transition from being a trading post to a manufacturing hub, further strengthening its trading ties within and outside the country. It turned into a hub for traders and migrant workers, confirming its position as the financial capital of the country.

Ultimately, land is a finite resource that has always remained a hurdle in the exponential economic as well as consequent population growth of the city. Attempts were made at each population upsurge to ensure stability and smooth functioning but most proved to be short term solutions. One notable solution was the plan to decentralize the city in the 1960s which initially failed due to failure to decentralize the government from southern Mumbai. In the present, Navi Mumbai owing to the development of major IT hubs and newer businesses has been able to create jobs and sustain in a relatively self-sufficient manner. The development of transport network has further improved connectivity and blurred the city's physical limits. The city continues to be a magnet for migrants and in turn, continues to flourish as a result of the roles played by them.

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Open Spaces and Campus Infrastructure

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ABSTRACT: Urban open spaces play an important role in promoting physical activities. The impact of the built and unbuilt environment on the lifestyle of its inhabitants is of global concern and is being monitored closely. The research aims to analyze the intertwined relationships between open spaces and habitant health, both in terms of physical as well as mental wellbeing. Our analysis factors in parameters such as time, distance, and space available for these activities and checks its feasibility. The suburbs of the state capital of Bengaluru have been growing rapidly with the morphologies tending towards fine grained urban settlements. The said development brings with itself several challenges including the plotted development schemes. Term after term, municipal authorities such as the Bangalore Development Authority (BDA) introduce masterplans for the city allocating more land than before enlisted for residential development. Bangalore's unchecked and uncontrolled urban sprawls, the breathing spaces of the city such as Turahalli urban forest, the city lake systems, as well as open grasslands and fields are being consumed for buildings. It is in this rapid growth that the open space of the city is threatened. The use of these open spaces- while it is significant to all people of the settlement, it is of utmost concern to the age groups falling in the range of 15 to 25 years of age. This happens to be user group at one of the most crucial developmental stages of adolescence and therefore also find a relief in releasing and channeling their energy towards various sports in these open spaces. The crux of the matter being the fact that the open spaces in and around the city being of great significance to both the physical and mental well-being of the future citizens. The core intent of this study would be to zero in on the campuses situated in the ever-expanding and dynamic suburbs to understand the psyche and the perspective of their students towards open spaces for physical activity and recreation around the places they live and work.

Keywords: *Accessibility, Open Space, Inclusivity, Youth, Physical Health.*

1. INTRODUCTION

Across the Indian demographic, an estimated 65 percent of the population is young adults below the age of 30, as of 2021, by the projections of data procured as per National Census 2011. Considering this to be an average across the country, it would be safe to assume that Urban metropolitans such as Bengaluru would have a significantly greater proportion of youth, credits to the variety of employment and academic opportunities the city offers. Most of the educational campuses in the city are scattered across the suburbs. Now, the suburbs of Bengaluru were particularly rich in their ecological value, as they were home to some of the largest lung spaces- for instance, the Turahalli forests, Kaggalipura range, Mallasandra etc., that occur in the Southern fringes of the metropolitan city.

As we know it, the suburbs of Bengaluru have been growing exponentially reducing these open green spaces. At such a time in post-pandemic hit Bengaluru, the shrinking of these "open spaces" in and around campuses are being felt more than ever before. Owing to the pandemic immigrant students as well as local day scholars found respite from the stressful screen-based education by often breaking out into these green patches (Ref. Figure 12). This was a typical response to the monotony and boredom induced by the pandemic in the daily schedule of several students. Later as the city services opened to the public, the trails around Turahalli permanently shut down to visitors, and a portion of it was opened as a ticketed park. Trends followed across green belts of Industrial zones such as the Khoday's estate, off Kanakapura road.

In order to better understand the repercussions of the said changes on the students' physical and mental well-being, studies were conducted in the form of pilot interviews as well as survey forms. These studies were focused on analyzing the impact of campus infrastructure as a built entity in conjunction with its open spaces and its efficient utilization given the framework of the curriculum the students are exposed to. The campuses chosen for the study were situated off the Turahalli range in the suburbs of the city. These campuses were namely- RV College of Engineering situated near Kengeri and RV College of Architecture near Vajarahalli. These campuses were chosen as they compare fairly in terms of curriculum and

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have contrasting scales in terms of size and student population. While the RVCA campus houses only the Architecture department, the RVCE Campus has multiple branches of engineering and technology.

2. ENQUIRY

The Masterplans of the city proposed by the BDA were studied and the adherence to these propositions and deflections, if any were observed.

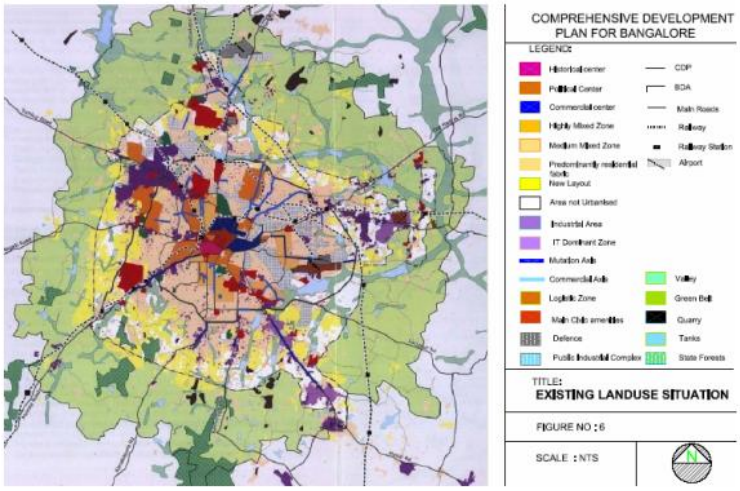


Figure 1: BDA Development Plan Indicating Land Use, 2015

(*Source:* BDA)

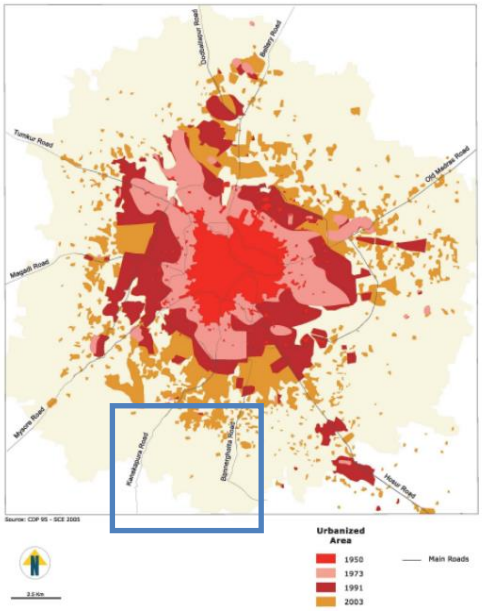


Figure 2: Urban Sprawls in South Bengaluru over the Decades 1950–2010

(*Source:* BDA)

A mapping of the historical changes over the last decade on the Google Earth database indicated the damage caused due to the expansion of the suburb into the southern forest of Turahalli. Infrastructural developments also led to change in the natural contour of the settlements and the now urban villages. This includes the cut that the 100 feet road makes through the urban forest as in figure 4, and razing down of the hillock to cater to residential and commercial plots. This led to changes in the ridge system and therefore also altered the water shed pattern that leads to the Vrushabhavati channel*.

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Figure 3: Current Situation of the Forest and the City Seen in Satellite Imagery as of 2022

(*Source:* Google Earth)



Figure 4: Historical Development over 1992, 2004, 2014 and 2022 respectively

(*Source:* Google Earth)

*Vrushabhavati channel is a river branching out from Arkavati. The river flows through the city, and happens to be contaminated due to various developments over the years.

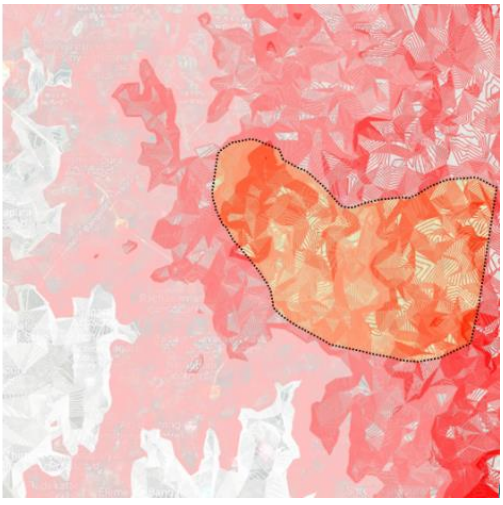


Figure 5: GIS Generated Contours Indicative of Ridge and Valley Positions

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The purpose of study in this zone is to determine the effects of said infrastructural and ecological changes on the residence. Therefore, a pilot survey was conducted around the Vajarahalli, Turahalli tree park region which is now ticketed to understand the opinion and general impact of cordoning off the Turahalli forest on the societies residing in its vicinity. The pilot survey was based on samples of people that live there, and included interviews of residents as well as tenants in the place. Another sample set was the children who played there and visitors who used the park as a means of recreation. They were the people most affected by the forest being restricted and the tree park being ticketed. Next came the workers, forest department guards and the maintenance staff including the gardener who gave us an insight of the forest and the park as a place of work. The findings of the pilot survey led to a conclusion that showed that the maximum impact of the above-mentioned changes was on the youth of the place.

3. METHODOLOGY

The proposition for data collection includes a survey conducted with the students of Rashtreeya Vidyalaya College of Architecture - the campus being situated near the Urban Forest of Turahalli and Vajarahalli settlement- the site chosen for study. The same questionnaire could also be conducted with the students of Rashtreeya Vidyalaya College of Engineering. This campus is much larger in area and in program. It is in the vicinity of one of the prominent edges of Bengaluru suburb and lies very close to the satellite town of Kengeri. The survey not only probes into the students' opinions on open spaces and physical activity but also aims at assuming the efficiency of the respective campus in accommodating for these needs. The lack of which would lead to raising important questions regarding their options available to reduce academic stress.
The resultant data set would then be comparative understanding between two different campus set ups that simulate a live and work situation with respect to play area and recreation, an analysis of the data so obtained could also help understand the boon or bane of current norm of institutional campus architecture in suburban setting. These comprehensive statements could also guide and inform design decisions in the creation of such institutions in future. The survey carried out was a comparative study between the students of RVCE and RVCA campuses and how and what physical activities they are involved in. The study focuses on the open spaces around these campuses and how they function differently and if they encourage the students to take part in any physical activity of their choice. The study aims to infer the details on what parameters affect the utility of open spaces around them and if any social aspects are also responsible for it. The study lists down what open spaces mean to different people and helps us understand how they look at it differently. It implies how different people get engaged in these open spaces, either actively or passively.

The methodology followed to carry out the study is through an online survey by Kobo toolbox**. It enabled data collection through photovoice method and some specifications of the pictures of the spaces and how well they encourage the students to actively engage in activities in those spaces. The data collection includes marking of locations of what places the students go to for their regular outdoor activities and what are the qualities of those spaces which make them suitable for certain activities. The data is analyzed based on different criteria to understand the functioning of the open spaces around them like the accessibility, quality of the space, equipment, provision of services, safety etc. The study also included a pilot study of student's opinion on various open spaces around them and if they think they support their outdoor physical activities and what other alternatives they choose in case their campus does not support any of it.

**Kobo tool is a data collection program registered at Cambridge, Massachusetts in USA. Partnering with United Nations Refugee Agency, Kobo aims at recording environmental, humanitarian concerns that can be voiced out by general public using photovoice to record places and issues associated with it using interlinked pictures and text, taken by respondents in a specific location,

4. DISCUSSION

The data collection process was done over a period of two weeks and the sample sets responded through an online survey including photovoice, locations and verbal descriptions. The outcome was then a comparative analysis between the students' opinion of the RVCE campus versus the RVCA campus.

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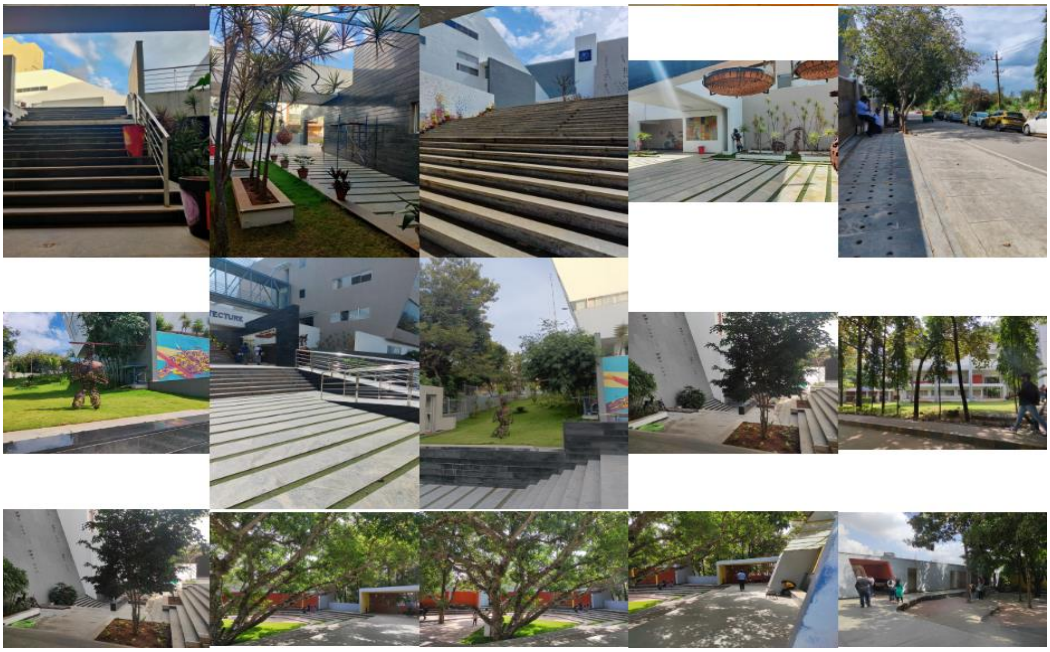


Figure 6: Photographs Collected via Photovoice Tool

(*Source:* Kobo toolbox reports)

The kobo photovoice tool was helpful in correlating data entered by each of the respondents and tally it with the location entered via GPS or OSM. The respondents also could voice out any personal preferences of physical activity apart from their judgement of suitability of a space for a certain activity. This also helped us understand their psyche in the educational setup and curriculum. The photovoice tool also helped us categorize various users of a space on bases of their gender, age-group, health conditions and individually represent them as classified categories of statistical data points. The locations entered not only recognizes the campus from where the respondent is answering the query but also indicates the exact location of the open space in the campus up to an accuracy of 4m.

Through the survey very few people responded that a space would be considered open if it is paved, while majority of the respondent's preferred greenery and vegetation. While few of them were fine with the open space not being free for entry round the clock, as many as 58 percent agreed that any open space would truly be considered open if only it is accessible by general public.

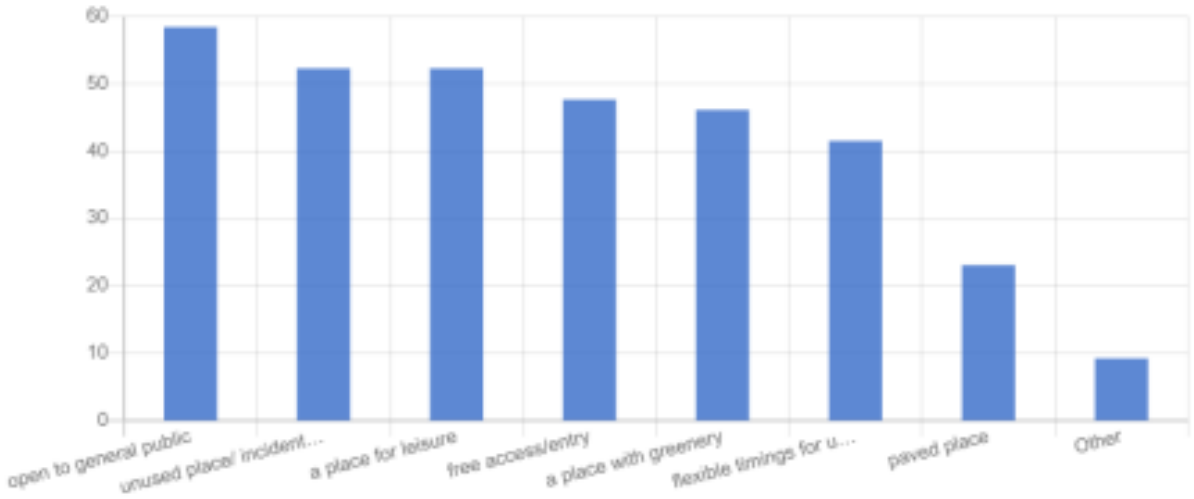


Figure 7: Respondents' Opinion of Open Spaces

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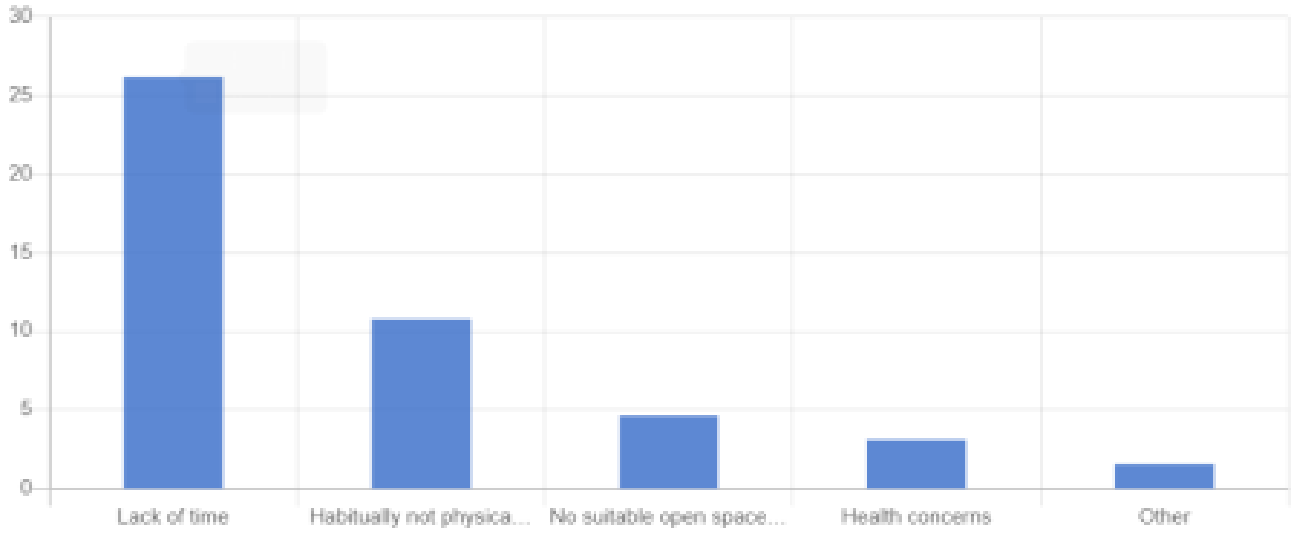


Figure 8: Respondents' Activity Preferences

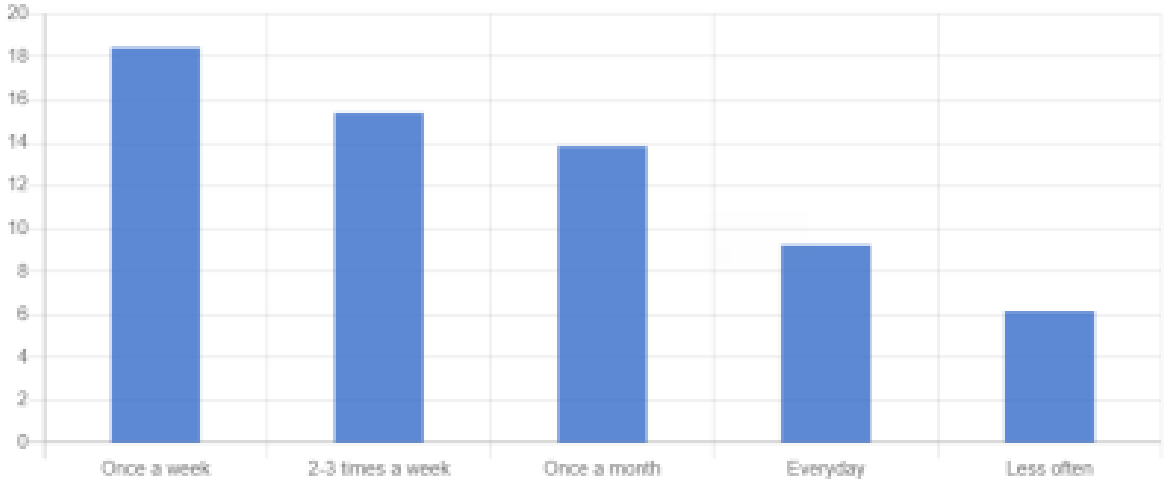


Figure 9: Frequency of Physical Activity

Under personal preferences, around 68 percent of the students stated that they were physically active.

The remaining stated reasons such as lack of time, busy curriculum, lack of equipment, security and privacy issues and health concerns. Most of the respondents who confirmed to perform physical activity were also not as regular as is expected. About 20 percent of the students said their busy schedule allowed them to work out only as often as once in a month, sometimes lesser.

With reference to the pictures, location of the places given by the respondents, the quality of the open spaces was also assessed as to whether they were suitable for physical activity or otherwise. Most of the places recorded were deemed to be unusable for physical activity by 45 percent of the respondents. Even the 40 percent of others who mentioned a possibility of the space being used for light transitionary activity such as walking or running and not for playing or sports. Very few open spaces such as playgrounds designed for sports activities would only come in handy for it.

With respect to dysfunctional open spaces, the above responses were recorded. Most of the open spaces had little or no infrastructure to aid physical activity. Some spaces such as roads and streets were also rendered dangerous or loud as they were motorable and could not host any physical activity.

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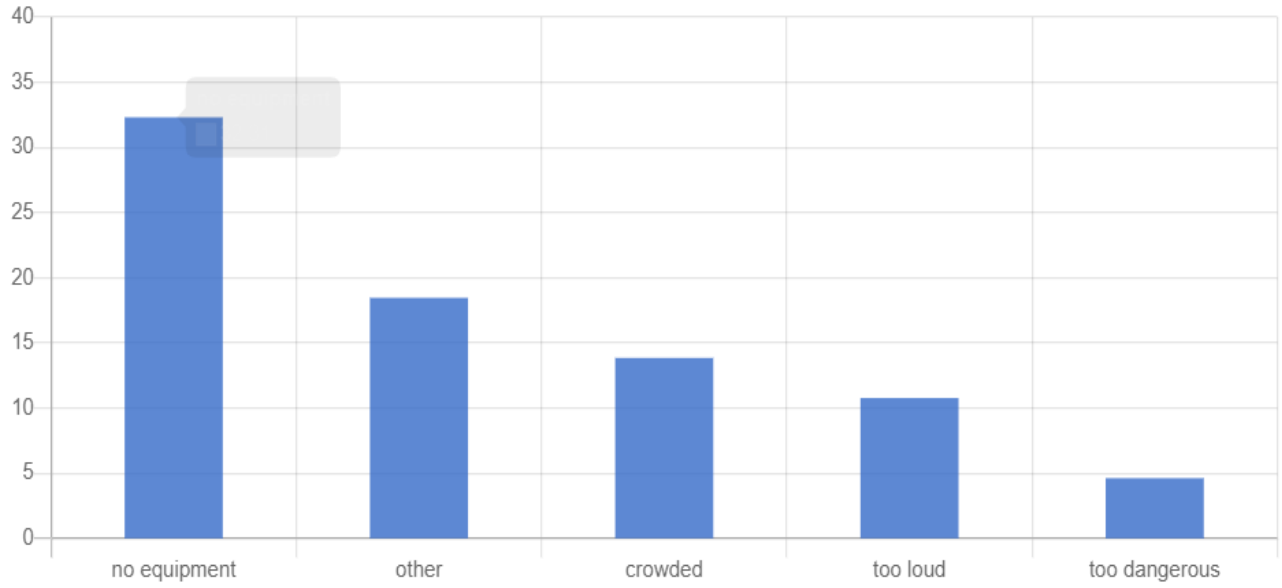


Figure 10: Reasons a Space is Not Efficient as an Open Space

(*Source:* Kobo toolbox reports)

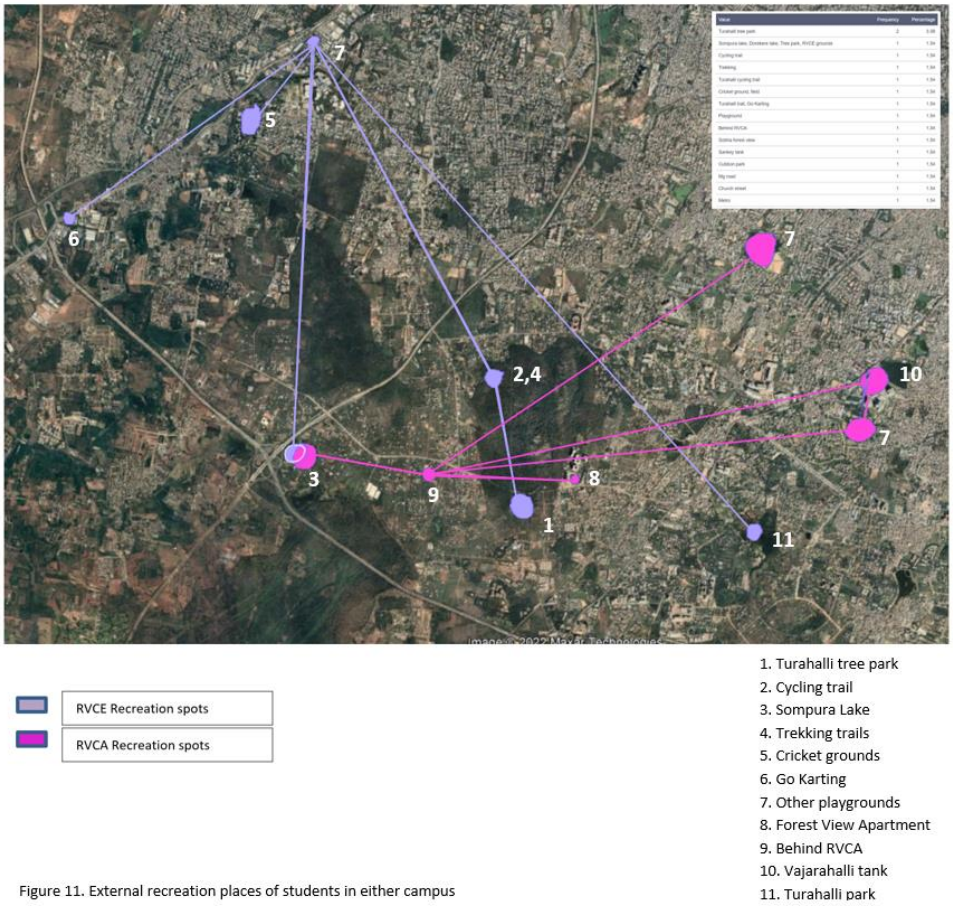


Figure 11: Preferred Alternatives to Campus Open Space

(*Source:* Google maps)

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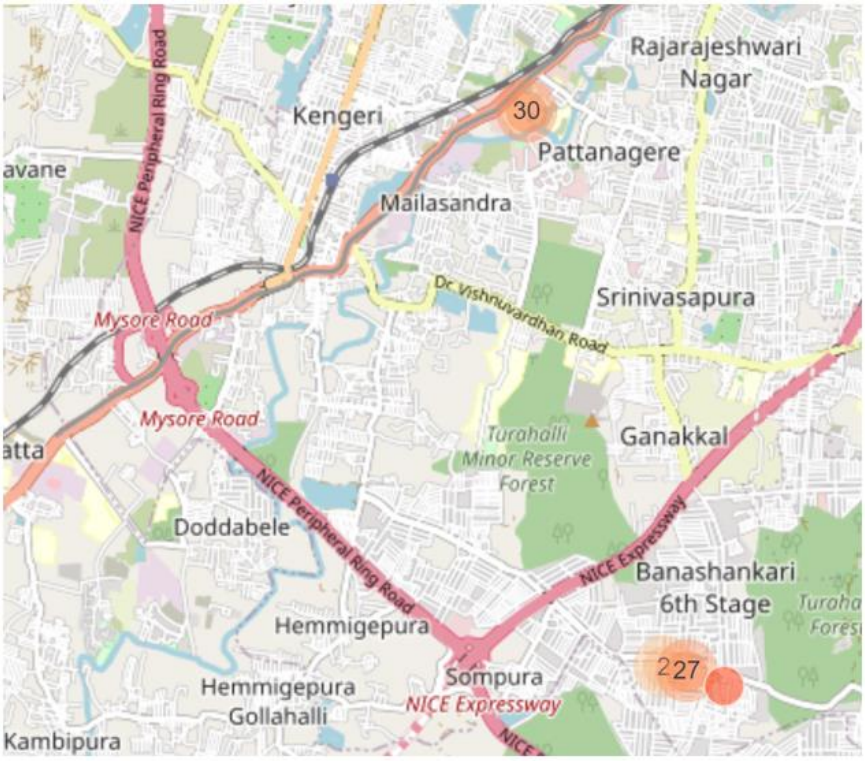


Figure 12: The Location of Recorded Responses

(*Source:* Kobo toolbox reports)

While Figure 12 indicates an instance from the sample of respondents in RVCE Campus near Pattanagere and RVCA Campus near Turahalli, Figure 11 shows the open space preferences of various students to suit their regular physical as well as mental well-being requirements. The choices are a consequence of a variety of factors, broadly stated as proximity, ease of travel, accessibility, and expenditure due to the said movement. These factors not only influence the influx of various individuals into the pubic spaces in and around campuses but also are an indicator of the equality in terms of free access and utility.

The repercussions of the above stated properties of open spaces lead to evaluative criticisms to effectively understand the dynamics of student demographics in urban campus settings. Broadly, they may be seen through the lenses of accessibility and public experience, equality, and justice, and largely impact the health and well-being of the population in question.

The aspect of accessibility and quality of open spaces in and around these campuses and how effectively they are utilized by the students particularly focusing on their physical activity is seen. It discusses how physical activity and health are affected by the qualities of an open space which includes it's tangible aspects like terrain, equipment, size, expanse, location as well as intangible aspects like, air quality, perception of safety, response to high densities of people etc. Open spaces encourage interactions, promote good health, encourage people to take part in various physical activities like sports, exercise, walking, running, yoga etc.

From the photographs in Figure 4, the campus of RVCE is very open and accessible with various entries, nodes, public seating, landscaping and spill out spaces. The buildings function as individual entities and are scattered within a larger whole. There are large open grounds and pathways which promote various physical activities throughout the day like walking running, outdoor exercises and sports such as cricket, football, basketball, volleyball etc. From table 13, the students of this campus mostly prefer to stay in campus rather than go out and would still be physically active. The accessibility to the open spaces in RVCE is majorly in pedestrian mode and these spaces lie on the primary parts of circulation to and from the gate to the classrooms which makes the spaces capture both passive and active activities often spontaneously in them. Infrastructure wise these open spaces are designed for being utilized for physical activity for example they are treated as grounds with sports equipment etc. which encourages people to take part in physical activities just by the definition of the space.

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In contrast to the campus of RVCE, the campus of RVCA is designed as a single entity with open spaces punctured within the built. This means that the open spaces are more defined in their proportions and forms rather than in their functions. The functions that happen in these spaces are influenced by the restricted forms. The passiveness or activeness of the activity depends majorly on where the space is located and what the functions are surrounding this space. The campus of RVCA does not have many dedicated spaces for outdoor physical activities because of the nature of the building. Major spaces for outdoor physical activity are concentrated on the periphery of the campus while the spaces in the center are more passive. The campus is more inward looking and does not have much equipment for any physical activity as well. The students look for more options which are off campus for sports and other physical activities. The places include the Turahalli tree park, streets behind the campus, open areas in private gated communities such as Sobha Forest view apartments etc.

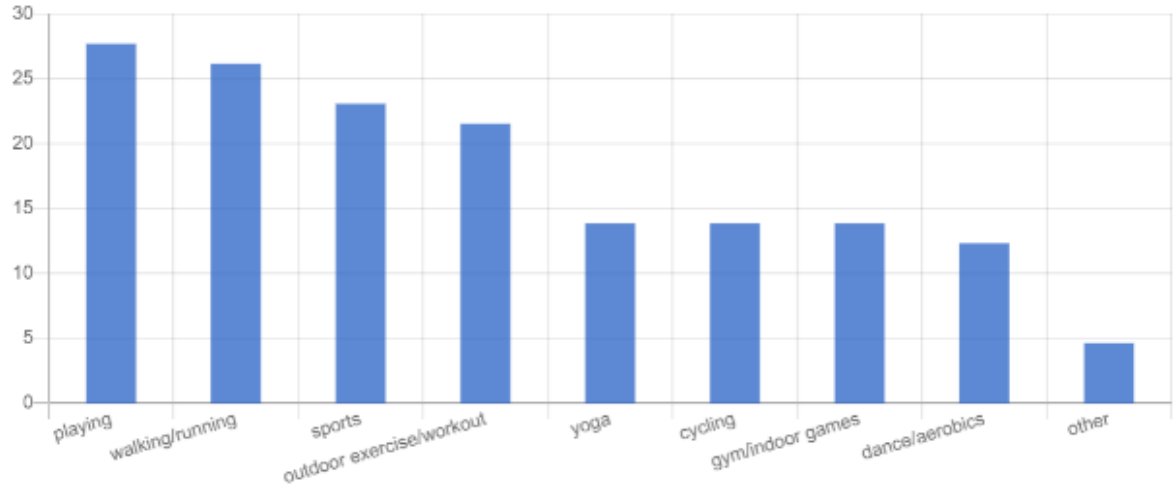


Figure 13: Different Physical Activities that the Students of These Campuses are Involved in

(*Source:* Kobo toolbox reports)

The students of both the campuses are involved in similar activities for their outdoor activity or physical fitness including sports, workout, walking, running; however the frequency of it is variable according to the quality, accessibility and equipment available around them as observed from figure 9 and 10. With that being said, it is also noticeable that even though the campuses have open spaces in them, they are mostly not accessible by the public except for the students, more so in RVCE where the whole campus is surrounded by a compound wall.

This barrier between the campuses and their contexts hampers the possible interactions that can take place between the students and the residents of the surrounding areas and engage the community in physical activities and making people more involved in the spaces. While on one hand, security is an important consideration, opening certain parts of the campus and making use of the idea of a public throughfare especially in case of large campuses like RVCE may prove beneficial in encouraging people to participate in activities through the public force of interaction.

The spaces like the playground which has a compound wall shared with the road directly or the walkway along the metro station stretch which in the RVCE campus can be opened at certain times of the day to the public which can be coordinated with break or end of class times to encourage public participation in these spaces. By the virtue of being lawned and having a shared compound with the road, these spaces provide ample opportunity to act as centers of physical activity. These spaces are currently inward looking but can easily looked at to be opening on the other sides as well to engage public more actively and the campus itself becomes a major contributor to encourage outdoor physical activity for the residential neighborhood around. On the other hand, the RVCA campus might benefit from a similar system but in this case the peripheral open spaces being opened will be the most effective and efficient rather than the throughfare approach owing to the compactness of the campus.

Another aspect in encouraging physical activities is infrastructure and equipment availability. Mere existence of open spaces and their accessibility by the general public is certainly effective in making them centers of public interaction, but to encourage people to participate in physical activities, another layer of consideration of the infrastructure available becomes

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crucial. Many who engage in physical activities are majorly involved in Sports or workouts and Yoga, etc. all of which require certain equipment for people to effectively participate. In the responses collected from the survey, about 33%, who said that a certain space was not appropriate for physical activity gave the unavailability of equipment as the reason for their conclusion. Even though the open spaces in the front of the RVCA campus are well defined and well proportioned, the lack of any sporting infrastructure make them function as merely passive spaces most of the time unless a tremendous upfront initiative is taken to encourage physical activity as a group. People who sit around these open spaces can very easily be encouraged to involve themselves in light physical activity if only the infrastructure like sport and exercise equipment exists.



Figure 14: Image Shows the Stretch Along the RV Campus which has Potential to Open up to Public

(*Source:* Google mape)

The location of the open space and the perception of formality in them is also an aspect that influences people's decision about the kind of activity they involve in. An open space very close to the Academic block for instance may be perceived as more formal than a space a little away from it. This is majorly where the open spaces in the RVCE campus have an edge over RVCA, because of the spread-out nature of the campus, this distance is easily achieved, which results in creation of setting of varied formality throughout the different open spaces. The compact nature of the RVCA campus on the other hand places many open spaces near the academically formal areas hampering the willingness to engage in physical activity. Even there the spaces closer to the informal areas like the Kund, the corridor to the cafeteria is more receptive to physically engaging activities as seen in figure. 6. Formality influences how people behave and its perception is bound to impact what people do in a space. Architecture and spaces can also be explored to provide healing environment. The role of open spaces in a university is not only limited to the students and residents associated with it but in a broader perspective, it extends to what it can offer to the city as well. Properly planned and managed urban green spaces can provide and maintain an eco-system and influence microclimate. The university campus and the city can be interlinked and hence benefit from one another instead of being isolated from one another. The open spaces in the university can be made available to the local population. Open spaces are hotspots of discussions and relaxation in a campus setting. However, this has to be done with proper supervision and measures of safety for the students. Parts of the university can be open to the local public for activities such as walking.

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From the campus surveys conducted in RVCE and RVCA, we saw that both the campuses are completely fenced and do not allow people inside the campuses without permission. RVCE is in a very busy part of the city, opposite to Pattanagere metro station. The open green space at the entrance of the campus which is hardly used by the students but cannot be accessed by the local population because of the compound wall. It would be better had this space been open to the public as gesture of giving back to the city. Elements like street furniture have huge potential and hence they should be wisely designed and made accessible accordingly. The safety concern of the authorities for restricting entry into the campus is understandable but with proper surveillance and rules, it can be permitted. Special time zones can be allotted and specific areas can be made accessible to all. This would probably help the campus in blending and offering to the city. RVCA is in the outskirts of the city and has a comparatively smaller campus than RVCE. It is situated in a residential area with a lot of empty plots. RVCA is an inward looking, highly built campus where the open spaces are just smaller voids within the built form whereas RVCE has several individual-built forms connected together in a large space. They are forced to look for places outside the campus for sports, walking, workout etc. The campus is in proximity with Turahalli forest. Earlier the students would go to the forest for recreational activities but now the forest department has restricted access into the forest due to safety reasons. Hence the students tend to look for alternatives. Many students have very minimal involvement in physical activities due to reasons such as lack of equipment, college schedule and timings, safety reasons etc.



Figure 15: RV College of Engineering



Figure 16: RV College of Architecture

One can say that open spaces are not just left over spaces but they are additional layers that have a bearing on their identities and the way they are used. Accessibility, public access, and scale of the space all play an important role in motivating people to use it and in encouraging themselves with the space. But public access to campus also comes with the considerations of security and privacy and in these cases, one might be tempted to put up walls and gates but question that needs to be asked is that "are walls the most effective way of providing security or is it time that we reinvent the wall to give a new meaning?" Can we get over the concept of "exclusivity" and move towards "inclusivity?" There are ways in which a campus can give back to the city. It can help the citizens to break from the monotony of their daily lives and help in encouraging physical activities.

Now, as stated earlier, the overarching intent of such a study would be to understand the experience of the students in the campus – that also includes their physical health and mental well-being. This exercise involved in depth study and analysis of the data sets. Referencing with WHO and UGC norms were also carried out to compare the existing and the normative conditions of campus infrastructure and its relationships with the existing curriculum. This helps gauge the current norms in formal higher education.

A recce of the campuses revealed a set of observations in terms of open spaces and building footprints. RVCE was mostly a series of individual blocks connected via hardscaped pedestrian paths as well as vehicular streets that run across majority of the campus area. On one end it is the Vrushabhavati river channel that abuts the site and therefore limits the extent of use. RVCA on the other hand is seen as a composition of three major interconnected blocks. In both cases the built forms were composed of educational lecture halls, admin blocks, gathering halls and labs in case of the engineering campus. The open

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spaces then could be generalized into the following categories – connecting paths (streets and paved walkways), plazas, landscaped courts, and playgrounds. While some of these places were intentionally left unbuilt, the remaining were demarcated for future expansion. In any case, the utility of these open spaces to students in both environments was arguably minimal.

Studies such as Ahmad Hami's paper on 'Students' landscaping preferences for open campus spaces' have indicated that students prefer a landscaped campus based naturally on the ground. In the tropical context about 40 percent of the students prefer a semi-shaded landscaped area with formal seating to study while majority of these students also agreed that an informal landscape is also essential to help relax and enjoy a recess. Most people considered places where open sky was visible to be more pleasant that only vegetated lawns or courts. The terms blue quotient and green quotient indicated the proportion of natural blue color visible and the number of vegetated greens respectively. Psychologically, a greater blue quotient would indicate an open space that is indeed rendered to calm one's mind and ensure slower breathing and heart rates, at a rate 1.8 times as high as landscapes with higher green quotient. Presence of water in these landscapes also helped improve the calming effect. Open spaces help relieve oneself from the high-alert mode and helps reflect on the learnings of the day. Time spent outside the built space can also help an individual absorb and process the information that has been gathered across the board. These "breather spaces" are also technically the ones that help decongest and heal the mind.

During an interview, a female student, aged 17, also argued that the presence of larger open playgrounds in the campus fostered pride among all other perks it offered to the physical health of the students. It was also the amount of free time the students would get as part of the recess or allotted Physical Education sessions that deeply factored in the psyche of the batch of students concerned. As per the data recorded under the Global Health Data Exchange by the World Health Organization, student suicides were the fourth leading cause of death in young adults aged 15–29. Mental health concerns would begin as early as adolescent ages of 14–15 and these usually stemmed from commonly seen causes such as bullying, academic stresses, as well as finances. This led to anxiety, depression as well as behavioral abnormalities in students. The number of diagnosed ailments was marginally higher in case of students residing in dormitories and hostels or other residential facilities in and around campus. The University Grants Commission of India also dictates that a student should spend an ideal 2 hours of time per subject enrolled outside of class hours and not more than 6 hours of focused study daily is advisable. Students should spend a healthy hour on different physical activities.

Student health stands vulnerable to several factors such as availability of time according to schedule, free time during daylight hours, availability of free access to open spaces, utility of these open spaces, amount of sky radiation and green exposure, and in case of lack of open spaces within campus, the accessibility to external open environment. As seen in figures 8 and 9, out of 65 students, 34 percent responded to having no physical activity of any kind. Of these, as many as 16 respondents said that they had no time dedicated to physical activity, as they would assumably be pre-occupied with the syllabi. The data comes up as almost equally divided across the two campuses in question. As many as 11 students indicated that ill-maintained spaces with no equipment also took away their will to perform physical activity in the surrounding spaces in campus. This data over a relatively small sample set goes to identify the major issues that lie with the scheduling and planning of classes and the distribution of mandatory subjects of study across the curriculum. A vast majority of the students also pointed out the fact that the dropping grades as well as stressful lifestyle could be attributed to having to rush to classes in fear of running late and missing attendance while completely ignoring the lush greens that some parts of the campus enroute their lecture halls or studios had to offer. The fact that some of the greens were situated along the desired paths students would have preferred was also disappointing as these would be curbed and fenced or rendered inaccessible to physical experience. Some students pointed out that formerly interesting open to sky spaces on higher levels of the buildings were also consumed in expansion endeavors by the college. These were supposedly the places to indulge in enjoying the panoramic views of the suburbs and the forests. Even a gesture as small as an unbuilt open space at a higher level not connected to the ground, that had to offer a mere visual respite from the dull interior-based learning was considered appropriable to a good refreshment from the conventional classroom.

From the remaining 42 respondents who did say that they involved themselves in physical activity of some kind, as many as 19 responses, that amounts 48 percent indicated that students preferred gyms, yoga, and other indoor activities to keep themselves fit. This trend was mostly observed in the architecture campus as the open spaces were fewer in number and mostly rendered unusable due to various reasons, as shown in figure 10, including construction and debris scattered across the usable plazas and podiums. Most students preferred going around the campus for walks or morning runs. On the other hand, in the engineering campus, people were way more active physically owing to the network of streets that allowed them to run and indulge in sports activities in the campus itself. This was also due to the presence of open field for sports activity.

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However, students also responded that the roads in campus were not any safer than the ones external to the campus as most of them were motorable and therefore, too dangerous to play in. They also observed that various decentralized parking spaces allowed students to speed around the campus in a bid to reach their destination in time.

The fact that the current setup of campus and curriculum is quite literally curbing the freedom of students is reflected in the number of students who responded to the query in terms of the frequency of their work-outs. While 34 percent of respondents said that they were not physically active in the true sense, even in the sample set that claimed to be physically active, as many as 22 percent respondents from either campus said that their physical activity was restricted to once a month or less often. Studies indicate that the use of spaces also vastly depend on the distribution of the time across the day. Several studies show the importance of sun exposure for both mental and physical benefits, the early morning hours of students are generally spent in preparing for classes that happen indoors. This cuts down the rather scarcely available Vitamin D intake in this category of population, who are still in their formative ages. This leads to several psychological ailments and physical disorders as risky as melanoma of the skin in some cases.

With the campus infrastructure engulfing all their open spaces evidently seen in RVCA, students resort to external means to enjoy recreation. These external open spaces were mostly the ones mentioned earlier. The Turahalli track which was a major point of egress has been cordoned off and the nearby attractions like the Sompura lake, and the Khoday's private estate are either shut down or very poorly maintained. With poor connectivity of the RVCA campus to any other mode of cost-effective public transport, the students complain of being left with little or no social life. Some respondents also claim the academic pressure to be so high, that they would rather spend their early mornings and late evenings in eateries scattered nearby to grab a quick refreshment before getting back to work for the day. The psychological condition of these students indicates that they may be prone to unhealthy coping mechanisms, such as digital consumption and addiction to substances.

5. CONCLUSION

The World Health Organisation norms dictate that as part of an individual's right to health, workers such as interns and students are all entitled to access mental help when required and this is turning out to be the need of the hour. As a result, several psychologists have come to recommend green therapy. This essentially implies that one must compulsorily spend a designated amount of time outdoors in nature to ease mental congestion. The crux of the issue being, activities that were conventionally happening in conjunction with the built environment, needs a different formalized environment and an allotted schedule for the same owing to the continuously created demand for built spaces.

The current campus infrastructure seems to require immediate introspection. Innovative methods to impart education are being implemented as part of early education years. This could also be extrapolated to older students keeping in mind the importance of open slots and open spaces in the process of learning. These open spaces quite essentially imply the health of its users in adjacent built environment as well as visitors alike. They not only improve the quality of space but also ensure increased productivity of students and academicians. They could then also impact the public in terms of the processed knowledge and open the open space facilities in campus for general use and access of the city-dwellers.

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To Study Design Parameters of Net Zero Energy Building in India

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ABSTRACT: The residential or commercial buildings consume a large amount of energy in total energy consumption. Net zero energy building is combination of energy efficiency and renewable energy technologies. In a Net-zero energy building the energy used by it totally depends on renewable energy sources, which are created from wind, geothermal or solar etc. In India there is a vast scope of wind and solar energy. The objective of the paper is to study parameters of designing net-zero energy building as: Orientation, Landscaping, Daylighting, Ventilation, Materials and Construction techniques, Renewable energy. This paper includes three energy efficient buildings in India with different climatic conditions. Indira Paryavaran Bhawan Ministry of Environment and Forest, New Delhi., Avsara Academy Lavale, Pune., Unnati Office Greater Noida, Uttar Pradesh. The selected case studies reveal that it is possible to achieve zero-energy performance using well known strategies adjusted accordingly to balance climate driven-demand for space heating, cooling, daylighting, ventilation, and other energy uses with climate-driven supply from renewable energy resources. After studying all these parameters conclusion is to shift our conventional buildings towards net zero energy buildings.

Keywords: *Energy Buildings, Net Zero, Consumption, Design, Building.*

1. INTRODUCTION

Energy is a crucial need of the world. India depends on fossils fuels to generate electricity. Buildings are the largest energy users in the India. 37% of India's total annual primary energy consumption is used directly in buildings and most of the used in residential and commercial lighting, appliances, heating, and cooling. This is mostly including coal, electricity and solid biomass. There are many opportunities to reduce building energy use through smarter design, efficiency, on-site renewable energy, and other operation. A net zero energy building is one that uses energy on an annual basis than it produces. The sum of all the energy consumption of site is must be less than or equal to the sum of all the energy that is exported from the site. There has been a rapid increase in solar passive architectural buildings in the last few years to achieve the net-zero energy concept. We have identified zero energy building located the Indira Paryavaran Bhavan,New Delhi. Avasara Academy, a residential school campus located in the rocky agrarian valley of Lavale in Maharashtra. The Unnati Office Building is the regional headquarter (North) for Gainwell Commosales Pvt. Ltd at Greater Noida. The research paper includes comparisons of material efficiency of selected buildings by using edge tool application. Also, includes comparisons of design parameters of selected cases. The main objective of this study is to give an overview, the future scope and current status of development along with Indian climatic context.

2. LITERATURE REVIEW

1. (Khandelwal *et al*., n.d.) case study has been done in this paper discloses that Indira Paryavarn Bhawan first govt. building in the country to achieve the landmark of netzero energy building which has an annual energy consumption of 14.21 Lakh kWh met with equivalent annual energy generation of 14.3 lakh kWh from Solar BIPV installed on-site and one of the very few full-fledged multifunctional office buildings in the world to do so on a tight urban site. This building will play the role model of sustainability and will guide the architects, MEP consultants, builders to implement green norms in upcoming buildings construction. The design parameters adopted in the building will enlighten the academician and professional for defining the design criteria of net-zero energy buildings in composite climate conditions.

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2. (Saini *et al*., 2022) this paper mainly focused on A Net Zero Energy Consumption Building (nZECB) which provides all essential operational energy along with thermal comfort and indoor environment quality within the optimized energy demand which may be fulfilled through a renewable energy source.

   The paper concluded many advantages such as non-dependence on the grid that uses fossil fuels to generate energy and decreased GHGs (Green House Gases) levels using renewable energy. Environment-friendly construction material used in nZECB reduces environmental impact with reduced overall cost and an opportunity to provide surplus energy back to the grid.
3. (Sudhakar *et al*., 2019) studied the Various building designs in hot and humid climates have been reviewed. The biggest problem in these areas has been found to be humidity, which makes it difficult to establish strategies that are used in other climates. Cooling only is not enough to ensure comfort for the in- habitants but is already responsible for the biggest part of energy consumption. By applying new designs, it has been shown that net-zero energy performances can be already reached. At locations, where wind velocity is high enough, natural ventilation systems have to be established.
4. (Madathil *et al*., 2021) This paper discussed the aptness of solar-grid-tied NZE buildings in India. Net Zero Energy Buildings (NZEB) offer a propitious option to be an eco-friendly, environmentally benign strategy for the promotion of renewable energy technologies. Simulations were conducted to represent the broad pursuit of end-users to eco-friendly strategies. The methodology targeted Maximum energy cost savings with minimum consumer discomfort. The results revealed an annual energy savings of $2209 when NZE constraints were employed. The estimated payback with the deployment of solar integrated NZEB was 2 years. The proposed method helps consumers to regulate their energy usage with better energy management given their chosen comfort level. NZE buildings support energy-friendly consumption with notably lower CO_2 emissions; a non-NZEB emits approximately 14.8 tCO2/MWh compared to an NZE building that emits barely 3.8 tCO2/MWh.

3. MATERIAL AND METHODOLOGY

We have selected zero energy building located at different locations in different climatic zones in India. The Indira Paryavaran Bhavan, New Delhi. This building is India's first net zero enegy building and uses renewable energy sources for heating. Avasara Academy, is a residential school campus located of Lavale in Maharashtra. This building location region is warm and humid climatic condition by using passive design strategies and efficient orientation of building is comfortable internally without mechanical system.

The Unnati Office Building is the regional headquarter (North) for Gainwell Commosales Pvt. Ltd. The facades of building design climate responsive. Overall planning of this building achieved building performs 59% better than other conventional building in composite climatic zone.

Project Names	***Case 1***	***Case 2***	***Case 3***
	Indira Paryavaran Bhawan Ministry of Environment and Forest (MoEF)	***Avasara Academy Lavale, Pune***	***Unnati Office Greater NOIDA, Uttar Pradesh***
Location	New Delhi	Pune	Greater NOIDA
Geographical coordinates	28°N, 77°E	18°N, 73°E	29°N, 78°E
Occupancy Type	Office (MoEF)	Institutional	Office Private
Typology	New Construction	New Construction	New Construction
Climatic Type	Composite	Warm and Humid	Composite
Project Area	9565 m2	11,148 m2	3,740 m2
Grid Connectivity	Grid connected	Grid-connected	Grid-connected
EPI	44 kWh/m2/yr.		60 kWh/m2/yr.

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Parameters	***Sub-parameters***	***Case 1***	***Case 2***	***Case 3***
Passive Strategies	Orientation	The building is north south oriented, with separate blocks connected through corridors and a huge central courtyard. Orientation minimizes heat ingress. Optimal window to wall ratio	The six four-storied rectangular blocks, organized as per the most favorable orientation,	The three-Storey building is a cuboid with a central courtyard. It is oriented northeast-southwest, with the core areas distributed in the east and the west orientations.
	Landscaping	More than 50% of the area outside the building is covered with plantation. Circulation roads and pathways are soft paved to enable ground water recharge.	The campus is characterized by an inter-connected yet informal arrangement around pathways, courts, gardens, and terraces	The landscape is a mix of existing and new vegetation. 30% of the site is un-built, of which 25% is covered with shrubs and trees. Only native vegetation has been planted to reduce irrigation water volume as well as pump energy. Treated wastewater is used for irrigation.
	Daylighting	75% of building floor space is day lit, thus reducing dependence on artificial sources for lighting. The inner courtyard serves as a light well.	The building is partly covered in bamboo screens, partly by glass surfaces, or it remains open, rendering a blur line between the sense of enclosure and openness.	90% of the office spaces, including the core and service areas, receive uniformly distributed daylight. This can be attributed to the form, central courtyard, shallow floor plates, appropriate sizing and distribution of openings. All the windows have box shading that prevents glare.
	Ventilation	Central courtyard helps in air movement as natural ventilation happens due to stack effect. Windows and jaalis add to cross ventilation.	The projection / overhang results in spaces being slightly stepped back. The spaces are attached to open corridors, deep verandas, generous semi-outdoor spaces, stairwells, and atrium, resulting in an extremely airy structure supported only in part by columns.	A design ventilation rate of 30% additional outdoor air over ASHRAE Standard 62.1-2010 enhances indoor air quality and occupant comfort. Passive design features reduce the total diversified AC load to 208 kW for 3740 m2 (80 tons for 33,500 ft (about 10.21 km)2).
	Materials and construction techniques	AAC blocks with fly ash Fly ash-based plaster & mortar Stone and Ferro cement Jalis Local stone flooring Bamboo jute composite doors, frames and flooring	bamboo screens glass surfaces, concrete floors raw concrete local stone timber windows	Truss reinforced insulated concrete panels (TRIC) 25 mm (about 0.98 in) concrete (AAC) 60 mm (about 2.36 in) polystyrene (EPS) 25 mm (about 0.98 in) concrete (AAC) 10 mm (about 0.39 in) plaster.
Renewable energy		Solar PV System of 930 kW capacity Total Area: 6,000 m2 Total Area of panels: 4,650 m2 No of panels: 2,844 Annual Energy Generation: 14.3 lakh unit	Photovoltaic solar panels and solar water heaters have been installed on the roof to provide electricity and supply hot water to the building.	The building draws 40% of its energy from the roof-top PV plant. The installed 100 kW solar PV generates 146 MWh/yr.

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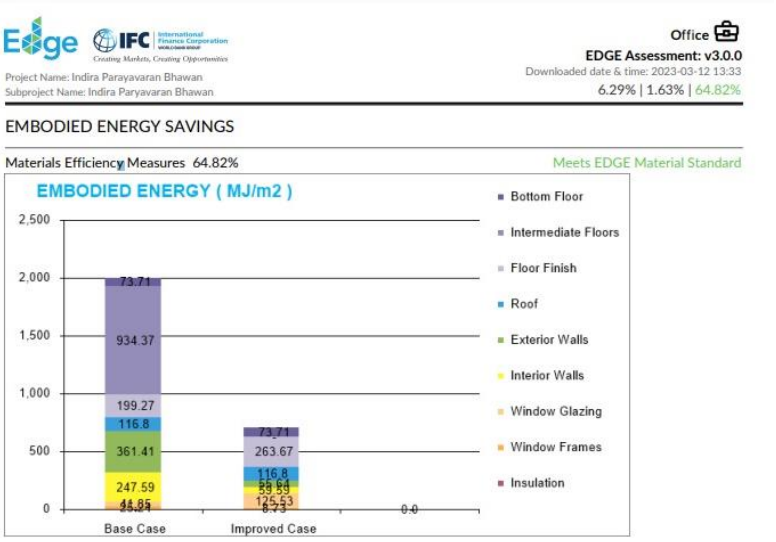


Figure 1: Indira Paryavaran Bhawan Ministry of Environment and Forest (MoEF)

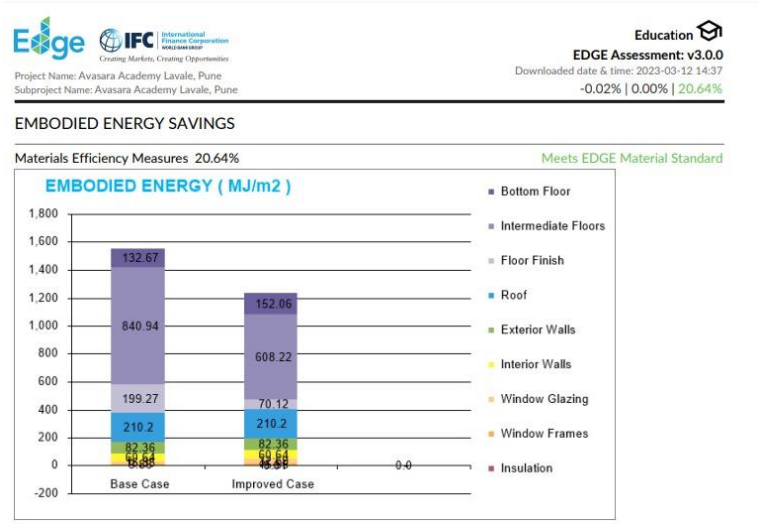


Figure 2: Avasara Academy Lavale, Pune

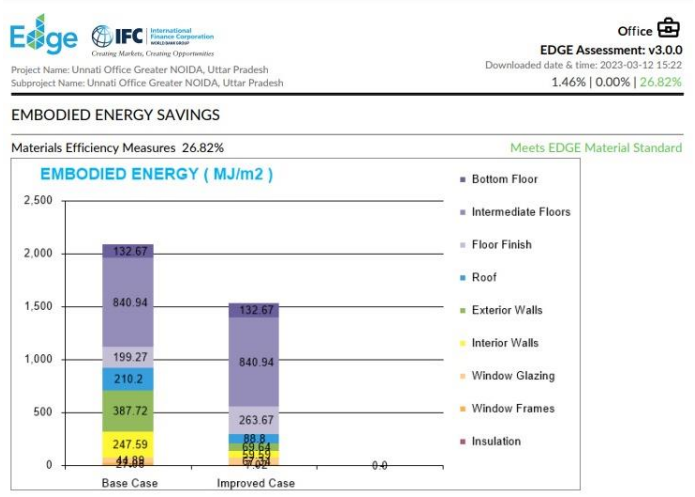


Figure 3: Unnati Office Greater Noida, Uttar Pradesh

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Figure 1 shows that material efficiency of Indira Paryavaran Bhawan is 64.82%.
Figure 2 shows that material efficiency of Avasara Academy is 20.64%.
Figure 3 shows that material efficiency of .Unnati Office is 26.82%.

4. CONCLUSION

India's population increasing rapidly, utilization of energy increased seriously.Net Zero energy building is future of India. According to material efficiency we decided that Indira Paryavaran Bhawan is the best material efficient building among all three building case studies. It is possible to achieve zero-energy performance using well known strategies adjusted accordingly to balance climate driven-demand for space heating, cooling, daylighting, ventilation, and other energy uses with climate-driven supply from renewable energy resources.

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Patterns and Layouts Used in Galleries

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ABSTRACT: The space that brings delegates from all the areas together to share common interests and development ideas in the form of various machinery, products, tools, etc.; Galleries and exhibition spaces shall be user-friendly, architecturally expressive, and energy efficient. To make the galleries and museums effective, various layout methods are used.

It is critical to understand how spatial layouts influence visitors' explorations of gallery space for exhibition installations and museum planning to be effective. The layouts of exhibitions and galleries guide visitors' exploration by providing the most accessible levels of visual information. Visitor's views vary with displays in smaller, more exposed rooms and larger, more isolated rooms. When visual information is opened through atrium voids, museum gallery layouts also predict different behaviours.

This study identifies various layout methods for designing museum and exhibition galleries based on their target audience and user group. To develop a positive relationship between visitors and delegates with their products and exhibits, various patterns are considered while keeping the total space and area in mind, bridging the gap between the event's content and the peculiarities of event locations. and to learn the patterns and spaces used to design interesting venues. The purpose of this research is to understand how various layouts work and to provide a general understanding of the operations and functions at gallery and museum spaces.

Keywords: *Exhibition, Business Centre, Patterns, Layouts, Commercial, Exhibits.*

1. INTRODUCTION

Galleries and museums may be the supreme building category for combining environmental consciousness with other forms of thinking and imaginative activity stimulated by the physical arrangement of objects around us. The gallery and exhibits aims to instruct, market, and inform. An exhibition varies from all other forms of communication because it is the only one that can convey information simultaneously through sight, sound, and touch. The ability to attract the attention of the right type of consumers is the foundation of good looks; assets are added for interest and engagement, and sensory elements for their ability to stimulate.

Significance

Museum galleries develops an intriguing and immersive or engaging journey into a major theme, encourage visitors and tourists to engage more often in events by offering unforgettable visual experiences through architectural encounters, surroundings, patterns, and elements.

Purpose and Aim of the Research

The purpose of this research is to comprehend how gallery spaces work and how its layouts get arranged according to need, it will assist in providing a general understanding of the operations and functions at the gallery spaces and museums.

Research Objectives

According to the significance and the aim, objectives of this research are:

- To study the potential of the gallery spaces and its layouts
- To learn the patterns and space designs used in galleries and museums to interest visitors.
- To understand the visitor's interaction and engagement with the exhibition spaces

Scope and Limitations: Research of the project is limited to the spaces and layouts in art galleries and museums.

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Research Question

Does the layout of an exhibit influence the whole outcome of the exhibitions in gallery spaces and museums?

Are visitors attentive to patterns in display engagement?

Which types of various patterns used in art galleries according to the available space and context?

2. LITERATURE REVIEW

The literature on the interaction of art and architecture in museums discusses how physical gallery properties such as room shape and size, as well as colour, texture, and length of wall surfaces, can influence the perception of works of art *(Staniszewski, 1998; Newhouse, 2005).* Indeed, curators and exhibit designers can use these gallery physical properties to enhance the meaning of artworks and thus enrich visitors' experiences with art in gallery space.

As mentioned by renowned architectural critic Michael Brawne, the organisation of gallery space and circulation in museum buildings, which create specific viewing sequences, is an important part of the viewing experience. In other words, the order of viewing art along the gallery promenade defines the museum experience (Brawne, 1982).

Importance of Gallery Spaces and Museums

- The exhibition aims to instruct, market, and inform. It varies from all other forms of communication because it is the only one that can convey information simultaneously through sight, sound, and touch.
- Exhibitions in galleries and museums are becoming more specialized and aim at distinct target markets.
- Every exhibit's prime consideration is "effectiveness." An exhibition creates a setting that can grab a person's attention and accomplishes this utilising a variety of tools and strategies. Here, architecture has a significant role to play. Imaginative architecture is used to draw attention, symbolise a nation, and impart information about a place or culture in any medium.
- Various sectors get benefit from exhibitions. Over half the revenues to a community arise from the things like organization, staging, events, and technology organizations.
- Valuable source of new talent, many wise communities are discovering that hosting a significant exhibition can be one of the best methods for luring and gaining access to the international talent that will shape important industries in the future.

Indoor Exhibition and Flow Management

The design of the indoor exhibition areas in galleries must give visitors a complete immersion in the theme on a human scale with content being always offered. The most innovative technology should be used to lead the visitor on a discovery of the exhibition's content.

Buildings or enclosed constructions with exhibition spaces or other spaces, including any balconies or upper floors with overhangs, are referred to as Covered Exhibition Spaces. Depending on their specific requirements, participants may choose to construct many levels within the Covered area of the Exhibition Space.

Entrance/Exits in Gallery Spaces

Building entrances and exits shall be designed considering the surrounding conditions and landscaping requirements. Gallery spaces may have multiple entrances/exits on different sides of the lot. They must supply differentiated access for visitors, including disabled, special reserved visitors, reserved groups, workers and finally supplies/waste.

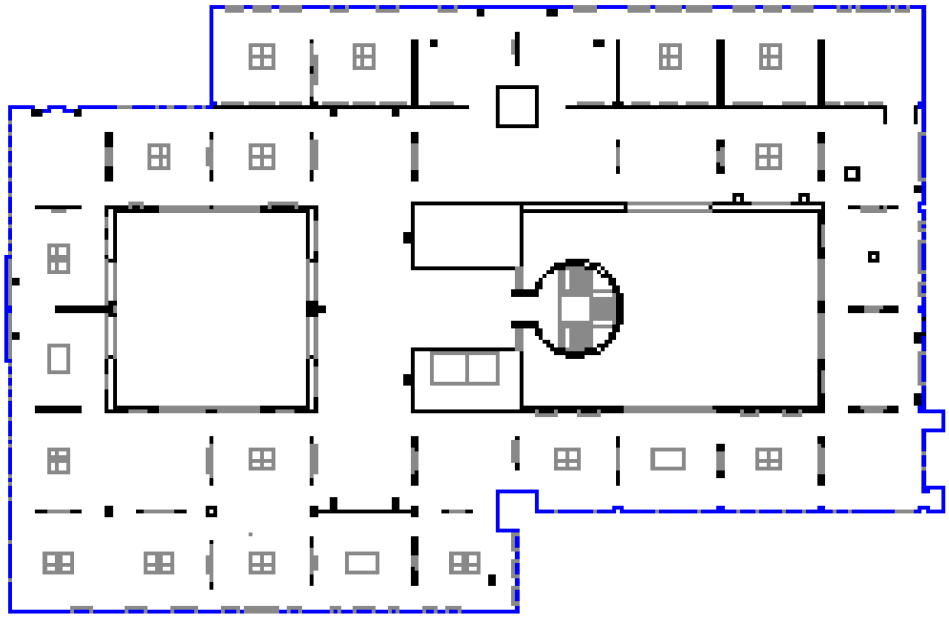
Several factors, such as visitors' individual interests and other activities offered, can influence the exhibition visit experience; however, two key factors that will serve as a foundation are exhibition narratives and visitors' space use patterns.

Case Study

1. The Yale Center for British Art (YCBA) in New Haven, Connecticut, houses a collection of British paintings and sculpture, watercolours, drawings, prints, rare books, and manuscripts spanning the sixteenth to the mid-nineteenth

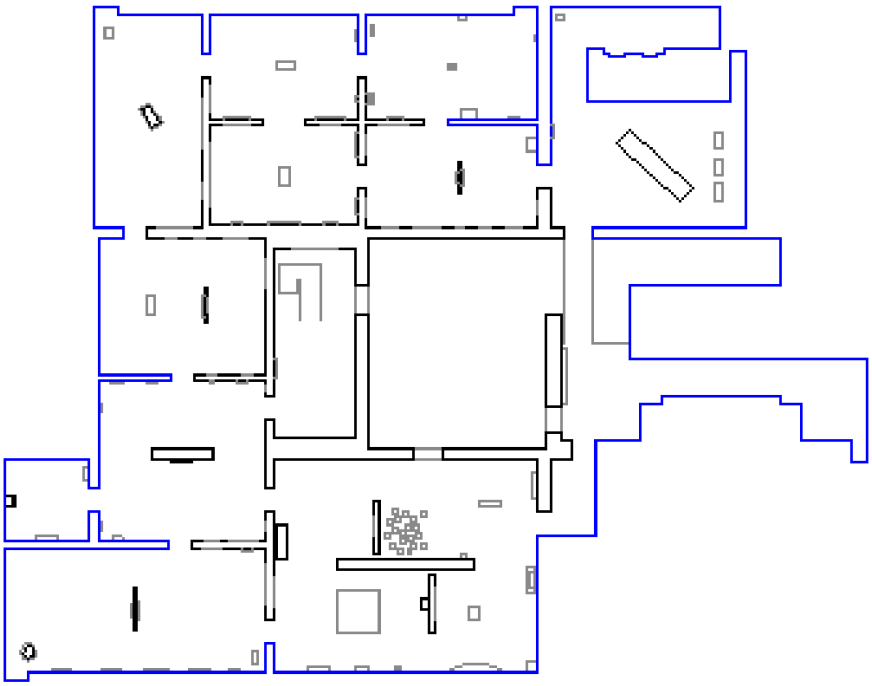
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centuries. The center is housed in a modern style building designed by Louis I. Kahn. The building is built on a structural grid, with gallery spaces organised around two atria and gallery rooms defined by movable partitions. This floor primarily displays the permanent collection of British painting and sculpture at the museum.



2.1 The New Museum of Modern art (MoMa), Mahatten, New York

The Museum of Modern Art (MoMA) in Manhattan, New York, is a leading institution for collecting and exhibiting modern art. The growing collection, as well as the growing number of visitors, prompted several museum gallery renovations and extensions. Over its 65-year history, six major building commissions have provided larger circulation spaces, display and storage areas, while also redefining the museum's spatial relationship with its visitors.



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2.2 The High Museum of Art, Skywalk (Uppermost) Floor, Atlanta (USA)

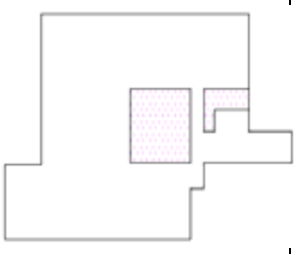
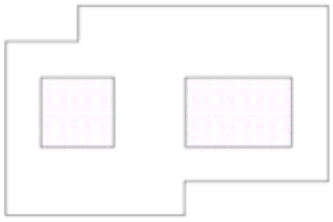
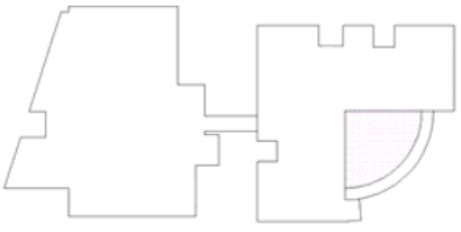
The Atlanta Art Association founded the High Museum of Art in 1905, and it later expanded its services as a museum. This design provided a space in an L-shaped gallery block centred on a quarter-circle-shaped atrium. The building's original interior was intended to house a decorative arts collection. The interior organisation has changed over the years as the collection has grown with the addition of various forms of artwork.



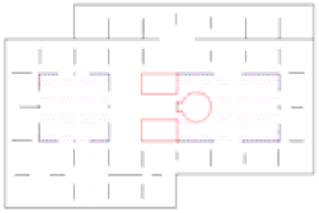
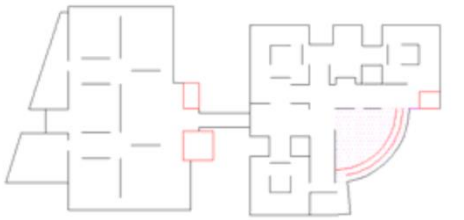
The spatial characteristics of the case study museum layouts are determined by a configuration of partitions and atria voids: all three museums have atria voids with openings to gallery spaces, and these spaces can be navigated in a variety of ways. The similarities in these museums' spatial attributes allow for an intriguing comparison of how their layouts shape narratives and visitor behaviour through these attributes. However, their morphologies are not identical; there is variation in the placement of the atria voids and gallery partitions.

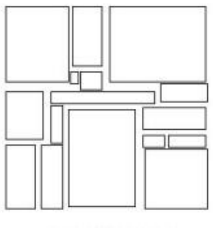
The new MoMA building, the atrium has few openings to the gallery rooms. The YCBA has two atria voids located along the longitudinal axis and open to the galleries. Despite being in the centre of the gallery floor in contrast, the High Museum of Art's atrium is located off the centre and is only open to gallery spaces in one wing, with no direct relationship to the expansion wing.

Table 1

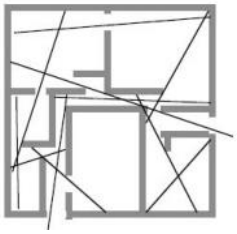
	MoMA	***YCBA***	***HMA***
Atrium Shape	3 Sided 	4 Sided 	2 Sided 
Atrium and Galleries	Few Openings	Largely Open	Quite Open

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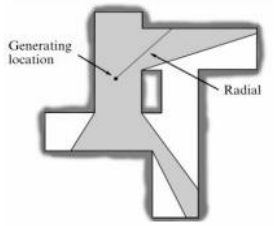
	MoMA	*YCBA*	*HMA*
Gallery room Organization	Linear circulation, matrix of rooms 	Linear circulation, room to room organization 	Left: Linear circulation, matrix of rooms Right: Linear-cyclic circulation, rooms within rooms 
Gallery partitions and building circulation	Partitions at sides, circulation through the central axes.	Partitions at center, circulation at sides	Partitions at center, circulation at sides



Sample convex space map

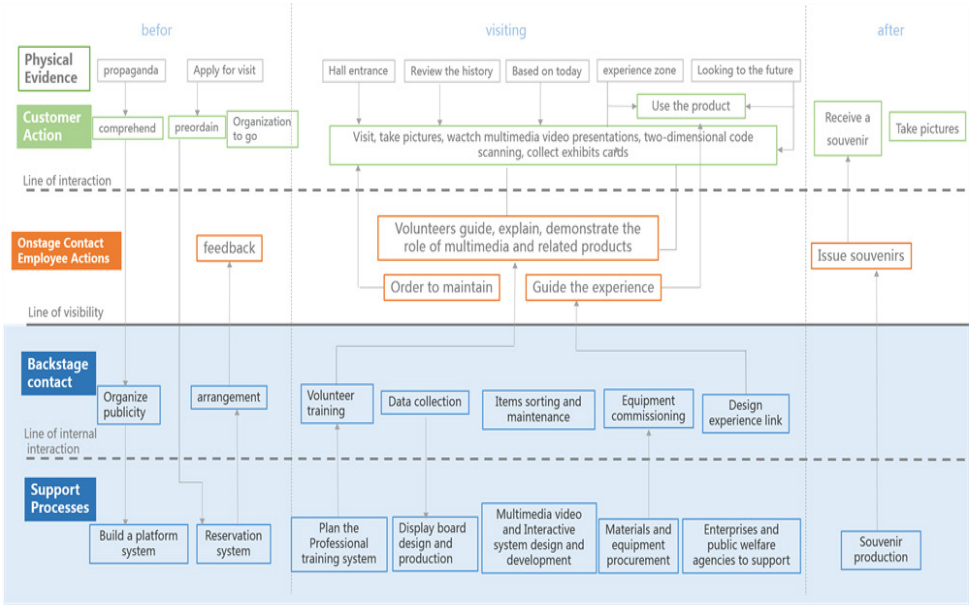


Sample axial line analysis



A sample visual field

The convex space and axial line map techniques can be used to analyse not only space permeability but also an observer's experience of space via visibility. This visibility experience can be analysed, for example, by using axial lines to represent the lines of sight.



The Service movement for Exhibition hall

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3. MATERIAL AND METHODOLOGY

Data Collection

Literature of similar existing projects.

Library study/ Internet study to know the basic standards of each kind of required space to be designed.

Methods – Primary source

To study the various physical characteristics including merits & demerits to better understand the functioning and use.

Case study: Case studies helps in understanding the spaces; understanding the services; understanding the spatial context and the circulation among spaces. Moreover, the functionality image becomes clear.

Secondary source

Secondary sources were referred to as internet research. This includes existing studies done by various researchers, reports, research papers, websites, and internet case studies.

This overall study will help in reaching the end user directly or indirectly.

1. Understanding various layouts used for exhibitions.
2. Understanding the problems in exhibitions layouts.

4. RESULTS AND DISCUSSIONS

According to the (Meetings, Expositions, Events & Conventions An Introduction to the Industry, 2015) Visitors should be correctly oriented inside the exhibition area, Viewers should be able to move through the exhibit without being forced to walk past objects they have already seen, Adequate space should be provided for visitors to move at different speeds, The circulation space should also allow the visitor to take a quick look at the exhibits so that they can decide which ones to examine in detail, A viewer tends to turn clockwise upon entering the exhibit area.

Planning & Designing Exhibitions while keeping in mind Key design elements:

1. **Value**: Associated with visual weight characteristics (darker = heavy, lighter shades = lighter weight)
2. **Colour**: Extensive subject - physics and psychology (requires both light energy and the action of the human brain, perceived through the filter of perception and are ascribed meaning)
3. **Texture**: The texture is the visual roughness or smoothness of a surface.
4. **Balance**: Quality of visual weight distribution, Infinite variations, Symmetry is formal composition and asymmetry is informal.
5. **Line**: The quality of linearity -- a string of points with little or no space between them to lead the eye and suggest direction.
6. **Shape**: The element of physical or spatial containment -- the composite of all points forming the internal or external surface of a composition

5. CONCLUSION

Visual access is an important attribute for exhibition galleries because it indicates the degree to which an observer has direct interaction with works of art. Thus, visual arrangement is useful for investigating the visibility structure of gallery spaces. Visual connectivity is a local measure derived from the connectivity measure, which defines the extent to which a spatial unit is visually accessible from its adjacent units. The gallery spaces should be adaptable enough to meet the change in size of exhibits and stalls because there will be a variety of events and exhibitions taking place. Instead of building a single enormous hall, varied sizes and capacities of partitioned rooms should be considered in galleries and museums. There are various options in which we can try and design our exhibition according to the available space. There should not be a fix layout for any exhibition in galleries, it should be adaptable according to available space and design elements.

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Post Occupancy Implementation Challenges of Sustainable Strategies in Residential Sector in Pune

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ABSTRACT: Green buildings are one which reduce, reuse, and recycle the resources and ensure minimum environmental impact. They optimize energy efficiency; conserve natural resources generate less waste and provide healthier and sustainable spaces for the occupants in comparison to mainstream conventional buildings. The Green Building Movement started in around 2003 in India, yet we observe very less development or application of this green building technology in the **residential sector** particularly even though so many advancements are being made in this industry day by day. To promote this technology in the residential sector, the government offers many incentives and rebates with respect to their achieved level of sustainability or IGBC rating. The local Municipal Corporations, Public Works Department (PWD), IGBC incentives on local townships- UDCPR are some of the **government agencies** that provide these incentives. This attracts the developers and builders so that eventually they achieve sustainability to some extent at least. In case of Pune, we have the PMC (Pune Municipal Corporation), the Urban Development Department, and the Pune Metropolitan Region Development Authority (PMRDA) promoting the green building movement in the city. **One of the top 10 green buildings**, Suzlon One Earth is in Pune which is a proof to the city's continuing efforts towards sustainability. Today, we hear a lot in the construction industry about the need to go net zero and green, however the situation is grave, on ground reality is different.

Keywords: *Sustainability, Strategies, Government Incentives, Residential Sector, Green Building, Green Building Rating Systems, Value Premium of a Project, IGBC, Green Building Movement.*

1. INTRODUCTION

Today, India is one of the top five countries in the world in terms of largest registered green building footprint. The Indian Green Building Council (IGBC) shares around 90% of the market share of this registered footprint. With such great achievements in our country, it is surprising to find that the share of Residential Sector in this progress is **almost negligible**. However, if we observe the overall share of residential sector in construction industry in India, it is the maximum. Indian Real Estate Industry contributes about **18–20% of the Gross Domestic Product (GDP)**. With such a big market, India has a great opportunity to lead this green building movement globally. While we all understand this opportunity, it is important to overcome the barriers and understand the challenges that are preventing the progress in residential sector.

Even after the establishment of Indian Green Building Council (IGBC), which is the national body adopted by the Confederation of India in 2001, very less development is observed in the residential sector particularly. It is estimated that 36% of India's population is likely to be urbanised by 2025. Housing markets in India are experiencing a huge magnitude requirement and the use of resources in housing has thus become unsustainable. Thus, there is a dire need to acknowledge this issue and find solutions regarding the same.

This paper is an attempt to understand the challenges in implementation of sustainable strategies in the residential sector and to find probable solutions to them that include that participation of government as well as public. It will also give a real report of the on-ground condition and awareness amongst people regarding the green building movement.

2. LITERATURE REVIEW

Maximum of the research papers and articles focus more on the sustainability and performance aspects of green buildings. This paper tends to explore the possible solutions to establish and promote sustainability measures with the participation of government as well as public in the residential sector specifically since it contributes majorly to the whole construction industry.

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The existing literature talks about various concepts such as 'value premium' of a project in property market, PPP models, cost incremental and decremental factors, incentives that could be given as per the level of rating achieved, etc.

Research Paper	***1***	***2***	***3***	***4***	***5***	***6***
Title	Green Buildings, Sustainability and Value premium	Solid waste management: A study of Pune Municipal Corporation	Economic parameters and Efficiency of Green Residential buildings in Pune, India	Cost Parameters of Green Residential Buildings in Pune	Mainstreaming of Energy-Efficient Technologies and Construction Practices in the Residential Sector in India	Analysis of the awareness, potential and challenges of "green building concept" in construction sector with reference to Pune city…
Author	Ramakrishna Nallathiga, Abhijeet Raipure, Prateek Ate, Ankit Singh	Shiba Parhi	Anshul P. Gujrathi, Vasudha Gokhale	Anshul P. Gujrathi	Veena Dharmaraj, Mahesh Patankar, and Tanmay Tathagat, Archana Walia	Gulam Tayab Ahmed Khan, Praveen Reddy and Mohammed Alman
Type of Publication	Article	Article	Journal Article	Article	Article	Journal Article
Year	January,2022	July, 2015	November, 2016	2016	2006	2020
Keywords	Green buildings, Sustainability, green facilities, property value, value premium	Solid waste management, refuse derived fuel, SWaCH	Conventional building, cost incremental factor, green building			Green Building, Cost Efficiency, Sustainability, Solid Wastes, Greenhouse Gases.
Context	Pune, India	Pune, India	Pune, India	Pune, India	Pune, India	Pune, India
Aim	To analyse the green facilities and other infrastructure facilities in both green and non-green building projects and to assess the value differential between them.	To study the root cause of waste generation and formation of a sound policy which provides protection to the corporation from breach of contract	To study the residential side of Green Buildings. To determine and analyse the cost incremental factors for the certified green residential buildings in Pune against conventional buildings	To determine and analyse the cost incremental factors for the certified green residential buildings in Pune against the conventional buildings.	To scale up the green movement towards resource efficient residential buildings.	Investigating the green building practices in construction sector
Sample	Green buildings in Pune	International and national comparison	Certified green projects from Pune	150 Certified projects from Pune		A random sample of 10 prominent builders chosen from the Pune

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Research Paper	***1***	***2***	***3***	***4***	***5***	***6***
Objective	To report the existence of 'value premium' associated with green buildings in property market	Systematic study of types of Solid waste generates in a city. 2- The collection, transportation and disposal of solid waste. 3- To understand the best practices in different region. 4- To understand the Solid waste management practices Pune, India 5- To find out the best practices that can be implemented in Indian cities.	To analyse the overall effective resultant of cost incremental or decremental factors with the cost benefit analysis. To study the buyers' cost associated approach to green buildings.	To determine the incremental percentage or the monetary value which impact the project cost. Overall effective resultant of cost incremental or decremental factors with the cost benefit analysis.		1. To study the awareness of Green Building Concept in Pune among builders. 2. To analyse the present building scenario and potential of Green building in Pune
Methodology	Questionnaire survey	Qualitative research	Qualitative and Quantitative 1. Identification of parameters 2. Case study of certified buildings studied for cost impact	- Case study- Cost analysis - Cost impact parameters- discussion - Comparative analysis of certification systems in Pune (Indian) context - Questionnaire		Questionnaire Personal Interview
Conclusion	Green buildings have better green facilities but no infrastructure advantages	Since plants do not function at full capacity, waste gets piled up. PMC does not have its own plant- hence dependant on private companies. PPP model is good but needs safeguarding measures for sustainable and stable operation.	Green buildings can be made cost neutral with the right implementation of strategy at the correct aspect. Green is for the wider cause of sustainable parameter Proves beneficial to every stakeholder Life cycle performance- added benefit	Green Buildings can be made cost neutral with the right implementation of strategy at the correct aspect. Maintaining the balance between the cost raise and cost decrease a neutral approach can be attained where in a premium rating at no additional cost can be realized. The benefits on the life cycle performance are the added advantage for the project with long terms savings. Every activity associated with green is for the wider cause of the sustainable parameter and always proves beneficial to every stakeholder directly or indirectly.	Green concepts and techniques in the residential sector can help address national issues	There is awareness amongst all the stakeholders regarding green building practices. Scope for green building practices in Pune's context is also checked.

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- These papers indicate that the **Future is Green** and there is no option but to explore and find solutions to adopt it as effectively as possible.
- One of the major concerns for adapting green building practices in residential sector is the **cost factor**. Even when the clients understand the concept of a sustainable building and like it, it is of no use if he cannot afford it. Hence, the aim should be to make green buildings cost effective with the right implementation of strategy.
- The need for housing is only going to increase day by day. With that, the demand for resources and its scarcity is also going to increase. Sustainable practices are going to be **imperative** and **inevitable**.
- All these papers have focussed on either the value premium that is associated with green buildings, or their feasibility in a particular sector, or a comparative analysis between a conventional and a green building. This paper will try to explore the residential sector and find probable solutions to make their adoption at ease.

Newspaper Articles: A Proof of the Accelerating Green Building Movement in India



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Making Sustainable Development a way of life

SUSTAINABLE development became a major focus of international public policy after the United Nations Declaration on Sustainable Development in 2015, which was endorsed by all 193 member countries. It identifies three core objectives for human development –economic growth, social inclusion and environmental sustainability. The collective pursuit of these objectives can help the world achieve 'development that meets the needs of the present without compromising the ability of the future generations to meet their own needs.'

The world today faces many challenges related to people, planet and peace. Such global problems require global solutions, which led to the formation of a comprehensive agenda moving forward from the Millennium Development Goals and addressing the gaps in it. United Nations and various agencies tried to address these challenges with participation from state and non-state actors through the tool of 2030 Agenda and Sustainable Development Goals (SDG). It's the most comprehensive blueprint for Sustainable Development.

We are in the third year of the SDGs and it's the time to discuss, think and rethink our course of action. For this, a three-day Capacity Development Workshop on Sustainable Development Goals was organised by Kalinga Institute of Social Sciences (KISS), Bhubaneswar, Odisha from February 15 to 17, 2018. Capacity Development Workshop on 2030 Agenda for Sustainable Development, in collaboration with United Nations System Staff College (UNSSC), Bonn, Germany and United Nations Volunteers (UNV), India was primarily for the national and international UN volunteers in India, with an aim of gaining a perspective on SDG implementation from UN Agencies and NGOs. Following it, another workshop -cum-conference on Building Capacity for localising SDGs continued in collaboration with NITI Aayog. This became one of the most comprehensive and largest workshops of its kind, with the participation of 25 federal units of India. It was a first of its kind as UNSSC Bonn is conducting SDG training in India for the first time. It was also the first time that the NITI Aayog has partnered with KISS to conduct one of the largest capacity-building exercises and high-profile SDG events in the country.

The inaugural session was graced by many dignitaries like Dr Ahmed Baghdady, Manager of Research and Content Development, World Innovation Summit for Education (WISE), who appreciated KISS and it's phenomenal work in the implementation of SDGs, and Dr Deepa Prasad, State Head – Odisha, UNFPA who quoted Gandhi's talisman as the aim envisaged by SDGs. Patrick Van Weerelt, Head of Office, UNSSC Knowledge Centre for Sustainable Development, Bonn advised seeing 5Ps of People, Planet, Progress, Partnership and Peace as an integrated solution and pathway to achieve the goals. Arun Sahdeo, UN Volunteers, India also graced the workshop. Dr Rajiv Kumar, the Vice-Chairman of NITI Aayog, encouraged convergence while remaining sensitive to the differences while addressing SDGs. The workshop had sessions on knowledge and experience-sharing by prominent persons such as Rahul Bose, actor and former rugby player, Director of Poorna; B R Naidu, Additional Chief Secretary, Government of Madhya Pradesh, Higher Education Department; Alan Gemmell, Director, British Council in India; Professor Anand Kumar, retired Professor, Jawaharlal Nehru University; Khaka Shengelia, President of International Association of Universities; Ashok Jain, Adviser, NITI Aayog and Dr Subroto Baghi, Founder, Mindtree and Chairman of Odisha Skill Development Authority, entrepreneur and thought leader.

Each delegate and dignitary who visited KISS as a part of the workshop called it a true reflection of the implementation of the 5Ps - People, Planet, Prosperity, Peace, Partnerships. KISS is not only about providing education but a complete ecosystem for Sustainable Development and a precursor to many such institutions in the world. KISS certainly leads the way in creating certain firsts. The larger beauty of it lies in the fact that the goals the world seeks to achieve in 2030 are the goals addressed by KISS since its inception, and for the last 25 years. It's the action and activities make it an innovation sandbox.

Such workshops are watershed events in the history of Odisha. KIIT and KISS seek to provide a platform to various states to come together and chalk the future course of action with greater clarity and knowledge-base and experience sharing. The interventions of various national and international participants in the conference tell us that there is a considerable momentum and serious work among the states with regards to analysis, advocacy and action. SDGs are here to stay as they're deeply associated with our everyday living and certainly, and India shall be the leader, just as KISS. SDGs are important but Sustainable Development is more important. While every state is doing its bit, a mechanism for solution sharing across states is a necessity.

As India affirms its global commitment on Sustainable Development Goals and is ready to collaborate with global institutions and communities for sharing knowledge and experience to realise the goals of "Sabka Saath, Sabka Vikaas" (Participation of All, Growth for All) the global convergence for SDGs requires specific solutions to bring together governments, international organisations, private sector, academia, research institutions, and domain experts from across the globe to identify and implement sustainable solutions, to alleviate the problems of humanity, a path that KISS analysed, advocated and acted upon since its inception.

Prof. Achyuta Samanta
Founder KIIT & KISS



WORLD VIEW *A personal take on events*

PICTURE: ZOOM

Business needs to embrace sustainability targets

Companies that do not align their management strategies with sustainable development goals will lose out, warns Klaus Leisinger.

In September, countries adopted the United Nations' 2030 Agenda for Sustainable Development: goals and targets to end poverty, protect the planet from degradation, ensure prosperity and foster peaceful, just and inclusive societies. This was historic — never before have world leaders agreed on such a broad agenda to transform societies.

Of course, real success of Agenda 2030 demands implementation by all of us, from governments and other societal actors to individuals. Companies — especially large, international corporations who set the standards for industry sectors and markets — have a pivotal role and must go further than 'business as usual'. Society's rules have changed and managerial attitudes must keep up. Here is how.

First, companies must buy into the Agenda 2030 values: freedom, equality, solidarity, tolerance, respect for nature and shared responsibility. Politically convenient lip service crafted by their communications specialists is insufficient. The values must be built into strategies, business models and product development. Corporations that ignore ecological, social and economic knowledge and the global values expressed by the international community show a lack of integrity.

New, integral thinking is crucial. If a corporate culture focuses only on short-term economic key performance indicators, then so will employees, and they will choose the cheapest suppliers irrespective of whether they have degrading working conditions or destructive environmental practices. The Volkswagen emissions scandal illustrates what can happen if management remains distant from its employees.

Corporate transformation for sustainability is a leadership task. Just as stairs are cleaned from the top down, so institutional reforms must be lived by executives, not just proclaimed. I have spent the past three decades at the helm of a major corporate foundation and engaging with civil society, governments and UN institutions. I know of no companies that are doing enough today to meet the sustainable goals. Their intergenerational and integrated nature requires difficult, radical shifts. 'Doing no harm' as suggested by current corporate responsibility efforts — fair labour norms, the precautionary principle and UN Guiding Principles on Business and Human Rights — is no longer enough.

Most of the business leaders I know are good people and managers. Few are moral heroes. The new UN goals, they tell me, are idealistic, and they agree with them in principle. But there are many reasons for them not to act, at least not immediately — too much existing regulation; foreign competitors with cost advantages; shareholders; and financial analysts who will not accept lower profits even for a short time. What is in it for these managers? They know that customers, even those who say that they agree with the sustainable vision will not pay the prices that tell the ecological and social truth.

Truly sustainable companies must embrace emission reductions and green energy, and control their use of non-renewable resources. They must invest in business models that bring essential products and services within the reach of low-income families, stop selling goods that are not biologically degradable, and develop alternatives that are. And they must have the same environmental and social standards at all production sites.

All these reforms have immediate costs and their returns will not flow quickly. Some sustainable pioneers will identify opportunities and enjoy first-adaptor advantages — car companies who invested in hybrid solutions are favoured by ecologically conscious customers, for example — but, yes, corporate sustainability investments will increase costs, and can reduce sales and lower profits at least in the short term.

This is why we must look at such reforms as the necessary price of integrity, an investment in credibility and an insurance premium for future success. In time, costs will be offset by success in new markets, greater motivation of employees and customers, and reputational gains. Values such as ecological sustainability, social inclusion and human rights must be assessed alongside measures of economic success when decisions are made. Codes of conduct and corporate sustainability guidelines must be amended. Performance appraisals and bonus decisions must refer to these criteria.

Sustainability thinking must penetrate the entire corporate value chain. That starts with the sourcing of raw materials and services, through to transport, employment practices and environmental stewardship in production. It extends to packaging and delivering, the use of products and services by customers, and product disposal, reuse or recycling. All new investments and research and development should undergo a sustainability assessment similar to the one proposed by the UN Guiding Principles on Business and Human Rights.

Communications also need an overhaul. An enlightened public does not find corporate responsibility 'poetry' — pictures of smiling children and jolly workers — credible. Communications must be truthful and show transition as a learning process, with setbacks and obstacles reported as well as successes and progress.

Competing with integrity is smart risk management. Acting against global societal interests results in reputational damage, law cases, penalties and more regulation — as banks around the world and Volkswagen are finding out. ■

VALUES MUST BE BUILT INTO **STRATEGIES,** BUSINESS MODELS AND **PRODUCT** DEVELOPMENT.

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MARKETMANTRA

Sustainable architecture

Roshni Udyavar Yehuda, professor and head, Institute of Environmental Architecture, Rachana Sansad, Mumbai, on what it takes to make a career in sustainable and ecofriendly construction

The building and construction industry is a large contributor to climate change. The operational phase of buildings alone is estimated to be responsible for 30-40% of global greenhouse gas emissions. As per the Greening the Building Supply Chain, SBCI, UNEP 2014, building construction and demolition waste contributes about 40% of solid waste streams while 12% of global water use is attributed to buildings in use.

year Master's degree in environmental architecture, sustainable design and environmental engineering or a one-year diploma in specific sub-

waste management, urban farming, etc.

Green building rating systems such as the Indian Green Building Council

opportunities for accreditation as green building professionals. The US Green Building Council also conducts exams regularly for those who aspire to become LEED (leadership in energy and environment) accredited professionals.

SKILLS SET

A basic background in math and science is essential for students who wish to pursue a career in this field. However, this need not necessarily be a restricting factor. Design know-how and analytic thinking abilities, basic software skills such as CAD (computer aided design) and documentation skills are required. Most importantly, they must believe in protection of the ecology

and construction has gained importance in the last two decades globally. Almost every country in the world has developed a national or regional green building rating system. Although most are voluntary, many countries are beginning to make this a mandatory practice.

In several developed countries, sustainable building practices are incorporated into all construction practices and building bye-laws. As part of its commitment to COP 21, countries in Europe and the US are already moving towards net-zero and nearly-zero energy building targets till 2020. This increases the scope for qualified professionals in the field.

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CONCERN FOR ENVIRONMENT | Currently there are 2,204 green buildings, including hospitals, hotels, colleges and IT parks in the country

India will have one lakh green buildings by 2025

Priyanka Golikeri @priya3014

Bangalore: At a time when climate change and environment have become crucial topics of discussion, the number of green buildings is expected to increase manifold. Built with an intention to protect the environment by using non-toxic materials like solar panels, wind turbines, rainwater harvesting systems, composting systems etc, green buildings are said to help in energy conservation.

And their number is anticipated to grow from 2,204 at present across India, to about one lakh by 2025, say estimates by the Indian Green Building Council. A far cry from 2001, when there was only one green building in India. This increase will include hospitals, hotels, offices, institutions, colleges, convention centres and IT parks.

"We are seeing a lot of interest from clients who include IT and ITeS firms for green buildings. They have understood the concept and are appreciating the benefits," says Satish BN, executive director at property consultancy Knight Frank. Experts say green buildings are beneficial not just in energy conservation, but also in cost reduction. "Green buildings can help save a lot of energy. The energy savings can be as high as 15,000 MWh, while water savings can be 45,000 kl," says Syed Mohamed Beary, chairman, IGBC, Bangalore.

Experts say such buildings help save about 15-20% of the total running and maintenance cost of a building, specially office premises and IT parks.

According to Adarsh Vansay from Aeon Green Power Solutions, a 600 watt solar panel and a 650 watt wind turbine are enough to provide 4-5 hours of daily energy supply for a two to three member household living in a 2 BHK.

"So installing a solar panel and wind turbine on the roof are useful. A minimum 300 days of sunshine is guaranteed in India so solar energy can be tapped more extensively. Wind turbine provides versatility," says Vansay, whose firm designs, supplies and installs solar panels and wind turbines to households in Bangalore. While installation of grey water treatment systems, for treating water from sinks and washing machines, proves helpful in reducing water bills.

What are Green bldgs

Green building refers to a structure that is environmentally responsible and resource efficient. Green buildings are designed to reduce the overall impact of the built environment on human health by efficiently using energy and water, protecting the occupant's health and improving productivity, reducing pollution etc. Green buildings use sustainable materials in their construction like recycled material, that are made from renewable resources.

3. SCOPE AND LIMITATIONS

- This research will help to understand how the residential sector can be included more in the green building revolution.
- It will bring upon solutions for both the stakeholders as well as the government as in how to promote green designs rightly amongst clients and what incentives need to be given.
- For this research, focus would be only on the residential societies that have adopted these sustainability measures post construction or occupancy (**non-pre planned adoption**).

4. METHODOLOGY AND TOOLS

- Research methodology will include Interview and Questionnaire aiming to study 3 to **4 live cases**.
- Interview would be conducted on site and questionnaire could be used for that interview itself.
- A **Structured Interview** is selected so that all the questions of the researcher are answered at one go and nothing is missed since a proper questionnaire is prepared in advance.
- Tools would be Site visits, Case studies, questionnaire, and **voice recording**.

5. SAMPLE AND SAMPLE SIZE

- For this research, 4 residential housing societies have been selected.
- All of them have **adopted sustainability measures post occupancy.**
- Developers, Managers of the society, residents or any person associated with decision making can be included in the sample.
- All the societies lie in the same neighbourhood: Kothrud, Pune.
- For uniformity in research, the scale of all of them is the same.

Sr. No.	*Name of Residential Society*	*Sustainable Strategy Adopted*
1.	Paranjape Ruturanga	Solar Water Heating, Composting
2.	Karishma Society	Solar Panels, Solid waste management, Composting
3.	Woodlands	Solar panels, composting

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6. DATA ANALYSIS

- The participants in the research were mainly the people managing the societies, the Secretary and Manager of the society.
- In all the 4 cases, the strategies were **adopted after 10 to 15 years of construction**.
- When asked why were they not thought of earlier or adopted earlier, they informed that the installation and adoption was planned as soon as they sensed the need for it.

Case I: Paranjape Ruturanga

In case of Paranjape Ruturanga, the society **observed an increase in the electricity bills**. At the same time, they were aware about the government rebates and hence took the decision to use Solar Water Heating. However, they were denied any rebates for solar power generation. The funding for these systems and strategies was derived from the "**Reserve fund**" which is created from the monthly maintenance that is collected by the Committee of the Society. With the installation of Solar Water Heating, the **society could reduce their electricity bills drastically** from Rs. 1,75,000 to Rs 35000.

Similarly, the society practices **solid waste management** and the **composting** is managed in the premises itself. A special shredder machine was bought and space provisions were created for that too. The resultant compost generated is then open for anyone from the society to use as well as used for landscaping in the premises also.

This work by the society is an excellent example of efficient management and goodwill.



Provision created for composting and Solid waste management



Compost artificial pit

Case II: Woodlands, Kothrud

Woodlands is a 22-year-old cooperative housing society located in Kothrud which is one of the prime areas of Pune. In their case, they adopted **composting** 15 years ago as a sustainable measure. The presence of a lot of trees in the premises eventually creates a lot of dry leaves waste lying around there which must be cleaned daily. So, they started collecting these dry fallen leaves and utilising them for composting. To support this procedure, they even bought a leaves shredder machine-1 for every 3 buildings. These machines are small and do not take up much space.

Compost pits were specially created and placed at the backside of the complex. The compost obtained is then used for the trees and plants in the society and the remnant is either open for sale or distributed amongst residents if they wish to give someone. According to the operating staff, it requires around 6–7 months for the compost to form.

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Provision created for composting at the backside

Along with this, they also practice **solid waste management** strictly. Separate dustbins for dry and wet garbage are provided and the collected waste is then again used in the composting. For the newer buildings of the society, an organic waste composter has been installed. This composter does not require any time and creates compost very quickly in 3–4 days. However, the staff states that the quality of the natural compost is much richer than this.



Wet garbage Dustbins



Leaves Shredder Machine



Organic Waste Composter Machine



Organic Waste Composter Machine Installed in Woodlands

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Case III: Karishma Society

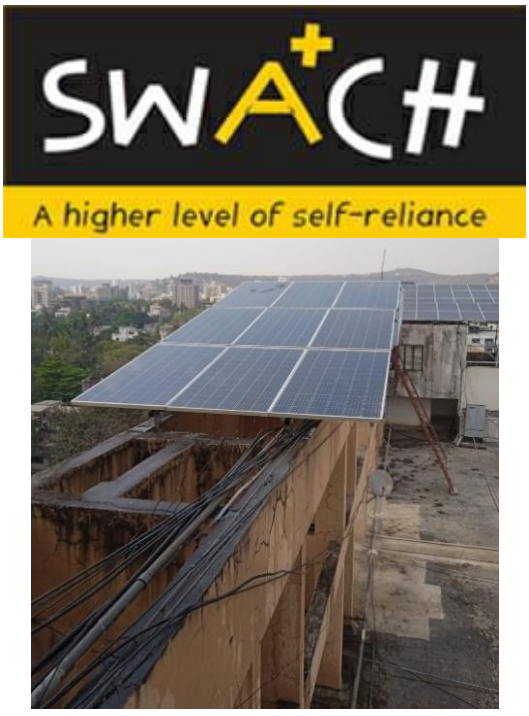
Karishma Society is also a 27-year-old society located in Kothrud. Despite being a very big and prominent society, they have adopted sustainable strategies very recently. They installed **solar panels** of 75kW in 2017 and **composting** around 1.5 years ago. The **solid waste management** of this society is managed by **SWaCH** (Sanitation, Water and Community Health) – a fully member owned waste pickers co-operative organisation. Through them, the society also achieved an award for their **E-waste** management.

After the installation of solar panels, they have achieved subsequent reduction in the electricity bills. Approximately **90% reduction** was observed. The managing body of the society presented the idea of installation and stated the incentives that would be incurred in front of the society. Since the residents knew this benefit, they easily accepted the decision of installation.



Solar Panels Installed on the Terrace

However, the society received only **35%** of the promised incentive amount from the government. Even so, they have continued their sustainable practices which is very commendable. One can observe SWaCH members working hard throughout the day in the society.



Solar Panels Installed on the Terrace

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7. DISCUSSION

We observe that the **driving factor** for the adoption for these strategies was not the rebates/incentives, but the **need to cut down on incurred costs.** If the rebates would have been genuinely appealing, this adoption might have happened much earlier. If the government policies are **advertised** more and a good level of **awareness** is maintained and regular updates are broadcasted amongst the citizens, the results might differ. At the same time, citizens need to be more **proactive** regarding the use of sustainable strategies sensing that it is the need of the hour. Moreover, for these transactions the government first needs to validate the use of the strategy and then the rebate is passed. If a separate body is assigned the task of regulation and monitoring these activities, it would become a smooth functioning process and people will find it more approachable.

Other than that, what if certain rules and norms are set for residential typology dwellings to reach up to a certain benchmark of sustainability? Certainly, people would take the whole green building movement more seriously and even might understand the gravity of the situation in India.

As per the World Green Building Council, the only way to save our planet in this prevailing scenario of rising uncertainties and climate change at its worst is by optimising the built environment. There is no doubt that housing is going to increase more and more with the land resource getting scarce and scarce. **Minimizing the impact** to environment from the already built fabric and **optimising the upcoming fabric** is the only way forward.

8. CONCLUSION

The government offered incentives are indeed a good step ahead in the direction of promoting sustainability, however that alone is not enough to bring about the kind of participation from people in the green building movement that India needs now. As of 2021, the total worth of Green Building Market in India is $20,983 million with the emergence of newer sustainable building technologies coming up. Not only this but the data also reveals a historical growth of 7.2% in the CAGR between 2017 to 2021 which clearly indicates the contribution of Green Construction industry. Hence, the government policies and incentives need to upgrade to benefit people as well as to promote sustainability.

Even a small step towards sustainability counts. People today are also becoming aware of these developments and hence investing in sustainable strategies. They may not achieve any green building rating or certification, but they will reduce the impact and that is very crucial- not just focussing on the newer green projects but thinking about how to reduce the impact from the existing built fabric.

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Recycled Plastic Used as a Construction Material

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ABSTRACT: The exponential rise in the production of plastic and the consequential surge in plastic waste have led the scientists and researchers look out for innovative and sustainable means to reuse/recycle the plastic waste in order to reduce its negative impact on environment. Construction material, converting waste plastic into fuel, household goods, fabric and clothing are some of the sectors where waste plastic is emerging as a viable option. But now a days, construction material modified with plastic waste has achieve a lot of attention. It reduces the amount of plastic waste going to landfills because now a days in the world human produce about 400 million of tonnes of plastic waste every year from that only 9% plastic will be recycled and remaining went straight to landfills. Thereby mitigating the negative impact of construction industry on environment. This research paper summarizes the recycled plastic waste use as a construction material. This research paper study about the how plastic material is better than conventional material in construction work.

Keywords: *Recycled Plastic, Plastic Waste, Recycled Plastic Construction Materials, Building Elements, Conventional Materials.*

1. INTRODUCTION

Plastic is one of the most popular materials used all around the world. This waste, if not managed properly, has numerous ill-effects on the environment and living beings. Hence, plastic waste management is very important. The exponential rise in the production of plastic and the consequential surge in plastic waste have led the scientists and researchers look out for innovative and sustainable means to reuse/recycle the plastic waste in order to reduce its negative impact on environment. Construction material, converting waste plastic into fuel, household goods, fabric and clothing are some of the sectors where waste plastic is emerging as a viable option. But now a days, construction material modified with plastic waste has achieve a lot of attention. It reduces the amount of plastic waste going to landfills because now a days in the world human produce about 400 million of tones of plastic waste every year from that only 9% plastic will be recycled and remaining went straight to landfills. Thereby mitigating the negative impact of construction industry on environment. This research paper summarizes the recycled plastic waste use as a construction material. This research paper shows how plastic material is better than conventional material in construction work.

The aim of this research is to explore the use of recycled plastic as a construction material.

The objective of this research paper is, to analyse the application of recycled plastic as a construction material used in wall, floor & roof for housing. To analyse how plastic material is better than conventional material in construction of building. To analyse cost of recycled plastic material compared to conventional materials. The research question of this paper is, how is recycled plastic superior as a construction material than conventional materials? The scope of this research is, this research focuses on recycled plastic used in building elements for walls, floor and roof only. The limitations of this research paper is, these research paper is relevant to time period of 2022.

2. METHODOLOGY

The purpose of this research paper is to analyse the application of recycled plastic as a construction material. For this research paper I used primary & secondary data collection method. The primary data will be collected from site visit which is Babji recycle board done near to Musal road, Pisoli, Pune. These data will be gathered directly from the respondents through an questionnaires & interview method. While doing the site visit I used observation method to understand the manufacturing process. The secondary data will be collected from literature review, also refer plastic in building book for book review. Also do the online case study in mangaluru which is 100% the eco-friendly house made from 100% recycled plastic. The data analysis of this research will be represented on qualitative & quantitative manner.

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3. LITERATURE REVIEW

3.1 Types of Plastic & Their Used in Building Materials

According to Department of civil engineering, covenant university, windsor, canada the research paper 2020 author described about several types of plastic used in building construction material. Several types of plastic wastes exist, and the most common ones in waste streams are polyethylene and Polyethylene terephthalate (PET).Plastic waste (PW) can be used as a civil construction material in the form of aggregate in cementations and asphalt mixtures, filler, insulation, etc. Therefore, the use of PW for different construction applications seems to be one of the effective ways to tackle this sustainability issue and meet future infrastructure demand. Different types of plastic used in building materials are as follows: high-density polyethylene (HDPE), polyethylene terephthalate (PET), polypropylene (PP), polystyrene (PS) and polyvinyl chloride (PVC). In addition to the performance of PW as a construction material, it should be cost-effective and sustainable to encourage its use over other types of materials. Waste plastic bags, which are non-biodegradable, have been recycled for the production of floor and wall tiles with lesser flammability and enhanced tensile strength. Physical properties and possible construction application of recycled plastic types. Ring-shaped plastic fibres used for improved concrete beam performance. A ring-shaped PET was added to the concrete in a bid to enhance compressive strength, splitting tensile, fracture energy, and beam flexural strength. Mechanically recycled PW can be incorporated into cementations composites as aggregates and fillers due to their hardness and stability. An innovative application of plastic has been explored in reinforcing building plaster. By using 1–2 % of plastic fibres and 5–10 % of glass powder in paste preparation. The following are the plastic used in different building construction material:

Base and subbase for road constructions: The use of PW as a replacement for aggregate in base and subbase construction for pavements has been found to improve the shear, stiffness and bearing capacity of the pavement

Components in asphalt: The use of PW as aggregate in asphalt has been found to improve the skid and crack resistance of the pavement.

Filler: Another prospect for the use of PW for construction applications is to be used as fillers.

Door panels: PW can also be combined with wood to produce an eco-friendly door panel. These eco-friendly door panel can be obtained by combining PW in pellets or powder form with cellulose fibre or wood flour to form a thermoformable wood plastic matrix that can be used for door panels.

Walls and bricks: PW can also be used as a replacement for conventional block, brick or wood walls. These plastic walls are made by placing recycled plastics in heat moulds and pressing the moulds together to form blocks. However, it is worth mentioning that these types of walls cannot be used for load-bearing applications but are suitable for wall construction applications such as partition walls. The potential revenue generation as a result of using PW for different construction applications can be achieved in the following ways.

3.2 Used of Waste Plastic Bottles in Construction of Building

According to Mandal S. B. Mumbai 2016, this paper expresses the concern on two such industrial wastes, used plastic water bottles and fly ash.The present study emphasizes on the recycle of used waste plastic water bottles in the Civil Engineering applications.The study confirmed that plastic bottles with suitable infill material can act as an ideal compression member.

3.3 Advantages of Plastic Waste in Construction

According to Gulhane, S.S. Dr. Babasaheb ambedkar college of engineering and research

Director, nisargika 2017, this paper expresses the concern on thermal properties of plastic with respect to building material. Lower cost of construction materials: since PW are deemed wastes, they are estimated to have little to no value. Therefore, the use of such materials for construction purposes will eliminate the cost associated with conventional building materials and will reduce the overall cost of construction. Reduction in waste management expenditure: Landfilling and incineration are cost-intensive processes that are being allocated a huge sum of money by municipalities annually. Value addition: The possible use of PW will add a monetary value to materials that have been deemed as wastes. Reduction in energy cost: The use of PW as insulation material will improve the energy efficiency of buildings, thereby reducing the overall costs

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associated with running buildings. Lower transportation cost: the viability to use RPW for construction applications will create an avenue to use locally generated plastic wastes, thereby reducing the high cost generated by transportation of construction materials. The reduction or elimination of transportation of some building materials will reduce the detrimental pollution emitted into the environment during transportation.

3.4 Analysis

Karnataka waste collector builds eco-friendly house made from 100% recycled plastic:

A waste collector in Karnataka collaborated with Plastics for Change India Foundation to make a house using 100 per cent recycled plastic. Kamala took almost ten days and used close to 1,500 kilograms of recycled plastic to build the house. This is an innovative and environmentally sustainable project that converts hard-to-recycle plastic waste into building material that can be used to construct low-cost shelter. This is Karnataka's first environmentally-friendly 'recycled plastic house' in Mangaluru. The durability test of the construction material has been conducted before building the house. The organization collects the plastic from the waste pickers and different communities, and incentivizes them with "fair and timely payments" Their mission is to formalize the informal plastics recycling sector and provide a holistic intervention program for one of its key, yet most vulnerable, stakeholders — informal waste workers. This first eco-friendly recycled house was built for a woman at Pachanady in Mangaluru. The house cost Rs. 4.5 lakh to be built for a 350-square-metre area. This plastic houses give the same cooling effect as like bamboo house. When they produce plastic boards, all the precautions are taken to ensure the house does not heat up. The roof and the walls are made of plastic comprising low-density plastic (LDP) and multi-layered plastic (MLP).



Image 1: Photographs of House Built in Mangaluru

Structural Performance of Plastic

From the book I conclude that plastic has a ability to move under stress & when the stress is removed, to return to their original position. Because of this property we can used plastic or recycled it at many more times. hence it is a used in construction material because of its properties & because of its need. The general properties of plastic is translucency, formability. There are two broad classes of plastic: thermosetting & thermoplastic. Plastic foams are used for thermal insulation core material for lightweight structural members & panels.

Physical & Engineering Properties of Plastic

Depending on the formulations & reinforcing materials, plastic can be extremely weak or extremely strong. The thermal expansion of plastics is high & must be kept in mind. Thermal conductivity is low; plastics are better insulators than metals. corrosion resistance is one of the most attractive features of plastics. All plastics can be destroyed by fire.

Evaluating Plastics for Building Applications

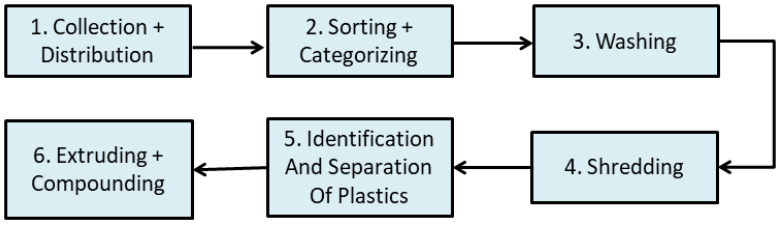
The factors favoring plastics for building use include formability, colorability, durability, chemical resistance, low thermal transmission, clarity, electrical characteristics, and physical strength. Some limiting properties are elastic behavior, stiffness, thermal expansion, heat tolerance & weathering.

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Glazing & Interior Illumination: Light-transmitting plastics are also used for skylights, luminous ceilings, facades, and lighting fixtures, as well as glazing.

Plastic Thermal Insulations & Vapor Seals: Basically, plastics are a poor conductor of heat. low – cost polyethylene film is being used as a vapor barrier in walls, under floor slabs, and in crawl spaces in dwellings.

Manufacturing Process of Waste Plastic Building Materials



The first step in the mechanical recycling process is the collection of post-consumer materials from homes, businesses, and institutions. This can be done by either local government or private companies, with the latter often a popular option for businesses. Another option is taking plastics to communal collection points such as designated recycling bins or facilities. This may be as simple as a bottle bank on a street corner or as complex as a local waste site with large areas for various recyclable and non-recyclable municipal solid waste (MSW).The next step in the plastic recycling process is sorting. There are several different types of plastic (see below), which need to be separated from each other by recyclers. Further to that, plastics might be sorted by other properties such as color, thickness, and use. This is done by machines at the recycling plant and is an important step to increase the efficiency of plants and avoid the contamination of end products.

Washing is a crucial step in the plastic recycling process since it removes some of the impurities that can impede the operation, or completely ruin a batch of recycled plastic. The impurities targeted in this step commonly include things such as product labels and adhesives as well as dirt and food residue. While plastic is often washed at this stage, it is important to remember that this doesn't take away from the importance of ensuring plastics are as free from impurities as possible before disposal and collection. The plastic is then fed into shredders, which break it down into much smaller pieces. These smaller pieces, unlike formed plastic products, can be processed in the next stages for reuse. Additionally, the resized plastic pieces can be used for other applications without further processing, such as an additive within asphalt or simply sold as a raw material.

Breaking down the plastic into smaller pieces also allows for any remaining impurities to be found. This is especially true of contaminants such as metal, which may not have been removed by washing but can be easily collected with a magnet at this stage. Here, the plastic pieces are tested for their class and quality. First, they are segregated based on density, which is tested by floating the particles of plastic in a container of water. This is followed by a test for what is known as the "air classification", which determines the thickness of the plastic pieces. It is done by placing the shredded plastic into a wind tunnel, with thinner pieces floating while larger/thicker pieces stay at the bottom. This final plastic recycling process step is where the particles of shredded plastic are transformed into a usable product for manufactures. The shredded plastic is melted and crushed together to form pellets. It is worth noting that it is not always possible to compound all types, classification, and qualities of plastic at a single plant, so different grades of plastic are sometimes sent to other recycling facilities for this final step.

Limitations of Recycled Plastic Used as Construction Material:

The process of melting down and recycling plastic produces VOC, or volatile organic compounds, fumes that can harm plant and animal life near the industrial site. The heat needed to melt plastic also generates carbon emissions, which contribute to global warming. Plastics may be degraded under the action of direct sunlight which reduces their mechanical strength. High embodied energy content. Thermoplastics are subject to creep and soften at moderate temperatures. Many types of plastics are not biodegradable thus cause pollution when they accumulate.

3.5 **Factory Visit Analysis**

Factory name - Babji recycle board, Musal road, pisoli, Pune.

The below chart shows market price & the plastic building materials manufacture in that factory.

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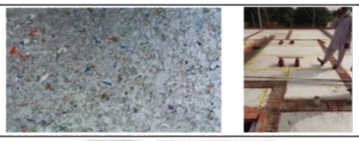
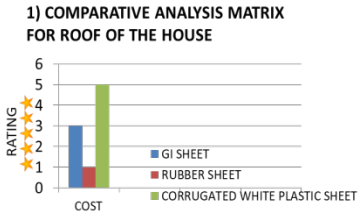
Sr.No	Name of the product	Image	Price of the product (In sq. Feet)	Percentage of plastic used in product
1	Recycled plastic sheets		4 Mm Thk- Rs 20 / Square Feet 18 Mm Thk - Rs 30/Square Feet	85%
2	Recycled plastic doors		18 Mm Thk - Rs 65/Square Feet	90%
3	Recycled plastic paver block pallet		Rs 70 / square feet	80%
4	Recycled portable toilet (4 unit)		Rs. 20,000 / piece	100%
	Corrugated white recycled plastic roofing sheet		Size of sheet = 2.44mx1.03m Price= Rs. 1,050 / piece	80%

Table 1: Market Price & the Plastic Building Materials Manufacture in the Babji Recycle Board Factory

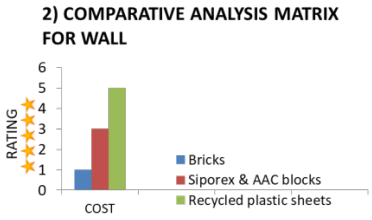
	Wall	***Flooring***	***Roof***
Conventional materials	Bricks-Rs. 60 to 110 /square foot Siporex & AAC blocks - 120/ square foot	Wooden flooring- Rs. 120–1,200 per sq. ft. RCC flooring- 80 per sq.ft.	Roofing GI sheet- Rs. 50/square feet Roofing rubber sheet- Rs. 150/square feet
Plastic materials	Recycled plastic sheets 4 mm thk- Rs. 40 / square feet 18 mm thk - Rs. 50/square feet	Recycled plastic sheets 4 mm thk- Rs.. 40/ square feet 18 mm thk - Rs. 50/square feet	Corrugated white recycled plastic roofing sheet Rs. 1200/unit

Cost analysis between conventional materials & plastic material.

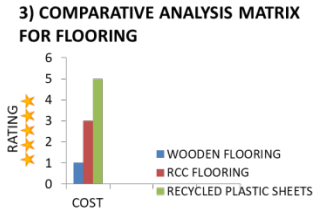
Table 2: Cost Analysis between Conventional Materials & Plastic Material



Graph 1: Comparative analysis matrix for roof



Graph 2: Comparative analysis matrix for wall

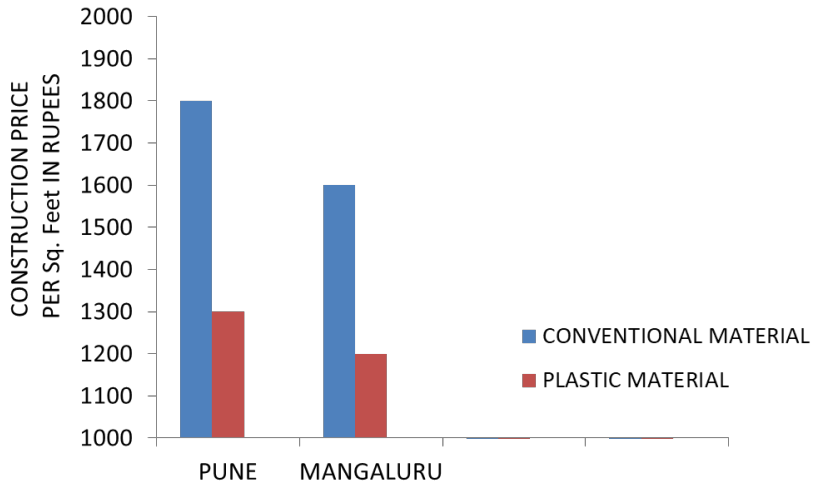


Graph 3: Comparative analysis matrix for flooring.

★★★★★- 5 star is the best rating.

This bar graph shows the cost analysis between conventional material and plastic material in construction of structure.

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Graph 4: Cost Analysis between Conventional Material and Plastic Material

Comparison between Conventional Materials & Recycled Plastic Material Used In Construction Materials:

Table 3: Comparison Between Conventional Materials & Recycled Plastic Material

POINTS	WALL			FLOOR			ROOF		
	Bricks	Siporex & AAC blocks	Recycled plastic sheets	Wooden flooring-	RCC flooring	Recycled plastic sheets	Roofing GI sheet	Roofing rubber sheet	Corrugated white recycled plastic roofing sheet
COST	★★	★★★	★★★★★	★★	★★★	★★★★★	★★★	★★	★★★★★
DURABILITY	★★	★★★	★★★★★	★★	★★★	★★★★★	★★★	★★	★★★★★
CONSTRUC-TION TIME	5-6 MONTHS ★★	3-4 MONTHS ★★★	1-2 MONTHS ★★★★★	1-3 DAYS ★★	2 DAYS ★★★	1 DAY ★★★★★	2 DAYS ★★★★★	2 DAYS ★★★★★	2 DAYS ★★★★★
ENVIRONM-ENT FREINDLY	★★★★★	★★★★★	★★★	★★★★★	★★★	★★	★★★	★★★	★★★

The following chart shows the different plastic building material seller company in Pune with product & price detail.

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Table 4: Plastic Building Material Seller Company in Pune with Product & Price Detail

Sr.No.	Product Name	Compony/Brand Name	Cost	No Of Product Sell Monthly
2	Recycled Roofing Plastic Sheets	Ricron,pune.	5mm thk- Rs 1445/unit	2200-2500 Sheets
		Babji recycle board, pisoli,pune.	5-8 mm thk- Rs 1000/unit	1800-2000 Sheets
		Shivam,Ravivar Peth,pune.	8 mm thk - Rs 1200/unit	2000-2400 Sheets
		Uni Plast,pune.	5 mm thk - Rs 1115/unit	1800-2200 Sheets
		Vijai Polymers,Pune.	6-8 mm thk - Rs 1150/unit	2000-2500 Sheets
		Tirupati Balaji Plstic,Pune.	4 mm thk - Rs 1160/unit	1500-1800 Sheets
Sr.No.	Product Name	Compony/Brand Name	Cost	No Of Product Sell Monthly
1	Recycled plastic sheets	Ricron,pune.	5-30 mm thk- Rs 65/ sq.feet	1500-2000 Sheets
		Babji recycle board, pisoli,pune.	4 mm thk- Rs 40/sq. feet 18 mm thk - Rs 50/square feet	2000-2500 Sheets
		Shivam,Ravivar Peth,pune.	8-30 mm thk - Rs 60/sq. feet	1800-2000 Sheets
		Uni Plast,pune.	5 to 30 mm thk - Rs 55/sq. feet	1000-1500 Sheets
		Vijai Polymers,Pune.	10-20 MM THK - Rs 50/sq. feet	1500-1800 Sheets
		Tirupati Balaji Plstic,Pune.	4-30 MM THK - Rs 60/sq. feet	1500–2000 Sheets

4. CONCLUSION

From the overall study I conclude that, the plastic material is cheaper than conventional material. Plastic material is 1.5 times cheaper than conventional material. It is more durable.it takes less time for construction. Therefore, it needs to be promoted and explored more for construction. The plastic material is used as a construction material because, it is more durable than other conventional material.As the plastic can be recycled or reused, if structure is demolished the plastic building material can be recycled but in conventional material they recycled or reused upto the some limit hence after demolishing plastic material can be environment friendly than conventional material.As per the overall study building made up with recycled plastic material can also give the same cooling effect like bamboo house.

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Art and Architecture of a Sustainable Community: Warli Tribe in Jawhar

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ABSTRACT: This Research Paper is an attempt to study the Warli Tribe in India, its origin, geographical classification, culture, art & architecture, etc. in a detailed and critical manner. It attempts to understand and give an overview of the architecture of the Warli tribe, the most popular, dominant yet under-developed tribe in Maharashtra. Warli is the predominant tribe majorly located in Jawhar, Vikramgad, Mokhada, Dahanu and Talasari talukas of the northern Palghar district of Maharashtra, comprising 45.84% (i.e., 7,07,494 as per Census 2011) of the tribal population. Besides, they are found in parts of Nashik and Dhule as well as Navapur taluka of Nandurbar of Maharashtra, Valsad, Dangs, Navsari and Surat districts of Gujarat, and the union territory of Dadra and Nagar Haveli and Daman and Diu. However, this study is restricted to the Jawhar Taluka, the stronghold of the Warli tribe in Palghar district. The motive of the study is to understand the origin of the Warli, its geographical classification, its culture and beliefs, the evolution of the architecture of the Warli tribe in Jawhar, and analyse the current architecture of the Warli tribe of Kogade Village in Jawhar. The study is broadly based on primary sources of data – interviews, site visits, questionnaire, and field surveys; and secondary data – case studies, reports, books, research papers, and articles. The primary research is limited to the Warli Tribe of Jawhar and will focus on the culture, art, and architecture of 4000 Warli living in Kogade Grampanchayat, Tal. Jawhar, Dist. Palghar. In the end, the conclusion of this research paper talks about the strengths & weaknesses of the study, possible applications of the research, and the scope of future research.

Keywords: *Tribal Art, Tribal Architecture, Tribal culture, Vernacular Architecture, Sustainability.*

1. INTRODUCTION

1.1 Background Study

1.1.1 *Origin and Spread of Warlis*

Warli is the predominant tribe in the Palghar region comprising of 45.84% (i.e., 7,07,494 as per Census 2011) of the tribal population, other tribes Koli Malhar, Thakur, Thakar, Kathodi, Katkari. Koli Mahadev, etc. constitute the remaining population.

Warlis are majorly located in Jawhar, Vikramgad, Mokhada, Dahanu and Talasari talukas of the northern Palghar district. Besides, they are found in parts of Nashik and Dhule as well as Navapur taluka of Nandurbar of Maharashtra, Valsad, Dangs, Navsari and Surat districts of Gujarat, and the union territory of Dadra and Nagar Haveli and Daman and Diu.

According to Dr. Wilson, they were uplanders and are called Warlis because they used to spread waral—brushwood—in the hilly districts. Their name is intimately associated with the profession they have been following, viz. the spreading of waral for burning the land for agricultural purposes.

'Warli' is the mother tongue of Warli tribe, with no written script. Warli of Jawhar speak and understand Marathi & Hindi.

1.1.2 *Geographical Classification of Warlis*

Warlis are found in North Sahyadri Range, the mountains and coastal regions in and around the borders of Maharashtra and Gujarat.

- **Gujrat Warli (Davar Warlis):** Located in & around Maharashtra border of Diu-daman & Dadar Nagar Haveli region. They speak Gujrati Warli (mix. of Marathi, Gujrati & Sanskrit) & dress heavy ornaments.
- **Samudri Warli (Dahanu-talasari region):** Located near the coastal areas of Maharashtra, closest to Mumbai-city. They are slightly more developed warlis speaking Marathi Warli (mix. of Marathi & Original Warli). Warli Paintings are commercially practiced in many parts of this region.

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- **Dongar Warli (Vikramgad, Jawhar, Mokhada region):** Located in the hilly forests in Maharashtra, near diu-daman border, away from the coast. These are slightly backward warlis as they don't have much employment opportunities because of hilly topography. They speak Original Warli (unwritten script with an addition of some Marathi). Their attire is simple and less ornamented than Gujrat & Dahanu Warlis.

1.2 Aim

The motive of the study is to understand the origin of Warli, evolution of culture, art & architecture of Warli tribe in Jawhar, and analyse its current status for Warli tribe in Jawhar.

1.3 Objectives

1. To study the origin, culture, art, and architecture of Warli tribe in Jawhar.
2. To study the current existing architecture of Warli tribe in Jawhar.

1.4 Research Questions

1. What is the origin and spread of Warli tribe in India?
2. What is the culture and lifestyle of Warli tribe in Jawhar?
3. What is the art and architecture of Warli tribe in Jawhar?
4. What is the current existing local vernacular architecture present in the region?

1.5 Scope & Limitations

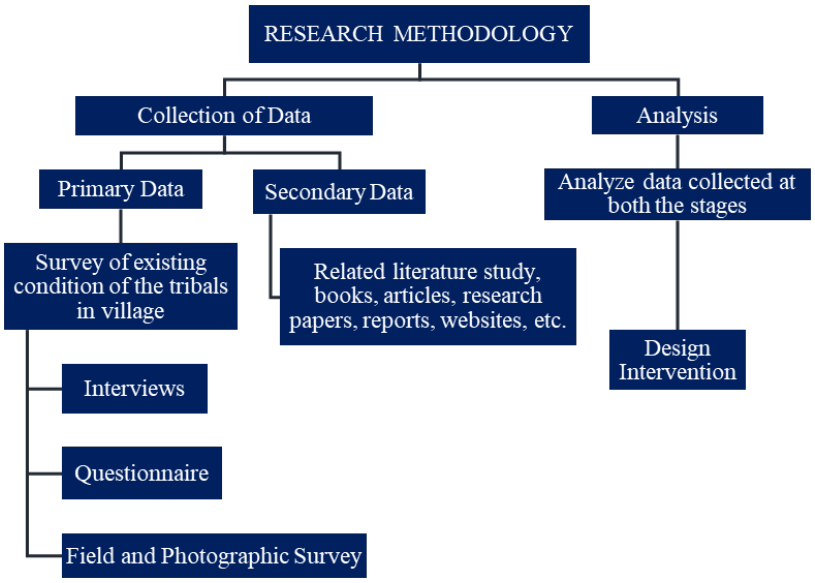
The researcher has limited the Primary study to Warli Tribe of Jawhar and will focus on culture, art and architecture of 4000 Warlis living in Kogde Grampanchayat, Tal. - Jawhar, Dist.- Palghar. 25 respondents out of 650 people living in Vaakicha Maal and Kogde-Patilpada (2 Padas out of 5 Padas of Kogde Gao) were interviewed personally and their houses and habitats were studied. The respondents selected were of different genders and age groups to prevent bias and get overall objective perception.

The interviews were limited to discussions of parameters like- Warli Art, their culture & lifestyle and their architecture.

2. RESEARCH METHODOLOGY

This research is very site-specific & user-specific. Primarily divided into 2 parts: Collection of Data and Analysis.

Table 1: Research Methodology



ISBN: 978-93-89934-68-7

3. LITERATURE REVIEW

There are a number of studies on Warli tribe, their culture, art & architecture, etc. The present Review of Literature provides a thoughtful peep into the researches carried out on Warli community in Palghar district and the thoughts and findings of noted scholars who have contemplated their culture, art & architecture from different angles. The literature review includes pre-reviewed articles, relevant chapter, and books, articles from recognized sources, a review of the important researches, authors, architects, etc.

3.1 Khanderao Save (1945)

The book- **'Warli'** is about the Warli tribe found in the Thane region (then thane includes palghar) as converted from the research paper submitted by author Khanderao Sawe in Mumbai University. The book helped the researcher to understand origin, history of Warlis, their culture & their houses back in 1945. The social, economic and educational conditions of Warli tribe are described. Initially, the book consists of origin & history of warli tribes, their dress, housing, religion, and worship of deities.

3.2 Adam A. Semlambo (2018) – International Journal of Scientific & Engineering Research Volume 9, Issue 5, May-2018

The Research Paper- **'Re-construction of a Community: A sustainable attempt at alternative opportunities'** talks about Warli Community, their spread, their habitat, their culture, food, music & art, beliefs, etc.

It also covers a case study of NOCO Project, Noco in Warli tribe means 'enough, no more.', carried out in Ganjad, Dahanu. The NOCO project consists of Model warli hut construction, NOCO Café, NOCO Seed Bank and other new earth products like Earth Stove and Sustainable toilet, all constructed using vernacular architecture in Dahanu by a group of architects and villagers together.

3.3 Ar. Remigius D'souza -Warli House and Habitat-1 (Blog article on Archetypes India), 29 January- 2011

The Blog Article- **'Warli House and Habitat-1': The Art and Science of Karvi Hut'** talks about the community habitat of Warli tribe in Palghar region. It also talks in depth about the construction and architecture of Traditional Warli hut also called as Karvi hut using architectural drawings.

4. RESULT AND DISCUSSION

4.1 Culture, Beliefs and Art

- **Beliefs:** Warlis had animistic beliefs but now they have partial hindu beliefs because of acculturation. The Sun and the Moon are regarded highly by the Warlis. They worship other nature gods like Kansari (Goddess of Harvest), Mahadev & Ganga Gouri (forest gods) & Rann Bhoot (Forest Ghost), each have a small folklore relating to forest & agriculture attached to them. They worship their ancestors by burying them with a tombstone, calling 'DagadDev' or 'Veer'.
- **Paintings:** Warli language doesn't have a written script so folklores and their paintings were the only medium to transfer their beliefs to next generations. Hence, every folklore & every painting tells a story that explains their life & beliefs. Traditionally, warli paintings are made on walls washed with mud or geru with rice paste and sticks or reeds.
- **Music:** Paintings, Music and Dances are a big part of their culture. Their music & dances are classified & performed as per their festivals, warli are very particular about when & what to perform. Their musical instruments are made by dried gourds, tree wood, bamboo sticks, etc. Tarpa & Ghangali are most popular instruments amongst tourists.
- **Dances:** There are no individual dances among them. The swaying body and clapping hands follow the rhythm of drum-beats. Diwali Dance also known as Tarpa Dance, is most popular dance followed by Shimga & Ranodi dance accompanied by dhol, timki and pipori, etc.

Cities nearby highly appreciate their paintings, dance & music culture, providing employment to Warlis near city area.

ISBN: 978-93-89934-68-7

4.2 Community Habitat

Warli people as a tribe are settled people. The shift from one place to another is sporadic. However, the Warli habitations are scattered. No Warli village has a group of more than 45–60 huts in one place.

4.2.1 *Warli Settlement in Jawhar, 1993*

The population was distributed in small hamlets of about a dozen huts cut off from each other by agricultural fields or small vegetation patches. A lonely hut in a far-off place is by no means a rare sight in the Warli village. This happens because Warlis prefer to erect a hut on the fields they cultivate.

4.2.2 *Warli Settlement in Jawhar, 2023*

Kogade Gao, Jawhar, is on hills and plateaus, and most of the people have their farms by the hills or downhill as the soil uphill is not fertile because of soil erosion over the years by heavy rains in this region. There is no electricity, water supply, proper road and other facilities downhill, hence, the people of Kogade Gao live away from their farm in a linear pattern, uphill or on the plateau.

As their sole livelihood is mostly on agriculture, all the members of the family work in farm including old people and children post 14yrs of age. Old people are not able to commute up & downhill daily, hence, they have settled down the hill for convenience.

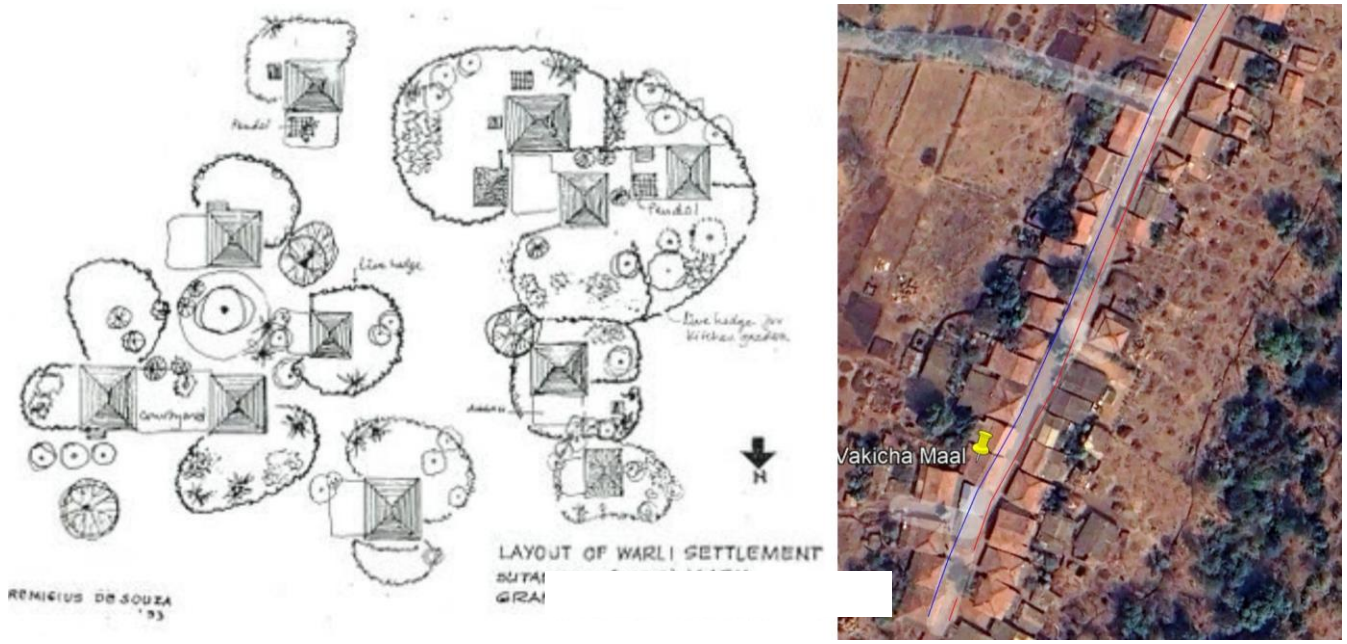


Figure 1: Warli Settlement Layout 1993 vs Warli Settlement Layout 2023

(*Source:* https://remidesouza.blogspot.com/2010/05/warli-house-and-habitat-1.html and https://earth.google.com/web)

4.3 Warli House

4.3.1 *Traditional Warli Hut*

- A Warli hut consists of a simple earth foundation, a wooden frame, bamboo strips, reed, straw and leaves, and organic fibres extracted from Sisal and Ambadi.
- It is always square in shape and in most cases facing the east. Many a time, a part of the hut serves the purpose of a shed for the cattle, particularly in the rainy season. Unless it is sufficiently big, the hut has no rooms inside it. The size ranges from 4×5 M to 7.5–8.5M.
- There is only one door for entrance. No window, just small cut-outs (About 1ftx1ft). Hence, free air and light have very little place in the Warli hut.

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- It is essentially a frame structure with wooden posts acting as columns. The walls are built of Strobilanthes sp. i.e., Karvi* sticks or bamboo strips and plastered with cow-dung or mud. Traditionally, these walls are decorated with Warli Painting, but now very few houses practice this.
- Nowadays the Forest Department has banned the collection of Karvi reeds. Also, Karvi is not a very strong reed, and the walls made from it have to be replaced every 3-4 years. The Warli farmers have started cultivating Jowar, and thus the people have started using Jowar stalks to build the walls instead of Karvi, almost tripling the life of the walls.
- The huts are roofed either with straw or dried leaves & tarpaulin in between during rainy season. The pitch is around 28–30 degrees.

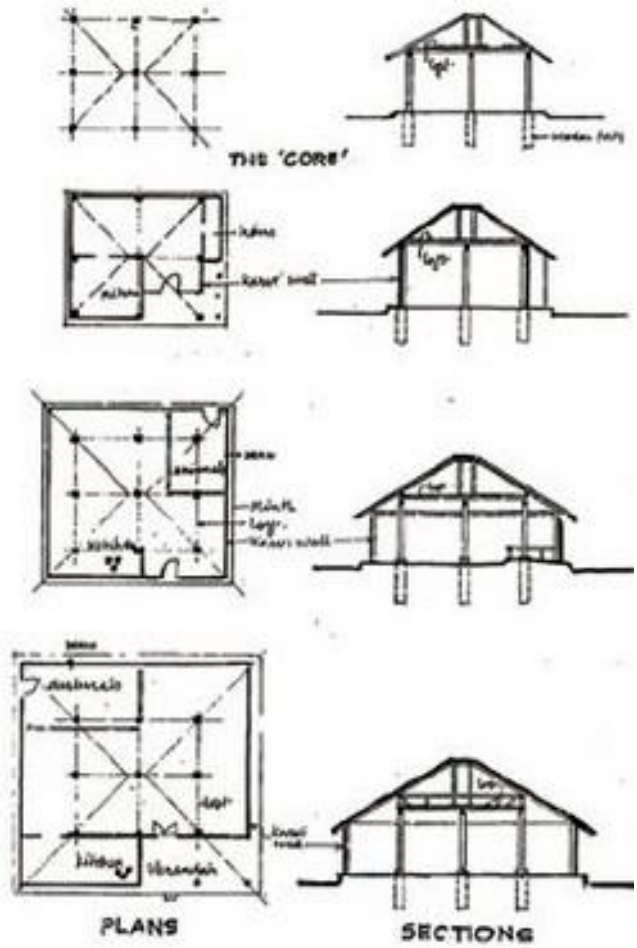


Figure 2: Plan and Section of Traditional Warli Hut

(*Source:* https://remidesouza.blogspot.com/2010/05/warli-house-and-habitat-1.html)

***Karvi** is a local word for a special type of reed which is available in the forest. Warlis use this reed to make the walls because of a very flexible property that is possesses. During winters, the reed wall acts as a warm skin to the inside while in summer it cools the temperature naturally. It is a connatural insulator.

4.3.2 *Current Warli House*

Based on technology and materials current Warli houses can be divided into 3 types for convenience. 1) Kaccha House, 2) Mix of Kaccha & Pakka House and 3) Pakka House.

Kaccha House

- This house is somewhat similar to a traditional warli hut. Orientation and planning of internal spaces are the same as that of traditional warli hut. 2 out of 50 houses is a kaccha house, only inhabited by those living in extreme poverty.

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- It is a frame structure with wooden columns and a central pillar of nearby timber forest-producing trees like Sag and a stone foundation with cow-dung and mud flooring.
- The walls are wattle and daub with Karvi reeds mesh (wattle) plastered with mud and cow-dung mixture(daub). These walls have to be maintained after every 3-4yrs, some are switching to Jowar stalks to increase life to 10-12yrs as mentioned before. The walls are traditionally painted with Warli painting but that is very rare in this kaccha house, warli painting is practiced on walls only during special occasions like marriage.
- Hip roof with wooden supports and thatched roof is present, mostly poorly constructed. Hence, a tarpaulin is put over the roof during the rainy season to avoid leakage.



Figure 3: Kaccha House/Modern Warli Hut

Mix of Kaccha and Pakka House

35 out of 50 houses are Mix of Kaccha and Pakka House which have stone/stepped cement foundations, roof with wooden trusses and clay tiles on top, or in some cases it is a load bearing structure with brick walls plastered with mud & cow-dung.

Pakka House

- 13 out of 50 houses can be classified as Pakka House requiring less maintenance compared to previous types. This is large enough to have 3–4 rooms within unlike Kaccha House.
- These houses are mostly RCC structures or Frame structure with teakwood columns and strip foundations.
- It has brick walls mostly plastered with mud and lime. They always use mud in plastering to reduce heat gain.
- consisting of proper openings with wooden window frames & panels. Glass is still very rarely used for any window panel.
- They are roofed with wooden frame and Khaprel (clay tiles) on top.
- They have proper entrance with higher plinth because of heavy rainfall and to create socially engaging spaces as most of them spend a lot of time by doing household chores, group meetings by the entrance.

CONCLUSION

- This paper contains an overview of their sustainable vernacular techniques, if studied in depth in the future these techniques combined with modern sustainable construction techniques can lead to more efficient, culturally sensible and homely architecture for the community. Some of these new techniques can be used in cities or to create ‘Smart Villages’.
- Almost all from the community are construction workers and hence are familiar with modern construction techniques. Also, their traditional paintings and music is popular among tourists. If we use their traditional knowledge and combine

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it with their modern construction skills, we can create more durable sustainable places & more employment opportunities for them.



Figure 4: Plinth Used for Social Engagement & Household Chores

(*Source:* Author)



Figure 5: Kaccha + Pakka House

(*Source:* https://www.gettyimages.no/detail/news-photo/adivasi-mother-and-child-in-front-for-their-house-with-news-photo/615862402)

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Outdoor Recreational Spaces in Prisons of India

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ABSTRACT: This paper will look at several aspects of prison recreation in an effort to show that it is an effective tool that should be used regularly in prisons. Both the history of recreation spaces in penal settings and the varieties of recreation that have been made available in facilities around the nation will be presented. The advantages and objectives of penal recreation are then discussed. These advantages include improvements to one's bodily and mental health, a rise in institutional safety, and a decrease in recidivism.

Anyone would find life to be terribly tedious without any form of amusement much more so in prisons with their rigid schedules. Therefore, a focus has been placed specifically on offering the inmates various recreational spaces indoors and outdoors.

Prison sports, according to its "official" ideology, are about more than just giving inmates a break from the routine of incarceration. Prisoners who participate in correctional recreation might alter their attitudes and conduct. Recreational programmes can support physical fitness, and stress reduction. These initiatives help prisoners decompress from prison life while also encouraging to maintain minimum good physical and mental wellbeing. The general health of the inmate should be a priority in the ideal prison leisure programme. Recreation would also encourage excellent sportsmanship, educate prisoners, and assist teach pro-social principles.

These spaces provide prisoners to indulge in recreation not making them feel like prisoner for some time while indulging in these recreational grounds.

Keywords: *Recreation, Recidivism, Correctional Recreation.*

1. INTRODUCTION

Today, more than 5,54,034 prisoners are currently incarcerated in the Indian Criminal Justice System. "These people are spread between the 1,319 prisons in the country consist of 564 Sub Jails, 424 District Jails, 148 Central Jails, 88 Open Jails, 41 Special Jails, 32 Women Jails, 19 Borstal Schools and 3 Other than the above Jails.

Even though these people have committed any number of crimes, they are still entitled to recreation privileges.

This paper will explore different outdoor spaces related to recreation in correctional institutions. Research shows that recreation plays a crucial role in the offender rehabilitation process because it keeps inmates occupied, increases institutional safety, is cost effective, limits inmate trips to the infirmary, and teaches prisoners vital skills needed for re-entering society.

2. LITERATURE REVIEW

2.1 History of Correctional Recreation Spaces

Prison life was supposed to be punishing in the early eighteenth century. There must be no sharing of profits — no visiting of friends—no education but religious education—no freedom of food—no weaver's looms or carpenters' benches in jails that are truly designed to keep the masses in order and be a terror to all evil doers. There must be a lot of seclusion; coarse food; shameful clothing; and constant, tiresome, external labor; a planned, controlled, and unyielding exclusion of enjoyment and comfort. Prisoners were intended to be rehabilitated by following a regimen, being contrite, and following prison rules. This strategy had no effect on recidivism. Instead, it appeared to increase the inmates' tendency to commit more crimes by further degrading them emotionally and physically.

Later in the late nineteenth century, correctional systems began to reform by making humanitarian improvements to alleviate the burden of prison regimes and adopting a more constructive attitude towards rehabilitation. Sporting activities in prisoners provided both of these aims.

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2.2 Types of Recreation Available

To understand the different types of recreation available to inmates, we first must define what constitutes as recreation and leisure. Both terms are assumed to be interchangeable, however there are subtle differences. Leisure is generally thought of as the spare or free time that during which one can do whatever they wish to. Leisure defined as "a block of unoccupied time, spare time, or free time when we are free to do what we choose". Recreation can be defined as "the use of time for amusement, entertainment, participation, or creativity, and frequently takes place in one's leisure time". Recreation includes activities whose purpose is to bring joy, fun or excitement. These activities are often pleasurable and are not taken part in out of necessity or for material rewards. Recreation can also be classified as either passive or active. Active recreation occurs when an individual actively participates in an activity that requires mental or physical effort to a substantial degree. Active recreation includes activities such as playing sports, playing an instrument, gardening, and crafts. Passive recreation occurs when someone is the receiver or consumer of entertainment by other people or activities. Passive recreation activities include watching television, listening to music, reading, and playing computer or console games.

Active outdoor recreational areas outside the housing units are important to the physical and mental well-being of inmates and to facility security, providing a positive outlet for inmate energies. Outdoor exercise is thought to be especially beneficial to both emotional and physical well-being because of exposure to fresh air and sunlight and because it provides a temporary release from confinement within the building. The most beneficial and typical kinds of active exercise found in jails arc: basketball, volleyball, weightlifting, and calisthenics.

The principal outdoor areas needed for a jail include:

- Exercise area—walled, fenced, or unenclosed, depending on the security level of inmates.
- Emergency egress/refuge area—a controlled outdoor area to which inmates can be temporarily evacuated in an emergency. This may be the same as the exercise area, if part of it is far enough from the main building.
- Visiting area—for minimum-security inmates, perhaps with a picnic table.
- Farm or garden area—if the facility grows some of its own food or has an inmate training program.
- General landscaping area—for aesthetic purposes and the creation of buffers between the building and the public. (Jail Design Guide for Small and Medium Jails, 1998)

The lack of indoor and outdoor exercise areas in small and medium-sized jails was a common practice in the past, with some inmates having to resort to individual efforts to do calisthenics in cells or dayrooms. However, the provision of such facilities in new jails has become a standard practice, and it is expected that they would have both indoor and outdoor exercise areas. This provision of facilities is essential for the physical and mental well-being of inmates.

Large jails or prisons may have organized recreational programs that involve trained recreational staff, competition, and training, but this is not typical of small and medium-sized jails due to limitations in staffing, space, inmate population, and length of stay. However, even the availability of outdoor recreation and exercise in small and medium-sized jails has been shown to result in fewer operational problems, such as inmate on inmate assaults, inmate assaults on staff, damage to jail property, and lawsuits.

Apart from these operational benefits, providing inmates with access to exercise and recreation facilities has several health and psychological benefits. Exercise is known to reduce stress, improve mood, and promote physical fitness, which can help inmates cope with the stress and challenges of incarceration. Additionally, physical activity can improve sleep, which is often a problem for inmates. The provision of exercise and recreation facilities can also foster a sense of community among inmates, reducing their feelings of isolation and improving their social skills.

In conclusion, the provision of outdoor recreational areas and outdoor exercise areas in small and medium-sized jails is crucial for the well-being of inmates, and it can also result in operational benefits for jail administrators. Providing inmates with access to exercise and recreation facilities can reduce stress, improve mood, maintain physical fitness, foster a sense of community, and improve social skills.

3. MATERIAL AND METHODOLOGY

Stage I: The first stage of research is about obtaining information regarding the key elements of the topic.

Gaining a thorough understanding of prison statistics and incarceration rates in various states of India involves collecting and analyzing data related to the number of people currently incarcerated, the demographics of the prison population.

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Understanding the history of recreational spaces in jails involves examining the evolution of prison design and architecture, as well as historical documents related to prison life. This may include researching the history of prison reform movements and their impact on prison design, studying the development of recreational programs and facilities within prisons, and analyzing the cultural and social contexts in which recreational spaces have been created and used within prisons.

Stage II: The second stage of the research focuses on the need and justification for the design intervention that caters to the needs of the inmates which is done by understanding the prison architecture and relationship of outdoor recreational spaces with the other facilities

Stage III: The last stage of the research focuses on the architectural aspect of the design intervention and architectural functionality. In this case, the various elements that are crucial for the recreational areas in prison design by stating issues and response to each factor of design.

4. RESULT AND DISCUSSION

- Ever since prisons started offering inmates structured recreation, problems have arisen. These problems range from views on recreation, to budget and safety issues, and to ineffective programs. Ultimately, these problems hold a lot of weight, especially with the general public and legislators. It is hard for one to ignore many of the issues. The public's main concern is the tax money that is poured into correctional recreation departments. They do not want to see their money squandered on frivolous programs that might not work. Prison administrators are concerned with safety, since it is a large part of their job. They cannot look past the fact that many recreation tools could be used as weapons if an inmate wished to do so.

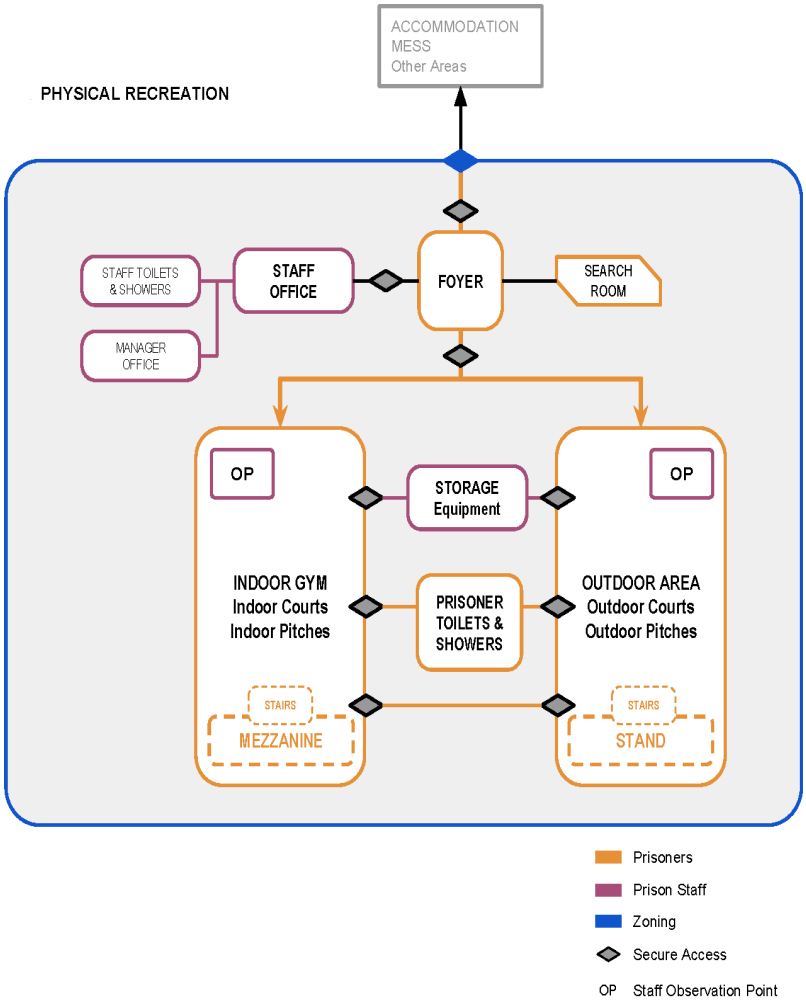


Figure 1: Typical Functional Diagram of Recreational Facilities

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- The issue of structured recreation in prisons is a complex and multi-faceted one, with concerns around budget, safety, and effectiveness. It is important to consider the perspectives of both the general public and prison administrators, as well as the potential benefits and drawbacks of providing inmates with structured recreational programs.
- From the perspective of the general public, there is a concern about the use of tax money to fund correctional recreation departments. Many people do not want to see their hard-earned money being used to provide frivolous or ineffective programs to inmates. As such, it is important for correctional facilities to ensure that any recreational programs they offer are cost-effective and provide tangible benefits to inmates.
- Prison administrators, on the other hand, are primarily concerned with safety. They need to ensure that any recreational tools or equipment provided to inmates cannot be used as weapons or otherwise pose a threat to the security of the facility. This can be a difficult balancing act, as providing inmates with access to recreational equipment is an important part of their rehabilitation and can help to reduce tension and conflict within the facility.
- Despite these challenges, there are many potential benefits to providing inmates with structured recreational programs. These programs can help to reduce stress, promote physical fitness and overall health, and provide a sense of structure and routine for inmates. Additionally, participating in recreational activities can help to develop skills such as teamwork and sportsmanship, which can be valuable for inmates as they work to reintegrate into society after their release.
- Overall, the issue of structured recreation in prisons is a complex and nuanced one. While there are certainly concerns around budget, safety, and effectiveness, it is important to recognize the potential benefits that such programs can provide to inmates. By carefully balancing these considerations, correctional facilities can provide meaningful and effective recreational programs that contribute to the rehabilitation and well-being of inmates.
- The typical functional diagram of jail facility is shown in Figure 2.
- Daily physical activity has a positive impact on physical and psychological wellbeing. Physical activity can be encouraged through 'active layout' (interior layouts and site configuration leading occupants to use stairs etc.) as well as accessible and appropriate athletic facilities.
- Green recreation space, landscaping, & gardening the wellbeing benefits of green and open space amenities and landscaping are well documented. In hospital settings, gardens have been found to reduce stress, increase physical activity, and foster socialization, all of which aid rehabilitation. Landscaping offers the biophilic benefits of visual connection with nature, but green recreation and gardening spaces both hold potential for the more comprehensive well-being benefits of increased physical activity, skill building, and self- and collective efficacy.
- Exterior spaces should be cultivated with plants and landscaping.
- External spaces should be designed to be easily maintained.
- External spaces should be easily accessible.
- There should be sufficient space for a range of purposeful outdoor activities and recreation.
- Planted recreational spaces are a great asset to environmental psychology, providing a wide range of health and wellbeing benefits. Spaces should be cultivated and abundant, to provide for sufficient outdoor physical activity.
- The scale and form should suit its function and should be located for ease of access and maintenance. If outside, will the areas be adjacent to the housing units or one central exercise area for all male and female inmates (general and special housing)?
- Will groups of inmates be mixed to some degree or will they exercise separately according to housing unit group? If the former, what is the makeup and size of each "mixed exercise group?
- Who will monitor the exercise activity and how?
- If outdoor exercise space is provided, should it double as emergency evacuation space? Should exercise areas be sufficient in size and number to accommodate a future expanded inmate capacity?
- Detail issues the following detail functional-architectural issues should be considered in the development of exercise areas.

The following issues apply to outdoor exercise and outdoor recreational areas:

Users: The numbers and types of people to use exercise areas should be determined. Response: There are three principal types of potential users: inmates, law enforcement or jail officers as part of their fitness or community involvement programs, and the public, with or without inmate participation.

It is important to identify the number of inmate groups that must exercise at separate times because of separation and supervision concerns. These groupings should respect the basic classification/separation requirements of the facility unless the level of staff supervision for exercise is sufficiently high to allow some merging of groups housed separately.

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Once the number and types of groups are identified, the maximum group size should be determined since that size will influence space and equipment requirements as well as staffing needs.

Capacity expansion possibilities should also be identified to determine if a larger group must someday be accommodated or if additional exercise spaces should be planned.

Size Issue: The size of exercise areas should be based on activities and group sizes.

Response: Activities should be chosen on the basis of what is most useful and productive for the inmates and the staff alike. Different activities require different amounts of space. For example, a small half-court basketball area would require 1,600 to 2,688 net square feet whereas a calisthenics area might require only about 300 net square feet for the same number of users.

Additionally, each space may have secondary areas to accommodate other activities concurrently (such as weightlifting and basketball), Or they may provide seating areas for those who are resting between activities, awaiting an opportunity to participate, or, in the case of outdoor exercise, merely enjoying the fresh air.

The number of people to use an exercise area at any one time clearly affects space size. Twelve people playing two 3- on-3 games of basketball, for instance, would require two half-court areas at about 3,100 to 5,040 net square feet total. However, eight people playing one 4-011-4 game need only about 1,600 to 2,688 net square feet—not counting secondary areas for sitting, weightlifting, or other activities.

See the space needs below.
Minimum Dimensions (feet)
Basketball 48 × 56 × 15 h
Volleyball 72 × 42 × 20 h
Weightlifting (weight machine) 12 × I6 × 8 h
Sitting 15 sq ft./person
Maximum Number Active of Users
10 (half-court; high school)
12
4–6

Number of Areas Issue: The number of separate exercise areas needed depends on scheduling, staffing, and the number of different exercise groups.

- **Response:** Most small and medium-sized jails will need only one large outdoor exercise area. However, this cannot be known with certainty until a variety of factors are considered. Additionally, space sharing options with other functions cannot be ascertained until all factors about exercise area use are considered.
- **Scheduling** is a major determinant regarding the number of areas
- **Frequency:** How often inmates will exercise outside the housing area—once a week? Three days a week? Five days a week?
- **Duration:** The length of time per exercise period, including movement time between housing and exercise areas—30 minutes? One hour? Two hours?
- **Hours of operation:** The number of hours per day the exercise area is available for use. This is frequently limited by other basic activities, such as food service and visiting, that absorb staff and inmate time during the day.
- **Weather Conditions:** The number of days per year that weather would typically prohibit use of an outdoor exercise area might influence the size and type of space for the outdoor area.
- **Staffing** is a major consideration, particularly when special staff must be retained to supervise the exercise activity. The need or desire to minimize staffing can limit the hours available for exercise. The number of different groups needing to exercise is critical since small and medium-sized jails can easily generate 8 to 12 different groups if a strict adherence to housing unit separation is adopted.

4.1 Movement and Control

- **Issue:** Determine how inmates will gain access to exercise areas and how they will be monitored.
- **Response:** Some movement and surveillance concepts follow
- Have one large central location to which all inmates are moved and subsequently monitored by special staff.

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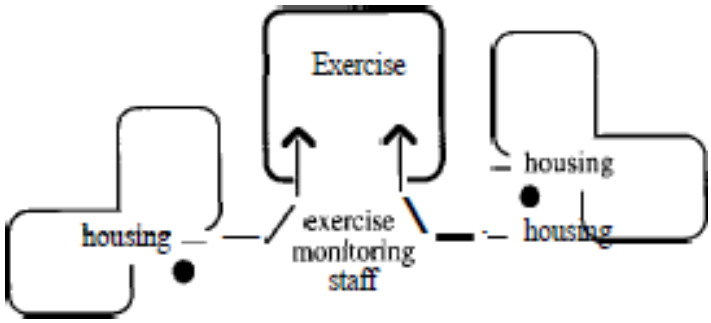


Figure 2: Locating Outdoor Area Near Housing Spaces

4.2 Communication

- **Issue:** A means of communication between staff and inmates in the exercise area and other staff should be provided.
- **Response:** Roving security and l or control post staff must be able to communicate with the inmates and staff in the exercise area. Depending on the location and roles of staff, the following methods might be considered to communicate with inmates: intercom, public address speaker, or direct voice communication through an opening in the exercise wall**.**

4.3 Security

- **Issue:** A special attention should be given to controlling escape attempts.
- **Response:** Experience and research both show that escape risks are high with outdoor exercise. Using solid, security-constructed walls and installing a sturdy, tightly woven screen or mesh over outdoor areas with security screen above.

5. CONCLUSION

- The provision of outdoor recreational areas in jails in India is an important aspect of the rehabilitation and reformation process for inmates. However, the quality and availability of these areas may vary depending on the specific jail and its resources.
- According to reports, many jails in India have outdoor recreational areas such as playgrounds, gardens, and open spaces. These areas can provide inmates with opportunities for physical activity, socialization, and mental stimulation. In some cases, these areas may also include sports facilities such as basketball courts, volleyball courts, or cricket pitches.
- However, there have also been reports of overcrowding and inadequate facilities in some Indian jails, which can limit the availability of outdoor recreational areas for inmates. In some cases, outdoor areas may be poorly maintained or unsafe, which can pose a risk to inmates' health and safety.
- In recent years, there have been efforts to improve the quality and availability of outdoor recreational areas in Indian jails. For example, the Ministry of Home Affairs has launched a scheme to provide funds to state governments for the construction of modern jails that include facilities such as sports grounds and libraries. Additionally, there have been initiatives to improve vocational training and education programs in Indian jails, which can also contribute to the rehabilitation and reformation of inmates.
- Overall, while the availability and quality of outdoor recreational areas in Indian jails may vary, these areas can play an important role in promoting the physical and mental well-being of inmates and supporting their successful reentry into society.

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Use of Calligraphy Art in Islamic Architecture

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ABSTRACT: In the early decades of Islam, calligraphy was first developed to write Holy Quran on leather, bones, leaves, parchment etc. Laterthis art became a part of precious objects, paintings, and monuments. Along with other forms of art, calligraphy also enriched architecture of the Islamic world. With the spread of Islam in different regions of world, the art of calligraphy transmitted to new territories and consequently various styles of calligraphy were developed. The early Muslim rulers in India, the Sultans developed this art and later Mughals enriched and flourished it to its peak. The monuments studied in this research are from three capital cities of Mughal Empire viz. Agra, Delhi and Fatehpur Sikri. Of all the decorative arts used in Mughal style, calligraphy has secured a higher reputation at the imperial court. Babur was the founder of Mughal dynasty in 1526. This research paper focusseson Islamic calligraphy art. Indian context and Mughal era have been considered. It will help the designers, architects, and calligraphers to conserve calligraphy as an art, as it is still associated as one of the most important elements of contemporary religious buildings.

Keywords: Calligraphy Art, Quran, Mughal Art, Marble, Sand Stone, Inlay Technique.

1. INTRODUCTION

Of all the decorative arts used in Mughal style, calligraphy has secured a higher reputation at the imperial court. Babur was the founder of Mughal dynasty in 1526.This research based on Islamic art (focus on calligraphy art). So, this research paper limited for Indian context only.

The title of research paper is use of calligraphy art in Islamic architecture. The main aim of research is to explore and study ofuse of calligraphy art and how it was used? where it was used? Mughal (A.D. 1526 to A.D. 1857) used this art in their architecture as well as other artifacts. This research paper focus only on Mughal period, in it this research limited to Akbar (Jala- Ud-din-Muhammad Akbar -1556 to 1605) and shah-Jahan period (Shihab-Ud-din Muhammad shah-Jahan-1628 to 1658). Thisresearch is limited to primary and secondary data collection only.

2. METHODOLOGY

I did this research paper from primary and secondary data collection, from visiting site, some books related to Mughal architecture, some literature reviews and from questionnaire with guide.

Site visited: Agra -taj mahal and Agra fort –, dewan-i-khas, Fatehpur Sikri -Buland Darwaza

The books are – Indo Islamic architecture (Delhi Agra) by K. Sharma, Indian architecture Islamic period 1192 to 1857 by Dr. Surendra Sahai, tombs of Delhi by Savita Kumari, Islamic architecture of Delhi by G.S. khwaja, Islamic art and architecture byMarkus hattstein and peter Delius, Mughal style (the art and architecture of Islamic India by George Michell, the timeline history of Islamic art and architecture by Nasser d. Khalili, Islamic architecture by Satish Grover.

The literature reviews are – research paper of architecture elements in Islamic ornamentation new vision in contemporary Islamic art by Jeanan Shafiq, evolution of Islamic geometric patterns by Yahya Abdullahi, M. Rashid, impact of modern technologies onIslamic architecture by Muhammad faiz, H.S. Chiong, Z.B. Razlli, typological study of domes in Islamic architecture of north India by Asif Ali, A.S. Hussain and one journal of Islamic art by Zarah Hussain.

2.1 Research Question

How Mughal used calligraphy art in their architecture?

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3. LITERATURE REVIEWS

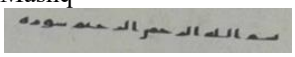
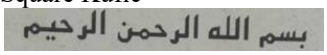
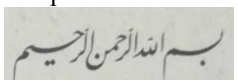
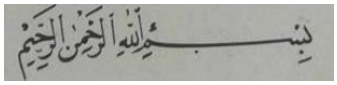
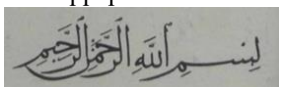
3.1 Calligraphy

Calligraphy is the art of writing. Is a unique feature of Islamic art in that it has been used on monuments and artifacts also in some jewelries. There were many ways in which calligraphy could be enhanced by adding decoration. The calligraphy art written in gold, or in other colors also. Letters and words could also be outlined or could lie against a background patterns. Calligraphers also combined different sizes, colors, and styles of text for different phrases or sections of text.

3.2 Islamic Art

Islamic art concentration on geometric patterns draws attention. Decoration principle of Islamic art is symmetry. Calligraphy expression is a fundamental decorative element of all forms of Islamic art, Islamic architecture uses arches a lot in the design ofentrances and wall pillars, the domes placed over a cubic space is sometimes an awe-inspiring symbol of heaven above the earth which carries the further message of all powerful oneness of Allah. Geometric patterns introduced during the late 9th century, arethe most seen in Islamic ornaments

From pre historic period domes had been used by mankind and ancient roman and Persians utilized the full structural properties of arcuated system. The first true dome was reflected in alai Darwaja, a shallow dome with final at its top. The domes is primarilya structural solution for roofing but being a dominant element it had been experimented for their aesthetic value too.

Calligraphy type	*Description*	*Year*	*Period*
Mashq 	An early script, first developed at mecca and medina during the first century of the Muslim era.	622 CE	-
Square Kufic 	Developed at Kufa, this script had the ninth century	9th century	-
Thuluth 	Fully developed by the ninth century	9th century	Akbar and Shahjahan For monuments
Taliq 	Developed by Persian calligraphers in the ninth century.	9th century	-
Naskh 	Easy to read and to write	10th century	Shahjahan Akbar For monuments
Muhaqqaq 	Featuring shallow Sub-linear curves	10th century	-
Rihani 	Combines characteristics of thuluth and Naskhi	10th century	-
Eastern kufic 	A more delicate version developed in the late tenth century.	10th century	-
Nastaliq 	Introduction in fifteenth century	15th century	Akbar and Shahjahan For small work

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3.3 Mughal Architecture

Babur was the founder of Mughal period. He won the sultanate of Delhi in 1526. Babur himself was a calligrapher.

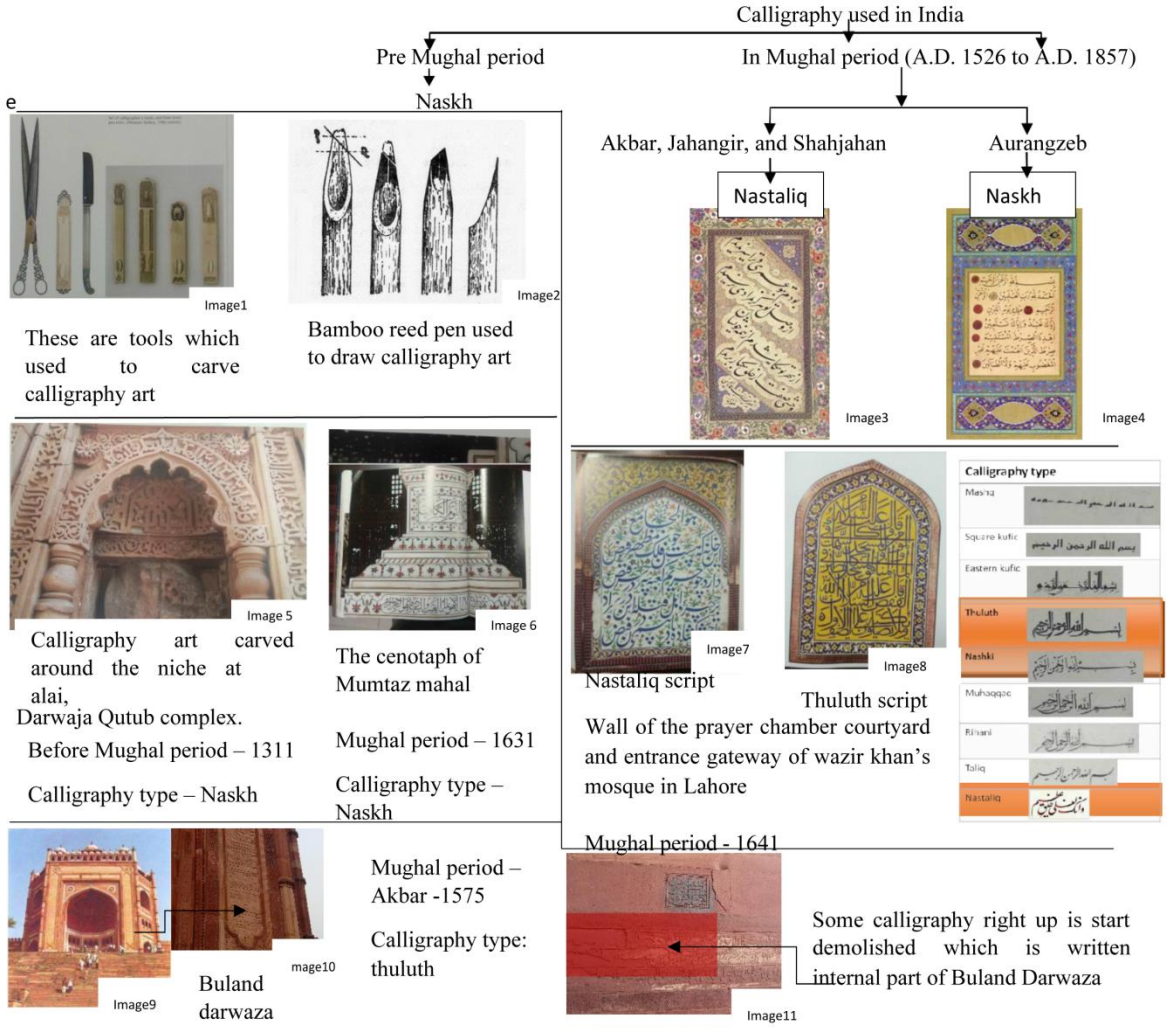
Akbar- ruled for fifty years (1556–1605) the general layout and the variety of building types and decoration reflect Akbar's experiments in architectural forms. Akbar believed in the power of the image and dedicated 4 role of painting. Red sand stone found in the area around Agra. This makes an early appearance under Akbar period and become a preferred building material.

Shahjahan- Mughal architecture reached its apotheosis during the rule of Shahjahan. There is complete transformation in the building style, change in building material. The red sandstone, Akbar's favorite stone for Fatehpur Sikri and Agra fort, was replaced by white marble. Shahjahan chose white marble for its purity and splendor which sets off the building from its surroundings. The architectural ideals included emphasis on symmetry and uniformity. Use of pietra dura ornamentation on white marble is main characteristic of Shahjahan's architecture. Multi-faceted columns, baluster columns and curved roof are seen in the structures.

Islamic architecture, should be consistent with the local economic, cultural, social, and climatic factors. Arches are important inIslamic architecture because of their symbolic significance and how they allow builders to create mosques that reflect the importance of precepts such as unity, beauty, and light in the Muslim faith.

These are calligraphy art types which were used in Islam.in these types specially **Naskh** and **Nastaliq** used in Mughal period with both of then thuluth also used in some places.

Naskh is used in pre-Mughal period and Mughal period also (Aurangzeb period). Nastalik is used in Akbar and shah-Jahanperiod.



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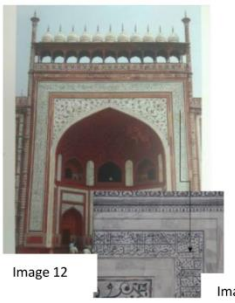


Image 12

Image 13

Calligraphy art in black stone set in marble on the pishtaq of south facing taj mahal gateway

Mughal period – shah-jahan -1628 to 1658

Calligraphy type: thuluth



Image 14

Central mihrab prayer chamber of the jami mosque at Fatehpur sikri (carved on sandstone and give dark blue background)

Mughal – 1571

Calligraphy on Artifacts

Steel blades of weapons

Mughal period – late 18th century

The flank of the bow

Mughal period: bahadur shah zafar II, the last Mughal emperor

Calligraphy type: Nastaliq



Image15



Image16

Brass vase with calligraphy

Mughal period: 1580 –1600

Calligraphy type: Naskh



Image13

Copper dish with calligraphy

18th century

calligraphy type: Naskh

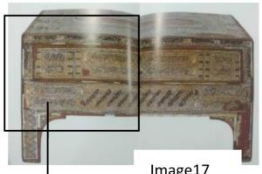


Image17

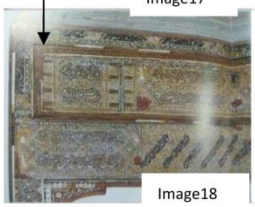


Image18

Writing chest (qalamdan) with calligraphydecoration

Mughal period – 1587

Calligraphy type: Nastaliq





Image

Mughal period: 1608

Calligraphy type: Nastaliq



Image20

Mughal period: 1619

Calligraphy type: Nastaliq

Mohur of Jahangir



Image 21

Inlay technique



Image 22

Inlay technique used on Taj mahal wall

The work of incrustation stones in a support also stone must be of great precision. The artists who worked on the Taj Mahal were endowed with a capacity for concentration and meticulousness, because in many places the quality is irreproachable. Moreover, this quality of execution of the works is one of the elements proving the success of the whole building. To make these inlays have used the technique of Pietra dura. It is a simple method developed by the lapidaries of Florence, Italy, who were masters in the art of stone marquetry. It was they who carried out a large part of the incrustation work, having moved to India to bring their know-how. In practice, the principle is to abrade a marble plate serving as a support until it is perfectly polished. Then, the artist makes a sketch of the drawing to realize and cuts in the stones corresponding to the good colours the forms to be incrusted, like parts of a puzzle. Finally, it carries over on the marble plate the contour of the cut stones and digs until obtaining a cavity corresponding to the stone. We imagine the precision needed for the two parts to become perfectly embedded, as well in width as in length, and even in depth, because if at the end the artist polished again the marble plate to level everything, it was not necessary too much difference in height between the support and the stone.

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Table 2

Monument	*Year*	*Period (Rurals)*	*City*	*Calligraphic Style*	*Technique*	*Material*
Buland Darwaza	1574	Akbar	Fatehpur Sikri	Thuluth	Carved	Sandstone
Akbar's Tomb	1612	Jahangir	Agra	Thuluth	Carved	White marble
Jami Masjid	1649	Shah Jahan	Delhi	Thuluth	Inlaid	White marble with black stone
Taj Mahal	1646	Shah Jahan	Agra	Thuluth, Nastalik	Inlaid	White marble and black stone

4. CONCLUSION

From study of some monuments and artifacts in Akbar and shah-Jahan period I analyzed that, in mosque and tombs used Naskh and thuluth calligraphy type (have clear curves and vertices it is difficult to carve in masonry) because they suited to public large-scale structure. Nastalik is used in small work like metalwork and manuscript and artifacts also. When we see two period i.e., Akbar and Shahjahan – in Akbar period he used mostly sand stone for his construction work and calligraphy art is carved on it by different types of tools. And in Shahjahan period we see that he used marble for his construction work. First carve calligraphy art then this gap is fill with colorful marble pieces. Mughal architecture shows its aesthetic value, the stylistic development, techniques, and symbolic function of monumental calligraphy. In table 2 you can see types of calligraphy art used on different monuments under different rurales,what types of technique they used for it on different materials. Now in present in image 11 you can see some calligraphy right up started to destroy and in an image 22 you can see some inlay work removed by people.

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Leisure Activities in Malls

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ABSTRACT: This research investigates the growth of Shopping centres in various places for leisure. Various leisure components are added to retail and shopping places to attract customers and increase shopper engagement. At the same time, under the influence of consumer culture, recreational shopping became one of the widespread leisure activities among different social categories. Contemporary research shows that nowadays, youth leisure is also widely associated with shopping centres. Recreational shopping, attendance at various leisure venues and events, and browsing around shopping centres are becoming increasingly popular among young people. Although this phenomenon is well elaborated in the context of developed countries, the research on youth leisure in shopping centres in a post-socialist context is in its infancy, especially considering its spatial aspects.

Some of the critical questions that were considered as a part of the research were –

What distinguishes malls from other forms of shopping, and what particular features of malls appeal to Indians as a leisure activity? These highlight the need for a more significant conceptualization of the relationship between consumption and leisure in urban settings, particularly in a nation where malls are increasingly being used and viewed as leisure escapes.

Therefore, this paper aims to explore young people's perception and recreational use of shopping centres and present a preliminary study exploring this phenomenon of shopping centres. To discover young people's preferences towards specific shopping centres, recreational opportunities, and recreational spaces to identify factors that shape their choice and use of shopping centres for leisure.

Keywords: *Shopping Centres, Leisure, Recreational, Mall.*

1. INTRODUCTION

If you were shopping over the weekend, chances are you were purchasing food for your family or essential items that your family needs rather than pampering yourself to a new hat. Shopping has evolved into a communal pastime. And once something becomes a hobby, it becomes something that people want to do all of the time. Different leisure components are being introduced to retail and shopping establishments in order to attract more customers and extend shopper stays. Meanwhile, under the impact of consumer society, recreational shopping became one of the most popular leisure activities among many socioeconomic groups. According to recent study, shopping malls are now generally connected with leisure. people are more interested in buying at various recreational facilities and activities, as well as browsing through retail malls.

The rise of e-commerce, or internet shopping, in recent years, as well as the pandemic, have all led to a shift in many of our purchasing patterns. Our time spent in shopping malls is now much decreased, with a portion of it dedicated to activities centred on leisure, entertainment, and dining. Currently, shopping malls are utilized for more than just shopping, as their new character encourages customers to spend their spare time entertaining themselves. Food and entertainment are important to tourists because they create an interesting atmosphere that makes visits enjoyable and exciting. It gives you a much-needed rest and allows you to stay longer. This study will examine the impact of entertainment and recreation activities as a source of uniqueness that might entice customers to visit retail malls.

1.1 Significance

It seeks to discover the preferences of people towards specific shopping centres, recreational opportunities, and recreational spaces to identify factors that shape their choice and use of shopping centres for leisure activities.

1.2 Aim

This paper explores people's perception and use of recreational in shopping centres.

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1.3 Objective

The research investigates recreational aspects of consumption and various phenomena related to leisure and shopping, such as recreational shopping, attendance at multiple leisure venues and events, and browsing around shopping malls; special attention is given to people because leisure is becoming widely associated with shopping malls. As a result, the primary focus of this article is to investigate the perception and recreational usage of shopping malls as leisure places.

2. LITERATURE REVIEW

Shopping mall, Its cultural significance is evidenced by the considerable time and energy consumers devote to the endeavor (Graham 1988; International Council of Shopping Centers 1990), it participate in a wide range of experiential activities in order to satisfy various personal and social motives (Bloch, Ridgway, and Dawson 1994; Morris 1987; Tauber 1972). shopping is a form of recreation and entertainment that may even be one of their favorite pastimes and a preferred activity of choice (Gonzales 1988; Hughes 1989).Consumers of all ages spend more time in shopping malls than anywhere else except home, work, and school (Kowinski 1985; Stoffel 1988), many consumers truly enjoy being in the marketplace to make a product purchase and/or engage in experiential consumption (Bloch et. al. 1994; Campbell 1997a; Prus and Dawson 1991; Solomon 1996). Customers attract towards shopping mall for shopping purposes and entertainment purposes also. Similarly, Customer satisfaction is defined as "the number of customers, or percentage of total customers, whose reported experience with a firm, its products, or its services (ratings) exceeds specified satisfaction goals." (Ferris *et al*., 2010; Tse and Wilton, 1988; Oliver 1999). Secondly said by Kim, *et al*., (2004) customer satisfaction is customer's reaction to the state of satisfaction, and customer's judgment of satisfaction level. Various factors affect to make successful any shopping mall. Like , The factors which are affecting to customer to shopping in selecting the shopping place fall in five groups i.e. Features of price, accessibility, environment, mall image, regarding the consumer buying behavior, convenience and rewards (Wong *et al*., 2012; Dawar and Parker, 1994;). Apart from that, A research done by Wang & Ha, (2011), nine features of mall make significant the consumer to loyal towards shopping in mall that are mall atmosphere, after sale service, brochures and pamphlets, communication, convenience, quality and assortment of products promotions, expected behavior and rewards as discounts etc. Shopping mall requires cultural effect to attract people. Merchandise price, income of the consumers & culture also had some impact on the failure cause of malls Ambavale (2013). Consumers evaluate the malls on the basis of products and different features of mall e.g. location, employees and atmosphere, Manana, (2009). Customer demand and expectations are very important to understand, Each and every region people demands does not match. Obeja and Bedia (2012) said that customers are conscious about extra facilities & service provided by personal selling in shopping malls. Now a days, tourist also visit in shopping mall and enjoy there, designer should keep in mind that shopping mall should keep some tourist attraction features so that tourist stay in shopping mall as much as possible. Length of stay is one of the key elements in a tourist's decision-making process (Bull, A. 1995).Determined other dimensions of mall selection behavior e.g. decoration, atmosphere, exterior and cleanliness of mall (Newberry *et al*., 2003).Differed levels of product assortment affect consumer purchasing behavior more than prices (Fox *et al*., 2002).Shopping mall has a very significant value for social issues through open spaces, which allows people to socially interact. Play spaces should provide opportunities for social interaction, which develops an individuals' ability to work in groups, share, negotiate, cooperate, resolve conflicts and learn self-advocacy skills (Ginsburg, 2007; Hudson &Thompson, 2001). Similarly, Play can also stimulate emotional and social states, such as empathy and self-regulation, known as emotional intelligence, which is vital for successful future relationships (Goleman, 1996). Through the open spaces and play opportunities in the shopping mall, socially people integrate more and more and connect deeply. The play space design should enable socialization to occur, through allowing enough space for interaction when desired but also providing safe areas in which to retreat until confidence and self-assurances developed (Heseltine & Holborn, 1987). Landscape plays a very important role in the success full design of shopping mall. Landscape is ''a way into a foundation for the exploration of all that there is—the social totality within which we live'' (Mitchell, 2008, p. 47).

3. MATERIAL & METHODOLOGY

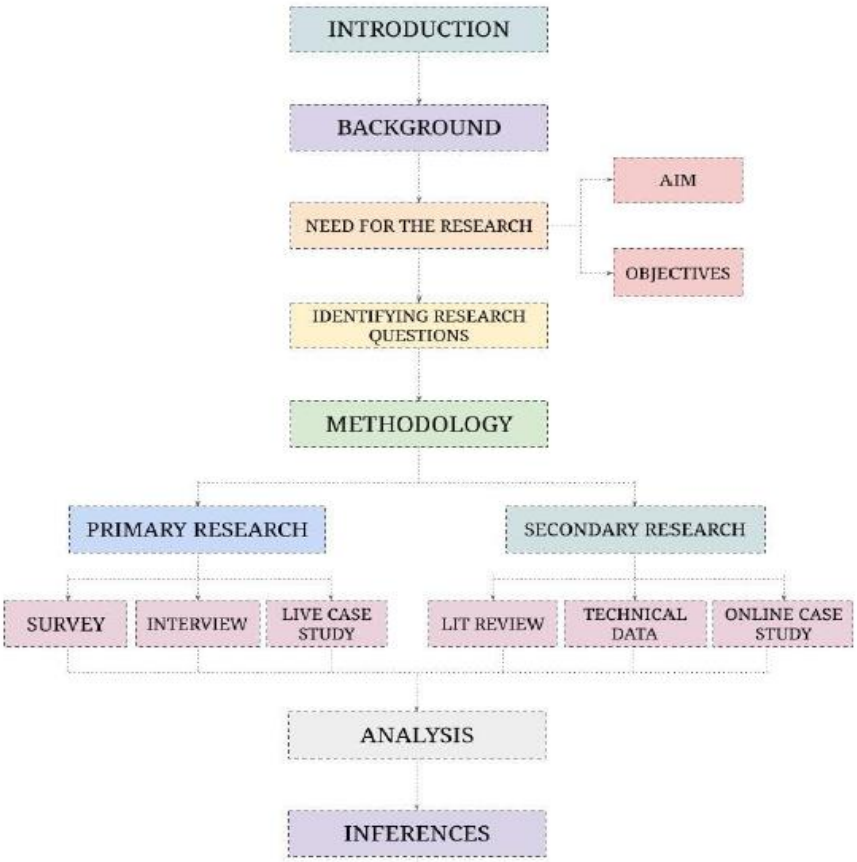
Shopping centres more than ever look for ways to enhance the customer experience. Customers increasingly expect engaging experiences in shopping centres. They expect to receive a full package of retail, leisure and entertainment activities. Offering memorable experiences and by doing so making sure that customers forget about the worries of everyday life and forget about time is the opposite of the world of online shopping in which ease, convenience and speed are the basic elements. Emotions versus transactions.

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The more impressed visitors are by the total experience, the more likely they will favour the shopping centre, will come back time and time again and become advocates of the place. Different customers have different needs, wants and expectations. Some customers will be primarily attracted by the products that are offered by the big brands or a specialty store. Some will be tempted by the wide range of choice. Other customers will see the shopping centre primarily as a meeting point where they can spend time with friends walking around, having a cup of coffee on a terrace or sitting on a bench. Others will see the shopping centre as the mini city where they have everything they need in one place, from groceries to holidays. Still others will go to the shopping centre mainly because of the leisure activities, going to see a movie, jumping on a trampoline or playing a game of bowling. Striking the right balance in the total offering in the shopping centre is key in creating memorable experiences.

Leisure activities are one of the elements which are necessary in order to get the right balance and create a compelling customer experience in shopping centres. Leisure activities increase customer traffic, increase the length of stay of the customers and in so the possibilities for the lessees to sell more of their products or services. Most of the shopping centres have therefore added leisure activities that customers can enjoy with their friends and family. For many years now, shopping centres have come to include cinemas in their offering. Bowling alleys, children playgrounds and arcades are also amongst the 'traditional' leisure activities to be found in shopping centres. While these traditional leisure activities still make up the bulk part of the leisure offering, newer concepts have been steadily integrated. Escape rooms have found their way into many shopping centres, as well as trampoline parks.

In some shopping centres, lessees active in the leisure industry have taken it (quite a bit) further. How about indoor surfing or ice skating in a shopping centre? What to think about having a rollercoaster inside the shopping mall? Too noisy? Then integrating a rollercoaster restaurant in the shopping mall might just be equally fun. These kinds of activities bring in additional customers, make the customers inside to stay longer and have them share their emotions with friends and family. They contribute to creating a memorable experience inside the shopping centre.



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4. RESULTS & DISCUSSION

Many elements draw consumers to malls for recreational purposes.

- 43% is comprised of sensual buyers who are active and social people who are looking for novel experiences while valuing elegance. They spend generously on innovative goods and services.
- 26% is made up of practical consumers who primarily base their purchasing decisions on practical requirements, selecting products that fulfil their needs and offer value for money.
- 17% is made up of emotional buyers who seek adventure and are the first ones to try new products and dine at newly opened restaurants. At the same time, they are not as impulsive as sensual buyers.
- 12% of buyers are intellectuals who make their choices based on information collected and price review conducted beforehand. Even though they make rational choices, they are willing to pay for a high-quality product and service, if the price is not ridiculously high.

Thus, the more stores in one location, the greater the percentage of the population that will find some outlet worth their leisure time.

5. CONCLUSION

Recreational opportunities contribute to increasing attractiveness of the shopping centres. study confirms that although shopping (including recreational shopping) is a major attraction in shopping centres, cinema venues, food courts and cafes are important too. Hanging out, sightseeing and special events are of less importance, and leisure in shopping centres is not associated with sport and culture at all. Leisure time in shopping centre is perceived as a form of socializing.

ACKNOWLEDGEMENT

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Preferences of Gated Community Residents for Morning Walk Routes

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ABSTRACT: Gated communities have become popular among people living in cities. This is due to social, economic, symbolic and physical factors. Gated communities are exclusive enclosed developments designed for providing safety, security and private facilities unavailable to outsiders. This paper intends to find out whether the facilities, mainly the pedestrian paths and parks within and outside the gated community, are used for morning walks, which will in turn give an insight for landscape design and site planning for future developments. Four gated communities with varied surroundings, locality and typology within Pune will be taken up for analysis. Around 50 people will be surveyed using a questionnaire as a tool. The research will provide an overview of factors, walkability and usage of pedestrian facilities in a gated community.

Keywords: *Surroundings, Pedestrian Paths, Planning, Walkability.*

1. INTRODUCTION

An early morning walk is a blessing for the whole day.

—Henry David Thoreau

There are a plethora of well-established advantages to walking. Walking is marketed as a low-cost and efficient approach to reduce the growing burden of sedentary lives and health issues [4][5]. Walking motivation can originate from a person's decision to walk based on the experience of walking rather than it being the most effective approach to take [7]. Environments can be objective (real) or subjective (experienced), physical (weather or climate, built environment), or social (social supports, norms, beliefs, and attitudes)[8]. The environment can be a particularly significant behavioural predictor for behaviours that are directly impacted by environmental limitations and supports, such as walking [9][10].

2. LITERATURE REVIEW

2.1 Gated Communities

Gated communities are enclosed developments created to offer privacy, security, and safe spaces that are off-limits to outsiders. A gated community is a general term that refers to enclosed neighbourhoods with controlled access through gates or booms across public roads, security villages and complexes, including lifestyle communities that offer their enclosed residents a variety of non-residential amenities like schools, offices, and retail establishments [1]. The choice of a "gated lifestyle" is a reaction to crime and safety requirements[2].

2.2 Factors Influencing Walking Routes and Walking

The BME (Behavioural model of Environment) suggests that environmental and regulatory factors, together with intrapersonal and interpersonal factors, can contribute to the explanation of active transportation behaviour.

These variables are:

1) Interpersonal and intrapersonal 2) Environmental factors, and 3) Trip-related factors [11].

When the BME is applied to walking behaviour, three environmental elements stand out as crucial determinants that people use to select whether or not to walk:

1. Origins and Destinations;
2. Route Characteristics; and
3. Area Characteristics.

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Any walking journey has origins and destinations, which serve as its beginning and finish points. By specifying a trip's purpose, origins and destinations have an impact on people's decisions to walk, and they may be tracked as places where people walk to[12].

The characteristics of the route used for walking trips—the path between origins and destinations—are described in the second part of the behavioural model. Aspects of the physical environment that fall under this category include things like the separation between an origin and a destination and the width, connection, design, and personality of a road or trail. Perceptions of the neighbourhood's quality, such as safety, friendliness, and beautiful scenery, are inter- and intrapersonal characteristics of the area component[12].

3. METHODOLOGY

Primary data was collected by undertaking face to face surveys and observations of gated community campuses. A questionnaire was created and the interviewees were asked questions regarding their preferences for morning walk routes. In addition to their preferred location of walking, their motivation, desired ambience and reasons for choosing the walking route was reviewed. Environmental factors, personal factors and trip related factors were taken into consideration. All these were related to the age of the interviewees and site context of the societies. People of different age groups(18+ years) were interviewed. People were also asked about their age, area of work, frequency of morning walks and walking routes in their societies.

A total sample set of 52 was taken from 5 gated community societies located in Pune, India. Random sampling was done and only the people who go for morning walks were considered.

4. RESULTS AND DISCUSSION

Overview of societies taken into consideration:

- **Society 1:** This gated society was located near a hill with facilities for morning walk on it. The society had little facilities for walking inside the buildings.
- **Society 2:** This society was a gated society of bungalows with internal roads serving the purpose of pedestrian and vehicular movement. The society was located amidst the city with no large parks or hills nearby.
- **Society 3:** The society was located near a famous park. The driveways also served the purpose of pedestrian movement in addition to paths along the play areas.
- **Society 4:** This bungalow society was situated amidst the chaotic city but had a good pedestrian pathway around an open space located inside the society.
- **Society 5:** This apartment society had a dedicated pathway for walking around the play areas in addition to driveways below the buildings being used as a walking route. The society was surrounded by similar societies and had no other park in its vicinity.

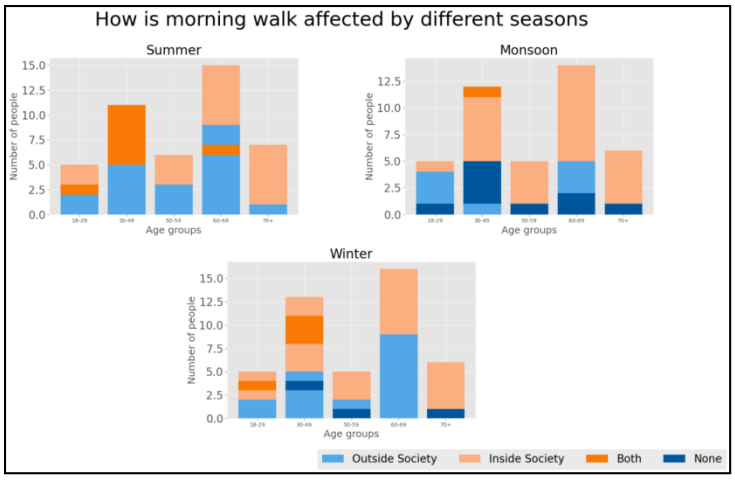


Figure 1

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4.1 Effect of Seasons on Morning Walk Routes

From Figure 1 it can be inferred that people generally do not prefer to go for morning walks in the society during summers but like to go outside the society for walking.

While in winters, people like to walk inside the society and not go outside. In monsoon, many people do not prefer to go for a walk. The people who do go for morning walk in monsoon prefer to walk inside the society to avoid the rains and puddles

4.2 Reasons for Choosing to Go Outside the Society for Morning Walks

From figure 2 one can deduce that the youngest age group surveyed, namely the 18–29 group, prefers to explore new routes, while a few also wish to not meet people unnecessarily.

The 30–49 age group also loves exploring new routes. At the same time, the data garnered also displays a certain existent, albeit tiny, group which prefers pleasant, verdant, and scenic places and dislikes, among other reasons.

The ages 50–59 do not like the facilities inside the society complex and prefer scenic and pleasant places.

The age group 60–69, likes to explore new routes and likes enjoyable surroundings while nourishing a dislike for the facilities available inside the society complex.
The age group 70+ has various reasons which aren't a part of the sample space.

4.3 Choice of Places for Morning Walks

From figure 3 one can see that the ages 18–29 mostly choose roads for morning walks, while a few also choose hills, forests, places of worship, parks, and gardens.

- Ages 30–49 are observed to choose hills and forests over others while avoiding places of worship altogether. Some choose roads as well, but the survey sample space does not have enough people selecting parks, gardens, or the banks of rivers, lakes, or other water bodies for their walk.
- Ages 50–59 have a significantly suppressed response, with people choosing only the roads, hills, forests, parks, and gardens for their morning walks.
- Ages 60–69 love roads, parks, and gardens, while a few favour places of worship, hills, and forests too. This age group avoids areas near lakes and water.
- Ages 70–79 prefer only roads or outdoor parks and gardens.

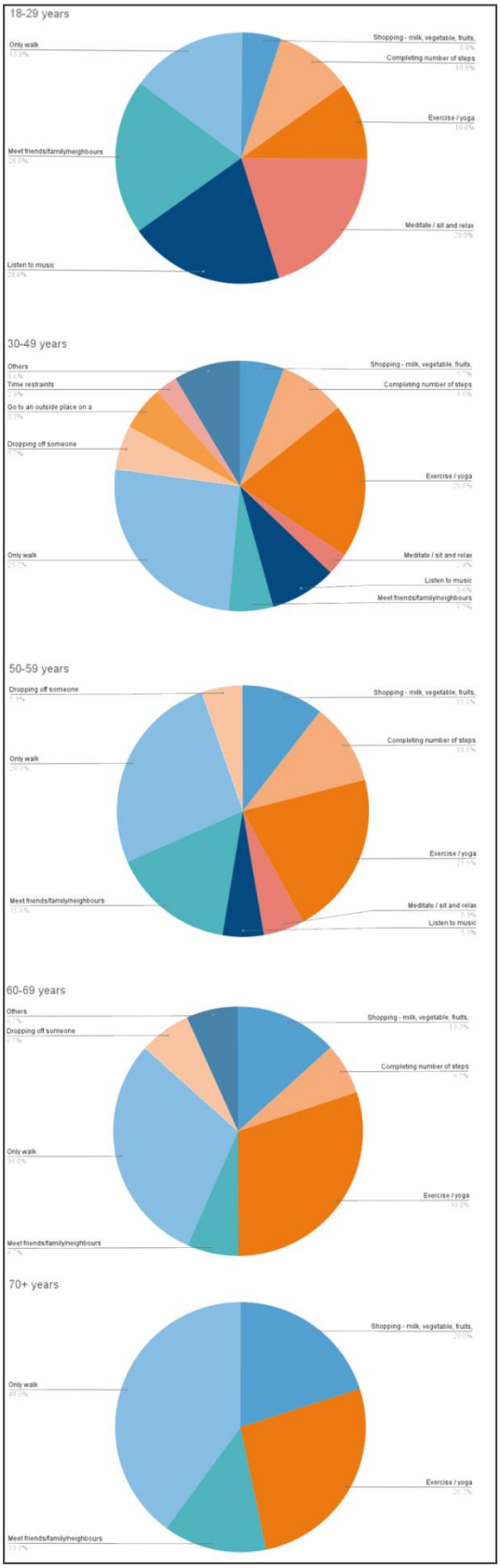


Figure 2

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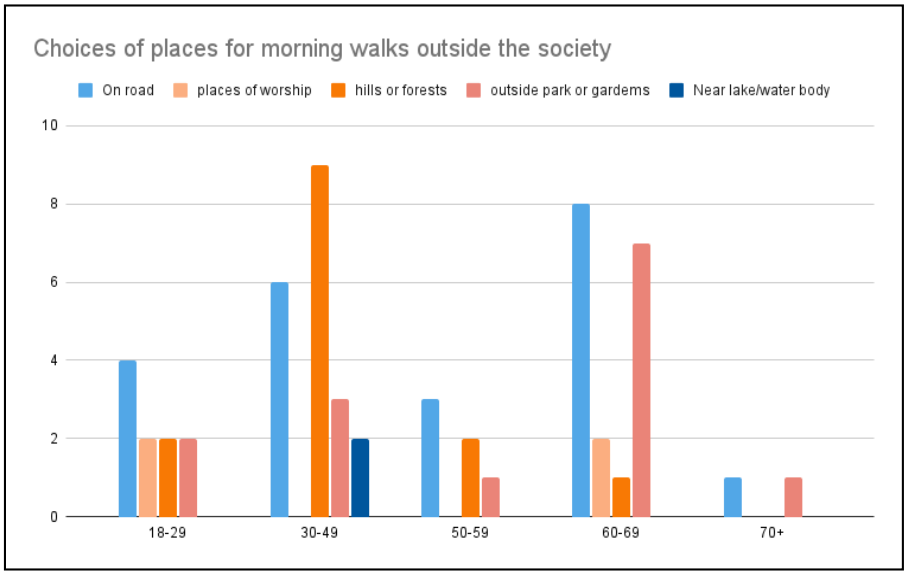


Figure 3

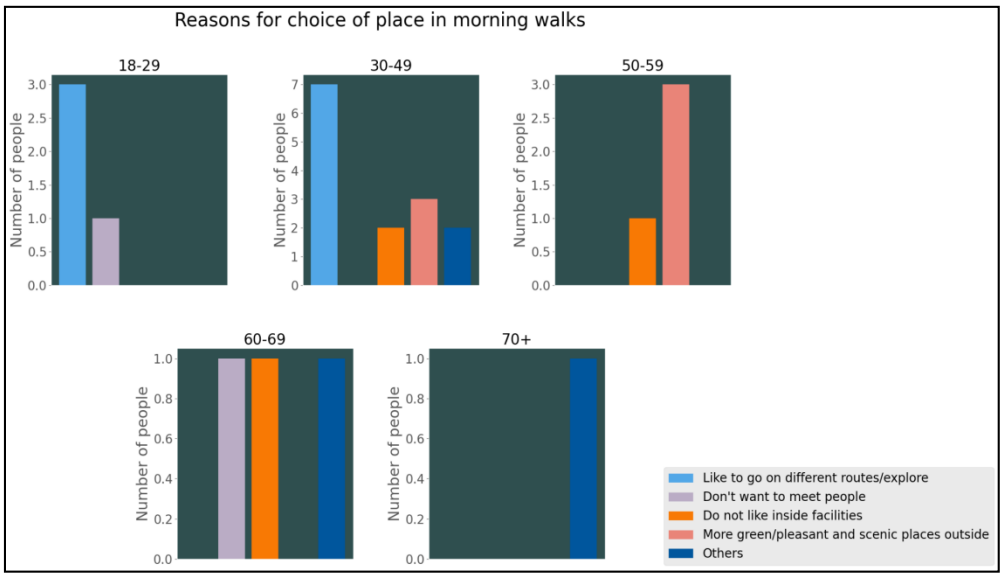


Figure 4

It can be seen from the figure 4 that the age group of 18–29 mostly go outside the society for walks to avoid meeting people but their motivation for going outside is to relax and meet people. People that go for morning walks outside their societies from the age group of 30–49 years like to explore and go to various places. Hence most of them go for walks on hills or on streets with the purpose of walking as a form of exercise and relaxation. The age group of 50–59 go outside for walks with the motive of walking in pleasant surroundings but majority go for walks on roads.

The age group of 60–69 years go for a walk as a form of exercise on roads and outside parks or gardens.This age group goes outside as well as inside the society for walks. The 70+ age group mostly go for a walk inside the society as it is safer and walk for remaining fit at their age.

It was observed while taking interviews that younger groups do not like to go for morning walks within the societies while the elder generation ie. 60+ walk within the society as they feel safer to walk and within the society as health problems may arise unexpectedly. It was also observed that in most societies younger generations did not like the facilities while the elder ones were content with what they had within the society. Driveways, staircase, ramps were also used by a few as morning walk routes within the societies.

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5. CONCLUSIONS

Morning walks or evening walks are a part of routine in many people's lives. It is a form of exercise that helps one engage ones muscles and relax. The paths must be accessible to as many people as possible. It can be seen that the facilities within the societies are mostly used by older age groups and hence path accessibility, materials, level differences and surroundings must be designed according to the needs of older people. Driveways and ramps can be thought of from the perspective of a person walking and attempts can be made to make them more pedestrian friendly. As most people avoid going outside the societies for walks during monsoon, some covered areas that might be used for multiple purposes, ideally, can be provided within the society.

The research was limited to preferences of people living in a gated community, but as many people go outside on roads for walks further research can be done to make roads pedestrian friendly for all age groups.

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Comparison Study of Defensive Architecture of Maratha and Rajput Forts: A Case Study (Shivneri and Chittaurgarh) Research Report

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ABSTRACT: Fortification and defensible structures are more than simply old architecture; they define a place's personality and reveal its actual potential and historical significance. They are legends that are rooted in historical reality. When it comes to identifying, documenting, recording, evaluating, and safeguarding cultural and historical treasures, Defensible Architecture is a critical component.

India is a treasure trove of priceless historical records, yet these sites suffer greatly from modern neglect. The full potential of defendable architecture can best be illustrated by several examples. Two such examples of lost history are "Shivneri Fort" in Maharashtra and "Chittaurgarh Fort" in Rajasthan.

The research paper aims to review the past and elements of military architecture and provide a comparison based on the factors affecting the tangible heritage. Both the considered forts, house many heritage buildings inside the moat walls, creating a small neighborhood in itself.

The main objective of the study is to critically examine the Defensible spaces, and compare them. The paper also analyses the existing condition of the elements and compares it with its former glorious state. Many different research papers, reports, and articles have been analyzed thoroughly to comprehend the topic and to derive conclusions. At present, the forts have very little architectural style left and have started looking like ruins of the past. Hence, as potential architects, we have to care for these magnificent structures and nurture them.

Keywords: *Defensible Architecture, Military Architecture, Chittaurgarh, Maharashtra, Forts, Heritage Structures.*

1. INTRODUCTION TO SHIVNERI FORT

The Shivneri fort's construction is mostly unknown. On this matter, historians and archaeologists disagree. Shivneri was first used in the Satavahana era, and from the Yadava era onward, it possessed the status of a fort. On the Shivneri hill, a Buddhist cave complex was built during the Satavahana era (Jadhav, 1980). As a result, Shivneri Fort witnessed the reign of the Satavahana, Yadava, Bahamani, Nizamshahi Adilshahi, Marathas, and ultimately the British. It demonstrates how crucial the Shivneri fort was to Maharashtra's growth. Since it is believed that Chhatrapati Shivaji Maharaj was born there, the fort is still well-known for Chhatrapati Shivaji Maharaj's rule.



Figure 1: Shivneri Fort

(*Source:* www.thetoptours.com)

ISBN: 978-93-89934-68-7

1.1 History of Junnar

The meaning of Junnar is "Jirna Nagar," one of the earliest towns in prehistoric India. Here, the Shaka dynasty held power. A Satvaahan monarch named Gautamiputra Satkarni overthrew the Shakas to establish his empire. The Satvaahan period is the most wonderful since so many creative endeavors were accomplished when it was under their dominion. They established Junnar as their capital.

The height of our civilization was during this time. Here, the mountains surrounding Junnar have been hollowed away to reveal more than 100 caverns. The mountain on which the stronghold was built is best suited for creating caverns since it is well protected by steep scarps. There are eight inscriptions and 64 carved caves in this area.

Shivneri was its given name. Following the Satvaahans, the Yadavas and then the Bahmani Kings controlled the fort. The trade between northern and southern India was hampered by the Bahmanis. Malik Ahmed, the son of the first Nizam Malik Hasan, ascended to power following the passing of Malik-ul-Tujar and founded Nizamshahi.

500 cavalrymen from Jadhavrao, Jijamata's father, rode with Jijamata to Shivneri. When Shahaji Maharaj was in trouble around 1630, Chhatrapati Shivaji Maharaj was born.

This fort was surrendered by Chhatrapati Shivaji Maharaj in 1632, and the Mughals took control of it in 1637. Local fishermen disputed them in 1650. The people were brutally murdered on the fort after losing to the rulers. The Marathas stormed Junnar in 1678, but their effort to seize Shivneri failed. Forty years later, Shahu Maharaj took possession of the fort. Later, Peshwas were in charge of it.

1.2 Hierarchy (Reign) of Rulers in Order

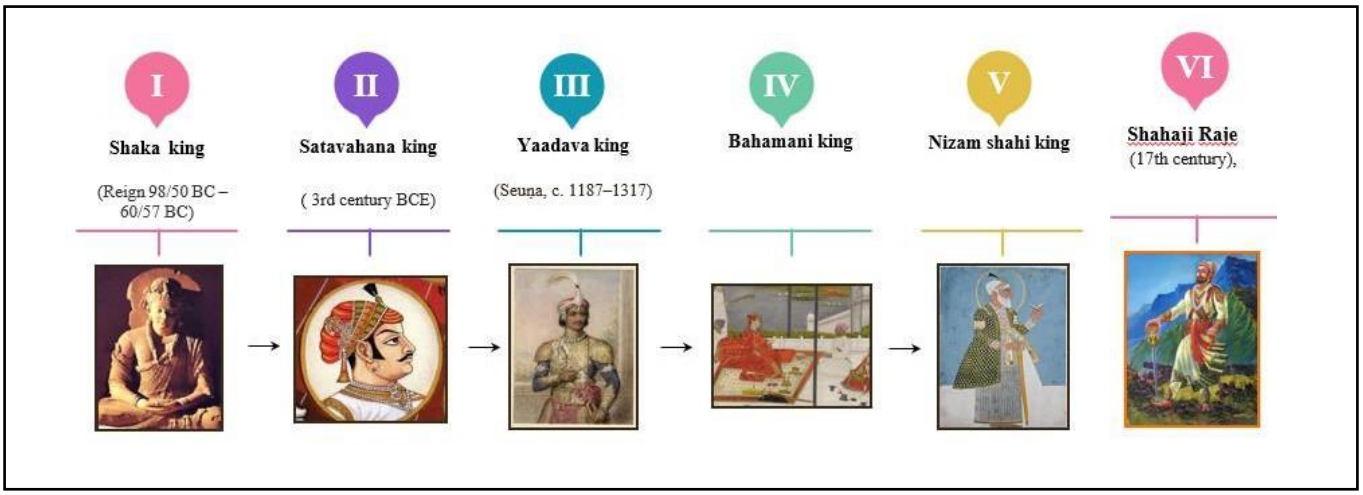


Figure 2: Timeline of Rulers in Order

1.3 Defensive characteristics of Shivneri Fort

(a) "Ghera," or the outermost frontier, included not only the main fort but also the several nearby settlements.

(b) Chowkis, or outposts, were situated close to forts to alert locals to imminent danger, monitor commuting traffic, etc. In addition to this, there were "Mets," or smaller outposts, located halfway between the outposts and the fort. These were staffed by locals and tribal members such the Kolis, Ramoshis, and Maangs who were familiar with the area and could even keep watch at night.

(c) "Kada," or the fort's vertical section, is the trickiest place to scale. The hill fort at Sinhagad was ascended by Tanaji Malusare, a commandant of Chhatrapati Shivaji Maharaj's soldiers, from the "Dongiri kada" because the other gates were fiercely guarded.

(d) The fort's towering stone walls, or "Tat Bandi." The fort's walls, which are reinforced by the 'charyaa' (merlons) and 'jangyaa' (embrasures) spaced inside them, form the rampart with a running parapet. The guards had shelter from the

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semi-circular merlons (a crenel between two merlons), yet they could see the adversary below thanks to the embrasures that pierced the merlons.

Even hurling stones at assailants from within the apertures or pouring boiling oil over them were utilized as machicolations. The name "medhekots" was used to describe forts with wooden walls, such as those seen in Europe or the United States. Any vegetation that may be used by enemy soldiers to scale the fort's walls was cleared away or burned out. Thick foliage was fostered away from the walls so that a force of soldiers might be concealed there to launch the initial assault on any incoming enemy troops.

(e) The wicket gate, also known as the "Dindi Darwaza," was constructed inside the main gate and was just big enough for one man to fit through. Without opening the main gate, it may be opened and closed to permit through sporadic human traffic.

(f) The bastions that flanked the main entry gates were part of the "Gomukhi Dwar Rachana," or "cow mouth gate structure. The bastions got their name because they were constructed in the shape of a cow's mouth and frequently had more than one. The path was detoured to avoid a frontal assault. The concept was that if the enemy assaulted the main gate, it could be defended from both the front and the back thanks to the adjacent bastion's ability to see the main entrance. At the Raigad fort, there is a beautiful specimen of the Gomukhi dwar rachana.

(g) In case the fort was overrun by the enemy, the nobility and their families had access to "Bhuyaar," or hidden tunnels.

(h) "Tofkhana" was the location where gunpowder was kept. The area was watertight to prevent rain from wetting the gunpowder and making it useless.

(i) The horse stables in the fort were known as "Ghodyaachya paagaa/ashwa shaalaa" (elephant stables were known as "Hattishaala").

(j) "Paanyaachya Taaka" or water cisterns along the Ganga Jamuna at Shivneri Fort were examples of water reservoirs that supplied water to the fort's inhabitants.

1.4 Regional Context

(a) Site context

Only Junnar town is a stop on either of the main routes going to the fort.

(i) Sakhali Road: After approaching Junnar town on this route, one must pass the Shivaji Maharaj monument that has been placed in front of the new bus stop. This square's left-hand path goes to a temple that is about a kilometer distant. In front of this temple, a well-traveled path leads to the Shivneri fort cliff. With the aid of an iron chain and stairs cut out of the vertically steep rock, one must ascend the fort. This rather challenging trek takes about 75 minutes.



Figure 11: Site Context Showcasing the Defensible Upper Hand of Shivneri Fort

(*Source:* Google Earth)

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(ii) Route through Seven Doors: A tar path takes one to the steps at the base of the fort if one keeps going left. One encounters seven doors along this trip. As one goes up, these are successively referred to as Mahadar Door, Pir Door, Parvangi (Permission) Door, Hatti (Elephant) Door, Shipai (Soldier), Phatak (Gate), and Kulabkar Door. The trip to the fort takes around an hour and a half.

(b) Placement of Shivneri Fort has worked very well with a defensible aspect in mind, as they were on higher ground, the Enemy could be easily attacked and kept track of while on Ground level.
Signaling to other forts or allies was easier without coming to the notice, and harder to encapture as there are no roads, except *Bhuyars*, which were known only to officials and courtiers.
The fort is surrounded by steep upwards slopes from all four sides and is unassailable.

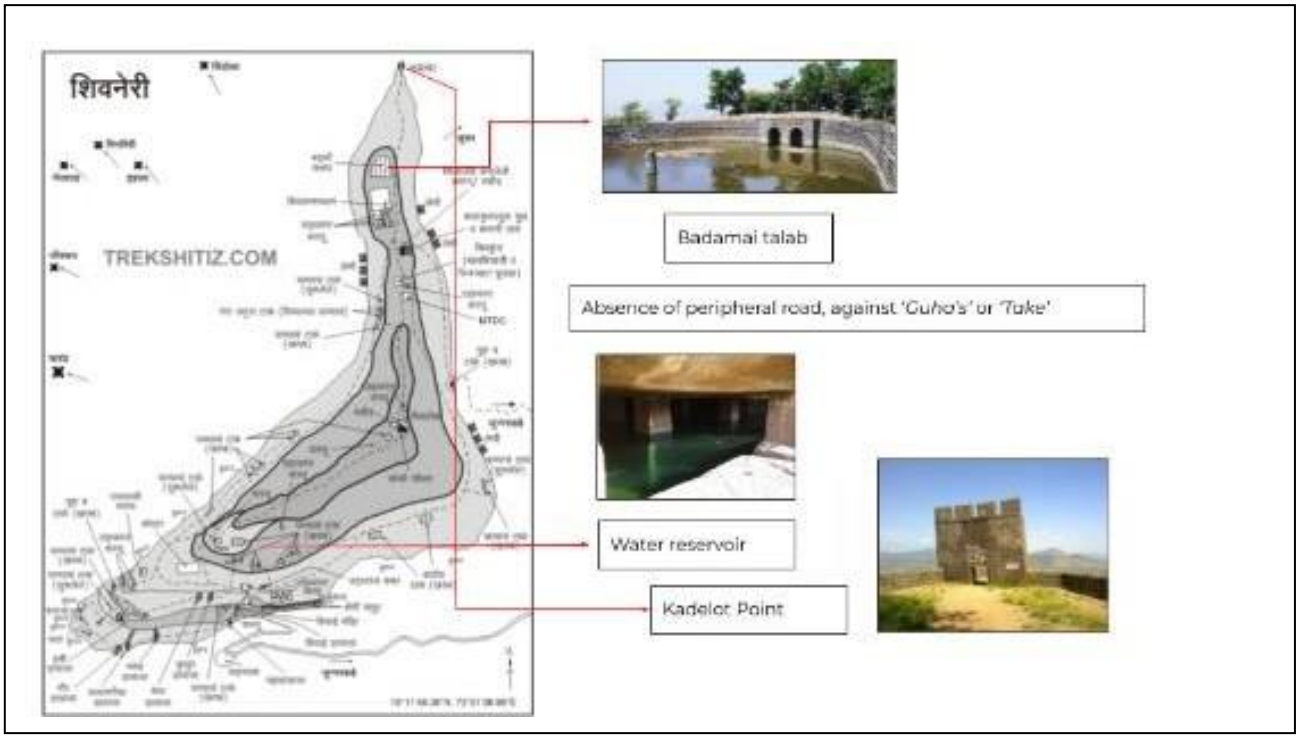


Figure 15: Analysis of Plan for Understanding the Defensive Elements of the Fort

2. INTRODUCTION TO CHITTAURGARH FORT

The largest fort in India and the most impressive in Rajasthan is Chittorgarh Fort (Hindi/Rajasthani: Chittorgarh Durg). The fort, commonly referred to as Chittor, was the Mewar state's capital and is currently located several kilometers south of Bhilwara. From the 7th century, when it was first governed by the Guhilot and then the Sisodia clans of Chattari Rajputs until it was eventually abandoned in 1568 following the siege by Emperor Akbar in 1567. It sprawls momentously across a hill 180 meters (590.6 feet) high, covering an area of 280 hectares (691.9 acres), above the plains of the valley that is drained by the Berach River.

The historically rich fort precinct is dotted with several old palaces, gates, temples, and two imposing memorial towers. For ages, visitors and authors have been captured by the grandeur of these remains.

Between the 15th and 16th centuries, the fort was taken three times: in 1303 by Allauddin Khilji, who beat Rana Ratan Singh; in 1535 by Bahadur Shah, the Gujarati Sultan; and in 1567 by Emperor Akbar, who defeated Maharana Udai Singh II, who fled the fort and created Udaipur.

Every time they charged the enemy from beyond the fort walls, the troops battled valiantly but always fell short. Following these defeats, more than 13,000 women and children of Rajput warriors who lost their lives in battles at Chittorgarh Fort committed Jauhar three times, first under the leadership of Rani Padmini, the wife of Rana Rattan Singh, who was killed in the battle in 1303 and then under Rani Karnavati in 1537 AD.

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Figure 16: View of Chittaurgarh Fort

(*Source:* timesofindia.indiatimes.com)

The fort, therefore, stands as the ultimate testimony to the nationalism, bravery, medieval chivalry, and sacrifice shown by the Mewar kings of Sisodia and their kin between the 7th and 16th centuries.

In the face of submission to the foreign invading forces, the rulers, their warriors, the women folk of royalty, and the commoners thought that death was preferable to dishonor.

2.1 History of Chittaurgarh

In terms of size, Chittorgarh Fort is regarded as being the biggest in India. According to inscriptions on ancient coins, the fort was built by the Mauryans in the seventh century AD and is named for the Mauryan king Chitrangada Mori. For 834 years, according to historical sources, Chittorgarh Fort served as Mewar's capital. Bappa Rawal, the first in the line of Sisodia dynasty kings of Mewar, founded it in 734 AD. Additionally, it is rumored that the fort was given to Bappa Rawal in the eighth century as a part of the dowry for a Solanki princess.

The fort was stolen and demolished by Emperor Akbar in 1568 AD, and it was never rebuilt after that; it was finally renovated in 1905 AD. Ala-ud-din Khilji besieged the fort in 1303, Gujarat Sultan Bahadur Shah besieged the fort in 1535, and Mughal Emperor Akbar stormed the fort in 1568, all of which resulted in significant conflicts for possession of the fort. Not that the fort experienced just setbacks. Except for the times when it was under siege, the Rajput Sisodias of the Guhilot (or Gehlot/Guhila) clan, who were descended from Bappa Rawal, had always owned the fort.

Before the fort was eventually abandoned in 1568, there are also success tales of its building and repair following each assault.

The Mahabharat epic refers to Chittor. According to legend, Bhima, the second Pandava brother of the epic Mahabharata, struck the ground with such force that water sprang to form a sizable reservoir. Bhima was famed for his great strength. It is referred to as Bhimlat Kund, a man-made tank bearing Bhima's name. Bhima reportedly began constructing the fort, according to folklore.

2.2 Defensive Characteristics and Precincts of Chittaurgarh Fort

The fort, which resembles a fish in general, is around 13 km (8.1 mi) in circumference, has a maximum width of 3 km (1.9 mi), and is about 700 acres in size. After crossing a bridge built of limestone, the fort is reached after a more than 1 km (0.6

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mi) zigzag and challenging rise from the lowlands. Ten arches support the bridge as it crosses the Gambhir River (one has a curved shape while the balance has pointed arches). The expansive fort's grounds are home to several palaces and temples, many of which are in ruins, aside from the two great towers that stand guard over the impressive defenses.

The fortified stronghold of Chittorgarh, a large fort situated on a remote rocky plateau of roughly 2 km in length and 155 m in breadth, is included in the 305-hectare component site, which also includes a 427-hectare buffer zone.

It is encircled by a 4.5-kilometer perimeter wall, beyond which a 45° steep slope renders it virtually impenetrable to invaders. Seven entrances constructed by the Sisodia family's Rana Kumbha (who reigned over Mewar from 1433 to 1468) are used in the ascent to the fort. These gates are known as the Paidal Pol, Bhairon Pol, Hanuman Pol, Ganesh Pol, Jorla Pol, Laxman Pol, and Ram Pol, the last and major gate, in order from the bottom of the hill to the top.

The fort complex consists of 65 historically significant buildings, including 4 royal complexes, 19 primary temples, 4 monuments, and 20 useful water features. There are two main building phases for them. In the fifth century, the first hill fort with a single main entrance was built, and it was progressively strengthened until the 12th. Most of its remnants are still discernible around the plateau's western margins. The Sisodia Rajputs erected the second, more important defense system during their rule in the 15th century. The medieval defensive wall was built on top of an existing wall structure from the 13th century, and the royal entrance was moved and reinforced with seven gates.

(a) *Gates*

The fort includes a total of seven gates, or "pols" in local parlance, including the Ram Pol (also known as Lord Rama's Gate), Padan Pol, Bhairon Pol, Hanuman Pol, Ganesh Pol, Jodla Pol, and Laxman Pol. The fort's entrances have all been constructed as imposing stone constructions with sturdy defenses for military defense. Elephants and cannon fire can be deflected by the strengthened doors of the gates with pointed arches. Archers can fire at the enemy army through the notch parapets on the top of the gates. There are several structures (ruined palaces and 130 temples) within the fort, and a circular path inside the fort connects all the gates.

Prince Bagh Singh perished at the Padan Pol in 1535 AD during the second siege. During the last assault on the fort in 1567, Akbar murdered Prince Jaimal of Badnore and his clansman, Kalla, somewhere between the Bhairon Pol and Hanuman Pol (Kalla carried the wounded Jaimal out to fight).To honor the locations of their sacrifice, chhatris have been constructed, their corbeled arches supporting the roof. On Emperor Akbar's instructions, monuments of them have also been built to honor their brave deaths. Cenotaphs of Jaimal (represented by a statue of a Rajput warrior on a horse) and Patta have also been built, one at each entrance.

A Chaatri was erected at Ram Pol, the fort's main entrance gate, in honor of the 15-year-old Patta of Kelwa, who had lost his father in battle and seen the heroically fighting mother and wife who perished at this gate.

He served as the leader of the Rajput soldiers, whom all lost their lives defending the honor of Mewar. The eastern wall of the fort is accessible by Suraj Pol (Sun Gate). A Ganesha temple and the zenana are located behind the Darikhana or Sabha (council chamber) on the right of Suraj Pol (living quarters for women). To the left of Suraj Pol lies a sizable water reservoir. There is also an odd gate known as the Jorla Pol (Welded Gate), which is made up of two gates that have been joined together. The base of Lakshman Pol is joined to the top arch of Jorla Pol. This feature reportedly hasn't been seen anyplace else in India.

The fort's northernmost entrance is the Lokota Bari, and its southernmost is marked by a tiny aperture that was once used to cast convicts into the depths.

(b) *Vijay Stamb*

Rana Kumbha built the Vijay Stambha (Tower of Victory) or Jaya Stambha between 1458 and 1468 to mark his victory against Mahmud Shah I Khalji, the Sultan of Malwa, in 1440. It is known as the emblem of Chittor and is a particularly brash display of triumph. It was constructed over the course of ten years, rising 37.2 meters (122 feet) over a base of 47 square feet (4.4 m^2) in nine stories. The staircase, which has 157 steps and is narrow and circular on the inside, leads to the eighth floor, where there is a good view of the plains and the new town of Chittor.

A subsequent addition, the dome, was struck by lightning and reconstructed in the 19th century. The Stamba is now lit up at night and offers a stunning vantage point for viewing Chittor.

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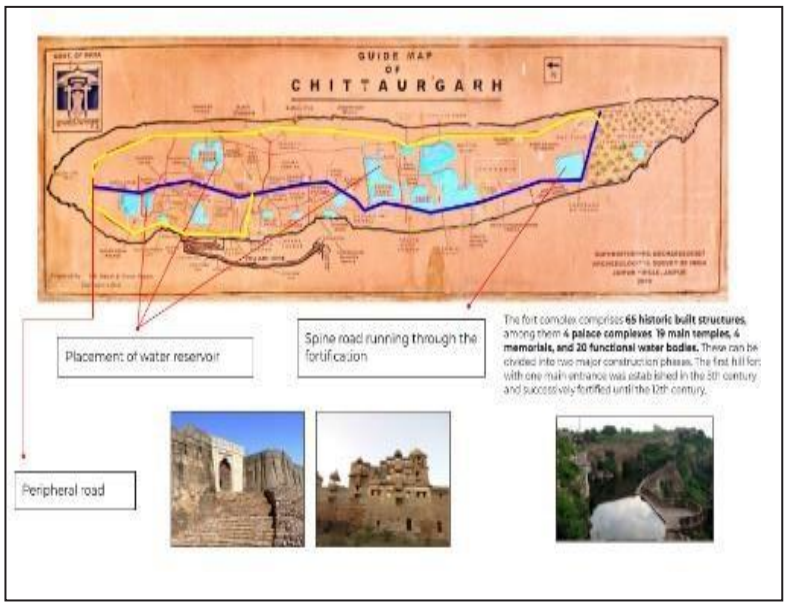
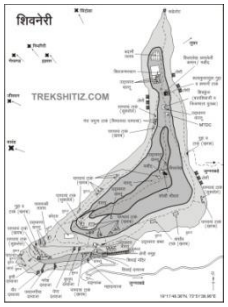


Figure 27: Analysis of Plan for Understanding the Defensive Elements of the Fort

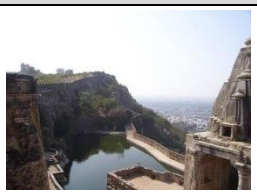
Comparison Study of Defensive Architecture of Maratha and Rajput Forts—A Casestudy (Shiveneri and Chittaurgarh Fort)

Comparitive Analysis					
Serial No.	***Comparison Heads***	***Shivneri Fort, Junnar, Maharashtra***	***Reference Image for Comparitive Parameter (Shivneri Fort)***	***Reference Image for Comparitive Parameter (Chittaurgarh Fort)***	***Chittaurgarh Fort, Chittaurgarh, Rajasthan***
1.	Geographical location	Due to its peculiar topography, Maharashtra has always revelled in different forms of fort constructions. Its structures and architectural designs have differed depending upon their region and location, and due to this, forts in Maharashtra forts were mostly built on a terrain region for stronger defense prospects.			Rajputs adhered to architectural texts that categorized different typologies of fortifications based on their geography. The earliest literary references differentiated four types of forts; Hilltop Forts, Water Forts, Forest Forts, and Desert Forts.

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Comparitive Analysis					
Serial No.	***Comparison Heads***	***Shivneri Fort, Junnar, Maharashtra***	***Reference Image for Comparitive Parameter (Shivneri Fort)***	***Reference Image for Comparitive Parameter (Chittaurgarh Fort)***	***Chittaurgarh Fort, Chittaurgarh, Rajasthan***
2.	Approach/Entry	The fort is placed on high terrain and can be approached through 'Dwars' (Fort gates), after climbing the terrain.			The fort is fish-shaped and covers 5 km in length and 13 km in circumference. The fort can be approached by a bridge, which spans for one kilometer. Just like Shivneri fort Chittaurgarh fort has 7 dwars, called 'Pols'
3.	Material palette	The structures were built using local stone blocks, laterite or basalt, laid in a lime mortar. Laterite is still abundantly available in the whole region and is easy to mine, cut into blocks and chisel.			Rajasthan is one of the most colourful and vibrant states in India. It is also home to some of the most impressive palaces and forts in the country.
4.	Road Layout				
	(a) Peripheral road	There is an absense of peripheral road in Shivneri fort, against the presence of 'Guha' and 'Taake'.			A peripheral road passes throughout the Chittaurgarh fort, that helps in circulation of Military and Royalty.
	(b) Spinal road				Spinal road ran through the fort for easy access and circulation of Courtiers, Citizens.

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Comparitive Analysis					
Serial No.	***Comparison Heads***	***Shivneri Fort, Junnar, Maharashtra***	***Reference Image for Comparitive Parameter (Shivneri Fort)***	***Reference Image for Comparitive Parameter (Chittaurgarh Fort)***	***Chittaurgarh Fort, Chittaurgarh, Rajasthan***
5.	Water resources	Dedicated spaces were alloted for storage of water, and were kept in good and secure conditions as water and food placement played important role from defense perspective.			Taalab system was achieved as rajasthan faced scarcity of water and storage of water was keen priority.
6.	Tangible defense strategy	Placement of various defense strategy building like – 'Kadelot Point', 'Ghera',Bhuyaar, 'Balekilla'; were planned as the central focus of construction.			Most forts of Rajputs also acted as Royal palaces, and therefore the defense strategies were added to facilitate military, and security.
	(a) Resources and Naval planning	Placement of forts were very important as deccan range had abundant of resources and trade routes and harbour to the country and hence strong defense was of peak importance and therefore the attitude of marathas was to fight, for any present or prospective intrusion.			Rajput forts and region had limited resources to defend, they were also a part of princely states, those which accepted the suzerainty of the British crown to escape being brought under direct British rule, in lieu of supporting the Raj.

3. CONCLUSION

Every fort in India has a rich tapestry of different architectural styles and personalities. Each fort has a fascinating tale it wants to tell, every piece has seen a period that it attempts to describe, and every visitor to this place has an experience they will never want to forget.

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Each area, each defensive or precinct aspect is comparable but yet is so distinct from the preceding one. This is how our fortification constructions work their magic. You become so engrossed in them that they take you back in time to a moment you wish still existed today.

We are not doing these institutions a favor by learning about and studying them; rather, we are doing humanity and future generations a favor.

In a nutshell, fortifications or defendable monuments serve as symbols of a country's previous history and culture.

They make up a precinct's architectural legacy as a whole. However, due to processes of forgetting brought on by the quickly evolving times, these great structures find themselves unable to serve the purpose for which they were constructed.

As a result, heritage and fortification structures require a crucial tool to defend them, which opens a whole new way for us to interact with our ancient ancestors and aids in our understanding of the culture and defense inventions made at that time.

The most crucial element in maintaining and understanding any system is people. Their thoughtful action may keep the building joyful for decades to come, or their carelessness could leave it in ruins for all time.

People must thus take ownership of their cultural history and recover their cultural identities and roots.

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The Children's of Banjara's (N.T)

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ABSTRACT: Individual and collective cultural identity are essential for humans to feel a sense of belonging. The influence of culture on one's identity and even way of life has always been profound. One can appreciate their common heritage and sense of community among people who share similar interests, backgrounds, and upbringing by being a member of a culture. Symbols, images, paintings, and sculptures from the past all contribute to reinforcing our dedication to our culture. Members of the same religious community can recognise and comprehend the culture by using analogous pictures. The purpose of the research is to provide an educational solution that can promote empowerment and growth by studying the banjara community's culture, way of life, and educational difficulties. Another objective is to establish contact with the banjaras' ideas centre so that one can learn about their way of life. With the advancement of technology, the cultural background has been neglected. The physical presence of a structure associated with a specific culture and history attests to its existence. Through exhibitions, public events, written materials, and research sources, cultural serve as both a representation of cultural history and a resource for people who wish to learn more about a particular region's culture. This study report would honour to teach the Banjara youngsters in rural locations by participating in customary holidays and events as well as by giving research prospects. As a representation of the Banjara culture, I thought about coming up with an idea where people or children of banjaras with similar interests could come together, share their passions, get to know one another, and have fun while learning and experiencing new things related to their interests and culture. The investigation into this issue is an effort to compile a toolbox to educate and address the needs of this unique and diverse group of people and to give them identity in the form of a holistic space showcasing culture in all aspects because they are primarily migrants across the various Indian states.

Keywords: *Banjara Children, Cultural Aspects, Customs, Educational Issues.*

1. INTRODUCTION

Geographically, Banjaras are dispersed from north to south of the nation. The Banjara population makes up roughly 13% of the entire population of the nation. They have a developed culture and have lived in relative isolation on the periphery of society. The Banjara community typically resides in the forested and inaccessible highland regions. The economy is generally unstructured, non-specialized, and self-sufficient. Their social structure is straightforward and operates more democratically.

The Banjara are one of the larger ethnic groups in any community with a distinctive culture and shared traits like physical traits, a language they all speak, customs they all share, cultural homogeneity, unifying social organisation, and habitats in the same region. Despite the invasion of outsiders on their territory, their towns are organised on lineage, clan, and cultural and economic resources. An ethnic group's families or communities are connected by socioeconomic ties, religious beliefs, and customary rules. For their indigenous economic and cultural identity, their land and territories—including the forests, hills, valleys, lakes, river beds, and islands—are of utmost importance.

2.1 Background Study

2.1.1 *Banjara*

These ethnic groups do not have a set place of residence because they were engaged in trading and were referred to as bajigar, or old traders. They come from different states, which has a different influence on their languages, attire, and cuisine. They mostly live off the income from farming and trading.

The Banjara people are classed differently. In Maharashtra, they are classed as Vimukta Jaati and Nomadic Tribes, but in Rajasthan, Karnataka, and Andhra Pradesh, they are classified as scheduled castes and ST.

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Historically, they were pastoralists, traders, expert breeders, and transporters of goods in India, where they used boats, carts, donkeys, bulls, and sometimes scarce horses for trade, economy, and some of them settled to be farmers. This community arose from the Harapan civilization, and the sculpture found in the Indus Valley is similar to the god/goddess they worship. The purpose of this dissertation is to bring the culture forward, to create a space where people can experience their habitat, cultural activities, and to display their jewellery, instruments, and costumes.

These community face problems like illiteracy, health problems, poverty, un employment, limited landholding, indebtedness, exploitation, migration, displacement. They primarily reside in rural locations, which lack infrastructure, because their hamlets are not located in urban areas. They migrate primarily in urban, rural, and peri urban settings. Therefore, those in urban regions with affluent backgrounds only have access to opportunities for good education and better lifestyles, while those in hamlets lack the resources to provide for the financial support, education, and better lifestyles of their children.

1.1.2 *Population and State Wise Categories*

Several nomadic tribes, as well as a great diversity of other tribal groups, may be found in India. According to a projection, by 2020 there would be 12,10,00,000 banjara people residing throughout all of India.

The Banjaras are a nomadic people who come from many states. They are also known as Gor, Lambani, Vanjara, and Gormati in various languages. They are a nomadic trading tribe that originates from Rajasthan's Mewar area. Southwest, western, and southern India are all included in the modern Indian subcontinent.

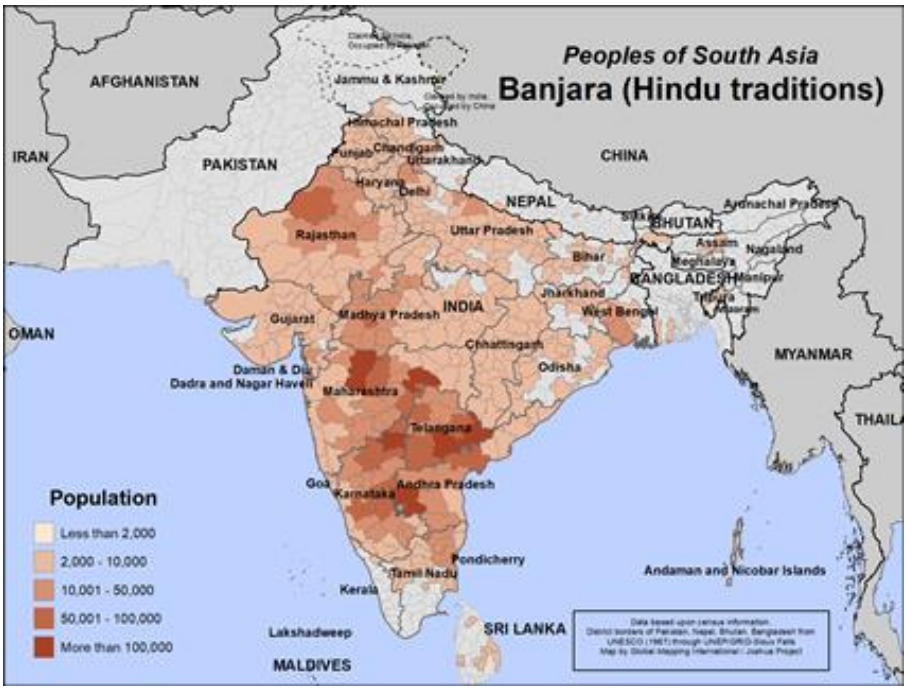


Figure 1: State Wise Population (censes)

1.2 Aim

To examine the banjara children's lives, standards of living, and methods of survival in order to understand how they are achieving their objectives.

1.3 Objective

1. To investigate the educational and medical status of children in Banjara
2. To emphasise the importance of banjara culture in the context of today.
3. To make recommendations for suitable cultural renovation/restoration initiatives.

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1.4 Research Questions

1. How this study will interpret its goal?
2. Are Banjara kids even attempting to protect their culture for the future?
3. Do all pupils receive financial aid for their education?
4. Are these Banjara youngsters receiving the necessary medical attention and living conditions to survive?
5. How one might organise a campaign to raise awareness of this neighbourhood?

1.5 Scope

1. Study about the culture
2. Study about how their migration reflected in terms of education and their standards of living
3. What the different scheme government provides them to survive
4. Are the schemes beneficiaries?

1.6 Limitation

Not many people fond of banjara's so that it reduces the users for reading and also it is difficult to examine the architectural style due to migration and poverty they survive to stay in any kind of residences belonging to locality.

1.7 Methodology

The primary and secondary data sources provide the foundation of the essay. Eldears and the Naiks of the Tanda were interviewed in order to get primary data. Secondary sources were used, including census data, reports, books of references, research journals, and numerous old field investigations. Much of the information was gathered using random sample approaches from respondents who were banjara tribal victims.

2. LITERATURE REVIEW

2.1 Education for Nomads in India – Status and Need to Design Separate Curriculum

2.1.1 *Educational Status of Nomads*

Nomads go from one location to another in search of a living. Because of movement, the nomad community cannot receive an education through the traditional school or system. They are seen as a community on the social and educational margins. Nomadic Education (NE), sometimes known as education for the nomads, is more difficult to accomplish and more expensive. Even Nevertheless, the Indian government adhered to the RTE Act and emphasised on NE for educational justice. Several programmes have been put in place by the Indian government to give nomads access to education.

2.1.2 *Steps Taken by Indian Government on Nomadic Education*

Every human being has the right to receive a free, required, and high-quality education, according to this statement (RTE, 2009). Without regard to race, colour, social class, or location of residence, every human being in the world has an equal right to an education. Tribes classified as NTs have equal access to educational opportunities. But, the nomadic child's parents are not particularly interested in educating their offspring. Because to their constant movement and the fact that their parents force them to work for a living, children from nomadic communities often do not receive an education even though it is an option for them. (Padmanaban)

2.2 Standing Committee Report Summary—Educational Schemes for Tribals

2.2.1 *Status of Hostels*

The Committee observed that there are 1,470 functional hostels in the country for ST students. Such hostels seek to provide accommodation to ST students who would otherwise have been unable to continue their education due to economic reasons. The Committee noted that hostels have poor building structure and sub-standard quality of food. The Committee also noted that since substantial amount of Ministry's money has gone into building these hostels and other infrastructure, they must be properly monitored for them to run well.

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In this research paper the author has mentioned the various schemes by government like pre. matric, post matric, scholarships, ashrams and for the hostels.

3. MATERIAL AND METHODOLOGY

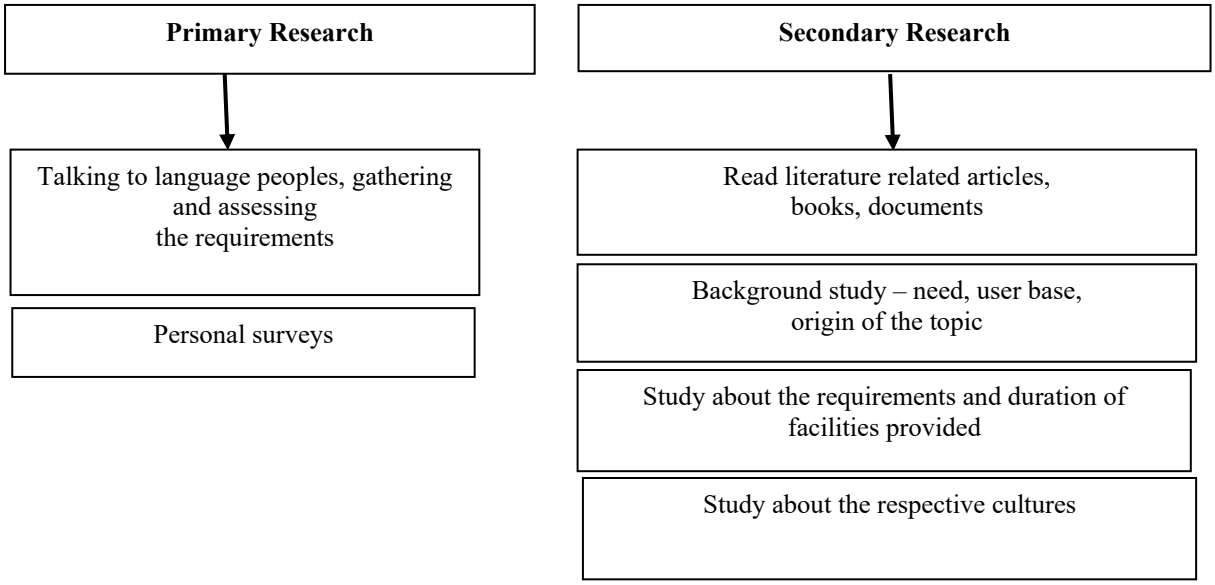


Figure 2: State Wise Population in India (censes)

4. RESULTS AND DISCUSSIONS

The Banjara children's culture, social system, administrative system, economic system, and societal ideals are all eroding in the current environment. Thus, social scientists, anthropologists, and other interested parties step up to preserve and maintain Banjara culture for next generations**.**

The government should encourage and provide the Banjaras with adequate financial support so that they can recover their traditional clothes, which are an integral element of their rich culture and a source of income that can support their future and education.

The government should create training facilities for skill development so that widowed ladies from Banjara who were harmed by gudumba and alcohol might receive instruction.

The government should establish educational facilities in every hamlet and thanda to raise literacy rates among the banjaras and keep evil at bay.

There are now options for development in every sector in the state and nation thanks to Banjara's request that the government allocate an equitable budget based on their population percentage.

5. CONCLUSION

As of the physical survey conducted during the main research at Hyderabad's Thanda Banjara has an unfavourable attitude towards education. The tribe's large average rate of illiteracy makes the eradication of poverty and mentality conversion necessary. Instead of enrolling their children in school, parents wait for their older children to start making money.

The Banjara community is less advanced economically than it is educationally. Even the community of Banjara was unable to utilise the government-provided facilities. Since this group is considered to be a nomadic tribe. Maharashtra states' condition in regards to expanding education is satisfactory. Political figures from the Banjara community, including incumbents and social workers, gave their life to help Banjara youngsters receive an education. By bringing up education, they were doing good service. The percentage of educated persons in this neighbourhood is still below average.

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Biodiversity Conservation and Rehabilitation Centre

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ABSTRACT: This study investigates the richness in biodiversity ecosystem zone in Velas, Maharashtra which is famous for turtle festival. This land holds the highest number of turtle nesting of Olive ridely turtles and Green sea turtle species in Maharashtra and has rich mangrove ecosystem in conservation area. We are going to study the Biodiversity which is critical for the ecosystem health which is rapidly disappearing across the world today, and suitable and necessary measures must be taken to save it for future generations. Therefore we are going to study the methods of conservation and how to sustain the richness of species in this ecosystem.

There is a growing need to promote awareness in the region as urbanization, animal-human conflicts, and settlements encroaching on forest areas increase. The major threats for sea turtles in Maharashtra are from the poaching of eggs and incidental catch in fishing nets. There is need for rehabilitation centre for injured sea turtle and incubation facilities for turtle egg to increase hatching ratio and to maintain the balance in sex ratio (which depends on temperature). There is a history of rich biodiversity in this region which can be interpreted in the conservation center to raise awareness in local community by understanding the previous and the current state of the biodiversity. And there is a scope to create mangroves, crab and oyster farming which we derived from the primary data by interviews.

The research will help researchers better understand the role of communities in biodiversity conservation and the impact of current construction practices on the region's biodiversity. It will also result in a better understanding of biodiversity design ideas in construction. The selection of structural materials and site requirements will be aided by research on how to generate a small carbon footprint. This will make it possible to achieve the objective of researching built environments for biodiversity conservation in eco-sensitive zones

Keywords: Conservation, Rehabilitation, Sustainable, Low-impact and Education.

1. INTRODUCTION

Variety of diverse lifeforms of species on Earth such as plants, animals and microorganisms, from smallest bacteria in the soil to the largest whale in the sea, is a component of Earth's biodiversity. This variety of species coming together forming a Natural habitat/Ecosystem is known as Biodiversity.

But biodiversity doesn't stop at the individual. Biodiversity is also the relationships between these lifeforms and their habitat. That includes the relationship between plankton and whales that help produce oxygen in the atmosphere, seeds and rhinos that help plant forests, and bacteria and plants that change the chemistry of soils. An ecosystem is the name given to all living species that live together in a stable community, interacting with one another and their physical environment. It includes the diversity within species and between different species within terrestrial, freshwater and marine ecosystems. Biodiversity Jenga: Each block represents a lifeform, and the accumulation of blocks represents biodiversity. Without the blocks, the tower wouldn't exist, and the more blocks you remove, the more unstable the tower becomes.

We are going to focus on a particular region in Maharashtra which has rich biodiversity ecosystem and variety of species which includes Seas turtles, a variety of birds, some small species of reptiles, amphibians and fishes in mangrove and vegetation which needs to be sustain and protected.

1.1 Aim

To design conservation and rehabilitation center for endangered speices and to help sustain the speices.

2. RESEARCH QUESTIONS

- To help conserve the population of endangered species is it necessary to build incubation block for more success ratio for hatchlings to hatch out?

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- Why is it necessary to build rehabilitation block?
- What role does constructed space play in conservation efforts?
- How can design be used to raise awareness?
- How can a design help preserve and increase biodiversity?

3. OBJECTIVES

- To have a better understanding of the space for study and conservation.
- To gain an understanding of design techniques for raising awareness via design.
- To investigate low-impact design for biodiversity management.
- To understand and generate design solutions for structures that include biodiversity.
- To understand the effects of building practices on ecosystem.

3.1 Identification of Research Methods and Methods of Data Collection

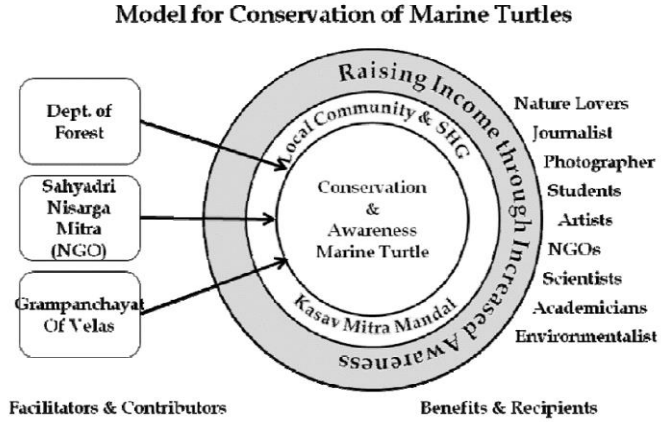
To achieve every objective following methods were identified and utilised. This includes study of books and internet-based study comprising of research papers, news, articles, government policies and initiatives to understand the current trends and understanding the potential to be pursued.

3.2 Limitations

To keep the scope of the study limited, the study focuses solely on the ecological variety of the Velas Eco sensitive area in Ratnagiri district of Maharashtra. The investigation will focus on the project's character and geographical aspects. Research of the project is limited to the Conservation and Rehabilitation center for the rich biodiversity and endangered protected species of this area. The study excludes the lodging and homestay inside the conservation and rehabilitation center.

3.3 Velas Eco Sensitive Zone

A tiny seaside town in Maharashtra, India's Ratnagiri District is called Velas (17.96° N, 73.03° E). In the whole state, the town is home to the most nesting olive ridley sea turtles (Lepidochelys olivacea). However, the eggs and hatchlings of sea turtles at Velas and the nearby shoreline have been seriously threatened by illegal taking and nest destruction by animals like jackals and dogs. In order to save sea turtle eggs, a local conservation group called Sahyadri Nisarg Mitra (SNM) built a hatchery near Velas in 2002. Although the exact position fluctuates every year, the hatchery is located on Velas beach. There are not only sea turtles Velas is also famous for bird watching. There are many variety of birds found in Velas mostly near mangrove area not only birds but also monitor lizards, otters and highly populated crab areas in mangroves. There are 4 types of mangroves trees in this area. To visit turtle festival (watching sea turtles hatching going to sea) the tourist also enjoys nature which includes all the animal mentioned above. Because of which villagers helps for conservation events as it becomes source of income by providing tourist, researcher and NGO's homestay facility



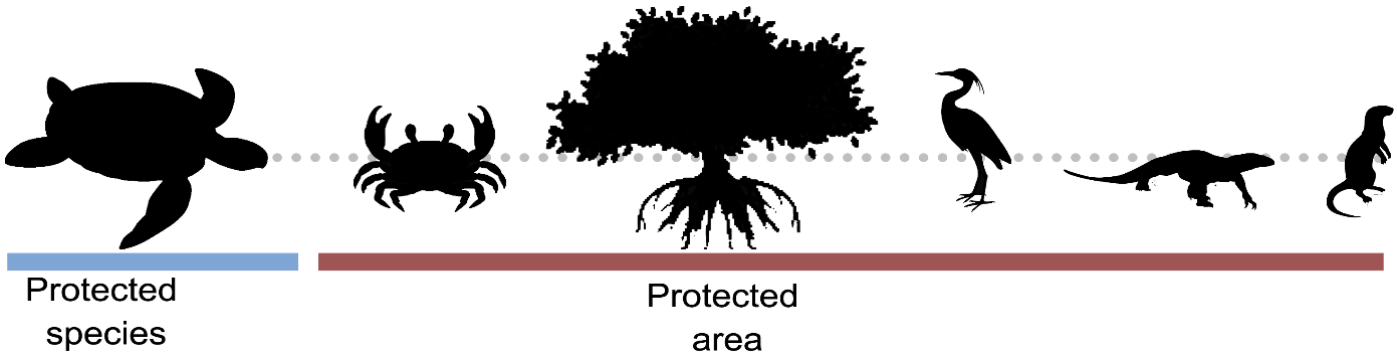
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Current plans are:

- To establish turtle and bird Conservation Centers.
- To extend activities of the marine turtle conservation along the entire coastline of Maharashtra and specific protection activities to a minimum of 50 locations.
- To carry out in situ conservation of marine turtles at 10 locations.
- To establish a 'Student Nature Club' to increase awareness and encourage participation of school students in the area.
- To carry out awareness programmes for mangrove conservation.

3.4 Threat

In the last three years of conservation work on the coast, eggs poaching is the major threat to the turtles followed by harvesting. We also found dead turtles on the coast in increasing numbers. Some incidents are given below. In the year 2002–03 at Velas we found one dead Green turtle. In the year 2003–04 we found two dead Olive Ridley turtles on Murud beach, and one young Green turtle at Saldure. In the year 2003–04, At Kelshi, some 3km. from Velas, two turtles were killed by striped hyenas and eaten partly. At Anjarla 5 nests were predated by jackals and not a single egg was found among them. Four turtles returned to sea without laying eggs i.e. two at Velas, and two in Anjarla. One turtle was found as a catch in a fishing net near the beach and was released by locals. In the year 2004–05 at Dabhol, due to a storm a lot of casuarina trees got damaged and now casuarinas tree trunks are lying all over the beach posing a big hurdle for the turtles on their way to nesting. Due to this obstacle 5 turtles returned to the sea without laying eggs.



At Velas 5 nests were partly predated by jackals. We found 9 dead turtles on three beaches, 5 at Kolthare, 2 at Ambolgad and 2 at Anjarla. At Velas, one nest was completely eaten while eight nests were partly robbed by jackals. In the year 2005–06 we found 8 strayed turtles on the beach. Public is now responding to awareness campaign. For instance, at Nivati, taluka Vengurla, district Sindhudurg one sub-adult Green turtle was caught in the fishing net. When it was brought back to the shore local dealers started bargaining to purchase it, but another local person on the beach who was in contact with SNM, informed conservationist immediately about it. They appealed repeatedly to fishermen and finally they responded to our appeals and released the turtle back into the sea. At Ratnagiri, one Olive Ridley turtle was caught in a fishing net and was injured. Ratnadurga Mountaineers, an NGO working in nature conservation activity, released it after nursing for a couple of weeks.

Species we going to focus on are olive ridley sea turtle, green sea turtle for conservation and rehabilitation. Species of birds found in mangrove areas such as black-backed dwarf king fisher, common king fisher, Malabar pied hornbill, western reef heron, Indian pond heron, little cormorant, etc. monitor lizards and otters are also found in mangrove area.

4. LITERATURE REVIEW

From the literature review we learned the major and minor threats and issue of current situation of conservation for turtle and history of issues in past few years. People are actively participating to help conserve turtle species and other species in Velas and some villagers are participating for earnings as they provide food and homestay for researchers and tourists. Now that we how local community, NGOs and researchers/students are interested in protecting the species and biodiversity we finally understand that conservation centre is necessary to learn more about species and biodiversity and to liberate people

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more. There is also need for workshop to help and train local community the methods of conservation. We have better understanding for current plans and future plans for conservation. Looking at the major threats and issue there is also need for rehabilitation centre for wounded animals as well. As we learned that some species like turtles are constantly in danger by predators and poaching actives due to which some time animals needs immediate medical assistance as there is no nearby vet in this area where biodiversity is so rich. Therefore rehabilitation centre also plays major role conservation. We were able to understand the types of user group in this village by analysis of types of stake holders in village. Some stakeholders are accidently and slowly destroying biodiversity without even realizing due to lack of knowledge in conservation methodology. But, some stakeholders are actively doing their best to conserve biodiversity this is all possible due to help of SNM. After that we learned basic guidelines for conservation Community based conservation thus has become instrumental to achieve sustainable development provided with efficient management and implementation of conservation projects. Economic incentives and compensation is reinforcing the local community to get involved in such projects. Similarly the mechanism of distribution of benefits and conflict solving approach is also making community involvement in such projects more successful. The elaboration of turtle festival of this paper is a representative example. It is necessary to perform the valuation of economic damage due to loss of biodiversity to the region. It can be also computed by assessing the economic value of maintaining biodiversity through conservation policies and other means. The next stage is to perform meticulous review of cost-effectiveness of various alternatives in biodiversity conservation policies and instruments. Once the planning and related execution has been performed, the overall economic impact (gained income, jobs) due to implementation of policies must be studied to assess effectiveness and course correction.

4.1 Interview with Mangrove Cell Head Researcher and Expert in Conservation and Villagers

4.1.1 *Scope of Built Spaces for Creating Awareness*

Mohan Upadhye sir is actively conducting awareness sessions and workshops along with his team with collaboration with SNM for nearby villages, schools and institutes in Ratnagiri and Sindhudurg dist. He says that villagers are suddenly interested in conservation and turtle festival because of thunderstorm that affected village, houses and farms. After realizing how tourists that they can have main source of income by providing homestay facility for tourist and researchers. Now that villagers are actively participation there is need for conservation center with learning and workshop area. According to Mohan sir's experience in Airoli biodiversity center he thinks that museum can be very helpful for learning as well.

Is there any need for incubation block? Currently lots hatchling and eggs or turtles nest are destroyed by predator and humans most of this eggs are not inside hatchery area build by conservationist (mostly they are missed). Due to which sometimes these eggs are removed out of sand by predators or due to high tide eggs do not get particular temperature to hatch out. So for these kind of eggs artificially controlled area or required which is incubation block. The male and female ratio is completely depended on the temperature of the environment where if temperature is high female ratio increase and if 91 temperature is low male ratio of increases depends from area to area. Therefore, to maintain balance in sex ratio incubation center is very important.

4.2 Importance of Rehabilitation

- When I asked about rehabilitation Mohan sir says that there are many cases where fishermen accidently catch turtle in net resulting in injuring them very badly. And sometimes this fisherman catch some badly injured turtle that can't swim properly due to boat motor crashes. There were some cases when turtles where taken to Dapoli city near Velas which is 2 hrs away but due to traveling it makes situation even worse so mostly this injured turtles are sent back to ocean on their own. There are also some cases when turtles are washed up to surface due to high tide or during storms and they are flipped up side down. It is very difficult for them to get back up and due to harsh sun they might die as well even after they get back up they need time to regain their proper swimming and eating ability in natural condition with any help which why observatory tank is also important after rehabilitation. Sometimes turtles that are caught are covered in barnacles and these barnacles spread throughout the shell covering whole shell due to which turtles do not get any natural sunlight which leads to bone deformation and bad movement while swimming. These barnacles are removed with the help of knife and turtles are kept under UV light and filtration tank. There are only 2 rehab in Maharashtra one in Dahanu and one in Airoli biodiversity centre. Therefore there's definitely for rehabilitation in Velas as it is one the highest populated turtle nesting area.

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- Increased residential development, especially in a coastwards direction, and corresponding increase in artificial lighting can influence both nesting and hatchling turtles. A negative relationship between nest site selection and the intensity of artificial light has been found in many studies, including olive ridley turtles in Odisha ,green, leatherback and loggerhead turtles in Florida, green and loggerhead turtles on the Mediterranean coast of Israel, and hawksbill and loggerhead turtles on the Brazilian coast. Turtles deterred from nesting at Velas by artificial light may instead choose adjacent beaches with lesser nest protection initiatives, so that more eggs are vulnerable to depredation and illegal take.
- The impacts of artificial light can be managed by preventing areas from being exposed to artificial light, shielding lights from entering areas not intended to be lit, limiting the duration of lighting, changing the intensity of lighting, and changing the spectral composition of lighting.

ACKNOWLEDGEMENT

I take this opportunity to thank all those who have directly or indirectly helped me in the research paper. I oblige to my research paper in charge Prof. Rajesh Rokade, who has been so patient and understanding throughout .My sincere gratitude to all those who gave their valuable time, support, advice and help in the making of the research paper. Thank you all.

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The Silence of LGBTQIAPD+ Spaces in India

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Abstract: The work presented questions whether our built environment is truly inclusive? Most Asians usually do not question public or built spaces as being gendered, but through this research, we recognize how the Indian built environment for centuries has been serving a few specific groups of people by excluding several other sets of minorities. 'Inclusive Architecture' refers to any space that can be seamlessly used by all users; not just disabled people, children, or the elderly, but also groups that have been traditionally excluded for decades, such as LGBTQIAPD+ individuals, outcast minorities, people from low socioeconomic backgrounds, and other socially excluded communities.

Most LGBTQIA+ individuals have reported feeling unwelcomed or restricted, discouraged or discriminated against, or unsafe in existing social spaces, services, housing, and other public environments. Prejudice, discrimination, harassment, torture, bullying, extortion and restrictions for more than ten decades now have robbed queer and trans individuals of safe and LGBTQIA+ affirmative spaces in India. Due to the scarcity of queer and trans-centric spaces, an LGBTQIA+-centered programme broadens its scope and calls into question the classic structuralist "cis-hetero architectural phenomenon." Unfortunately, Architects and designers are rarely seen discourse on this. In most countries including India, the Architecture profession largely comprises of upper-class/caste cisgender heterosexual males, whitewashed.

This results in a design approach that favours the male perspective, ranging from licensing regimes that benefit cisgender heterosexual male drinking establishments to sports facilities that are built with male users in mind. This results in a design approach that privileges the male perspective, from licensing regimes that favour cisgender heterosexual male drinking establishments to sports facilities that are built prioritizing males. These assumptions about who the built environment should serve first, as well as others such as the heterosexual, family-oriented nature of urban cities, contribute to how it is designed or

Most privileged people regard LGBTQIA+ affirmative spaces as "special" and some even wonder "Why create and separate the LGBTQIA+ community?" Many people are unaware that safe spaces and queer affirmative centers are often largely born out of necessity and need, rather than "exceptional or special circumstances." The idea is an introduction of built space with an assured safe environment for people on the LGBTQIA+ spectrum to gather, socialise, and connect without fear of blatant hate or microaggressions that they continue to receive in other public spaces otherwise. Having their own spaces as in a hub, where they are most understood, can be freely queer – by which the author means they can be out and be themselves and openly with their partners too. A safe space commitment establishes the expectations and assurances in a space; it creates an agreement for how people should treat one another and what the space is like, while discouraging discriminatory behaviour. To begin with, it aids in making LGBTQIAPD+ people feel safe.

The aim is to create a space that is welcoming and positive for everyone, regardless of identity or alternative gender expressions. It provides consistency and helps LGBTQIA+ individuals know what to expect, allowing them to participate fully while reducing uncertainties and anxiety. It aids in the development and implementation of a safe space commitment. These factors have a positive impact on how queer and trans people experience such spaces. In the context of rising hate crime rates, the concept of "queering spaces" provides inclusivity and safety for our society's intersectional users.

Keywords: *LGBTQIA+ Affirmative, Inclusivity, Intersectionality, Safety, Safe Spaces, Cis-hetero Phenomenon, Public Spaces, Built Environment, Queering Spaces.*

1. INTRODUCTION

Present 'Inclusive or LGBTQIA+ Architecture' refers to any space that can be easy to use by all and varying individuals; women, men, transgender people, non-binary individuals, the entire array of LGBTQIA+ spectrum, physically as well as mentally handicapped users, and the list goes on. Focusing on eradicating barriers that create undue effort and separation due to societal norms and stigma, enables LGBTQIA+ minorities to participate equally, confidently, and independently in everyday activities along with the rest. This queer and trans-inclusive approach to design offers new insights into the way we interact and create spaces for the ones that are deprived of it with the built environment. LGBTQIA+ centric

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organizations and NGOs have been operating on a grass root level to support and facilitate individuals belonging to this spectrum, however, this can be found in top-tier cities by far and on a low numerical scale, reaching remote areas of our country to aid them is still a vision. Queer and trans studies have mostly been limited to cultural studies, literature, arts and social geography, very often these alarming social issues are considered as an offering to the possibility of questioning the 'straight' architecture.

An intervention introduced as an LGBTQIA+ affirmative centre opens itself up to a realm of humanity and questions the classic structuralist 'cis-hetero phenomena', inside-outside because usually 'different' is often mistaken as 'less or unimportant'.

Most Indians do not usually think of public or built spaces as being gendered, but this is how Architects and designers increasingly talk about it and have been seen speaking about it to date. In most countries including India, the Architecture profession largely comprises of upper-class/caste cisgender heterosexual males and whitewashed. This results in a design approach that privileges the male perspective, from licensing regimes that favour cisgender heterosexual male drinking establishments to sports facilities that are built prioritizing males. These assumptions about who the built environment should serve first, as well as others such as the heterosexual, family-oriented nature of urban cities, contribute to how it is designed or practised to date. These factors adversely affect how public spaces are experienced by women, men, non-binary, agender and other individuals. In the context of rising patterns of hate crime, the idea of "queering public spaces" offers inclusivity and safety for intersectional users of our society.

1.1 Gender and Space; Power Relations

The basic need for a safe space and a place to find resilience has resulted in the urgent need for LGBTQIA+ or trans-only spaces. Architecture is a significant profession that is associated with human experiences and emotions, catering to the needs of those who require shelter and resilience. Many LGBTQIA+ people and their families face difficulty and frustration, which can be alleviated by creating LGBTQIA+ affirmative spaces in the built environment that are inclusive. As a result, the goal is to design in accordance with general "inclusivity-design for all" principles. It should reflect the diversity of its users and should not impose any barriers; design should always be evaluated in terms of whether or not it achieves an inclusive environment. We all benefit from an environment designed in line with inclusive principles, author believes that we must understand and introspect how public and social spaces train us to design better for every individual today, and how they affect queer users along with other users.

Critiquing existing spaces in our country, emphasizing on the lack of safe spaces for LGBTQIA+ people in our country, and advocating for design elements that should be regulated and curated over time to reflect societal changes is an alarming need. LGBTQIA+ bars and cafés are no longer the only queer and trans affirming casual or informal settings; their significance has shifted. There is an increasing need for public and social spaces, particularly those known to be welcoming to and frequently used by members of the LGBTQ+ community. Community centres, communal spaces in neighborhoods, queer affirming commercial spaces, intramural sports leagues, and portions of public spaces are all examples (such as beaches and libraries).

Dreadful stigma and insults directed at LGBTQ+ people for being who they are, as well as living in near-constant fear for their safety, are all draining psychologically and can have long-term consequences for their mental health. LGBTQIA+ affirming spaces provide a safe haven for people to connect and share their experiences. To create welcoming, accepting environments in which all people who identify as lesbian, gay, bisexual, transgender, queer, or otherwise sex and/or gender diverse can unwind. Through research and design initiatives like these, we can learn more about the effects of our created environments on people's health, the environment, and the economy. As a result, we have more freedom to design better for everyone, especially minority communities. Providing us with the opportunity to improve architecture for everyone, particularly minority communities.

1.2 Law and Violence

The majority of Indian LGBTQIA+ people face horrific abuse and targeted physical assaults, including being murdered and disowned if they come out. Only a few transgender people in our country have access to legal recognition of their gender identity, while the majority must still comply with harsh legal and societal laws in order to live a decent life. In violation of their human rights, intersex children and adults are pressured or compelled to undergo medically unnecessary procedures

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and interventions. We have an opportunity to dramatically accelerate inclusive architecture in line with social and legal change for LGBTIQA+ people right now by establishing, building, creating, introducing, and expanding safe spaces. Introducing, creating, developing, and building such community centres and health initiatives entail defending and celebrating safety, freedom, dignity, and equality.

The core utility needs of people on this spectrum who have been suppressed for decades, as well as the basic needs of LGBTIQA+ individuals, must be met by inclusively designed environments. This research examines the idea of establishing a facility specifically for LGBTQIA+ Indians in need in order to provide critical assistance to this segment of our country's population. Understanding the effects of sex, gender, and sexuality on people in society, as well as how and why these issues are related to the built environment, sexual orientation, and gender identity, are particularly under-addressed due to their relative invisibility and less obvious discriminatory effects, remain particularly under-addressed. The "neutral" Indian laws and policies are a contradictory system run by rival fascist forces which have colossally failed to aid LGBTQIA+ individuals.

In reality, the ostensibly "neutral" Indian laws and schemes are governed by antagonistic fascist conservative forces. The discussion of LGBTQIA+ individuals as a pre-existing spectrum in society is highly stigmatised and not openly discussed. LGBTQIA+ people are discouraged and discriminated while seen accessing basic services in institutions ranging from educational institutions to health clinics. There is an alarming requirement with architectural education to provide a community/wellness centre that will have an impacting positive effect on this spectrum of the population while creating social awareness with elements of designing new spaces as such.

From educational institutions to health clinics, LGBTQIA+ people are discouraged from being themselves or from accessing basic services. There is an alarming requirement with architectural education to provide a community/wellness centre that will have an impacting positive effect on this spectrum of the population while creating social awareness with elements of designing new spaces as such.

1.3 conQUEERing Ways of Perceiving

It is crystal clear that our perceived built environment lacks the affirmative and inclusive design qualities that we believe it should have. Architectural education has the ability to bring together contradictory/divergent issues of the world while also design programmes and spaces for minorities with clear and holistic solutions to cater for the lack of queer and trans safe spaces that aren't designed at large. The future of India must be adaptable to a changing and evolving world. Architects, artists, and designers have the ability to promote the creation of queer and trans affirming spaces. Community centres and wellness initiatives are locations run by or on behalf of a government or nonprofit group that are vitally important across the nation and give individuals in need a way to live, be revived, socialise, study and access necessary basic services. We are in difficult circumstances now more than ever, and we need places to support and accommodate LGBTQIA+ people who aren't receiving support from society. Lesbian, gay, bisexual, transgender, queer, and intersex people continue to experience widespread stigma, exclusion, and discrimination in many spheres of life, including education, employment, and health care, as well as in families and communities.

In India, LGBTQIA+ affirmative spaces are frequently the only places where queer and trans people socialise openly without fear of abuse or, in some cases, prosecution (though IPC Section 377 has been scrapped off almost four years ago). Another example of an LGBTQIA+ space is the underground 'Kitty Su' club culture, where drag queens/kings, gender nonconforming and queer people come together and perform because they are frowned upon by other clubs otherwise.

To understand the issues of existing spaces and design structural systems, as well as the effects of the government's current limited guidelines, practicing architects and designers require basic qualitative learning and understanding of social issues in a structural theory in order to design rational buildings; only then will a structure be created that is healthy, vital, and possibly safe and empowering. We are currently struggling with a traditional engineering-based approach to structural instruction that is becoming increasingly unsuitable.

2. LITERATURE REVIEW

The inclusiveness of Indian cities in 2022 through an article by Mohd Shehwaz Khan, whether our built spaces are queer affirmative or are typically imagined as class-less and caste-less spaces where sexual identity predominates. However, these sexual identities are frequently intertwined with class or other social landscapes that are frequently overlooked within the context of sexual politics and architecture.

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Recognizing LGBTQIA+ people and the heinous injustices they face on a daily basis as a vital part of our society has become an urgent need of the hour. It has been discovered that a focus on accessibility and legislation, both in terms of content and format, hinders a potential broader understanding of LGBTQ+ user experience, which may correspond more to an Architects' way of working to progress.

'Lihaaf,' a controversial novel by legendary writer Ismat Chugtai, was published in an Urdu Literary Journal titled Adaab-i-Latif in 1941, before Independence. It is about repressed sexual desires and the exploration of another persons' body to fulfil oneself. Ismat Chughtai's writing had the power to break down patriarchal barriers and bring to light the previously unexplored subject of female desire and sexuality. Her writing discusses women's bodies as independent entities rather than objects of male gaze. Despite being heavily scrutinized, her writings 'lifted the veil' on the controversial and made the invisible visible.

The novel is set at a time when women's bodies were traded in the name of marriage and treated as possessions, while men used marriages as a front to continue their adulteries while appearing stable in the eyes of society, as Nawab Sahab did in the novel. The story is a remarkable piece of queer writing that exposes colonial India's traditional attitudes toward queer people. Because of the time's homophobia and rigid mentality, the story was accused of blasphemy and spreading immorality due to its evocative depiction of the female protagonist Begum Jan's homoeroticism. The use of language had a significant impact on the outcome of the story. When discussions about female bodies or sexuality are initiated today, many people seek refuge in the English language. The general public frequently does not know what body parts are called in languages other than English. Ismat Chughtai wrote about gender and sexuality in Urdu. It caused quite a stir at the time because languages are also associated with religion in India. When it came to her female sexuality literature, people from Muslim households called Chughtai "shameless." Since then, not much has changed. Even today, when an individual openly acknowledges their sexuality and does not conform to the established beauty standards, they are labelled "shameless." Furthermore, giving a voice to a young girl in the novel who did not know much about her sexuality is a raw representation of an India where homosexuality has always been a taboo subject.

Begum Jaan harnesses her sexuality to empower herself. In the foreground, she works within patriarchal norms and adheres to the standards of a dutiful wife, while within the quilt (Female homosexuality is referred to as a "quilt."), she acknowledges her sexual desires and does everything she can to fulfil them, and she seeks solace in a non-conforming sexual relationship. In her relationship with Rabbu and Nawab Saab's relationship with the young men, the bodies and desires bridge the heteronormative marriage gap. The constant mention of "the elephant" under the "quilt" that prevents the narrator from sleeping also serves as a metaphor for the sexual desires and relationships that are either not mentioned or are discussed in metaphorical terms and are not addressed directly. Chughtai used an elephant image to perplex the story's young narrator. Furthermore, it is a symbol of the public's confusion about homosexuality at the time. However, the metaphorical expression of female homoeroticism wrecks Chughtai's life and landed her in Lahore High Court.

'The Stonewall Reader' is a collection of firsthand accounts, diaries, periodic literature, and articles from LGBTQ magazines and newspapers from the years preceding and following the riots, drawn from the archives of the New York Public Library. Most notably, the anthology highlights both iconic activists who were pivotal in the movement, such as Sylvia Rivera, co-founder of Street Transvestites Action Revolutionaries (STAR), and forgotten figures, such as Ernestine Eckstein, one of the few out, African American, lesbian activists in the 1960s. Stonewall after the night of riots became a symbol of resistance to social and political discrimination, inspiring decades of solidarity among homosexual groups. Although the Stonewall riots did not start the gay rights movement, they did serve as a catalyst for a new generation of political activism.

3. MATERIAL AND METHODOLOGY

The methodology used as qualitative, and tools of primary data collection include the in-depth, unstructured interview – that took on the form of conversations.

Literature review has been woven in as theoretical inputs to the themes of analysis that is gender, sex and sexuality on the one hand and design, architecture and spatial elements on the other.

An overview of the historical context of clear affirmative designs both internationally and in India is made to provide the theoretical background to the loss of society's awareness itself as a subject of exploration. The exploration of square identity and pride history is important herein.

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Current issues and affairs are studied in-depth by referring books and LGBTQIA+ literature.

Criticizing existing spaces in our country accessed by LGBTQIA+ citizens and proposing regulation and curation in designs that should evolve over time in tandem with social issues. Queer spaces are more than just "gay bars and cafes," and their significance has shifted today more than ever.

The rising demand for queer affirmative hubs, community centres, neighbourhood communal spaces, commercial spaces, intramural sports leagues, or portions of public spaces (e.g., beaches, libraries).

To create safe spaces where people who identify as lesbian, gay, bisexual, transgender, queer, or otherwise sex and/or gender diverse can unwind in a welcoming and accepting environment. Researches as such assist us in determining and gaining a response on how our designed spaces have an environmental, social and economic impact on people. Thereby, giving us a scope to design better for all.

Voicing concerns about human rights violations and violence experienced by LGBTQIA+ individuals in various spaces. Social equality for LGBTQIA+ individuals and to liberate society as a whole from biphobia, homophobia, and transphobia.

Creation of LGBTQIA+ affirmative spaces in the city, a safe space for confirming and non-confirming queer and trans individuals.

Encouraging the development of a hub of social and welfare organisations that work for marginalised communities as such, bringing in a diverse range of people and progress. More community participation in social movements for progress.

Bursting the bubble of heteronormativity and cis hetero dominated spaces, LGBTQIA+ individuals exist, and thus programmes and designs must include more fluidity in its elements for LGBTQ+ individuals to access safe spaces.

Evolving designs hold promise for the betterment of our public's future.

The secondary goal of this research topic is to initiate a conversation among designers, beginning in their own learning environments, namely universities, about the safety and inclusivity that must be considered as a fundamental right when designing for minority groups such as LGBTQIA+.

4. RESULTS AND DISCUSSION

LGBTQIA+ or queer-only spaces arose from the need for a safe space and a place to find resilience. The frustration and hardship experienced by many-LGBTQIA+ individuals and their families can be alleviated by designing inclusive queer affirmative spaces in the built environment.

Proposed analysis and reformation for universal principles of 'inclusive and intersectionality' must include all minorities.

LGBTQIA+ affirmative spaces provide a safe space for queer and trans individuals to bond and share their experiences. Designers have a tremendous opportunity right now to dramatically accelerate social and legal change for LGBTIQA+ people by creating spaces and ensuring that our progress is not lost.

Creating such outreach programs and wellness programmes means expediting and fighting for the safety, freedom, dignity, and justice of our country's oppressed groups. Designers must consider the need to change/evolve traditional practises and design methods in order to create inclusive spaces that cater to various societal sections.

In order to make our city, parks, and streets feel safer and more comfortable on an individual level, architecture students/designers must consider taking a gender-sensitive approach. There must also be guidelines or policies for inclusive designs that focus primarily on accessibility and the introduction of affirmative spaces.

Designers while planning should prioritise safety. Provision of gender-neutral washrooms, ramps and lifts mandated in designs for independent accessibility, greenery and lighting used to break up space and sight lines and provide more privacy.

5. CONCLUSION

This research assesses the hypothesis of the need for a community centre for the LGBTQIA+ Indians specifically in need to provide a vital aid to this set of population of our country. Learning about the impact gender, sex and sexuality has on

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individuals in the society, how and why issues linked to the relationship between the built environment – sexual orientation – gender identity, remain particularly under catered, because of their relative invisibility and less clearly identifiable discriminatory consequences. It is crystal clear that our perceived built environment lacks the affirmative and inclusive design qualities that we believe it should have. Architectural education has the ability to bring together contradictory/ divergent issues of the world while also design programmes and spaces for minorities with clear and holistic solutions to cater for the lack of queer and trans safe spaces that aren't designed at large. The future of India must be adaptable to a changing and evolving world. Architects, artists, and designers have the ability to promote the creation of queer and trans affirming spaces. The Indian laws and schemes which are supposed to be "neutral" are in fact, a contradictory system governed by antagonistic fascist forces of the conservatives. The conversation of LGBTQIA+ as a social issue is highly stigmatised and not openly conversed about, let alone availing LGBTQ+ individuals to be treated as an existing spectrum in the society. Right from educational institutes to health clinic spaces the prohibition of LGBTQIA+ individuals to be themselves or access basic services are frowned upon/ not cater well. There is an alarming requirement with architectural education to provide a community centre that will provide impacting positive effect on this set of population while creating social awareness with elements of designing new spaces as such.

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I am a South-Asian queer-identifying woman of colour, one of the innumerable faces of the Indian LGBTQIA+ minority who were criminalised until 2018 and to date remain largely abhorred by Indian society. I recently turned twenty-three years old, and I am immensely proud to be a first-generation student who has made it to higher education and has had the courage to come out of the closet and march for liberation. I am from a middle-class nuclear family, living in an urban city all my life, using primarily English, Marathi, and Hindi in daily life. These important factors have been particular privileges along with a few more; access to sufficient literature, activist peers, and resource staff at various stages that assisted a great deal in the shaping of this thesis, to whom I am indebted and express my fathomless appreciation. During this slow progressive hour, my position as a researcher in "queer, trans, and gender research" is especially privileged, and for that I am thankful.

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चहल पहल: Exploring Social Spaces of Jaunpur

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ABSTRACT: Jaunpur, a 3-tier city in Uttar Pradesh is not known to many. If known, there is a preconceived notion of it being a crime ridden city which is put forth through entertainment media. There is a lot of negative news and publicity of the city on the internet.

Cities in general, showcase their culture, in terms of tangible and intangible through the lens of history, food, art and architecture. Similarly, Jaunpur too has a rich culture showcasing the rich heritage of Sharqi Architecture, the river Gomti and ghats around it, the 'Shahi Pul' and the informal market on it. The intangibles revolving around the tangibles being locals jogging around the Shahi Fort, shopping and devouring the famous 'Jaunpuriya Imarti aur Samose' in the markets such as Olandganj, Hindu devotees performing 'Chhath pooja' on 'Human Ghat', 'Salat al-Jumu'ah' in 'Lal Masjid' also near the banks of the river Gomti. The city also has a history of skilled workmanship of creating 'Chikankari'—a traditional embroidery style, Silver Jewellery making and traditional oil and 'Attar' making which in present is sent to the markets of Mumbai. The Sufi tradition that was established in the 14th century in Jaunpur also flourished with a number of poems written in Awadhi. Mushairas are still conducted in the city to celebrate the art of reciting poems. This interesting combination of what you see and what you feel in small pockets spread throughout the city holds the potential to explore the city in terms of people, culture and social engagements.

The city of Jaunpur is yet to experience urban development. There is a lack of formal spaces necessary for a city to grow such as a space to study art and craft, to form communities and share ideas and a new age market space with adequate facilities to promote businesses and generate revenue. People of the city, especially young minds are migrating to metropolitan cities of the country in search of a better lifestyle and livelihood. Locals have an impact on the city's political, economic, and social aspects. Cities are centers of social interaction and the culture cannot be replicated anywhere and by anyone. So it is important for the dwellers of the city to inhabit and uphold the cultural integrity of the city they belong to.

A community space is necessary where all the tangible and intangible features of the city can be represented with an introduction of modern elements and functions where youngsters can imagine their future in the city. AMRUT Scheme is currently being implemented with respect to Riverfront development in the city. This gives an opportunity not only to create a community space while visually connecting it to 'Shahi Pul', 'Shahi Qila', the river Gomti but also help attract people to the intervention.

Keywords: *Historic City, Culture, Social Interaction, Community, Bazaar.*

1. INTRODUCTION

Jaunpur, a city in Uttar Pradesh, India was known as "Shiraz-E-Hind" in the history of the Indian subcontinent. In the current scenario, Jaunpur lacks the identity it had before. Jaunpur represents all the rulers who carried their culture, art form and architecture to this city and very proudly still holds them in the form of ruins, some still used, many forgotten. Shiraz E Hind, also known as the Shiraz of India was the title given to the city of Jaunpur during the 15th and 16th century. Shiraz is a city currently located in southwestern Iran, known for poets, literature and flowers. This title was given to the intellectual capital known for it's scholars, craftsmen, religious leaders and madrasas with Sher Shah Suri being among the famous alumni. Sufism flourished during Sharqi rule. Hussain Shah, the last monarch of the Sharqi Dynasty was fond of music known as Khayal, which inspired him to create new ragas such as 'the raga Jaunpuri'. For this reason, he was given the title of Gandharva (skilled musician who can perform in both the past and the present). Today, this art seems to have been forgotten in the city. However, the art of Shayari is still celebrated as Jashn E Shayari (All India Jaunpur Mushaira) every year. The built heritage of the city includes Sharqi Architecture only present in the city. The Atala Masjid, Jhangiri Masjid and the Shahi Quilla being some of them.

Art and craft of Chikankari, ittar and oil making, silver jewelry making still exists and is exported to the metropolitan cities of India but are not known to many. There is a lot of potential in terms of small businesses through the medium of retail,

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craft and vegetation, yet the young individuals of the city do not prefer living here and instead migrate to the metropolitan cities of India to try their luck. This problem isn't just faced in the city of Jaunpur but in the northern belt in general. This not only creates an issue in the region but also in India as a country as there is burden on the metropolitan cities to fulfill the demand of the migrants and a slow pace of growth of North Indian cities. This research looks at Jaunpur through the lens of Social Engagement, and understands the city in terms of the nature of Bazaar, the Built Heritage and people responding to it.

- **Aim**: To study the city of Jaunpur—its past and present through the lens of social interactions in the city.
- **Objective**: The objectives of the research include:
  - Study and analyze the city of Jaunpur in terms of history of art and architecture.
  - Study the current scenario of the city in terms of urban fabric and public interaction with the heritage structures and area around it.
  - Understand important elements in a city and contribution of social engagement in a city.
  - Study points of social engagement throughout the city and find out the gap.
- **Scope**: General purpose of the study:
  - To study the city of Jaunpur with existing factors which makes it unique to other cities. Population/Sample of the study:
  - Local population of Jaunpur Topics to discuss:
  - Brief history of the city
  - Sharqi Architecture
  - Current Scenario
  - Potential of the city in terms of social spaces Geographical location:
  - *District:* Jaunpur
  - *Division:* North-West of Varanasi

Limitations

- Study looks at the city of Jaunpur through only the lens of social interactions.
- Site potential in the central part of the city.

2. LITERATURE REVIEW

Hindi heartlands needs an urban revolution by Business Line—Prateek Raj

This Article written on 13th March, 2019 starts with the Kumbh Mela which was held in Prayagraj. Organizing the Kumbh requires a great amount of urban planning and management. The points out if the authorities have an ability to organize an event of this magnitude, can this ability be used to translate into the quality of the Indian cities. Prayagraj as a city situated at the heart of India has seen its fair share of ups and downs throughout history and has 2 major rivers flowing through it could not keep up with the progress of India. This according to the writer is a symbolic representation of the decline of the Hindi speaking belt i.e. Uttar Pradesh, Bihar, Jharkhand, Chhattisgarh and Madhya Pradesh. The population in this belt make upto half a billion. In the history of the belt, because of its fertile land, it supported important cosmopolitan cities of the world—Kashi and Patliputra. According to the 1911 census 4 of the 10 largest cities (Lucknow, Benaras, Kanpur and Agra) and 8 of 20 (plus Allahabad, Bareilly, Meerut and Patna) were from the Hindi speaking belt, yet this belt suffers from Metropolis Vacuum. In the current scenario, 6 largest cities—Delhi, Mumbai, Kolkata, Chennai, Bengaluru and Hyderabad are outside the Hindi belt. Upcoming urban cities—Pune, Ahmedabad and Surat also lie outside the region. Among the 10 largest cities none are in the region, while only five cities (Lucknow, Kanpur, Indore, Bhopal and Patna) belong in the top 20 (2011 census). The glaring absence of a major metropolitan center in the region has forced young people to migrate from the small towns and move to other cities in the West and the South. This not only affects the belt but also affects the nation as a whole. To sustain economic growth for the aspired young population, the Hindi belt has to create an engine for economic growth. The writer further mentions that the Central and state government, Mayors and local bodies are key players for creating centrality of cities for economic growth. The writer further urges the government bodies to further enhance the smart city mission (2018) and develop through appraisal, approval, funding, implementing and managing innovations to help the city flourish.

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Journal of the IIA (August 2021) City Syntax: Unfolding The Urban Sphere—Ar. Rahat Varma & Ar. Samruddhi Bhalerao

Cities are centers for social interaction and the inventions that result from it. Although urbanization has brought about many positive changes in society, it has also contributed to many of our most enduring problems. Our understanding of the activities that shape how cities originate, evolve, and function as context has always benefited from new perspectives offered by complex network systems. All these entanglements differ from region to region and each time a diverse character zone is born. A city has its own culture, which shouldn't be layered, submerged or replicated anywhere and by anyone. As understood, urban spaces have numerous functions and these consequences are more often interdependent forming a web of activities across the city.

These activities seamlessly develop interaction and cohesiveness within the urban sphere. While the networking of the city could be related to the semantics of the city. Intangible configurations of city networks exist with commercial, market, global finance, cultural, and social ties that have historical significance for our daily lives. In the case of India, all of these are intricately connected because settlement age also affects the complexity and development of these networks in this country.

Imagine observing the subtle layers of cultural, financial, environmental, and ecological impacts as our cities change over time. Additionally, it would be possible for these web-structures to overlap one another and affect how we navigate the city and live there. Dynamic of the City: People and City Cities can provide for everyone only when they are produced by everyone, and only then do they have the capacity to do so (Jacobs, 1961). We now believe that cities are dynamic ecosystems as a result of our learning. Cities are much more than just the pursuit of novelty and invention and aesthetic universalization. It concerns the feelings and values that people identify with. The goal is to preserve "a particular cultural ethic."

The City Shaped—Spiro Kostof

Main purpose of this book is to explain the city pattern and the city formation history and also explain Organic pattern and the grid formation of the city. City is the maximum concentrated power with dense settlements of people. Urban form cannot neglect the human behaviours while shaping the city and also we need to understand the social activities of people. How does the city form? He also explains how the city takes their shapes in a way. Form as a receptacle it could be abstract and behavioural possibilities. While the evolution of the city and respect for their culture and history. Land and land market, building and other regulatory measures are taken to the formation of city shaped. The designed city can be grid, circle, polygon, etc. The spontaneous design with no designers, an irregular shape, and organic form. He thinks that the city is an organism like a human body park and Open Square (lungs), city centre (heart), and street area (arteries). The organic form can be unplanned with irregular form. Origin of urbanism influences security, political, sociological responses, religious, and infrastructure needs for people. Water plays a major role in critical human settlement. This entire thing is not something different about modern cities and their basic needs for future land use and redevelopment. Various urban developments around the world develop with the fundamentals of religious structure as per sun, moon and the stars is the orientation of the structure. City shaped can be Organic form and dynamic formation with grid and non-grid And central part of city has more settlement of people. While the formation of the city Cultural and historical background have been taken care off. Important element to help the city's security. Religious and the infrastructure people. Which makes the city strong and helps the people.

Space for Engagement: The Indian Artplace and a Habitational approach to Architecture—Himanshu Bhurte

The book looks at tangible/intangible responses of the people towards built form. Social engagement is an important response in terms of architecture. As an architect, the spaces you design dictate movement and interaction of people with each other and with the building. This review focuses on the sociability part of the book mentioned in Chapter 8. The writer describes how environmental situations affect social interactions. Classrooms, family living rooms, railway waiting rooms, gardens or markets all of them facilitate social interactions differently. Something as small as placement of benches of students and chairs of the teacher in the classroom dictates the interaction between them. Scale of the living room in a house dictates if the space is cozy for social intimacy or not. Every inhabited space has its own requirement to fulfill its own type of social interaction.

The book gives a unique insight on architecture, its relationship with people and co-presence of people. Interaction can not only be defined in the 'area program' but also in spaces which are often miniscule or neglected by us such as transitional

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space. The design as a whole, be it built/unbuilt should create some kind of narrative which is unique from one individual to the other.

3. RESEARCH METHODOLOGY

Research Methodology in this project is required to create a framework to study the city of Jaunpur and topics related to cities and social engagements. Objectives to be completed through study and analysis.

Objective 1: Study and analyze the city of Jaunpur in terms of history of art and architecture. This Objective to be completed through qualitative analysis of literature review.

Objective 2: Study the current scenario of the city in terms of urban fabric and public interaction with the heritage structures and area around it.

This Objective to be completed through ethnographic study and mapping of the city of Jaunpur.

Objective 3: Understand important elements in a city and contribution of social engagement in a city. This Objective to be completed through qualitative analysis of literature review.

Objective 4: Study points of social engagement throughout the city and find out the gap.

This Objective to be completed through mapping of the city, study of points of social engagement and interviews of the locals of the city.

4. RESULTS AND DISCUSSIONS

Through mediums of data collection and mapping of the city, one understands that there are no formal space for social interaction. Literature review in the upcoming chapter makes one understand the importance of social engagement and how it is the backbone of the city. A city needs to have a space which represents it's culture and potential. This space should help people generate some kind of revenue to understand the potential of the people living there. That space needs to be for the people and by the people and of the people.

Architectural Intervention will be a culmination of all the social engagement points from all over the city which includes: Bazaar, Eateries, Space to learn the art and crafts of the city, formal space for Mushaira festival. Apart from this, newer spaces will be dedicated to just social engagement on site. Viewpoints of the River Gomti to be considered.

- From study and mapping of the city of Jaunpur, one understands that there is not a single dedicated space for social interactions.
- People while shopping need a place to relax which is missing in the current scenario.
- Chikankari, ittar and oil making, making of silver jewelry are not showcased enough as art and craft.
- The Modern Icon of the city which represents both the past and present of the city is missing.

5. CONCLUSION

Architectural Intervention will be a culmination of all the social engagement points from all over the city which includes: Bazaar, Eateries, Space to learn the art and crafts of the city, formal space for Mushaira festival. Apart from this, newer spaces will be dedicated to just social engagement on site. Viewpoints of the River Gomti to be considered.

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Halfway Housing Post Prison in Indian Context

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ABSTRACT: A halfway house is an institute for people with criminal backgrounds or substance use disorder problems to learn (or relearn) the necessary skills to reintegrate into society and better support and care for themselves. One cannot compare the difficulties that people encounter in different lifetimes unless one has walked in their shoes. A person will respond differently to various situations, and each of these events will have a distinctive answer that will be subjectively assessed. Such is the life of people who have been formerly incarcerated by the judicial system. A person commits a crime due to various reasons though they might not be justified but such is the way of man that when given a chance to evolve and learn from their mistakes with the support of the surroundings, a person does find a way to reformation. A fair chance to reconstruct the fragmented lives of people and rebuild relations after having served their sentence, to having to relearn the contentment in life and care for themselves and their loved ones, is the ideology that this book and the extensive research that has been carried out adopts.

While enduring the horrible conditions of a prison, a person experiences a wide range of emotions. These emotions alter the person and also have a negative impact with lasting effects. These emotions and thoughts are carried forward even after release from the correctional facility. In a way to find their life back, this trauma causes a hindrance and forms a barrier for the person's mental and physical recovery. The aim of this book is to help the reader educate on such difficult times in a person's life and thus unearth the possibilities of aiding them to rehabilitation and have a sound, independent and progressing life ahead.

By studying the various aspects of mental health and mental disorders and how architectural spaces and therapeutic spaces can affect the healing process of patients which is a very important part of the research, helps in implementing design strategies for the suitable built environment.

Architecture is an art, which has many facets to it as it is an amalgamation of science, expressions, aesthetics, technology, and satisfaction of human needs. Architecture, if practised correctly, has the ability to create meaningful spaces. The work aims to discover how architecture and aesthetics can create an environment conducive to the healing process.

The methodology of the research is derived by the desk research obtained from the internet. The study of different literature with the help of research papers, articles, online courses, websites, books, documentaries (movies, TV series). Interviews of different people from different professions help to form first hand evidence of the research to support the hypothesis. To study similar sites and projects, the case studies selected help to understand the concept, scale, climatic control, materials, the construction technology, spatial arrangements and the functioning of the facilities. This detailed research analyses the aspects related to architectural intervention of the topic.

Keywords: *Halfway House, Ex-offender, Rehabilitation, Mental Health, Social Reintegration, Recidivism.*

1. INTRODUCTION

(defn.) "A halfway house is an institute for people with criminal backgrounds or substance use disorder problems to learn (or relearn) the necessary skills to reintegrate into society and better support and care for themselves.

As well as serving as a residence, halfway houses provide social, medical, psychiatric, educational, and other similar services. They are termed "halfway houses" due to their being halfway between completely independent living and in-patient or carceral facilities, where residents are highly restricted in their behaviour and freedoms."

The halfway house contracts with non-profit organisations and private companies. They constitute the primary means of the funding and functioning of the halfway house. Since the halfway house is in collaboration with the correctional facility, the approval of the government can be attained if presented and proved to be in the government's interest.

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When the ex-offender has been let out back into the society after serving their term, it is difficult for the person to reintegrate into society and start a new life because of numerous and diverse factors. The rate at which the world changes and adapts, it is difficult for the person to adjust in their new surroundings. The ex-offender who has assumingly spent a considerable amount of years in prison will face different obstacles to rejoin the society. The ex-offender might not find familiarity with the contemporary world. The chances of being disowned by their families are high as the family might have faced societal pressure. In such cases, with no family to go back to and rely on; in addition to the extremely low prospect for job opportunities where self confidence and trust is at stake, an assisted kick start to a new life is necessary.

In such difficult situations, where people are at their peak of vulnerability, they resort to illegal, criminal activities again such as selling drugs and substances in search of easy money. This would again lead them into the same path of crime and eventually would have to serve time again.

This is where halfway houses come into picture where they serve as transitory houses for such prisoners who have nowhere to go. After having lived under harsh conditions while serving their term in prison, a person loses his confidence, self esteem and in order to regain them, it serves as a safe space to grow and learn. Most prisoners suffer from past trauma mental disorders. The halfway house serves as a safe space for such people and provides therapy to overcome their problems and protect their mental health. Not only does it provide legal aid for its residents to protect their rights, but also educate them of their rights and duties. It promotes education and skill training to its residents where they can resume their education during their time in prison. It provides vocational training that will be valuable for them to sustain in the outer world giving occupational security. It promotes leadership by engaging with community based services and social organising. Engaging everyone with community based activities will help in therapy for the residents as well as building relationships with others and gaining trust in the community.

A halfway house that encourages them with up-skilling with the help of architecture to ground the residents, normalising culture and also provides safety to the residents as well as the society.

The aim is to create a safe space and surroundings for the ex-offenders who have completed their sentences, to enhance the potential of the person and to bring out the best in them, understanding culture shock and helping with mental and physical health of the residents, in addition where they can work towards reintegration and have a stable future.

2. LITERATURE REVIEW

By understanding the past and present of a person, one will understand the difficulties faced by that person to reintegrate into society with the help of halfway houses located in neighbourhoods where they can coexist with the society peacefully.

The study was collected to form a conclusion based on different published articles, research papers, case studies, interviews, books, documentaries and movies.

Deathworthy: A mental health perspective of the death penalty (Project 39A — Deathworthy), discusses Vulnerabilities And The Social Reality Of Death Row Prisoners, where they present analytical data about the concerning mental health of the death row prisoners. Their cause of actions majorly stems out of adverse childhood experiences and traumatic life experiences.

This report helps form a relation with the people on life imprisonment where they also faced similar experiences.

An article by The wire, **"Children of women prisoners in India struggle to get proper food and education despite guidelines"**, **(The Wire, 2019)** discusses the issues faced by children who live in prisons with their mothers. The investment for the future of these children is minimal as they are denied food and education. Model Prison Guidelines as stated by the Supreme Court do not get followed in the reality of the prison.

"Improving the service environment" (QualityRights Materials for Training, Guidance and Transformation, 2021), by WHO Quality Rights is a report of guidelines for the improvement of the physical environment in services. Article 28 of the Convention on the Rights of Persons with Disabilities (CRPD) protects the right to an adequate standard of living, which includes food, clothing, housing and clean water. It also promotes ongoing improvement of living conditions. The WHO QualityRights assessment toolkit defines standards to ensure that mental health and related services respect quality of care and human rights.

"Restoration of Released Prisoners to Society: Issues, Challenges and Further Ways; Insights from Kerala, India" (Tata Institute of Social Sciences, Mumbai, India and Centre for Criminology and Justice, School of Social Work, Tata Institute

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of Social Sciences, Mumbai, India, 2020) a research paper written by Jenu Varghese and Vijay Raghavan, which aims to understand the rehabilitative measures which can be taken to face the issues related to the re-entry of released prisoners into society after their long-term imprisonment in the Indian context.

It explores the issues and challenges faced by the released prisoners during their social re-entry and Rehabilitative initiatives for a better restoration process in the Indian context.

A research paper "Incarcerated Mothers' Contact With Children, Perceived Family Relationships, and Depressive Symptoms" (Poehlmann, 2005) written by Julie Poehlmann talks about the relation with children, perceived family relationships, early experiences of relationship disconnection and trauma, and maternal depressive symptoms in incarcerated women. The results highlight the need for mental health services for incarcerated women who have lost contact with their children.

"Spaces Inspired by Nature" (Pitkar) written by Shirish Beri, tries to explore the many ways in which he attempts to address his concern for man's alienation from Nature through his work as an architect.

It discusses the consistency of his design philosophy which is called "Form Follows Nature".

The illustrated essays discuss his views on various issues concerning architecture and life. They range from sustainability to art; from immeasurable spirit dimension to vernacular architecture; from aesthetics to ethics; from various tools for connecting with nature to architectural education.

It also explains the design ideologies behind Muktangan Rehabilitation Centre, Pune, Maharashtra. **"Therapeutic Architecture: Role of Architecture in Healing Process" (Rethinking The Future)** is an article by Rethinking the Future, which talks about the aid in healing process and how it affects human psychology as a way to encourage therapeutic architecture.

2.1 Scope

- It helps with education and literacy rate as it aims to provide education and job opportunities to the former prisoners who are generally poor and illiterate.
- It works towards the awareness of legal rights of the ex-offenders by educating them and also providing legal aid when necessary.
- To provide aid for women offenders who have been abandoned by society and help them to become self-sustainable.
- It serves as a measure to reduce recidivism in the country.
- Helps in normalising the need for treatment for mental and physical health.
- It works towards breaking the social stigma of what the ex-offender is labelled as, and also the stereotyping occurring for all genders.
- It assists in community based activities and services which not only helps in regaining the confidence and self esteem of the residents but also regain the trust from society.

2.2 Limitations

- The idea of a halfway house needs to be accepted by the individual in order to help in their own interest.
- The halfway house should also be accepted by the neighbouring community.
- The ex-offender will be considered as a threat to the outside world.
- It is a strenuous exercise to bring everyone together when different people come with different backgrounds.
- It is a challenge for the women offenders to reintegrate into society whilst supporting a child.
- The government could take active participation when the halfway house works in accordance with the betterment of the society.
- India is a densely populated country with different ethnicities and beliefs and it is difficult to achieve acceptance from everyone.

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3. RESEARCH METHOD

The study discusses the various aspects of the understanding and functioning of a halfway housing for the ex-offenders, thus understanding how architectural spaces and functions will help their progress into re-integration.

The methodology of the research is derived by the desk research obtained from the internet. The study of different literature with the help of research papers, articles, online courses, websites, books, documentaries (movies, TV series). Interviews of different people from different professions help to form first hand evidence of the research to support the hypothesis.

To study similar sites and projects, the case studies selected help to understand the concept, scale, climatic control, materials, the construction technology, spatial arrangements and the functioning of the facilities. This detailed research analyses the aspects related to architectural intervention of the topic.

Objective	***Strategy to Achieve***	***Medium***
Understanding Halfway houses and their significance to Indian Context	Literature and document study to learn the concept of a halfway house.	Websites, research papers, articles, books.
To understand the problems faced by ex-offenders	Literature study and analysing data.	Websites, research papers, articles, books, documentaries, interviews.
To study the architectural and spatial design aspects of a halfway house.	Case study visits to understand the flow of movement and spatial arrangement.	Books, articles, websites, case studies.
To study new concepts and design interventions for mental healthcare.	Forming questionnaires for interviews, literature research.	Interviews, books, websites, case studies.
To formulate steps that are required in inscribing a narrative in real space.	Zonal mapping and observation of case studies.	Case studies, websites.

4. RESULT AND DISCUSSION

The conditions of the prison are not in the favour of the prisoner. After being released, the ex-offender faces short term and long term effects of the incarceration. The treatment and mentality imbibed in the prison can have more negative effects than positive. The trauma one faces while being in prison, can have lasting effects and cause impact on their physical and mental wellbeing. The research discusses that the majority of prisoners suffer from mental health disorders such as chronic depression, PTSD, Anxiety disorders, Bipolar disorder, Schizophrenia. Once they are released, the difficulty in overcoming mental stability, and loss of purpose and and family disconnection leads them back to crime and even pushed towards suicide.

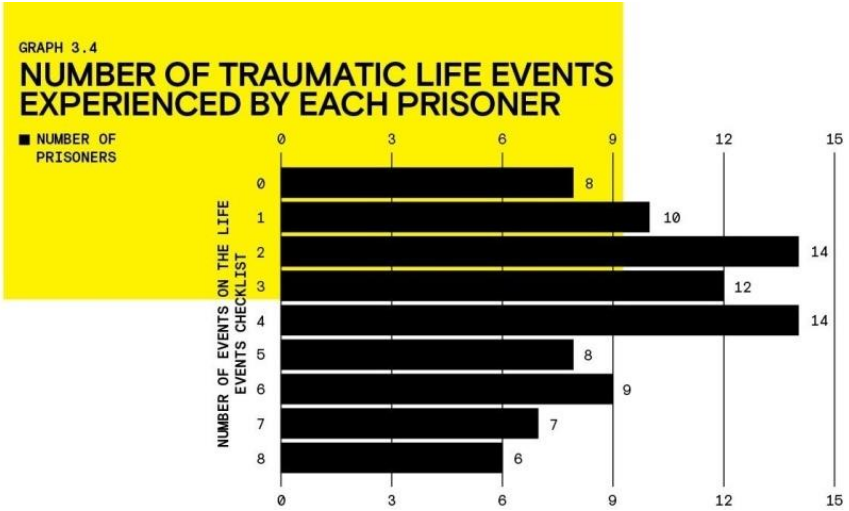


Figure 1: Number of Traumatic Life Events Experienced by Each Prisoner

(*Source:* Project 39A—Deathworthy, 2021)

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Apart from accepting themselves, it is strenuous for the community to accept an 'ex-offender amongst them. They are socially stigmatised and discriminated against and labelled as a criminal even after having served their term, without giving a chance to redeem themselves back into the society. The negativity imposed on the ex-offender becomes a threat not only to the society but also themselves. This becomes a struggle to reintegrate them into society. The reinstatement of the person as an individual to stand independently and to suffice for themselves becomes a hassle.

Majority of the ex-offenders are poor with low socio-economic status and illiterate. The lack of knowledge acquired, they are not able to defend themselves as they are not aware of their rights and duties.

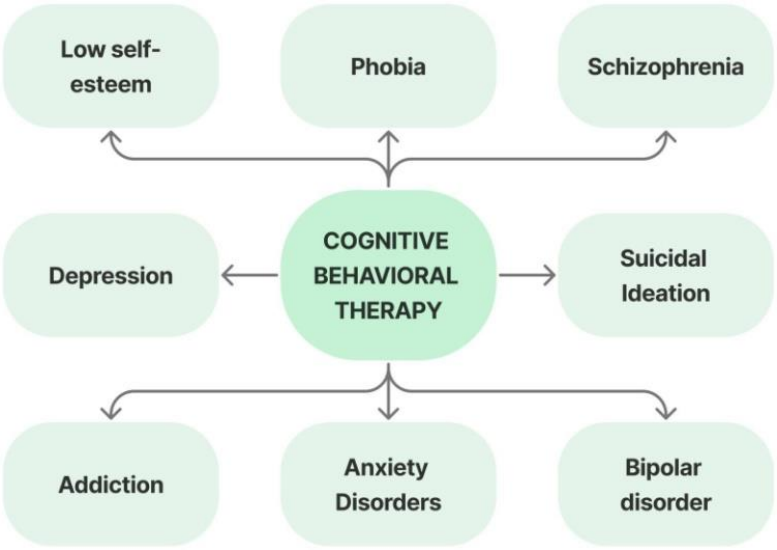


Figure 2: Cognitive Behavioral Therapy *Source:* Author

Women offenders are often abandoned by their families, leaving their children to be left with the woman in the prison. With no one to support them, the women have to work harder to provide for the child and such challenges posed after release it is strenuous to reintegrate into society. The impact of the child is also of a major concern as the child has been deprived of basic necessities and education affecting its future.

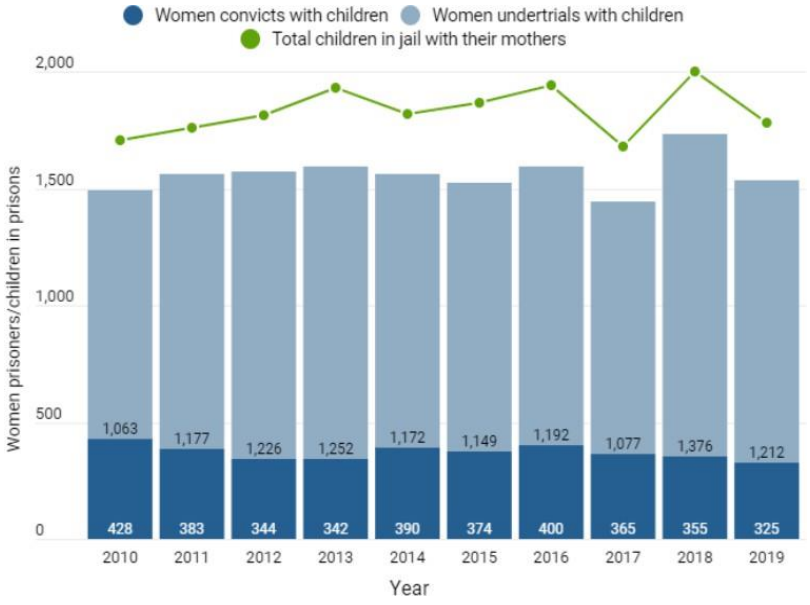


Figure 3: Women Inmates with Children in Indian Jails 2010–2019

Source: Prison Statistics India, National Crime Records Bureau.

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The concept of a halfway house is a novel idea for India. Considering the challenges faced by ex-offenders and the difficulties they face after release, and reintegration into society, the introduction of the concept of a halfway house to the criminal justice system, serves as a ideal measure to successful reentry of ex-offenders as well as reduce the chance of recidivism in society.

> *"The idea of reintegration essentially encompasses working with the offenders in order to bring them back to the community, facilitate conditions to promote law-abiding behaviour and reduce the rate of recidivism.*
>
> *Reintegration thus aims at facilitating the ability of the ex-offender to function within the community, within their family, employment and be capable of managing circumstances in a manner that circumvents risk and additional conflicts with the law."*
>
> *(Singh, 2016)*

The halfway house is a medium between the ex-offender and the society and serves as a bridge between after release effects and successful reintegration into society. The halfway house caters as a comprehensive and an elaborate mechanism to work with the physical and mental wellbeing of the ex-offender, in order to make them independent and achieve self sustenance. By serving and protecting the rights and needs of the ex-offenders, it reduces the chance of recidivism. As the ex-offender finds a future for themselves, it reduces the possibility for them to turn back to crime.

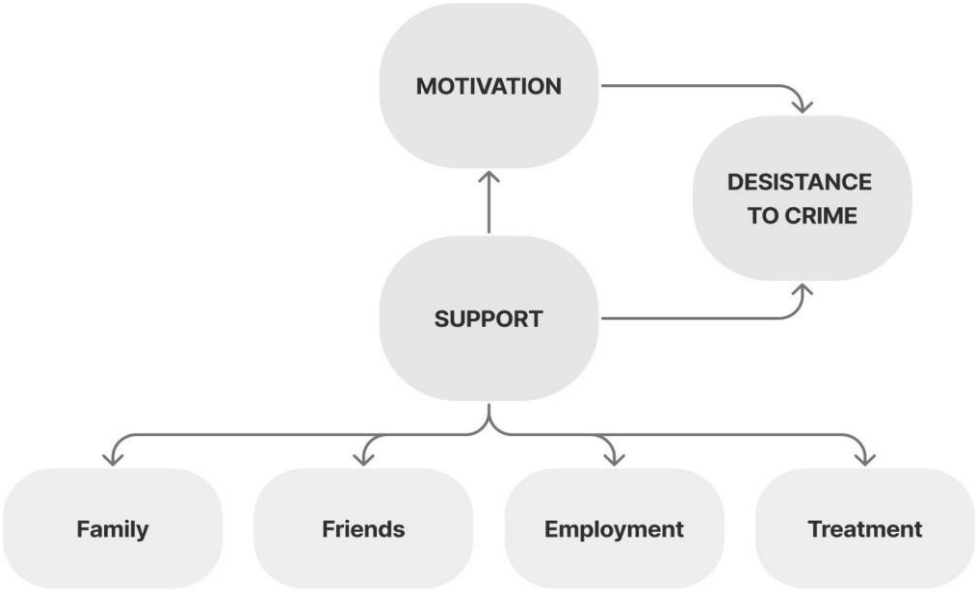


Figure 4: Model Showing Motivation and Support to Interact with Desistance to Crime

Source: Author.

The halfway house promotes education to the ex-offenders as an attempt to teach them their rights and also provides legal aid. By providing education, the residents have a better chance to find jobs outside and increase their potential. Promotion of vocational training such as stitching, knitting, handlooms, textiles, gives them opportunities to earn and provide for their families.

The access to recreation and open spaces is also important to the residents as they were deprived of such freedom, giving them a sense of liberty. The open spaces like amphitheatres, gardens, farming, outdoor activities help in the process of recovery.

A chance to family is ensured by the halfway house as it also takes care of the ex-offenders children, by giving them education and post trauma therapy, securing their future in a right direction.

Transition housing programs are responsible to protect and support the health and wellbeing of their residents, and gender-specific housing ensures that the issues of one group do not create an unsafe environment for the other.

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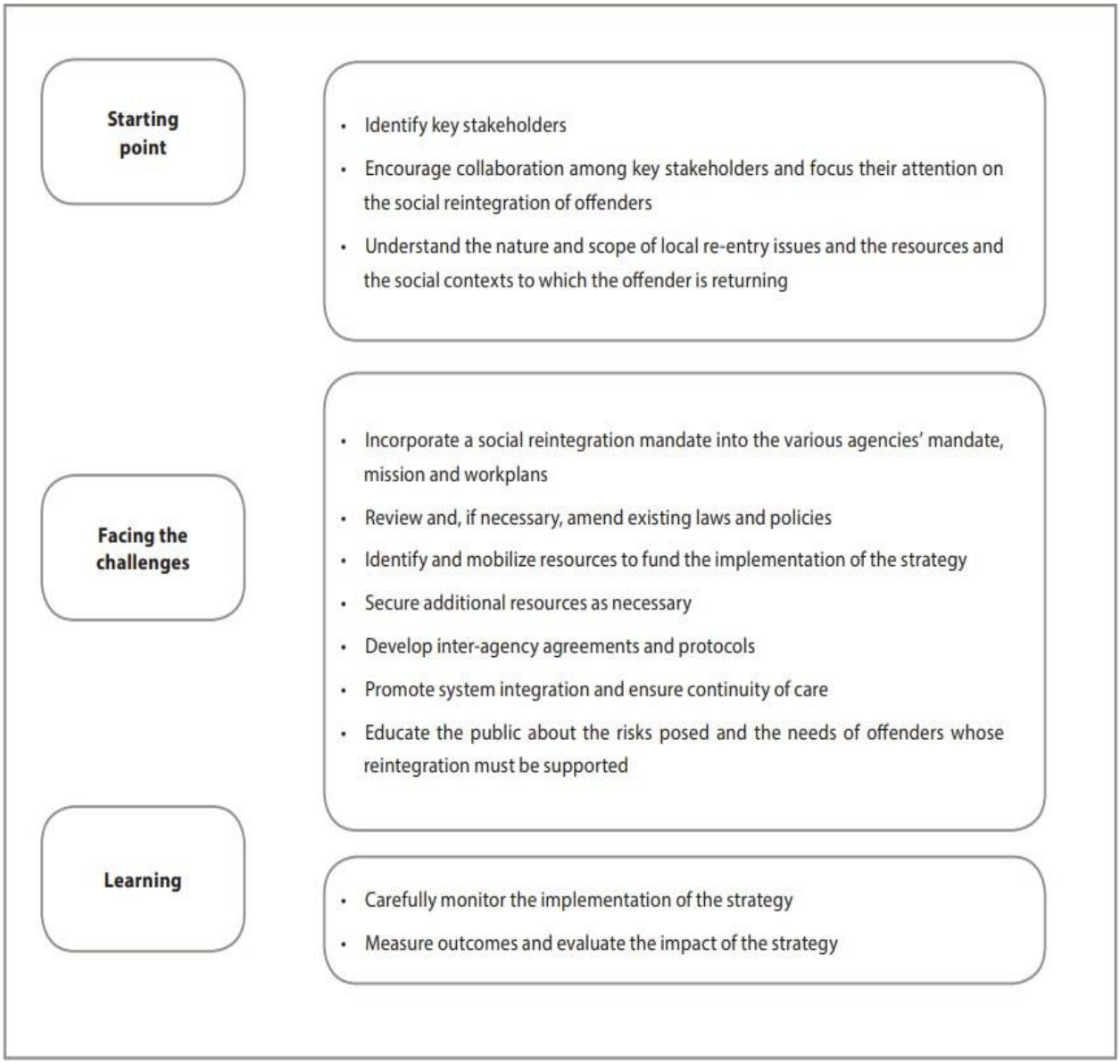


Figure 5.4: Elements of a Social Reintegration Strategy for Offenders

Source: United Nations Office on Drugs and Crime, 11.

5. CONCLUSION

Connecting the two ends, the halfway house provides various facilities for an ex-offender to build a life in order to become self-sustainable for themselves and their families. With the intention to provide psychological, medical and legal assistance to the prisoners, the NGOs and the prison work together to provide support. The halfway house develops an environment for the melioration of the prisoners. This supportive environment with the help of therapy and recovery process, guides the resident towards rehabilitation, by engaging in social settings, community activities and interaction. As a measure to become comfortable in the surroundings, these reforms serve as a step towards regaining confidence and self-esteem in the community, thus attaining the feeling of being accepted.

Compared with the number of male prisoners, the number of female prisoners is relatively small. As a result, most prison systems and after release programmes tend to be planned, designed and managed for male prisoners, leaving the particular needs of female prisoners unaddressed. Very often, women in prison do not receive adequate, gender-specific rehabilitation resources or guidance preparing them for release and life after imprisonment, despite the fact that women are often ill-

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prepared for release from prison. Women in prison are more likely to have a history of sexual and physical abuse, and they suffer from mental illness at a higher rate than male prisoners; moreover, if they have a history of drug abuse, it tends to be different from that of male prisoners. Most women, because of the nature of the offences they have committed, can be detained safely under far less strict security levels than men, a fact that has implications for restrictions that can impede their social reintegration.

In addition, women face specific social reintegration challenges in the community. Prior victimization, such as childhood or intimate partner abuse, may provide pathways to drug use disorder, limited job opportunities, prostitution and involvement in criminal activity. A history of victimisation, the unresolved trauma and the socioeconomic disadvantages that characterise a significant proportion of the population of women prisoners predispose them to mental illness and self-harm. Women have alarmingly high rates of mental health problems such as post-traumatic stress disorder, depression, anxiety, phobias, neuroses and drug use disorders. This is often a considerable obstacle to gaining acceptance in their community. Developing strategies to prevent suicide and self-harm and to provide gender specific and individualized mental health treatment to female offenders, both during their imprisonment and afterwards (when they have entered the community), must be recognized as a priority.

Imprisonment creates special challenges for mothers, in particular if they are unable to maintain bonds with their children during the period of imprisonment. Along with other challenges, such as a lack of employment and accommodation, women must reassume their role as mothers following their release.

While family support is an important factor for the offender's eventual family reunification, incarceration even for a short period is associated with shifts in the family configuration, increasing the risk of divorce or separation. Children of incarcerated women are a neglected and vulnerable group. In many cases, they suffer from lack of food, no exposure to social interaction and no access to educational and health services. They also suffer from the stigma of being associated with the prison system through their mother.

The proposal to design a halfway house for women serves a greater need of rehabilitation. The women face the full extent of challenges, by being stigmatised by the society, being abandoned by the family, needing to support a child in most cases even while living in a prison, the lack of education and the prospect to acquire any job to provide for herself and the child. Designing a safe place for rehabilitation for the more vulnerable part of society, the women, and their children, adds more value and comprehension to the quality of architecture. This type of architectural space having a more justified and primary cause can be applied to the dominant user such as men but the vice versa, the intimacy involved in designing establishments for men cannot be implied to for women as the requirements are different as a different sense of sensitivity is required.

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Sincere gratitude toward my thesis guide, Professor Rajesh Rokade. I truly appreciate his time and efforts behind this research paper and for always guiding me if and when I felt astray. His attention to detail and invaluable advice, and above all, his patience has made this project possible.

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Lavanya Soparkar.

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Co-Working Space in Incubation Center

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ABSTRACT: There is an overwhelming consensus among researchers world over, that the work environments of today are transforming at a rapid pace. Many workplace physical environments rely on rigid models of 20th-century office design, but today's increasingly mobile workforce requires a more flexible work environment. India has launched many innovation spaces such as co-working spaces and innovation hubs in the last five years, giving birth to a new model of workplace design. The purpose of incubation is to nurture and build new and small firms by assisting them through early phases of development and transition. Incubation ecosystems are essential for the development of new technologies, innovations, and the success of businesses. The seed of startups has also emerged in this age of new technology, machinery, and businesses.

In the past decade, co-working spaces have emerged as a new and promising phenomenon within entrepreneurship. Co-working spaces and incubation centres is an environment without the stuffiness of corporate office space, more structure than your home office. Co-working spaces are a shared location which provide a cost-effective workplace along with networking opportunities, high-tech facilities, as well as offer support through mentorship programmes. Co-working spaces have become a central component of new work environments.

The main aim is therefore to study the working spaces in order to establish the architecture principles behind the physical design of their workplaces. This research paper mainly focuses on the types of coworking spaces in an Incubator.

This study is limited to the study of the work environment in a business type of Incubation facility.

Keywords: *Incubation, Work behaviour, Nurturing start-ups, Innovation, Co-working spaces.*

1. INTRODUCTION

A co-working space is a type of workplace where we share a common workspace and establish a local community. The phenomena of these co-working spaces has developed tremendously all over the world since they are the sole choice for start-up entrepreneurs to begin establishing their firm. Co-working spaces are often regarded as office spaces that come with wrap- around amenities for a minimal risk monthly charge. People frequently select co-working spaces over traditional corporate offices because of design.

The characteristics of co-working spaces have evolved throughout time. Most work can be completed in isolation in the millennial era with only a virtual human connection through the internet. In addition to offering private, secluded office space, this mobility and flexibility in working locations changes the dynamic of the workplace by encouraging public engagement among employees and teamwork.

This May be Done in a Number of Ways, Including

Outdoor areas: Nature has always been a source of inspiration since it helps to clear the mind, which has a beneficial effect on creativity and productivity either through a visual connection or by having actual access to such locations,

Connectivity: Instead of segregating the workspace on the basis of department or post a better interaction between different kinds of employees can make them more broad minded.

Meeting areas: Meeting areas include casual meeting areas, interaction zones that serve as spaces for brainstorming sessions, and breakout areas in addition to official meeting and conference rooms. Such zones should be placed in a floor plan that is properly connected to other areas.

Collaboration: Provision such be provided architecturally to facilitate collaboration with different firms or organisation.

Focus: Some spaces with a decent level of privacy should also be provided to allow the workers to focus and concentrate.

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Learning: To help train new hires or young entrepreneurs, learning resources like libraries and workshop spaces should be made available.

Mobility: Instead of having a working desk where the work is done, employees should have interactive zones where the job is done. This is where technology may play a significant role.

Socialize: Socializing areas like a cafe, restaurant, or amphitheatre should be given.

1.1 The 21st century Evolution of Work Culture

History of Work Culture

As the companies' external environment has changed, the need for work of thought increases, which advocates that work can be executed at different times, and in different places, depending on the individual rhythm and times of peak performance. There is a need to create a new version of the old compartmentalization of life, because the new realities do not facilitate the recreation of clearly demarcated limits between work and spare time. However, we can learn, we can adapt, and we are able to utilize the advantages of modern technology while we ride in its tides of change.

To attract the individuals capable of creating valuable thought output, companies need to move away from the antiquated and rigid industrial thought paradigm, and move towards the new innovative and flexible work culture. Companies must find an optimal balance between these two poles of work culture, benefiting from both the structure and discipline of the industrial work culture, and the flexibility and freedom of the innovative mindsets, and from this new balance develop a new and unique work culture.

Role of Innovative Spaces

The Role of Management in the industrial work culture was time control and working environment control. This management model was perhaps suitable when it came to control the visible physical work, which demanded the same rhythm and speed of the workers.

Now that so much of working consists of the movement of thought that is invisible in the production process, the management has to move towards supporting interplay, interaction and facilitating individual flexibility to work during the most effective times and in an energizing and inspirational environment (not necessarily the office).

1.2 Types of Workspace We Work Spaces

A survey of employees by We Work and Reuters found that when U.S. workers were asked what would make them more satisfied with their job, the top wish was better work areas/facilities (13 percent). That response even edged out higher pay (9 percent), better hours, and more vacation time.

Hybrid working is adopted for new working operating structure, buildings, new culture settings which will cater to company leaders to set and implement.

Workspace included in We work Buildings are as follows:

- Private office
- Meeting room
- Office suite
- Dedicated desks
- Full floor office

1.3 Aim

To study the finest office spaces along with infrastructure that abide common interaction space and other facilities. To study different types of workspace.

1.4 Objectives

- To provide a creative and realistic environment for an incubator that encourages and accelerates the potential of new collaboration opportunities via the use of spaces that can be adjusted to meet changing technical and spatial needs.

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- To give technical support in the creation of processes, technology, and products, as well as managed workspace.
- Innovators and executors could meet at a common place and share their ideas.
- A structure to reflect the contemporary and growing image of the country.
- To indicate various workspace and their parameters to measure the user comfort.

1.5 Scope

- This study focuses to understand the inter-relation and functionality of various spaces in an incubation, combined with a critical analysis of its conceptualization.
- To understand the requirements of small business.
- Study spaces which are adaptable and flexible in nature.

1.6 Limitations

This study is limited to the study of the work environment in a business type of Incubation facility.

1.7 Identification of Research Questions

- What is an Incubation centre? What are functions and need of Incubation centres?
- How were the informal spaces provided in your office?
- What are the influencing factors that enhance the functionality of an incubation hub?
- What are the parameters that enhance productivity within a workspace?
- Which work setting boosts the occupant performance and comfort?

2. LITERATURE REVIEW

2.1 Herman Miller: Measure What Matters

Herman Miller's Measure What Matters paper talks about the use of space and ways to efficiently use the space in offices. Space allocation in a workplace cannot be bench marked as each organization has a unique culture and collaborative work practices. In one of the studies, researchers found it important to provide spaces responding to the task at hand and documented a need for group workplaces that include:

- Meeting rooms for formal meetings & negotiations
- More casual places for having more creative meetings & brainstorming sessions
- Quiet rooms for tasks requiring concentration & peace
- Appropriate space for informal communication and ad hoc discussions
- Appropriate social spaces such as coffee lounges

Researchers also found that meeting rooms in traditional office layouts are often underutilized. For better collaboration and space allocation of group work, smaller settings for scheduled meetings or ad hoc discussions prove to be useful. Findings suggest that optimal team size should be five and smaller teams perform better than larger teams (Appelo, 2011). Leading corporate companies are moving from assigned workstations to a variety of shared work points which are designed to support different activities. The current trend in office layouts focuses on downsizing & densifying the space but in many cases the total usable area per person is the same as this space is utilized in collaborative and amenity space to better align work styles with the workplace to enhance productivity. Initially the purpose of providing shared work points was to reduce usable space per person & better usage of the trapped spaces in the dedicated workspaces which remained unutilized for most of the time. It has now evolved to make an effort of encouraging collaboration and creating community. Such user oriented design leaves a respectful impression on the users. In a study investigating the effects of these alternative workplace strategies on the experience of privacy, crowding & satisfaction, it was found that design intervention that ensured spaces for private conversations and alternative spaces to work reduced feeling of overcrowding and lack of privacy, even in high density plans (Keeling et al, 2015)In these transitional areas, movement, social interaction, and knowledge sharing combine to create a powerful potential for productive and engaging work experience. As compared to the conventional distant break rooms, well-appointed gathering spots creating a community focal point placed centrally on

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the floor plates or near the heavily trafficked areas can have a deeper function and meaning. Taken together, these emerging space-use patterns point to a need for purposeful variety in workplace design: a customized mix of defined settings arranged to support the unique works and goals of a given organization.

2.2 An Evolution of Work Culture

The concept of work culture is today characterized by two very different paradigms: the paradigm of the industrial work culture and the paradigm of the innovative work culture. The former has dictated how companies should organize their production and workers for centuries – the later has only just arisen in the horizon on the global scene and is still in the making.

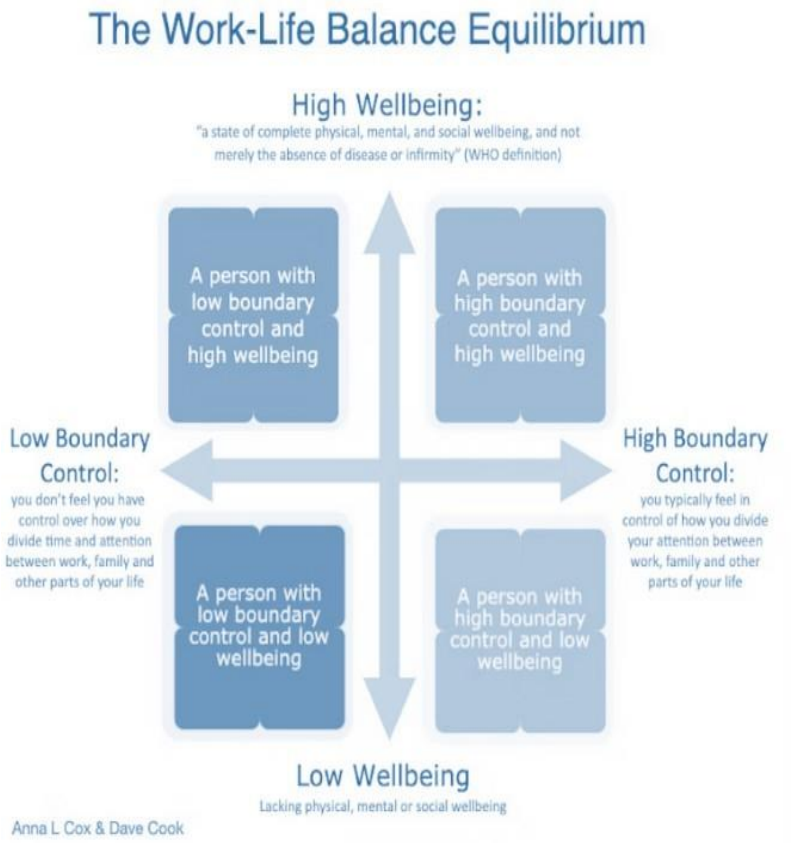


Figure 1: Work Life Balance Equilibrium

Just a few decades ago it was a common place to mentalist life with reference to physical space, which made it easy to live by the norms dictated by a spatial classification of life. When at home, one was "at home" or "off," and when at work, one was "at work" or "working." The industrial mindset emphasizes visible work and physical output, requiring a fixed work place and exact working hours, and thereby supporting the collective work design.

2.3 Workplace Environmental Psychology

Introduction

This unit deals with environment psychology as applied to work place. Starting with impact of environment on workplace and deal with the importance of workplace environment in greater detail. Then physical environment in the workplace and other issues like illumination, noise, heat and cold, color, indoor pollution and indoor air quality, etc are discussed. Importance to personalized space for the employees in the workplace and also the need for open place office is added further. The social environment in the work place and its importance in employee's performance in the workplace situation is mentioned.

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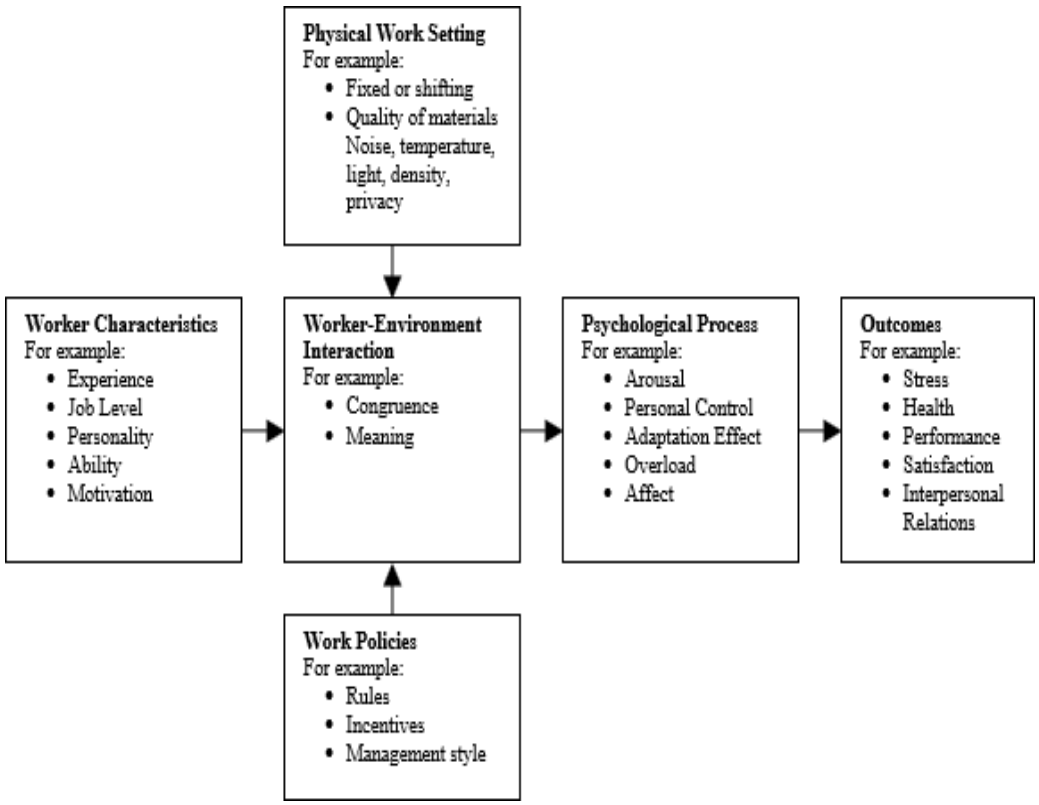


Figure 2: Workplace Environmental Psychology

Impact of Environment on Work Place

It is the quality of the employee's workplace environment that most impacts on their level of motivation and subsequent performance. How well they engage with the organization, especially with their immediate environment, influences to a great extent their error rate, level of innovation and collaboration with other employees, absenteeism and, ultimately, how long they stay in the job.

Physical Environment

Many aspects of the physical work environment influence job satisfaction and productivity. Again, environmental psychology is Concerned with the impact of the environment on human behavior. In addition to studying large scale question of work space, design, psychologists have conducted extensive research on specific physical environmental factors, including illumination, noise, color, music, temperature and humidity.

2.4 Open Plan

The concept of large working places evolved during the industrial revolution whereby dingy, stuffy cubicles or desks used to be provided in a regularized fashion to reduce human interaction and increase productivity in monotony. However, humans crave interaction to be more creative and innovative. This seclusion within workers leaves out creativity and prevents collaboration and innovation. Studies have shown that an open plan improves the frame of minds of the employees. The open creative playground is a prevailing fundamental design of the digital economy. Many companies like Google, Apple, Yahoo have moderated their working spaces to become more social by making interactive spaces. The evidence presented in Working Without Walls (AllenT, Bell A, Graham R, Hardy B & Swaffer F, 2004) demonstrates that open plan environments are more common than they were, as enclosed offices have decreased in number, densities have risen and shared meeting and project areas have increased. A densely-partitioned space tends to be less efficient by introducing more secondary circulation than is necessary and by increasing individual allowance on space. Growing numbers of organizations have therefore dispensed with cellular offices altogether, preferring instead a more egalitarian layout, with greater choice over work settings. (National Committee of Sciences, 2008)

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3. MATERIAL AND METHODOLOGY

Data Collection

- To carry out case studies of similar projects already built. Case studies include study of different incubation centers and co working spaces including the spaces required for them to work.
- To carry out detailed library study/Internet study to know the basic standards of each kind of required space to be designed.
- To carry out a visual and physical survey of the site and its surroundings.
- To collect information about government schemes and policies related to the topic.
- **Primary source:** Primary sources are used to understand the space requirement and decide the design program accordingly. To study the various physical characteristics including their merits & demerits to better understand their functioning and use.
- **Live case study:** Case studies basically helps in understanding the spaces; understanding the services; understanding the spatial context and the circulation among spaces. Moreover the functionality image becomes clear.
- **Interviews and surveys:** Survey form asking questions relevant to the research and getting public opinions about the same helped me come to the design intent and brief.

Secondary Source

- Secondary sources were referred to as internet research. This includes existing studies done by various researchers, reports, research papers, websites and internet case studies.
- Online researcher: This includes existing studies done by various researchers, reports, research papers, websites and internet case studies.

This overall study will help in reaching the end user directly or indirectly.

- Understanding user experience
- Understanding user preferences
- And, understanding the problems (which architecture can solve).

Content Analysis: The data hence collected from literature review, conducted case studies and surveys is then summarized and relevant inferences are jotted down in order to give an idea about the process, factors and interaction of spaces with humans which in turn helped in the formulation of the design brief.

4. RESULTS AND DISCUSSION

Inferences from case study:

We Work, BKC, Mumbai Work Space Typology

- **Hot Desks:** Hot desks have been provided on the ground floor in the entrance lobby area and on the 7th floor that is the recreational floor. These are free of charge proposition at first come first serve basis. Since these are undedicated work desks it gives greater flexibility to users to where they want to work. These also create a more interactive work experience.
- **Common Co-working Space:** This is a large glass partitioned enclosed workspace with several dedicated work desks for users but each one is working individually in this common space. This is for users who prefer working in a co-working environment rather than in an individual cabin.
- **Individual Cabins:** These are dedicated spaces rented to users who want private work environment.
- Office Spaces: These are dedicated rentable spaces for offices and start-up. These spaces range from two desk space, three desks, all the way up to the required number of desks. An entire floor can also be rented if required by the user.
- **Conference Rooms:** Formal discussion rooms have been provided for common use by the users. These rooms have different capacities ranging from 3-seater conference room to a 8-seater conference room.
- The various co-working workspace typologies increase the flexibility for renting out spaces from indusial undesignated, designated, private offices, and common workspace helps the clients work in the most comfortable typology to them, be it private, semi-private or public.

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- The recreational floor is the most active in the building with the provision of hot desks and informal conference rooms for people to relax and work at the same time.
- Informal seating on each floor promoted interaction amongst differ people.

5. CONCLUSION

Flexible working is a central part of this solution. One of the hardest things to achieve within hybrid working environments, however, is a shared sense of purpose and culture across teams and the company. Companies were already moving towards more flexible working**.** Workplace choices will differ greatly depending on the business, the managers who run it, and the type of work. Effectiveness of alternative work arrangements will depend on clear communication, a readiness to try new things, and trust.

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ISBN: 978-93-89934-68-7

Author Index

A

Advani, Naomi 547
Agrawal, Keshav 460
Agrawal, Shivam Anilkumar 255
Aher, Neha 599
Almelkar, Sufiya Babajan 334
Atluri, Gayatri 557
Avachat, Varada V. 94
Avhad, Ankit Bhagwan 88

B

Bangad, Mahesh Rameshwar 571
Bathija, Yagnik 214
Bhagwat, Atul 622
Bhange, Anjali Balu 571
Bhanushali, Vidhi 19
Bharat, Oswal Preksha 408
Bhutalia, Parth 505
Biviji, Akbar 171

C

Chandrasekhar, Aarthi 25, 222, 317, 408, 445
Chavan, Hrithik 642
Chenji, Vishnupriya 557
Chhatwani, Naresh 242, 293, 347, 355, 360
Chitale, Priyamvada 83, 423, 429
Chokshi, Swati 547

D

Desai, Kirti 653
Desai, Nidhi Dhananjay 77
Deshpande, Kedar 180
Deshpande, Madhura 73, 165, 434
Deshpande, Sudhir 269
Dhawale, Shilpa 627
Dhondge, Sharvey Ramesh 275
Dixit, Aparna 394
Dubey, Anvita 114
Dubey, Shreya 557

E

Ekawade, Shweta Parab 193

G

Galinde, Vedant 477
Gandhi, Akshay 365
Ganu, Prajakta 60
Garud, Shekhar 124, 306
Gedia, Raj 360
Gopalakrishnan, Ramiya 460
Gupta, Divya 534

H

Hindlekar, Mitali 647
Hipparkar, Dinesh 151, 520
Hiremath, Vinaya 114

I

Inamdar, Anuja 106

J

Jadhav, Rajratna 467
Jadhav, Tejasvini Ishwar 637
Jain, Aditi Anil 222
Jhawar, Garima 667
Joshi, Neha 583
Joshi, Rashmi 255
Joshi, Tanvee 12, 19, 236, 439

K

Kanitk, Ajinkya 39
Kanitkar, Ajinkya 557
Karani, Nikita 540
Karhade, Rashmi Abhay 613
Karmalkar, Isha 583
Kavthekar, Anita 394
Khan, Poonam 65
Khangsarpa, Angela Soden 492
Khatav, Prathamesh Shailendra 394
Khawale, Abhishek 145
Khevalkar, Madhura 467
Kolhe, Vinita 484
Kshirsagar, Rushika 627
Kulkarni, Anushka Anand 275
Kulkarni, Savri 106

L

Lalwani, Diksha N. 171
Lonkar, Akanksha 592

M

Malani, Vedika 306
Mallya, Prof. Umesh 56
Mallya, Umesh 540
Mane, Shrushti 647
Marode, Tejaswini 492
Mate, Swaraj Ajay 434
Mewawala, Krish 1

Miriyala, Jahnavi 39
Mutalikdesai, Shruti 198

N

Nagpure, Yogita 236, 439
Nampelly, Gajalley Narendra 25

P

Padhmashree, E.V. 39
Pal, Sushma 653
Panchal, Neha 214
Pansera, Hemin 347
Parab, Siddhi Shivram 484
Parashar, Sushma 88
Patel, Hetvi 242
Patil, Kavita 592, 613
Patil, Rashmi Sharad 514
Patil, Rupam 576
Patki, Pradnya 477
Patki, Pradnya N. 382
Patni, Kunal 157
Patwardhan, Ravindra 180
Pawaskar, Komal 249
Pedanekar, Aadya N. 622
Penkar, Rugved 618
Prachiti, Karanjgaokar 124
Punde, Harshada 300
Purandare, Hrishikesh 389

R

Rahmat, Shahid 151, 520
Rahul, Dungarwal Smit 445
Rahul, Gokhale Tanvi 317
Rao, Lakshmi 65
Rathi, Akshita 269
Raut, Nayana 484
Rawle, Himanshu 606
Rawool, Parag 249
Reddy, Anvika 39
Rehpade, Sanika 198
Rokade, Rajesh 145, 525, 576, 599, 606, 618, 637, 642, 658, 667

S

Sahu, Sandeep 520
Salunke, Pranav Anand 389
Salvi, Isha 12
Salvi, Kalyani 56, 60
Sampat, Jinay R. 56
Sardeshpande, Narendra J. 46
Sathe, Akshita 365
Sawant, Yashashree 300
Shah, Antara 525
Shah, Kalyani 60
Shah, Kashish Vaibhav 73
Shah, Manav 236
Shah, Vimarsh 293
Shankavaram, Hiranmayi 39, 557
Sharma, Savan 355
Sharma, Shilpa 1, 171, 214, 401, 467, 505, 94
Sheth, Savi Kishor 165
Shinde, Nirantari 423
Shinkre, Rohit 94
Shitole, Ashwini 514
Shrinivasan, Vijaya 255
Silveira, Romeiro 334
Sohani, Asawari 46
Solanke, Rachana S. 382
Solanki, Hinal 214
Soparkar, Lavanya 658
Subramanian, Shweta P.R. 484
Surate, Prajakta Rajendra 83
Surve, Anuprita 534
Suryawanshi, Prerna 401
Suryawanshi, Smita 514

T

Tapke, Rashmi 193
Taras, Sejal 151
Thakoor, Sarika 157, 592
Tholiya, Jyoti 180
Tholiya, Jyoti Jain 394
Tomar, Kamakshi 65
Topale, Manaswi 429

U

Upasni, Shubhashree 77

V

Vasani, Grishma 439

Y

Yammiyavar, Anita P. 114



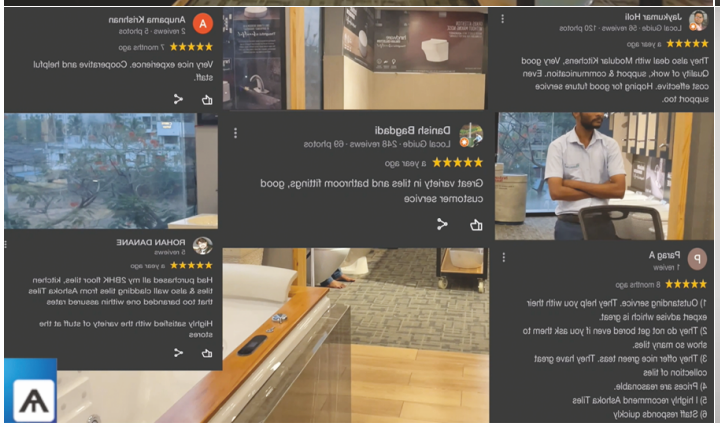












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