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iiapublication@gmail.com

www.indianinstituteofarchitects.com

Editor Ar. Vinit Ramkrishna Mirkar

601, Ratnagar Chs, Jaiprakash Road, Four Bungalow,
Andheri West, Mumbai Suburban,
Maharashtra - 400053.

vmirkar@gmail.com

Advisors : **Ar. Mukul Goyal**

Printer's Email

design.quickprint1@gmail.com

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PRESIDENT'S MESSAGE



Dear Members,
It is with immense pride, gratitude, and a deep sense of responsibility that I address you as the newly elected President of IIA for the term 2026–2028. I sincerely thank all our members for their trust and confidence. My commitment is to strengthen our institution, enhance member engagement, create meaningful professional opportunities, and elevate IIA's standing nationally and internationally.

As architecture continues to evolve through technological advancements, sustainability imperatives, and changing urban aspirations, IIA must remain a vibrant platform for knowledge exchange, collaboration, mentorship, and professional growth. I look forward to working with our members, past leadership, chapters, and industry partners to translate this vision into meaningful action.

One of our key initiatives is IIA Career Connect, a platform designed to bridge the gap between architectural talent and professional opportunities. It aims to connect students, emerging professionals, established practices, and potential employers while encouraging mentorship and career development. Investing in young architects is essential to the future of our profession.

We have also introduced a Membership Amnesty Scheme for members with outstanding arrears, providing an opportunity to regularise their membership and reconnect with the Institute. Additionally, the revamping of the IIA website aims to create a contemporary, accessible digital platform for institutional updates, professional opportunities, events, publications, and member engagement.

A significant milestone is the agreement-signing ceremony for hosting the IIA International Forum at the Jio World Convention Centre (JWCC), Mumbai. This initiative strengthens India's engagement with the global architectural community and provides an opportunity to showcase the country's architectural achievements, cultural diversity, and evolving urban landscape while encouraging dialogue on architecture, sustainability, and urbanism.

I extend my heartfelt congratulations to Ar. Tushar Sogani on becoming President Elect of ARCASIA. I also congratulate Ar. Debatosh Sahu on his appointment as Vice President of IIA Region IV. I wish them both success in their respective roles and look forward to stronger international collaboration.

During this term, we will focus on building a more inclusive, participative, and forward-looking IIA. Our priorities include strengthening chapters, encouraging young architects, expanding continuing professional development, fostering industry-academia collaboration, and creating opportunities for members to share knowledge and experience.

I firmly believe that IIA's strength lies not merely in its leadership but in the collective commitment of its members. Every contribution, idea, and act of participation helps build a stronger institution. I invite all members to engage actively and join us in shaping IIA's next chapter.

As we move forward, let us work together with renewed purpose, mutual respect, and a shared commitment to advancing our profession.

Together, let us build a stronger IIA—connected in purpose, collaborative in action, and committed to the future of architecture.

With warm regards,

Ar. Jitendra Mehta
President,
The Indian Institute of Architects



Ar. Akshaya Kumar Beuria
Vice-President, IIA



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EDITOR'S NOTE

A New Term, A Shared Vision: Indian Architecture on the World Stage

Every new beginning brings renewed aspirations, fresh perspectives, and new possibilities. As the Indian Institute of Architects enters its new term, 2026–28, the architectural fraternity stands at the threshold of an exciting chapter that calls for collective responsibility, progressive thinking, and a renewed commitment to the profession and society.

I extend my heartfelt congratulations to all the newly elected members of the IIA National Council, Chapters, Centres, and Sub-Centres across India. Their election reflects the trust and expectations of the architectural community. May this term foster constructive dialogue, inclusive participation, and meaningful initiatives that strengthen the Institute. Leadership is not merely about assuming office; it is about building consensus, creating opportunities, and translating shared aspirations into collective achievements.

Under the leadership of our new President, Ar. Jitendra Mehta, the Institute looks forward to a fresh approach, renewed vision, and new energy in addressing the challenges and opportunities confronting the profession. As technology, environmental concerns, and rapid urbanisation reshape architectural practice, the IIA must continue to guide professional discourse, encourage innovation, and ensure architecture remains responsive to society's needs.

The strength of the Institute lies in collective effort. The National Council, Chapters, Centres, and Sub-Centres must work in unison, respecting regional diversity while pursuing common goals. Let this term bridge generations, encourage young professionals, promote research, and strengthen connections between academia, practice, and public life. There is much to learn, much to share, and much to contribute towards advancing the profession and improving our built environment.

A significant milestone ahead is the UIA World Congress of Architects Forum in Mumbai in November 2027. This international platform offers the Indian architectural fraternity an exceptional opportunity to engage with global ideas, practices, and perspectives while showcasing India's architectural richness.

Rooted in indigenous knowledge systems,

climatic wisdom, craftsmanship, cultural plurality, and diverse building traditions, Indian architecture has much to contribute to global discourse. The convergence of indigenous and international architectural perspectives can foster meaningful exchange, where local knowledge informs global practice and international experiences enrich our understanding of the built environment. The Forum is an opportunity not merely to participate, but to learn, contribute, and position Indian architecture confidently on the world stage.

As we welcome new leadership and look towards wider horizons, let us remember that our success will ultimately be measured by our contribution to the profession and society. A new term brings fresh energy; a shared vision provides direction; and collective action creates lasting impact.

May this new chapter of the IIA be defined by collaboration, professional excellence, and a shared commitment to shaping a better built environment for all.

Prof. Vinit Mirkar
Editor, JIIA



Ar. Vinit Mirkar

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Architecture in Transition: Between Memory and Tomorrow



The cover explores the relationship between two worlds; the architectural heritage of the past and the evolving urban landscapes of the future. On one side, a carved arch frames the steps of a traditional ghat, beyond which stand domes, minarets, palaces and historic façades that reflect the craftsmanship, material wisdom and climatic understanding of earlier architectural traditions. On the other side, across the water, the contemporary city emerges through glass towers, a cable-stayed bridge, large-span structures and wind turbines on the horizon, symbolising technological advancement and changing urban aspirations.

The water serves as a unifying element, reflecting both landscapes and establishing a visual dialogue between heritage and modernity. Rather than presenting them as opposing forces, the composition highlights their shared purpose: to create spaces for gathering, provide shelter and foster a sense of identity and belonging.

As the ghat steps extend into the foreground, their edges gradually transform into architectural drawing lines. This transition represents the continuum of architectural practice, where collective memory and inherited knowledge inform design thinking, and design evolves into the built environment.

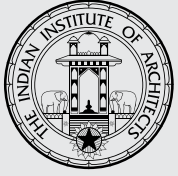
The river becomes a silent witness to the transformation of the city, observing the passage from heritage to modernity without judgement or preference. It reflects, absorbs and carries the imprints of changing landscapes, human aspirations and architectural expressions through time, continuously flowing towards its next destination. As a timeless continuum, the river connects different eras, holding within its course the memories of the past and the possibilities of the future.

Rendered in a unified terracotta palette, inspired by brick, laterite and the earth, the composition establishes a material and cultural connection between past and future. The colour reinforces the idea that even as architecture embraces new technologies and forms, its future remains deeply rooted in the land, its traditions and its collective memory.



Ar. Pratik Pravin Malpure (A27116) is an architect and co founding partner of MMA Architects, with offices in Satara, Pune and Mumbai. He completed his B.Arch in Mumbai and worked with Malik Architecture before starting his own practice. His work covers civic, commercial and residential projects, exploring how heritage and contemporary architecture can coexist.

Email: pratik.malpure30@gmail.com



JIIA Call for Papers, Articles, Projects

The Journal of the Indian Institute of Architects invites original and unpublished contributions from members **ONLY** (academicians, practitioners and students) under the following FOUR categories. Submission in each category is strictly only through the respective google forms.

In order to be accepted for publication, all material sent in these categories should have the following components:

1. MS Word document file with text only. Please do not format it in anyway. The numbered captions for all the images will also be in this document.
2. Folder with all images (minimum 300 dpi), numbered according to the captions given in your text file
3. Photograph of the author/s (minimum 300 dpi).
4. Author biodata – Maximum 50 words.
5. PDF (optional)– showing the intended layout. This pdf should include text and all images, with numbered captions.

Category 1 : Articles

google form link: <https://forms.gle/pJ2d4MVYqyPzWiVc9>

Essays, interviews, articles (1500- 2500 words), book reviews (600 and 750 words), travelogues, sketches and photo-essays in the areas of architecture, planning, urbanism, pedagogy, heritage, technology, ecology, theory and criticism, visual design, practice or any other relevant subject pertaining to the built environment. (Details of the format will be available on the JIIA website).

- For a design project, please include the 'Fact File' with the following details : Project Name, Location, Plot area, Total built up, Structural consultants, Project completion. Also please give the photo captions and credits. Please ensure that the image is referred to within the text. For eg, "As seen in Figure 1...". This is essential for the layout.
- For design projects, plans and sections of the project are desirable along with the photographs.
- Book reviews should be only of books by Indian authors. please include the "Fact File" with the following details: book title, author name, publisher, year of publication, ISBN, language the book is written in, genre (technical/ fiction/ etc.), no of pages, dimensions (in cm), type (Kindle / paperback/ hardback), available at (amazon.in/ flipkart. com/ others).
- Please send a write-up of about 200-300 words along with sketches and photo-essays.

Category 2 : Student Work

google form link: <https://forms.gle/8wDCYFusLb7hWcpa6>

Summaries of dissertations (2000-3000 words) at the level of B.Arch. & M.Arch., and theses at the Ph.D. level. The Guide for that work will be mentioned as the Co-author. (Format will be available on the JIIA website).

Category 3 : Contributions from Chapter Correspondents

google form link: <https://forms.gle/kdVvqQUmWDMRhjGi8>

- (a) Chapter News: This includes various interesting activities from the Centres of your Chapters (maxm. 500 words for the news from the entire Chapter).
- (b) News of conferences by the academic institutes in your respective Chapters.
- (c) Obituaries : Obituaries of IIA members should consist of the photograph of the departed soul, the dates of birth and death and a short 50-word note.

Category 4 : Research Papers

google form link: <https://forms.gle/4CmCsXQJdrBiSrSD8>

Research papers (2000-5000 words) in the prescribed format. The research may be based on their ongoing or completed research. (Format is available on the JIIA website). All contributions in this category will be double blind peer-reviewed before being accepted for publication by academic experts of repute.

Category 5 : JIIA Cover + Theme Note

google form link: <https://forms.gle/En69gXSps2j72Hrf7>

Students from affiliated colleges are invited to design the cover page theme. This should be a graphic based on some aspect of Indian Knowledge Systems. The submission will include the graphic file (jpeg or corel draw); a theme note (with a title) of about 500 words explaining the concept of the graphic. Please note that the image you send should be within a SQUARE of 15 x 15 cm. It will be adjusted as per the layout requirements of the JIIA Cover. It should NOT contain any text / slogan/ etc.

Please note:

1. All submissions will be accepted only through google forms.
2. Submissions will **NOT** be accepted through email.
3. Any queries to be addressed to : jiiacomment@gmail.com.
4. When you correspond with us, please give your email id (that you regularly use) and your cell no. (preferably with WhatsApp).
5. It is compulsory to mention your IIA regn. No. Submissions will **NOT** be accepted from non-members.
6. The review process takes anywhere between 4-6 weeks. Since it may not be possible to respond to all authors who send in their work, we will definitely revert if and when your work is accepted.
7. JIIA does not charge any fees for publication of any professional or academic work.
8. It is understood that submission from an author is an original work, unpublished anywhere else, and that IIA and JIIA are in no way responsible for any matter or dispute arising out of the publication of the same.
9. All authors are requested to refer to further detailed information available on the JIIA website.

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WORLD ARCHITECTURE DAY 2026 Theme: HOUSING

DECLARATION

On the occasion of World Architecture Day 2026, The Indian Institute of Architects reaffirms its commitment to the theme of "Housing" and recognises the fundamental importance of housing in shaping the quality of life, dignity and well-being of individuals, families and communities.

Housing is not merely a physical structure or a place of shelter. It is an essential part of the social, economic, cultural and environmental fabric of our communities. The way we plan, design and develop housing has a direct bearing on the quality, inclusivity and sustainability of our cities and settlements.

India is experiencing rapid urbanisation and significant changes in its demographic and social structure. These changes have created a growing need for housing that is affordable, accessible, inclusive, safe, sustainable and responsive to local contexts. Addressing these challenges requires a collaborative approach involving architects, planners, policymakers, institutions, industry and communities.

As members of the architectural profession, we recognise our responsibility to contribute our knowledge, expertise and creativity towards addressing the diverse housing needs of society. We believe that architecture can play a meaningful role in creating housing environments that promote dignity, well-being, community interaction and a better quality of life.

On this World Architecture Day, The Indian Institute of Architects calls upon its members to strengthen their commitment towards responsible and people-centred architectural practice, and to actively engage in discussions, research, innovation and initiatives related to housing and the future of our built environment.

We encourage the architectural fraternity to explore solutions that respect local conditions and cultural contexts while responding to contemporary challenges such as climate change, resource efficiency, urban growth and changing patterns of living.

Through our collective efforts, we can contribute towards creating better homes, stronger communities and more sustainable cities, ensuring that the benefits of good architecture reach a wider section of society.

On this significant occasion, The Indian Institute of Architects reaffirms its commitment to advancing the role of architecture in addressing the housing challenges of today and shaping a more inclusive, resilient and sustainable built environment for future generations.

Ar. Jitendra Mehta
President
The Indian Institute of Architects

5th October 2026

Notions of Sacrality Associated with a Space during Wārī

A Case Study of Gadital, Pune

By Ar. Amol Holey, Dr. Ashwini Pethe and Dr. Abhijit Natu

ABSTRACT

The presence of a deity renders the temple and its place, or the *sthāna*, sacred. However, during religious processions, sacredness travels with these deities. Notions of sacrality temporarily become associated with the route and the halt points of the deities. Using the theories of environmental behaviour, this paper explores how people's behaviour changes when a mundane space becomes sacred, through a case study of the annual *wārī* pilgrimage to Pandharpur. Through non-participatory observation and qualitative interpretative analysis, the paper highlights that the temporarily associated sacrality lingers in the space for a while even after the sacred object has moved ahead. For this sacrality to linger in the space, physical markers are often necessary.

KEYWORDS: *wārī*, *pālakhī*, sacrality, environmental behaviour, milieu, behaviour setting

1. INTRODUCTION

A Hindu temple is considered the abode of a deity and is usually situated on an auspicious site or *sthāna*. According to the *Purāṇas*, the consecration ceremony, or *prāṇapratīṣṭhā*, infuses life into the icon, making it sacred. The icon thereafter signifies the sacred presence of the Supreme within the given space. All three—the icon of the deity, the temple and the *sthāna*—carry this sacredness. This sacredness finds expression as sacrality in various ways, including prostrations, offerings of flowers and

other objects and the performance of rituals such as *pūjā* and *abhiṣeka*. Codes of conduct evolve around the deity as norms to be observed within the temple and at the site to maintain their sanctity.

Within this icon-place-sacredness-sacrality relationship, the icon and its *sthāna* are stationary. What happens when the icon is in motion, such as when a deity is taken out in a procession or *yātrā*? Sacredness travels with the deity, but what happens to the *sthāna*? Is the *pālakhī*, or the palanquin carrying the icon, the *sthāna*, or does the entire processional route become the *sthāna*? Alternatively, does the *sthāna* move with the deity? How does this moving sacredness find expression through the rituals and ritualised gestures of devotees? What changes do these temporal factors bring about in the environment and how long do these notions of sacrality remain attached to the place? These questions necessitate an exploration of the notional environment, its associated temporal sacrality and the responses of devotees.

This study draws upon ecological psychology and Roger Barker's Behaviour Setting Theory to analyse this transition. The theory conceptualises behaviour settings as bounded, self-regulating units in which the physical environment and patterns of social behaviour are closely linked. The procession is interpreted as a series of shifting and transient 'behaviour settings' to explore how ritualised actions are sustained within changing environments.

The *wārī*, a pilgrimage to Pandharpur in Maharashtra, offers a valuable opportunity to study this phenomenon because it temporarily transforms urban spaces.

1.1 Aim and objectives

This paper aims to study the notions of sacrality associated with a space and the response of people through the case study of the *wārī* as the Sant Dnyaneshwar *pālakhī* halts at Gadital in Pune.

The objectives are:

- To observe and map the activities as the *pālakhī* halts at Gadital.
- To identify the notions and expressions of sacrality in the activities.
- To analyse the relation between the milieu and behaviour of the devotees.

1.2 Methodology

Gadital, being a bus stop has no reference to sacrality on other days. It gets completely transformed on the day the *pālakhī* arrives at Gadital, offering a good opportunity for studying the effect of the changed setting on the behaviour of people. For this, the elements of space making that are temporarily introduced in the given place were documented, followed by a mapping of the behaviour patterns of people in the changed setting. The standing patterns of behaviour of the people were captured during the brief halt of the *pālakhī*, highlighting the relation of the rituals and the temporary milieu. Photographs and videos were used for this documentation, along with field notes, and quick mapping on-site. The field notes and mapping sheets were immediately updated on the same day to account for any information that could not be entered on-site due to the crowd.

The data was collected twice, first on 24th June 2022, between 8:30 am and 10:30 am (Indian Standard Time) and again on 11th July 2026, between 8:00 am and 1:30 pm. The *pālakhī* halted at Gadital from 9:00 am to 9:40 am in 2022, and 9:20 am to 9:45 am in 2026 on its way to Saswad. The *wārī* was halted in the years 2020 and 2021 due to the Covid pandemic. In 2022 the *wārī* returned to its former glory. The second documentation in 2026 was undertaken to negate mapping of aberrations. It also enabled confirming observations and covering a few areas that were missed in the first data collection.

A non-participatory observation method was used to map the activities at the site of investigation. While non-participatory observation enabled an unhindered mapping of the changes in the

elements in space making and collective behaviour, the method has its limitations. The study does not address the internal motivations, emotional drivers, and personal spiritual experiences of the devotees. A separate study involving interviews and participatory methods can certainly enrich the findings in this paper.

An interpretative approach is used for analysing the data. This involves the external interpretation of physical gestures of the devotees. The physical milieu was categorised as temporary, semi-fixed and fixed entities. Values of sacrality associated with them were analysed by identifying gestures of the devotees that exhibit a response to sacredness.

2. LITERATURE REVIEW

2.1 The Behaviour Setting Theory

The Behaviour Setting Theory pioneered by ecological psychologist Roger Barker (1968), argues that the 'setting' of a place determines the behaviour of the people. Barker and Wright (1954) suggest that this 'setting' is formed by the 'milieu' or the physical environment, the timing, and the intended activity of the place. The milieu surrounds the people, and seamlessly aligns and supports their behaviour. This behaviour setting is natural and not an artificial experiment. It is specific to its geographical location and time. It also exhibits a 'standing pattern of behaviour', repeating over time regardless of the participants.

This theory undermines individual personality traits in determining a person's response to the setting and its expression in the form of their behaviour. Hence, any person would respond similarly to a setting irrespective of their regional and cultural background. Barker focusses on the physical form of the milieu, overlooking the notional meanings that people bring to the space.

2.2 Notional Environment

Inhabitants occupy not only the physical milieu, but also create notions about the space. Can human behaviour be predicted merely by the physical characteristics of the milieu? Koffka (1935) distinguishes between the geographical environment (objective reality) and the behavioural environment (notional reality). He explains how the same object can attract different reactions based on the notions attached with the object. Amongst many other areas, these notions help us in wayfinding in the urban space. Lynch (1992) demonstrates this with the method of cognitive mapping.

2.3 Affordances and Normative Constraints

Heft (2024) challenges Barker's 'neutrality' in response to the setting. He integrates Barker's theory with James J. Gibson's (2015) concept of 'affordances' wherein affordance is the property of the environment which makes its use clear to the user. Affordances are not universal. For example, a book in English 'affords' reading only to those acquainted with the language. Hence the affordances of an environment vary for individuals with specific skills or cultural background.

Heft (2024) argues that the functional, moral, and conventional possibilities of an environment determine the manner in which people experience it. Apart from these possibilities, behaviour settings also impose 'normative constraints.' Legal constraints such as smoking prohibitions, norms defined by morality such as respect for elders, or by conventions, such as lowering one's voice in a library are examples of these normative constraints. Hence a behaviour setting operates between the extremities of possibilities and constraints.

2.4 Role and Sense of Community

But settings are not always inhabited by individuals alone, but in groups. The individuals in the groups need not be homogenous, each having a certain role defined by various factors such as age, sex, administrative position, etc. Turner (2002) categorises two approaches to studying the relationship of the role and behaviour in a setting. Structuralist Role theories argue that the behaviour of individuals in a setting is defined by their role. In contrast, interactional theories take a flexible approach towards this role assumed by individuals and their resulting behaviour.

Crowds collectively exhibit various levels of a sense of community. Gharehbaglou et. al. (2024) highlight that the relation between the milieu and behaviour is significantly influenced by external factors such as the sense of community or the bond amongst the members in complex socio-religious settings. People do not enter such a milieu with a clean slate, responding to the setting impersonally. They arrive with cultural and spiritual filters. The shared memories and historical identities of the community not only determine the activities but help maintain order in special events such as religious gatherings.

2.5 Culture and the System of Settings

While Barker and Heft's theories focus on individual settings, Amos Rapoport looks at a system of such settings. In his Environment-Behaviour Studies, he conceptualises the environment as a 'system

of settings' in which a 'system of activities' takes place. For Rapoport the built environment was not simply a response to climate and technology, but an outcome of cultural choices, turning the environment into a cultural landscape (Wissing, 2024). This landscape consists of fixed, semi-fixed and non-fixed features. Permanent structures, infrastructure, and geographical features form the fixed features. Temporary structures, street furniture, and signages form the semi-fixed features, while human inhabitants, their activities, vehicles and their sounds form the non-fixed features. These features communicate 'meanings' through non-verbal cues which act as rules in the behaviour setting (Rapoport, 2006).

2.6 The Context of Pilgrimage: Sthāna and Tīrtha

Both the environment, or the milieu, and the behaviour of the people therein need to be understood in the Indian context of a pilgrimage. Devotees and pilgrims do not enter the sacred space 'neutrally', but carry with them their ideas associated with the sacred, the sacred space affords sacrality to them.

The milieu, such as a temple, is not merely a place of worship, but a sacred '*sthāna*' or a '*tīrtha*'. It is the abode of the deity, and represents multiple ideas such as the sacred Mount Meru or Kailash, a heavenly palace, or even a microcosmic representation of the macrocosm (Meister, 1994). The word *tīrtha* etymologically means a place for crossing over to another place. Philosophically the *tīrtha* represents a place for crossing over from the material world to the spiritual (Kramrisch, 1946). Interpretation of this concept of the *tīrtha* is challenging in the context of a *yātrā*, with the route, and halt points exhibiting a temporal sacrality.

Since it is so charged with notional values, the response of the people to the milieu is equally intense.

'.... it is the power of the place itself which is transforming. Ordinary acts of worship (puja), almsgiving (dana), and listening to the ancient lore (śravaṇa) are charged by the extraordinary power of the place and its deity. So significant is this power that it is sometimes claimed that the place transforms even the inadvertent visitor.' (Eck, 1981, p. 338)

2.7 Icon

The deity itself is central to the milieu. The deity could be manifested in various forms, whether iconic or aniconic. The mere presence of the icon makes the entire space sacred.

Architectural treatises such as the *Kāśyapaśilpa* classify the icons based on their purpose. The icons stationed in the *garbhagrha* (sanctum sanctorum) of the temple are the *cala*, or the immovable ones. On certain auspicious days the *cala* or the movable icons are brought out and are taken around the town in the form of a *yātrā* (Kulkarni, 1987).

2.8 Darśana

Devotees manifest sacrality through various rituals and ritualistic gestures. At the core of these gestures is the act of ‘*darśana*’ (Eck, 2007). *Darśana* is difficult to translate to English, with the closest associated word ‘seeing’ being highly inadequate to explain the concept. Eck illustrates that through this act of seeing the deity, the devotee establishes an intimate communion with the divine. *Darśana* is an integral part of other rituals such as *pūjā*, which can involve singing hymns, prostrations, offering flowers, and other objects to the deity, and consuming the ‘*prasāda*’. The *darśana* is a reciprocal relationship that enables the devotee to experience a momentary oneness with the divine.

2.9 Tīrthayātrā- Journeys for the darśana

While a devotee could undertake a long journey, a *tīrthayātrā* or a pilgrimage for this *darśana*, the deity could also be taken out on a sojourn in the town. An example of this is the famous Ratha Yatra, a procession in Puri.

Pilgrimage is no ordinary journey. A tour is an ‘outer journey’, while a *tīrthayātrā* is an ‘inner journey’ (Singh, 1997). The word yatra is mentioned in Yaksa’s Nirukta. But it does not mention pilgrimage as one of the meanings. The tradition of a *tīrthayātrā*, or a pilgrimage, might have originated in the folk traditions in India (Bharati, 1963). The first major reference to a *tīrthayātrā* in the classical Indian traditions dates back to the Tīrthayātrā Parva of the Mahabharata (Eck, 1981).

The *Purāṇas* give four main motives for undertaking a *tīrthayātrā*: desire for a son, wealth, liberation, or other worldly gains. The motive could also be for general purification or bliss, or an expression of devotion to a deity (Singh, 1997). As per Eck (1981) these motives range from healing to achieving liberation or *mukti*. Within this range operate the desires of boons and blessings, performance of religious rites, or a will to leave behind all desires. These religious rites could be the performance of a *śrāddha* (memorial rituals for ancestors), a *pradakṣiṇā* (circumambulation), *muṇḍana* (tonsure), or *prāyaścitta* (atonement for a sin) (Bharati, 1963).

The *tīrthayātrā* in itself is a transforming experience (Eck, 1981; Singh, 1997). This transformation happens not because of the motives and the rites being performed, but due to the ‘power’ of the *tīrthakṣētra*. ‘The *tīrthayātrā* is the rite; the place is the power.’ (Eck, 1981, p. 338)

In contemporary times, the growing tourism industry and the availability of multi-location ‘sight-seeing tours’ seem to have affected this experience (Shinde, 2011).

2.10 Procession

The procession, with the presence of the deity spreads divine power (Sinha, 2008). The vehicle that carries the *cala* icon becomes a mobile temple (Brown, 2024). The icon when brought out for a procession activates not only the space around it, but the entire route of the procession, making it sacred (Pethe & Shinde, 2020, 2023). These processions need not happen within the temple town. When the procession travels beyond the boundaries of the town it becomes a symbol of the divine. At the same time, it represents the place of its origin. The collective identity of the population materialises in the vehicle (Mahajan, 2022).

The divine power is not spread by the vehicle alone, but is a cumulative effect of the accompanying sounds, smells, touch and activities (David, 2012; Mahajan, 2022). This divine power brings a ‘spiritual disruption of the public spaces’, and gives a ‘unifying experience of collective joy’ to the devotees (Brown, 2024). These processions add an intangible layer to the physical form of the public space, rendering it with a ‘permanent image’, transforming the space into a place (Nanda & Khare, 2014).

Religious processions are particular displays of religion that lay claim to public space. Some are pilgrimage processions that move towards a sacred space, others make their space sacred as they progress. Transportation of gods through the streets makes them sacred ground, often symbolised by their being covered with flowers; or chariots signify that the streets belong to the gods. Sacredness has to be created and the musicians who often lead the parades are an important element in this production of sacredness. Through sound, they signal that an area is marked off as sacred. Kavati dancers at the front of the Tamil chariot festivals have a similar function. Processions can delimit the territory of a temple or expand its sacred space. (Jacobsen, 2008, p. 5)

2.11 Research gap

Existing scholarly works explore the permanent sacrality of religious milieus such as temples. The studies that acknowledge the transformation of public spaces due to processions focus on the active presence of the deity. A gap exists in the study of the temporal dynamics concerning religious processions. The questions regarding how long does the sacrality linger in the urban space after the procession is over remained unanswered. This paper addresses this with the case of a mundane space like Gadital which briefly imbibes sacrality on the day of the *wārī*.

3. CONCEPTUAL FRAMEWORK

Barker's theory in which the behaviour setting is formed of the location, timing, and activity has limitations with its applications in the context of religious spaces in India, as it does not consider the notional values that can get attached with a milieu. The sacred spaces afford the notions of sacrality which are inspired by the sacredness of the icons. Such a milieu, with its 'power' attracts devotees for *darśana*, sometimes not only from the neighbourhoods, but also from distances in the form of pilgrimages (Figure 1).

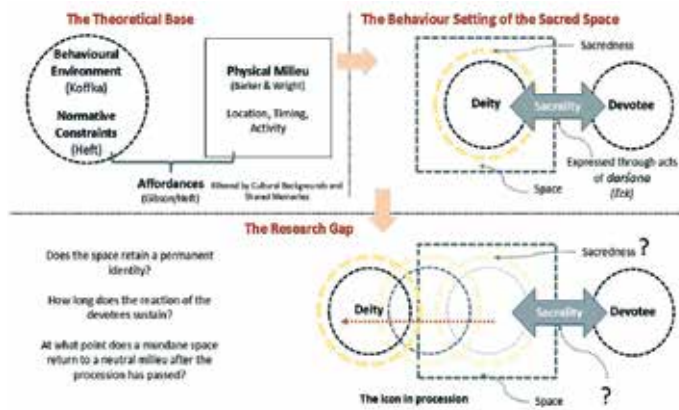


Figure 1: The Conceptual Framework
Source: Authors

These notions activate the urban space when the *cala* icons are brought out in the form of processions. Sounds, smells, touch and activities amplify this sacrality. As the procession keeps moving, it creates a system of settings, which afford sacrality and attract devotees for *darśana*.

The procession can give a permanent identity to the public space, but does it render the space sacred forever? Does the reaction of the devotees to the space sustain after the procession? These questions have been addressed in this paper with the case study of the *wārī*.

4. THE CASE STUDY

4.1 Wārī

The *wārī*, which is a pilgrimage on foot to Pandharpur, has a long-standing tradition rooted in the Bhakti movement. It is undertaken four times a year by *wārkarīs* i.e. devotees of Lord Vitthal all across Maharashtra. *Wārkarīs* cover the entire distance on foot. *Wārkarīs* arrive at Pandharpur on *Ekādaśī*, or the 11th day of the *Śuklapakṣa* (bright fortnight) of *Caitra*, *Āṣāḍha*, *Kārtika* and *Māgha* months of the Hindu Calendar. The *wārī* in the month of *Āṣāḍha* is the most significant one.

The *pādukās*, or icons of the footprints of the saints from the Bhakti movement are carried in palanquins (*pālakhīs*). Two of the most prominent *pālakhīs*, that of Sant Dnyaneshwar and Sant Tukaram are carried from Alandi and Dehu respectively to Pandharpur.

Dr. Kiran Shinde (2018) calls the *wārī* a moving sacred town and that even mundane places attain sacrality temporarily due to the *pālakhī*. The towns seem deserted as the *pālakhī* moves ahead before people return to their normal business (Mokāśī, 1987). But what remains is the identity added by the *pālakhī* to the town (Shinde, 2018).

As such, the *wārī* is not just a pilgrimage of the *wārkarīs* to Pandharpur, but also a procession of the *pālakhīs*. Along with the sacredness the *pālakhī* also brings festivities to the town. This 'mixing of the sacred and the profane' brings in people with varied interests, which Mokashi (1987) observes as, the 'the fun-lovers, the vow-keepers, and the profit-seekers'. Shinde observes that there has been an increase in the fun-lovers and the profit-seekers in the *wārī* in the recent years.

Most studies on the *wārī* focus on the towns where the *wārkarīs* and the *pālakhīs* halt for the night. But, these *pālakhīs* also halt briefly at multiple resting points enroute during the day. Local devotees throng to these places for *darśana*. (The word *wārkarī* shall be used for the pilgrims or the devotees of Lord Vitthal who travel all the way to Pandharpur, and devotee shall be used for the non-*wārkarī* local devotees in this paper). The places where they halt are fixed, and usually a temporary or permanent *maṇḍapa* (a pillared kiosk) is built at such locations.

4.2 Gadital

One such place is the Pune Mahanagar Parivahan Mahamandal Limited (PMPML) bus stop, known as Gadital, in Hadapsar, Pune. Located at a prominent node, the bus stop is typically overcrowded. It is constantly overburdened by drivers trying to

accommodate maximum buses in the limited space. This place does not carry any notions of sacrality on normal days. On the day of the *wārī*, the Sant Dnyaneshwar Maharaj *pālakhī* arrives at Gadital at around 9:00 am and halts for about half an hour for the locals to take *darśana*.

Gadital, which literally means the hub for vehicles, is located at the junction of the Pune-Solapur (National Highway 65), and the Pune-Hadapsar-Saswad Road. This is an ideal location for an intra-city public transport hub. For a long time, it was on the eastern limits of the city of Pune, making it an important bus depot from where the Pune Mahanagar Parivahan Mahamandal Limited (PMPML) buses to all parts of the city could run. With the growing traffic congestion, flyovers along the Pune-Solapur Highway and the Saswad Road came up, leaving the triangular site of Gadital surrounded by flyovers. Bus sheds are aligned along two sides, leaving the central space for the movement of buses

Historically, the *pālakhī* would halt at a place, in a housing complex (Utkarsh Nagar Housing Society), about 100m from this bus stop. With the growing crowds this halt had to be shifted to the bus stop which offered a larger open space and better crowd management possibilities. Today the place in the housing complex has a permanent *maṇḍapa*, known as *Pālakhī Tal*. The *maṇḍapa* has a permanent platform with *pādukās* of Sant Dnyaneshwar installed on it (Figure 2).



Figure 2: Locations at Gadital and the permanent *Pālakhī Tal*
Source: Authors

As mentioned earlier, the data was collected twice, first in the year 2022 and again in 2026. The observations and mapping from 2022 have been described first, followed by a short description of the variations seen in 2026.

The observations and mapping were done from three locations, one within the PMPML premises, one from the flyover, and a third near the permanent *Pālakhī*

Tal. The first, gave a closer view of the happenings. The researcher was stationed at this point from 8:30 am to 9:15 am. The researcher shifted to the second location that gave a bird's eye view of the overall scene from 9:15 am to 9:45 am, and returned to the first location from 9:45 am to 10:30 am, to map the activities after the *pālakhī* left Gadital.

People's movements were mapped and gestures were noted. Changes in the milieu and gestures which exhibit response to the presence of a sacred object were marked as indicators of sacrality. Some examples of the changes in the milieu were the hoardings welcoming the *pālakhī*, ritualistic decorations such as erecting a *mandapa*, ritualistic decorations such as *rangoli* etc. Some examples of these gestures were folding of hands, prostrations for obeisance, movement towards and touching the sacred object for *darśana*.

4.3 Behavioural and Environmental Observations

On the day of the arrival of the *wārī*, Gadital had transformed starkly from a bus stop, assuming the role of a sacred destination. As part of larger crowd management, vehicular movement was restricted on the roads along which the *wārī* travels. Hence no buses plied from Gadital on that day, removing the everyday mundane non-fixed entities from the milieu. Other semi-fixed entities were introduced in this milieu which announced the sacred nature of the upcoming event. The premises of the PMPML bus stop were barricaded. A temporary *maṇḍapa* was set up in the centre for the *pālakhī* to halt, with a queuing system for devotees to approach the *pālakhī* for *darśana*. The foreground of the *maṇḍapa* was decorated with a *rangoli*. Figure 3 highlights the change in the milieu.



Figure 3: Gadital during normal times and during *wārī*
Source: Authors

Even the roads leading to the bus stop assumed a different character. Temporary pavilions were set up all along the roads, from where water bottles, breakfast and snacks were distributed to the *wārkarīs* as *dāna* (Figure 4). Most of these pavilions were set up by local level politicians and political aspirants, exhibiting their names and photographs on large billboards. Sellers selling toys, beads, conches and other items for ritualistic purposes were seen at



Figure 4: Temporary pavilions set up by local leaders for dāna
Source: Authors

places. The immediate area surrounding Gadital was prohibited for such activities.

4.4 Detailed Timeline of Events

Before the arrival of the *pālakhī*: The *pālakhī* was preceded by a processional holy horse (Figure 5). This horse reached Gadital 15 minutes before the arrival of the *pālakhī*. The horse and its rider were in decorative attire. The rider carried a celebratory flag. The attire and the paraphernalia announced the sacredness associated with the horse. Devotees rushed towards the horse for *darśana* and touched it to amplify the *darśana*. The horse along with a few attendants were allowed in the PMPML premises, and after a brief halt the horse was led to a road adjoining the premises for a small rest. (Refer Figure 8 for the description below).



Figure 5: Processional holy horse and devotees rushing for darśana
Source: Authors

a) 8:30 am - 9:00 am: Barricades were closed, preventing people from entering the PMPML premises. Police took their positions. Few people started queuing up for *darśana*. Crowds started swelling around the premises by 8:45 am. Nobody was allowed in the *maṇḍapa* and its foreground.

b and c) 9:00 am - 9:05 am: The *pālakhī* reached Gadital, marking the arrival of the notions of the divine and redefining the space. Barricades were removed for the *pālakhī* to enter the PMPML

premises. Some people managed to enter along with the *pālakhī*. Barricades were immediately put back in place. More people started queuing up.

d) 9:05 am - 9:40 am: Observations were mapped from three different locations during this time period. Between 9:05 - 9:15 am data was collected from the *maṇḍapa*. Between 9:15 - 9:22 am the mapping was done on the way from the premise to the flyover, and between 9:22 - 9:45 am from the flyover.

The *pālakhī* entered the *maṇḍapa* and halted for *darśana*. The queuing system got full in 2-3 minutes. People thronged in front of the barricades for *darśana*. All movement was towards the *pālakhī*, all eyes were towards the *pālakhī*.

The people who managed to reach the *pālakhī* barely got 5-6 seconds to take *darśana*. It incorporated folding hands, closing eyes and bowing. The ones who got extremely close touched the *pālakhī* with both hands and forehead. They exited from the other side of the premises. Police guarded this exit to prevent people from entering. Many volunteers belonging to various organisations helped in crowd management.

People had thronged the barricades on the rear side of the premises as well. Everybody tried to get as close to the barricades as possible. They searched for any possible entry points to the premise. Some people tried to talk their way past the police.

At the permanent *Pālakhī-Tal*, the platform was decorated with flowers, though the *pālakhī* does not halt here anymore. Some devotees were taking *darśana* of the *pādukās*, others were seen lining up along the street, waiting for the *pālakhī* to pass by.

People had lined up along the parapet of the flyover. There were very few people on top of the flyover. Though one could get a panoramic view of the entire setting, direct visual access to the *pālakhī* was not possible due to the *maṇḍapa*. The high railings at that point created physical barriers. Generally, most people spent a brief amount of time on the flyover before coming back down. The youngsters indulged in taking photographs and selfies.

Down below, one could see that the *wārkarīs* continued along their normal route (Figure 3). But the local devotees had a different movement pattern. Their movement was towards the *maṇḍapa*. People outside the barricades faced the *maṇḍapa*, and tried to get closer to the barricades. One could estimate around 1000 devotees in and around the PMPML premises.



Figure 6: Devotees paying obeisance to the space where the pālakhī halted
Source: Authors

e) 9:40 am - 9:50 am: The *pālakhī* started leaving at 9:40 am. There were still many in the queue who had not received the *darśana*. All of them rushed towards the *pālakhī*. The people closer to the *pālakhī*, moved along with it. The ones away from it managed to reach the spot where the *pālakhī* was stationed. They offered their obeisance to the place. Some people were seen applying the *raṅgolī* that decorated the space where the *pālakhī* had halted to their foreheads. A few people imitated their action.

The crowds lined all along the street had increased. The *pālakhī* had gone past this stretch of road. Many people were seen at the permanent *Pālakhī Tal*.

f) 9:50 am -11:40 am: By 9:55 am the crowd at the bus stop had thinned. Between 9:55 am and 10:10 am only 5 people were seen paying their obeisance at the spot where the *pālakhī* halted. Between 10:10 am to 10:30 am, only 1 person was found to do so. People walked freely across the entire premise, even over the spot. Most did not even stop there, as if nothing existed on the location.

But, at the same time people continued to take *darśana* of the *pādukās* at the permanent *Pālakhī Tal* (Figure 7). This same scene was observed again at 11:35 am, albeit with fewer people.

By 1:30 pm a few *wārkarīs* were seen resting under the *maṇḍapa* at Gadital. By 3:30 pm vehicular movement was restored on the roads, and Gadital had resumed its role as a bus stop, while the *maṇḍapa* was being taken down. The remains of the *rāṅgolī* were nowhere to be seen as the premises were swept clean.

4.5 Variations observed in 2026

The sequence of events and activities remained almost the same in the year 2026 as well, with a few variations. The crowd in 2026 was visibly larger, and



Figure 7: Devotees paying obeisance at the permanent *Pālakhī Tal*
Source: Authors

so was the police force. The reason was that in 2026 it was a Saturday when the *pālakhī* arrived. Each year, many non-*wārkarī* devotees from Pune walk along with the *pālakhī* for a distance, sometimes up to the next destination of Saswad. It being a Saturday the number of such devotees was larger in 2026. Similarly, more people had gathered along the roads and at Gadital for *darśana*. This resulted in the *pālakhī* reaching Gadital 20 minutes late.

The focus of mapping remained largely on the periphery of Gadital in 2026. Before the arrival of the *pālakhī* the police seemed a little relaxed. A young lady police officer was seen posing for a photograph with a *tulsī* plant which she had borrowed from a *wārkarī* for the photo. (Some of the ladies amongst the *wārkarīs* carry a *tulsī* plant on their head till Pandharpur). In a short conversation she said,

‘*Āmcyā sāṭhī hī phakta duty nāhī. Hyā nimittāne darśana hote*’, ‘this is not just a duty for us. We also get *darśana* due to the duty.’

As compared to 2022, the crowd in the PMPML premises after the *pālakhī* left was comparatively larger. The phenomenon of devotees paying obeisance to the place where the *pālakhī* had halted continued for a longer time in 2026.

5. DISCUSSION

Applying Behaviour Setting theories to the transformed milieu of Gadital reveals several insights. Specifically, it highlights how the space affords temporal sacrality and allows it to linger.

5.1 Behaviour setting with and without the sacred entity

Before the arrival of the sacred, when people were queuing up, and entry inside the *maṇḍapa* was restricted, behaviour was being regulated by legal

and social constraints. Once the *pālakhī* arrived, all movement and eyes were towards it, highlighting the central role of seeing in this behaviour setting involving the phenomenon of *darśana*.

After the *pālakhī* left, devotees paid obeisance to the place where the *pālakhī* had halted. This indicates that the sacredness of the *pālakhī* was now manifesting as sacrality associated with the milieu (Figure 6). This continued for some time, indicating that the sacrality associated with the place 'lingered' for a while. This did not continue for long. The associated sacrality which created a notional environment had dissipated, reverting the space back to its original functional state.

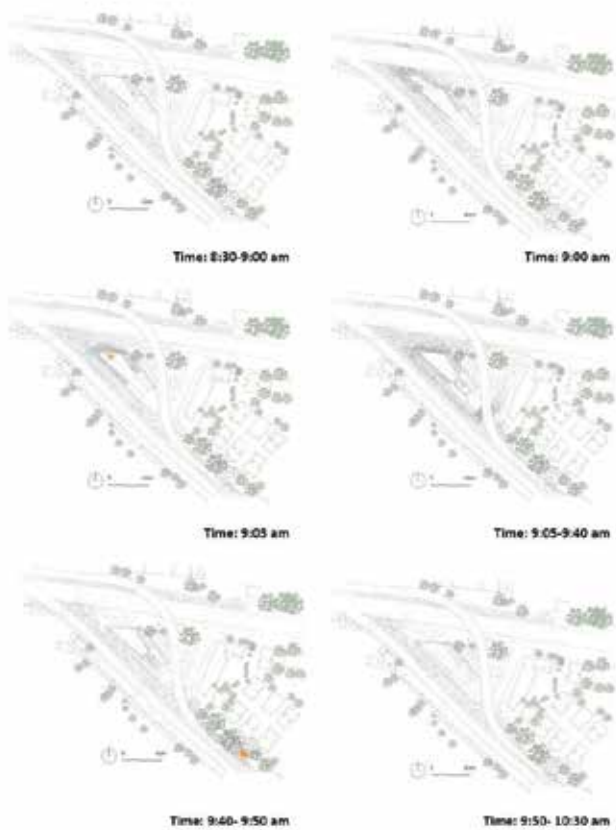


Figure 8 Mapping of the *pālakhī* and the crowds
Source: Authors

The transformed milieu had semi-fixed and temporary features like the *maṇḍapa*, hoardings, *rāṅgolī*, etc. But the response of the devotees to this milieu before, during and after the *pālakhī* entered and left the *maṇḍapa* was different.

5.2 Notional value of the milieu

Since the fixed features such as the bus shelters, and the flyovers at Gadital have a non-religious role to play in normal times, they are not associated with notions of sacrality. It is the *pālakhī*, a non-fixed feature that carries sacredness, while the

semi-fixed features such as the *maṇḍapa*, *raṅgolī*, barricades announce the anticipation and presence of the sacred. Literature study could not determine this semblance of a variation amongst the features, though the temporal nature of the event accords an importance to the non-fixed features.

The notional value of the *pālakhī* remains high, irrespective of its location, whether in transit or in the *maṇḍapa*. The policing and guarding of the *maṇḍapa*, preventing the entry of people before the entry of the *pālakhī*, and an equal response from the devotees respecting its sanctity indicates a good notional value attached to it. Its value peaks when the *pālakhī* is stationed in it, and lingers for some time after it leaves, eventually fading away. The value of the fixed features such as the bus shelters is reduced to simple enclosures for the behaviour setting.

5.3 Darśana: seeing the sacred, the carrier and the enclosure of the sacred

People entered the milieu with a sense of devotion, driven by the phenomenon of *darśana*. *Darśana* involves more than the simple act of seeing. It carries the anticipation of a closer connection with the sacred object. Hence, the sacred object remained in focus. A cursory look at the plans shows that the *pālakhī* being the primary sacred feature always had the concentration of the crowds towards it.

The devotees at Gadital desired the physical presence of the carrier of sacredness. Observations in this study suggest that if the sacred object is not visible, people may attach sacrality to the nearest visible object. This phenomenon is seen in similar contexts where a person pays obeisance to a temple from a distance, even if the deity is not visible. In this case the actual sacred object is the *pādukā*. But what is visible is the *pālakhī*. As the visual affordance of the *pādukā* is limited due to its size, the *pālakhī* itself becomes sacred. When the *pālakhī* left, the nearest visible tangible entity that had an association with the primary sacred object was the ground. Hence, we could see devotees offering obeisance to the place where the *pālakhī* was stationed. This sacredness can exhibit a quality to get associated with its immediate surroundings which activate and keep the sacrality lingering.

For the devotees who tried to take *darśana* from the flyover, the railings were a physical barrier, and they returned down. The visual detachment due to the *maṇḍapa*, physical distance and the barriers inhibit the person's relationship with the sacred environment, shifting his role from participant to spectator.

5.4 Role of the inhabitants in the milieu

The police and volunteers managing the crowd exhibited a different pattern of behaviour, which was dictated by their role in the setting. They carried similar emotions of devotion as was evident from the policewoman's conversation, but their role prevented them from engaging in the deeper acts of *darśana*.

Not all devotees could get close to the *pālakhī* for *darśana*. People who could not, moved to the barricades for a closer view of the *pālakhī*. Though, as a sense of community, the priority of the crowd seemed to be getting close to the *pālakhī*, individuals exercised their discretion to be content with a *darśana* from a distance if they found getting in the crowds difficult. This case indicates that the response of people to the milieu neither operates at an individual level nor at the level of community. The responses in this case find spaces within a range of possibilities.

The brief time available to the devotees for *darśana* of the *pālakhī* in the *maṇḍapa* necessitated an expression of sacrality in a highly mechanised manner with rigid gestures, almost identical with each other.

Devotees imitating others in applying the *rāṅgoḷī* to their foreheads suggests a case of a 'sense of community' where one's actions direct the behaviour of others. The police and volunteers not engaging in *darśana* confirm the role theory wherein people's behaviour is dictated by their role in the setting.

5.5 Gadital vis-a-vis the Permanent Pālakhī Tal

There were two locations which attracted devotees for *darśana*, the temporary *maṇḍapa* at Gadital and the permanent Pālakhī Tal in the housing complex. It was the *pālakhī*, along with the icons, which carried sacredness along with it, both these spaces temporarily acquiring this attribute.

This lingering of sacrality was seen for a longer time at the permanent Pālakhī Tal, indicating that for the sacrality to linger for a long time, permanent sacred entities and associated historical memory are needed.

If the main marker of sacredness at Gadital was the mobile *pālakhī*, it was the fixed *pādukās* at the Pālakhī Tal. The semi-fixed feature of the temporary *maṇḍapa* formed the anchor of the milieu at Gadital, whereas it was a fixed feature, the permanent *maṇḍapa* at Pālakhī Tal.

At the Pālakhī Tal, expressions of sacrality were seen before, during and for a long time after the *pālakhī* passed from there. Whereas the *pālakhī*

halted at Gadital, it did not halt at the Pālakhī Tal. The number of devotees at Gadital were more than that at the Pālakhī Tal. Despite this, Gadital retained the sacrality only for a brief period after the *pālakhī* left, whereas the Pālakhī Tal continued to be sacred for a longer period. During a later visit to this spot on an evening of a non-auspicious day, older residents of the society could be seen spending their time around the Pālakhī Tal. A resident confirmed that the area is kept clean on all days, and that children are warned not to play on the platform. Occasionally and on auspicious days flower offerings are made to the *pādukās* at this Pālakhī Tal.

One reason for this could be that the Pālakhī Tal has historically been the place where the *pālakhī* halted, thus public nostalgia could be attached with it. This nostalgia was confirmed through interactions with the residents of the housing society. No such nostalgia was associated with Gadital.

Another reason could be the existence of icons, the anchors of sacredness. The Pālakhī Tal has permanent *pādukās* installed, whereas no such thing exists at Gadital. People need to 'see' to 'believe' (Aristotle & Lawson-Tancred, 1998). The 'direct perception' theory of affordances comes in picture here, where the permanent *pādukās* directly afford *darśana* regardless of the presence of the *pālakhī*. Whereas the notional environment at Gadital is dependent on the presence of the *pālakhī* and the devotees.

6. INFERENCES

This case study demonstrates that the behaviour-milieu interface is not determined merely by the physical form of the milieu. Instead, cultural notions and symbolic meanings that determine the sacrality of the place heavily influence this interface. While the devotees displayed a uniformity of behaviour as predicted by Barker, the other people involved, such as the *wārkarīs*, police officers, and sellers responded differently to the sacredness. The lingering of sacrality was a phenomenon observed.

The findings through this case study suggest that:

- With the presence of a focal sacred object, temporal sacrality has the potential to redefine mundane environment into an intense behaviour setting.
- If the actual sacred object (*pādukā* in this case) is not visible, sacrality can get associated with its carrier (*pālakhī* in this case)
- Physical markers and historical memory appear to play a critical role to enable sacrality to linger.

- The response of people to the milieu can operate within available possibilities. These could be community driven on one side to individual choices on the other.

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Ar. Amol Holey is an architect, urban planner and Indologist. He is currently a research scholar, pursuing his PhD from MIT ADTU School of Architecture and Planning, Pune. He has over 14 years of teaching experience and has developed a niche in the Indian Knowledge Systems.
Email: amolholey@gmail.com



Dr. Ashwini Pethe (A16524) is the Dean of MIT ADTU School of Architecture and Planning, Pune. She has a PhD in Cultural Landscapes of the Kullu Valley and is the PI for the MoE-sponsored IKS Teacher Training Center. She has pioneered India's first M. Arch. in Traditional Indian Architectural Knowledge Systems.
Email: ashwini.pethe@mituniversity.edu.in



Dr. Abhijit Natu (A12879), Principal, BKPS College of Architecture, Pune is an expert in landscape architecture, conservation and environment behaviour. He has more than 30 publications and has supervised 10 PhDs. He is a recipient of multiple awards and conducted Teacher Training Programs and workshops for AICTE, COA and ISOLA.
Email: asnatu@bkps.edu

A Comparative Analysis of Daylight Metrics in Residential Buildings in Indian Climatic Zones

By Ar. Bikash Patra, Dr. Tejwant Singh Brar and Dr. Rajeev Garg

Abstract

Daylight enhances visual comfort and energy efficiency in buildings. Varying climates in India create unique challenges for optimisation of daylight in residential buildings. However, due to the lack of available climate-specific design tools, daylight optimisation, visual comfort and energy efficiency remain suboptimal across all five climate zones in India. To optimise daylight, it is necessary to quantify daylighting performance in residential units. This study investigates the use of daylighting metrics in residential structures across a range of climatic conditions to evaluate the hypothesis “Daylighting contributes to energy efficiency and occupant comfort in residential structures”. This paper presents a review of the documented literature for daylight performance under the following heads: i) Useful Daylight Illuminance (UDI), ii) Spatial Daylight Autonomy (sDA), iii) Daylight Factor (DF) and iv) Annual Sunlight Exposure (ASE). The study was based on India’s climatic zones and building types. A few exceptions were also analysed outside India relevant to the topic. The results suggest that a combination of daylighting metric(s), rather than single metrics, is necessary to provide maximum daylighting and reduced energy consumption for occupant comfort. This study highlights key indicators assessing daylight availability, energy use and visual comfort in residences, offering insights for architects and policymakers.

Keywords: daylight metrics, daylight factor, daylight autonomy, useful daylight illuminance, residence

1. Introduction

The growing emphasis on low-energy, sustainable buildings has necessitated the development of simple and precise procedures for determining whether a “daylit” building meets basic energy efficiency and comfort standards (Mardaljevic et al., 2009). Measurement of various daylighting parameters and understanding their impact on human response, performance, and satisfaction are necessary to create a comfortable daylit environment that enhances well-being (Lu et al., 2026). The common practice of designing daylighting with parameters such as window-to-floor ratio (WFR) and the daylight factor (DF) is becoming obsolete due to global climate change. DF is based on overcast conditions and WFR doesn’t consider climatic influences (Martinsons et al., 2025). While climate-based lighting models are widely used to evaluate lighting in workplaces, they have limited usefulness for residential buildings (Dogan & Park, 2020).

Most literary references concentrate on daylighting in specific climates; very few studies have thoroughly examined how well daylighting metrics function in India’s varied climatic zones. Studies that integrate objective daylighting metrics with subjective occupant comfort are also rare. This comparative analysis of daylighting indicators and their efficacy in residential structures in India’s varied climatic areas aims to address these discrepancies.

This study aims to provide a comprehensive analysis of daylighting measures in residential buildings

across India's five climate zones. By integrating the findings from earlier research, the review will assist in offering region-specific recommendations for maximising daylighting performance. Indian homes may become more energy-efficient and comfortable as a result. The study commences with the introduction covering already documented literature, followed by a literature study under the following heads: i) Understanding Daylight Metrics in Residential Architecture ii) Overview of daylight metrics iii) Climatic Influence on Daylighting in India iv) Existing Research on Daylight Metrics in Residence. The methodology section included the process in which the study was conducted. The study concludes with a presentation and discussion of the findings, highlighting potential directions for future research.

2. Literature Review

A considerable amount of literature is available on daylight performance in buildings, but a study evaluating multiple daylight metrics across varying climatic zones of India has not been conducted, especially for residential buildings.

2.1 Understanding Daylight Metrics in Residential Architecture

Daylight enhances housing quality, decreases the need for artificial lighting, promotes well-being and supports health through circadian entrainment. Natural light and an indoor-outdoor connection enhance comfort in an area with proper light, making it more valuable and pleasant (Waskett, 2021). Daylighting performance enhancement in buildings also contributes to a decrease in artificial light demand with improved spread of daylight throughout the interior space (Park et al., 2014).

2.2 Overview of daylight metrics

Daylight metrics are critical tools to determine the usefulness of natural lighting in buildings. Daylight Factor (DF), Daylight Autonomy (DA) and Useful Daylight Illuminance (UDI) are the most prominent metrics. Each metric has a specific purpose and provides various aspects of daylight performance. Daylight metrics quantify illuminance, distribution, glare and circadian effects. Traditional static metrics like Daylight Factor are simple but ignore climate and time variation.

Dynamic, climate-based metrics like Daylight Autonomy, Useful Daylight Illuminance, Annual Sunlight Exposure better predict daylight availability, visual comfort and energy savings (Bian & Ma, 2017; Brembilla & Mardaljevic, 2019; Dogan & Park, 2020;

Khaire et al., 2026; Li, Li, Chen, Tsang, et al., 2023).

2.2.1 Daylight Factor

The Daylight Factor (DF) is a static metric that expresses the ratio of indoor illuminance to outdoor illuminance under a standard overcast sky at a given location. As it does not address variations in daylight availability due to changing weather conditions or seasonal differences, its usefulness in dynamic environments is limited (Mo et al., 2022; Sun et al., 2017). Daylight Factor is among the most commonly used daylight metrics for predicting preliminary daylight in areas that experience a high frequency of overcast skies (Bian & Ma, 2017).

2.2.2 Daylight Autonomy

Daylight Autonomy is a dynamic daylight metric that assesses the efficacy of daylighting for measuring the percentage of occupied time that a given area achieves a minimum illuminance value solely through daylight. Unlike the Daylight Factor (DF) that represents a static condition, DA assesses variability in daylight over the course of the day and seasonally, providing a more accurate representation of the actual indoor lighting conditions experienced at a given site. DA is also valuable for assessing the effectiveness of daylighting schemes across a variety of climates and building orientations (Handina et al., 2017; Mo et al., 2022). A comprehensive assessment of daylight performance is typically performed using Daylight Autonomy (DA) along with other daylighting metrics (Bian & Ma, 2017; Cabezuelo et al., 2020).

2.2.3 Useful Daylight Illuminance

Useful Daylight Illuminance (UDI) is another important dynamic daylight metric that quantifies the percentage of occupied time that indoor daylight levels fall within a desired range; typically, between 100 and 2000 lux. Unlike simple metrics, UDI evaluates daylight quality by determining when the amount of available illumination is inadequate to accomplish visual tasks or excessive to create glare and visual discomfort. As such, UDI provides a more accurate depiction of the effectiveness of daylight in achieving visual comfort in occupied spaces. (Mo et al., 2022; Shafavi et al., 2020a). UDI has proven to be particularly beneficial in optimising window design and shading strategies to improve occupant comfort while decreasing energy consumption (Cantin & Dubois, 2011).

2.2.4. Annual Sunlight Exposure and Spatial Daylight Autonomy

Spatial Daylight Autonomy (sDA) and Annual Sunlight Exposure (ASE) will provide insight into daylight

availability, as well as potential glare, over the course of a year; sDA and ASE may be particularly useful in tropical climates to balance daylighting and thermal comfort (Kalaimathy et al., 2023).

Daylight Autonomy (DA), Daylight Factor (DF) and Useful Daylight Illuminance (UDI) are the three primary daylighting performance metrics used to evaluate daylight performance in buildings. Daylight Autonomy and Useful Daylight Illuminance are climate-based daylighting metrics and offer dynamic insights considering variations in daylight availability based on weather or time of the year. These metrics work well for daylighting optimisation, increase energy efficiency and improve occupant comfort. The benefits and constraints of daylighting are represented in Figure 1 and the metrics and their applications are represented in Figure 2.

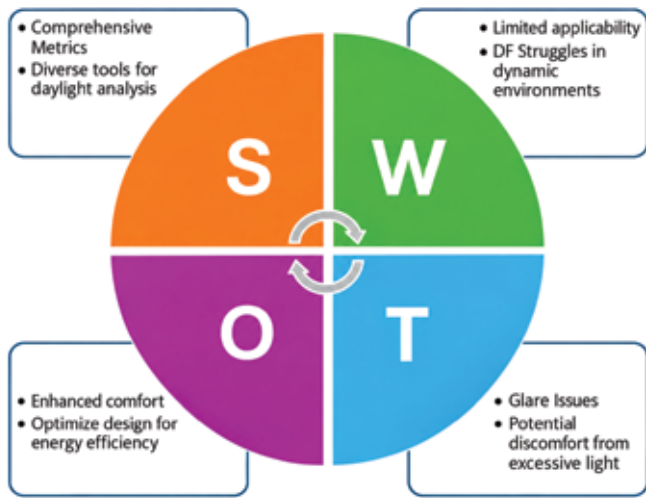


Figure 1: Daylight Metrics: Benefits and Constraints diagram
Source: Authors



Figure 2: Daylighting Metrics and Their Applications
Source: Authors

2.3 Climatic Influence on Daylighting in India

The National Building Code (NBC) divides India into five climatic zones: hot dry, warm humid, composite, temperate and cold. The study was confined to three primary zones (hot and dry; composite; warm and humid) as they represent many large population centres and have considerable climatic variability. This study provides an opportunity to conduct a deeper and focused comparison of the daylighting

performance of residential buildings specifically designed for the most prevalent Indian climatic conditions.

Traditional strategies of daylighting in India combine indigenous methods with new technology to accommodate the various climatic zones within India. These zones are crucial for both planning and policymaking related to daylighting, especially considering current changes in climate. Daylighting should therefore be specific to a particular climate in combination with passive and active elements of buildings for improved energy efficiency and occupant comfort.

India's diverse geography creates various climate zones with distinct characteristics that influence energy use and building design. A thorough understanding of climate is required for effective planning and policymaking, especially in diverse climate zones.

2.3.1 Impact of climate on daylight availability and performance

The climatic condition of a region has a direct effect on the daylight penetration and the quality of daylight in a building, which is one component of the complex topic of climate's effects on daylight availability and performance; this will impact the design of space, visual comfort and energy efficiency.

2.3.2 Daylight Sufficiency and Climate Change

Climate change can significantly affect the quantity of daylight reaching interior spaces. Therefore, accurate estimates of outdoor daylight availability become increasingly important, because projections of future climate scenarios suggest that variability in solar radiation data may result in differences of up to 18% in Spatial Daylight Autonomy (sDA) (Arango-Díaz et al., 2022).

2.3.3 Design Parameters and Climate

Choices made during design, including the orientation of windows, the angle of surrounding obstructions and the window-to-wall ratio (WWR), greatly influence the effectiveness of daylighting strategies. These variables will determine how much natural light enters a space and how much of an effect it will have on energy consumption and glare under various climatic conditions (Asfour, 2020; Kalaimathy et al., 2023).

Because climate influences daylight availability and performance as well as building design and energy efficiency, climate-responsive design strategies are necessary for the sustainable design of buildings to enhance visual comfort and energy efficiency (Table 1).

Table 1: Daylighting Strategies across India’s various Climate Zones
Source: Author

Climatic Zone	Vernacular Features	Contemporary Practices	Literature
Hot-Dry	Courtyards, thick walls, small windows, Jaali screens, high parapets, orientation for minimal heat gain	High-performance glazing, light shelves, shading devices, optimised window-to-wall ratios	(Deshpande A & Gupta D A, 2024; Maligi et al., 2024; Patra et al., 2024)
Warm-humid	Large overhangs, verandas, elevated floors, cross-ventilation, shared walls	Advanced shading, reflective materials, improved fenestration, passive cooling integration	(Patra et al., 2024)
Composite	Courtyards, multiple courtyards, flexible fenestration, thick walls	Skylights, solar tubes, clerestory windows, retrofitting with light shelves	(Chandel et al., 2016; Thakur et al., 2021; Verma & Bano, 2021)
Temperate	Stone walls with high thermal mass, verandas and semi-open spaces	Attention to orientation and openings for daylight and thermal comfort	(Chandel et al., 2016; Henna et al., 2021)
Cold	Stone walls, small and recessed windows, compact forms	Orientation, layout, thermal mass, insulation	(Gautam et al., 2025; Singh et al., 2011)

2.4 Existing Research on Daylight Metrics in Residence (Table 2)

3. Methodology (Figure 3)

To have insightful information on the parameters mentioned in the literature review section, a systematic search using databases including Scopus, Web of Science, ScienceDirect and Google Scholar was conducted for peer-reviewed articles. Daylighting metrics, daylight factor, useful daylight illuminance, daylight autonomy, daylighting and climate were among the keywords used in the search. The following criteria were utilised in the selection process: (i) research that concentrated on residential buildings utilising a quantitative daylight metric; (ii) studies that were relevant to India or similar climatic zones; (iii) both usage and comparison of the chosen daylighting metrics; and (iv) papers published between 2006 and 2026 were considered for the study. Exclusion criteria included building type and daylight metrics not relevant to the study, outside climate scope and information outside the scope of the research question. Following the initial screening and eligibility assessments, 54 relevant studies were evaluated to compare the various daylight metrics. A few studies from outside India were also considered, having the same climatic effect to ensure a broad-spectrum insight into the above-mentioned parameters.

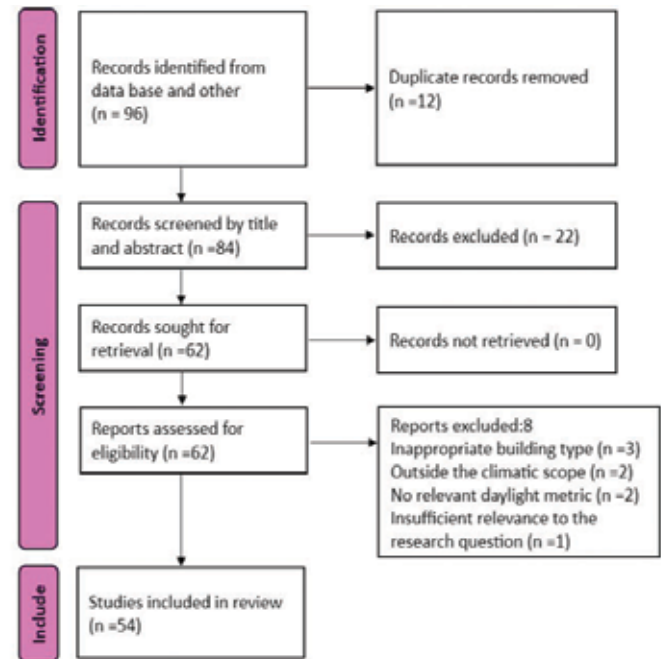


Figure 3: Inclusion-Exclusion Criteria
Source: Authors

4. Discussion

Studies highlights selection of appropriate daylighting metrics is critical to enhancing daylight performance in residential buildings within various climatic settings. Performance indicators (i.e., useful daylight illuminance [UDI], spatial daylight autonomy [sDA], annual sunlight exposure [ASE], daylight autonomy [DA] and indoor illuminance levels) are used to

Table 2: Review of Daylight Metrics in Residence
Source: Author

Literature	Parameter Studied	Daylighting metrics used	Observation and conclusion	Building type	Climate and Location
(Kamel et al., 2024)	WWR	sDA, ASE	Multi-objective optimisation balances daylight and energy use	Residential	Hot Arid, Egypt
(Kalaimathy et al., 2023)	VLT, WWR	UDI, ASE, sDA	Optimal VLT and WWR enhance daylighting	Residential	Warm and Humid Climate
(Purohit et al., 2020)	Orientation	Daylight Area, UDI	Orientation optimisation and sensors reduce energy use	Residential Apartment	Hot and dry, Gandhi Nagar
(Dabe, 2019)	Percentage of CAWR and Orientation	UDI	Appropriate window size and orientation help to improve daylight	Residential	Nagpur, Hot and Dry
(Dogan & Park, 2019)	Daylight Performance	DF, DA, UDI, sDA	Residential daylight score improves layout design	Residential	Cold climate, USA
(Dabe & Dongre, 2018)	CAWR, Orientation		Larger windows need heat-glare balance	Residential	Hot and Dry Nagpur
(Xue et al., 2016)	luminous comfort, energy-efficient design	DA300 (Daylight Autonomy), uniformity	Daylight benchmarks guide façade design	Residential	Cold, Hong Kong
(Bardhan & Debnath, 2016)	WWR, Orientation	UDI	Climate-specific daylight metrics improve daylight assessment	Residential	Warm Humid Climate, Mumbai
(Debnath & Bardhan, 2016)	WWR, Orientation	UDI, Annual light exposure	South-east orientation and 50% WWR optimise daylight performance	Residential	Warm Humid Climate, Mumbai
(Mardaljevic et al., 2011)	Illuminance, Circadian Impact, Lighting Energy	UDI	UDI refinement links daylighting, energy and circadian health	Residence	
(Bhattacharya et al., 2022)	Solar Illuminance	Perez model and IESNA	Perez model supports efficient daylight design	Residence	Warm Humid, Kolkata
(Dabe & Adane, 2020)	WWR Shading Device	Lux levels	10% WWR in combination with shading devices improves daylight performance	Residence	Nagpur
(Jakubiec et al., 2019)	Daylight availability	DA UDI mean/ median annual illuminance	Annual illuminance better predicts occupant satisfaction	Residential apartments	Tropical hot-humid climate; Singapore
(Kalaimathy et al., 2025)	WWR, SRR, Orientation	UDI, sDA, ASE	Low WWR, skylight-to-roof ratio, Visible Transmittance balance daylight	Single-story residence	Warm-humid climate, Chennai, India
(Sherif et al., 2025)	Glazing type, WWR, Wall finish colour	sDA, ASE	50% WWR optimises daylight in hot arid housing	Residential	Hot arid climate, Egypt

assess daylight adequacy; glare risks; and energy performance. The above-mentioned performance indicators are also related to the key design elements (i.e., visible light transmittance [VLT], window-to-wall ratio [WWR], building orientation and use of shading devices); therefore, it is essential to consider

these design elements when creating a balance of effective daylighting. A comparison of daylighting metrics including the purpose, dynamic, applicability, thresholds, impact on design and resident comfort has been carried out in Tables 3, 4 and 5.

Table 3 Comparison of Daylighting Metrics
Source: Author

Daylighting Metrics	Purpose	Dynamic	Applicability
Daylight Factor	Indoor vs Outdoor Light	No	Limited by weather changes
Daylight Autonomy	Occupied Hours Satisfaction	Yes	Effective in various climates
Useful Daylight Illuminance	Quality of Daylight	Yes	Optimises comfort and efficiency
Annual Sunlight Exposure	Glare Insights	Yes	Useful in tropical climates
Spatial Daylight Autonomy	Overall Daylight Availability	Yes	Balances daylight with comfort

Table 4: Daylighting Metrics, Thresholds and Impact on Design
Source: Author

Metric	Definition and Thresholds	Impact on Design, Comfort and Energy	References
DF (Daylight Factor)	Ratio (%) of indoor illuminance at a point to simultaneous outdoor illuminance under overcast sky (commonly, DF ≥ 2% is considered good)	Simple, static metric for minimum daylight; does not account for climate or orientation; useful for early design and code compliance.	(Bian & Ma, 2017; Gorzelewska & Kwieciński, 2025; Hong et al., 2024; Li, Li, Chen, Lou, et al., 2023; Nabil & Mardaljevic, 2006)
DA (Daylight Autonomy)	% of occupied hours a point exceeds a set illuminance (e.g., 300 lux) using real climate data	Dynamic, climate-based; higher DA means less need for artificial lighting; does not indicate over-illumination	(Bian & Ma, 2017; García-Martín et al., 2025; Gorzelewska & Kwieciński, 2025; Jiang et al., 2025; Li, Li, Chen, Lou, et al., 2023; Nabil & Mardaljevic, 2006; Ruiz et al., 2021)
UDI (Useful Daylight Illuminance)	% of time daylight at a point is within a “useful” range (commonly 100–2000 lux)	Identifies both underlit and overlit areas; helps reduce glare and cooling loads; supports energy savings	(Boubekri & Lee, 2017; García-Martín et al., 2025; Hu et al., 2023; Shafavi et al., 2020b)
sDA (Spatial Daylight Autonomy)	% of floor area receiving ≥300 lux for ≥50% of annual occupied hours	Measures daylight sufficiency for tasks; LEED recommends sDA ≥ 55% for good daylighting; supports visual comfort and energy efficiency	(Ershov et al., 2022; García-Martín et al., 2025; Hu et al., 2023; Li, Li, Chen, Lou, et al., 2023; Shafavi et al., 2020b)
ASE (Annual Sunlight Exposure)	% of floor area receiving >1000 lux of direct sunlight for over 250 hours/year	Assesses risk of glare and overheating; LEED recommends ASE ≤ 10% to avoid discomfort	(Farivar & Teimourtash, 2023; García-Martín et al., 2025; Hu et al., 2023; Li, Li, Chen, Lou, et al., 2023; Shafavi et al., 2020b)

Table 5: Daylighting impacts on energy use and comfort in residential buildings in Indian Climate zones
Source: Author

Study	Residential Context	Key Finding Relevant to Energy Efficiency and Comfort
(Bardhan & Debnath, 2016)	Affordable housing, India	Daylight-inclusive byelaws function as an energy-saving route, reducing reliance on artificial lighting in low-income housing.
(Debnath & Bardhan, 2016)	Naturally ventilated dwellings	Daylight performance directly informs energy management strategies in residential units.
(Dabe, 2019; Dabe & Adane, 2020; Dabe & Dongre, 2018)	Hot and dry climate dwelling units	Daylight metrics vary significantly by floor level and room type, guiding design for adequate illumination without overheating.
(Xue et al., 2016)	Residential buildings (general)	Dynamic daylight metrics (e.g., useful daylight illuminance) better quantify luminous comfort than static daylight factor.
(Hong et al., 2024)	Dense urban residential areas, China	Current planning/setback regulations often fail to guarantee sufficient daylight in living rooms, affecting comfort.
(Kalaimathy et al., 2023, 2025)	Tropical residential buildings	Architectural parameters (window size, orientation, shading) have an impact on daylight autonomy and occupant visual comfort.
(Kamel et al., 2024)	Residential building stock, hot climate	Optimising view percentage and daylight autonomy alongside energy use reduces lighting-related energy demand.
(Patra et al., 2024)	Residences across Indian climate zones	Review confirms daylighting methods consistently improve energy efficiency across varied residential climates.
(Waskett, 2021)	Homes (general commentary)	Argues daylight adequacy in homes must be regulated as a health and comfort safeguard

The studies found daylighting minimises energy use and improves occupant comfort in residences. In hot and dry climates, daylight availability changes by floor level and room type, which influence the amount of artificial lighting required (Dabe, 2019; Dabe & Adane, 2020; Dabe & Dongre, 2018). (Bardhan & Debnath, 2016) found that daylight-inclusive building codes help to minimise energy use in affordable housing. (Kamel et al., 2024) showed that balancing daylight autonomy with view access can reduce energy demand in residential buildings. Comfort is equally significant as energy savings. (Xue et al., 2016) found that dynamic daylight metrics track occupant comfort better than the static metric daylight factor. (Hong et al., 2024) found that current planning rules are not enough to guarantee daylight in living rooms. Overall, these findings across different climates prove the hypothesis that daylighting contributes towards both energy performance and comfort in residential buildings.

Both static and dynamic daylighting metrics should be employed to gain a comprehensive knowledge base regarding daylight performance. While Daylight Factor (DF) will provide a basis for evaluating daylight potential, dynamic metrics (DA, UDI, sDA and ASE)

are more representative of how daylight performs in real-time. Dynamic daylighting metrics are more beneficial for determining occupant visual comfort; estimating occupant satisfaction; and providing the most energy-efficient options across multiple climate conditions and building orientations.

Research indicates that in hot-dry climates, the building orientation and the compactness of window-to-wall ratios are key factors to improve UDI (Useful Daylight Illuminance) while reducing the potential for overheating. In warm-humid climates, researchers often depend upon daylight metrics (e.g., UDI [100-2000 lux]; sDA > 50%; ASE < 10%; and DA) to provide a balance of adequate daylight; glare control; and thermal comfort. Conversely, research conducted in cold climates has focused on developing uniform daylight distribution throughout a space and achieving DA300 targets to maintain consistent visual comfort.

The studies referenced in the review demonstrate that all the dynamic daylight metrics (i.e. sDA, ASE, UDI, DA300, annual illuminance) provide a higher reliability in determining daylight performance in residential buildings across different climates than the static metrics. Window-related factors (WWR,

CAWR, VLT, WDR) and orientation were found to be consistent design factors that influence daylight adequacy, glare control and energy performance. It was determined that hot-dry and warm-humid climates need tighter controls on window size and orientation as well as additional measures such as shading, balconies, or façade modulation to maintain daylight and thermal comfort (Dabe, 2019; Dabe & Adane, 2020; Dabe & Dongre, 2018; Kamel et al., 2024). In addition to these factors, studies demonstrated an increasing focus on occupant-centric issues, such as luminous comfort, circadian effects and perceived brightness; and linkages have been made between daylight metrics and both occupant satisfaction and energy savings (Jakubiec et al., 2019; Mardaljevic et al., 2011; Xue et al., 2016).

These findings support previous studies that emphasised UDI and sDA as good indicators of residential daylighting (Bardhan & Debnath, 2016; Dogan & Park, 2019; Kalaimathy et al., 2023). While the studies referenced herein extended the existing body of knowledge in terms of showing that the optimal threshold for each metric is dependent upon the climate (for example, Mumbai, Nagpur and Egypt), they differed significantly from traditional methods that rely on DF to determine daylight availability and occupant perception (Dabe, 2019; Debnath & Bardhan, 2016; Kamel et al., 2024). Newer studies reference CBDMs and annual illuminance, as opposed to DF and are able to better capture both actual daylight available to occupants and occupant perceptions of daylight availability (Jakubiec et al., 2019). Use of validated sky and illuminance models (for example, the Perez model) further enhances the ability to perform daylight-responsive analysis in Indian climate conditions (Bhattacharya et al., 2022).

The study has found supporting evidence for the use of multiple daylight metrics as well as their integration into the architectural design process earlier than previously used to provide better daylight conditions throughout a building through differing orientations and climates. The study also shows that having a daylighting standard for each region would help with policy-making and rating system development; however, one standard will not have the same level of effectiveness.

There has been limited research conducted regarding multi-story residential buildings; however, most of the research is directed toward low-rise and mid-rise residential buildings. The lack of consideration of multiple-story residential effects, along with behaviour by long-term occupants and its influence upon health, are among several areas of future

research. Future research may include developing regionally based daylight threshold values for India, correlating daylight metric data to post-occupancy evaluations (POE) and investigating an integrated daylight-energy-health methodology using users' real-time inputs.

Climate-responsive and dynamic metrics can identify changing daylight conditions, which occur throughout the day/season/year. Additionally, the results from this study demonstrate the need for designing buildings that respond to local climatic conditions, utilising combinations of multiple daylighting metrics and applying state-of-the-art daylight simulation techniques to provide optimal daylight performance (energy-efficient and comfortable for occupants) in residential dwellings.

5. Conclusion

The findings from this research show that there is a need to develop climate-specific applications of dynamic daylight metrics to provide better daylight performance for residential buildings in every zone across India. The comparative analysis above demonstrates why Useful Daylight Illuminance (UDI) can be used to evaluate daylight adequacy and over-illumination in warm-humid and glare-prone zones; Annual Sunlight Exposure (ASE) will help to detect high levels of direct sun exposure, thereby enhancing evaluation of glare and potential overheating in hot dry and warm humid climates. In addition, the results indicate that spatial daylight autonomy (sDA) indicates the percent of total floor area receiving sufficient daylight for an extensive period of time during occupied hours in composite and hot-dry climates and therefore provides architects and designers with the information required to decide upon optimal building orientation, form and use of shading devices. Conversely, daylight autonomy (DA) measures only the percent of occupied hours when a given point receives an adequate daylight level; however, it does not consider direct sunlight or glare, which can create uncomfortable conditions. Consequently, this study advocates the importance of applying combinations of multiple daylighting metrics and inclusion of UDI, sDA and ASE in climate-specific daylighting guidelines and Indian building codes (including the ECBC and residential building standards) to enhance occupant-centricity and energy efficiency of residential design. The study provides a comprehensive framework for assessing daylight metrics in Indian residences based on daylight availability, reducing artificial lighting demand and enhancing visual comfort through appropriate design strategies.

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Ar. Bikash Patra (A20218) is a PhD Scholar at School of Art and Architecture, Sushant University, Gurugram, with over 20 years of academic and professional experience. He holds IGBC AP, GRIHA CP and GEM CP credentials. His research focuses on daylighting, sustainable architecture, climate-responsive design, energy-efficient buildings and environmental performance of the built environment.
Email: bikashpatra5536@gmail.com



Dr. Tejwant Singh Brar (F14255) is a Senior Professor at School of Art and Architecture, Sushant University, Gurugram, Architect and Urban Planner. His expertise includes urban water management, GIS, remote sensing and planning pedagogy. Educated at GZSCET Bathinda and IIT Roorkee, he co-founded MAP Solutions and has over 90 national and international publications.
Email: brartejwant@yahoo.com



Dr. Rajeev Garg (F13839) is an Adjunct Professor in the Department of Architecture and Planning at the National Institute of Technology (NIT) Kurukshetra, Haryana. He holds a Ph.D. from IIT Roorkee and has over two decades of experience in architectural education and research, with expertise in sustainable architecture, building performance and environmental design.
Email: gargrajeev3@rediffmail.com

Acoustic Isolation in Buddhist Spiritual Spaces

By Sona and Ar. Priya Arora

1. Introduction

Acoustic has historically played a central role in Buddhist spiritual architecture, where sound through chanting, bells, prayers and silence acts as a medium for transcendence and emotional regulation. Historically, Buddhist architectural typologies including stupas, chaityas, viharas, pagodas and courtyards have been designed to intensify spiritual experience through controlled reverberation, sound diffusion and integration with natural soundscapes. Even though there have been various research works conducted on the topic of acoustics in spiritual spaces and the impact of sound, there is a need for extensive research on the relationship between acoustical design and spatial experience. The following research gaps have been identified, through literature review. This research demonstrates how spatial characteristics such as form, volume, materials and spatial sequence contribute to acoustic isolation (Zhang, Zhang, Liu, & Kang, 2016).

- i. There has been no comprehensive study to show the effect of spatial design on the acoustic environment in a spiritual space.
- ii. There is limited research to show the impact of acoustics in enhancing emotional response in a Buddhist spiritual and meditative environment and the physical characteristics of a space responsible for the acoustic experience.

1.1 Aim and hypothesis

The aim of the research is to study the impact of spatial design on acoustic characteristics in Buddhist

spiritual spaces and its influence on enhancing human emotional response. The primary hypothesis of this research is that acoustic characteristics/isolation enhances emotional response in a meditative space. Ultimately, the research argues that in spiritual architecture, silence is not the absence of design. It is the result of correct design. The measure of the success of a Buddhist spiritual space is not determined by its appearance, but by gauging whether the person inside the space can sit, breathe and become aware without any distractions. The objectives of the study are:

1. To study the effect of physical meditative spaces on characteristics of acoustical design.
2. To identify the auditory processing for different stimuli for an emotional experience.
3. To evaluate the impact of an acoustic environment in enhancing auditory experience and intensity of emotional impact.
4. To propose ideal acoustical design solutions specific to meditation centre.

The research is limited for the term acoustics and will not be focusing on any other parameters that might or might not affect the human perceptions of space such as thermal comfort, lighting, visuals etc. The research will be limited only to spiritual and experiential buildings and will not focus on any other typology of building. It would neither include the simulation and artificial technologies as methods, nor the technological interventions such as sound mapping.

2. Literature Review

2.1 Spatial design and acoustics

Spatial design is one of the most important factors which influence the user experience and affects factors like acoustics within a built environment. Hence, the need to study the spatial design emerges while analysis of any space. Effective spatial design improves the user experience providing comfort, both physiological and psychological.

Spatial design shapes how sound behaves in spaces, influencing acoustic quality and overall comfort. It affects user experience by controlling noise, echo and clarity through volume, surfaces, orientation and zoning. Spatial planning separates quiet and active areas, enhancing both psychological and physiological well-being in built environments (Zhang, Lai, Zhang, & Kang, 2020).

The primary acoustic parameters of study are:

- Reverberation Time (RT): Ideal RT for spiritual spaces is 1.5 - 2.5 seconds, while for quiet meditative spaces it is 0.5 - 1.0 seconds. It is calculated using the formula

$$RT_{60} = 0.161 \times (V/A)$$
- Echoes: Overpowering echoes can create a sense of surrendering to the divine.
- Sound strength (G): Measure of sound loudness in a space expressed in decibels (dB).
- Noise from external sources: Includes traffic and surrounding activity

- Spatial planning impacts: Larger spaces create longer reverberation time while smaller spaces absorb the sound quicker reducing the reverberation time, as reverberation time is proportional to volume of the space. Proportionally imbalance spaces create uneven sound distributions. Examples include rooms with dimensions like 1:2:3 or 1:2:4.
- Materials: Hard, reflective surfaces amplify reverberation, while absorbent materials reduce sound spill and dampen sound quickly, improving speech intelligibility.

2.2 Stimuli for auditory processing

Auditory Stimuli are sounds and acoustic properties manipulated by buildings, such as natural reverberation or reduced noise via absorbing materials (Algargoosh, Soleimani, O'Modhrain, & Navvab, 2022).

Types of Stimuli: Stimuli are categorised into:

- Natural stimuli: Running water (40 dB), birds chirping (35 dB), wind (60 dB) and leaves rustling (20 - 30 dB). These are generally perceived as pleasant and harmonious.
- Human-related stimuli: Conversations (50 - 55 dB), footsteps (30 - 50 dB) and chants (55 - 60 dB).
- Negative stimuli: Vehicle horns and traffic typically register high noise levels (70 -100 dB) (Figure 1).

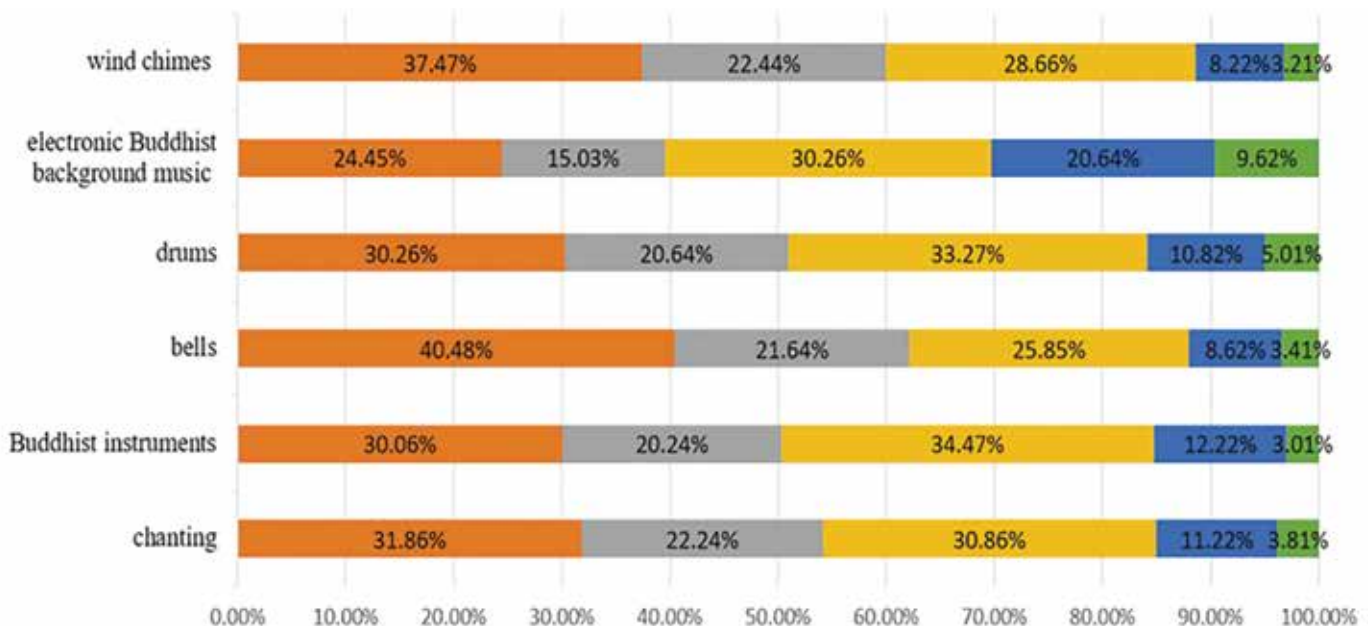


Figure 1: Preferences of sound in Buddhist spiritual spaces
 Source: Zhang, Kong, Zhang, & Kang, 2022

Emotional Response Assessment: Emotional responses are measured through subjective analysis (user surveys/self-report ratings) and objective physiological tests (Heart Rate response). The study notes that religious elements (wind chimes, bells, chants) and natural elements (water, wind) are key acoustic factors affecting spiritual spaces (Zhang, Kong, Zhang & Kang, 2022).

2.3 Soundscape through architecture

A soundscape is defined as an acoustic environment as perceived or experienced and/or understood by a person or people, in context (ISO 12913-1). It is a person's perceptual construct of the acoustic environment, emphasising quality and character over mere volume (Schafer, 1994).

Soundscapes enhance the meditative experience by promoting mindfulness and reducing distractions. They support spiritual symbolism (e.g., bell sounds symbolising awakening) and enable integration with nature. Spatial zoning is essential for marking the transition from a public space to a more serene environment.

Buddhist centres use a specific sequence of spaces to manage the sound experience, mirroring the spiritual path from worldly existence to inner enlightenment (Zhang, Kong, Zhang, & Meng, 2020). Entrance gateway/outer courtyard acts as a transitional threshold where natural sounds establish calmness.

The main courtyard/prayer hall functions as a collective, reverberant space intended for immersion and rhythm. The meditation hall designed for deep, silent practice where silence itself is an active acoustic state aiding concentration.

3. Methodology

The research adopted a mixed-method approach combining literature review, field observation and user surveys. Both qualitative and quantitative methods were used to understand the relationship between architecture, sound and emotional response.

3.1 Data Collection Methods

- a. Sound level measurement: Sound Level Meters were used to record decibel levels in various zones (crowded vs. quiet).
- b. Psychological and physiological testing:
 - i. Subjective: Self-report ratings via user surveys were utilised.
 - ii. Objective: Heart Rate Response via biometric devices (mentioned as a method for emotional record response) were recorded.

3.2 Research Framework

The study is structured into four distinct phases:

- i. Study of spatial design: Analysing how physical characteristics affect acoustical design.
- ii. Identification of stimuli: Categorising physical factors and stimuli responsible for auditory processing.
- iii. Evaluation: Assessing the impact of the acoustic environment and soundscapes in built and open spaces.
- iv. Proposal: Developing ideal design solutions specific to Buddhist spiritual centres.

3.3 Case Studies

3.3.1 Shanti Stupa, New Delhi

Shanti Stupa is a Buddhist monument in Delhi, India, intended as a symbol of universal brotherhood and peace (Figure 2). It is one of several Peace Pagodas in the world. It features a garden surrounding it, acting as a soundscape for the stupa. The case study observes the spatial distribution within a Buddhist complex and measure sound levels throughout.



Figure 2: Shanti Stupa, New Delhi
Source: Author

The soundscape includes natural sounds such as birds, wind and water features, which reduced the perception of urban noise and enhanced calmness. Field research indicates that sound levels dropped from 90 decibels (traffic noise) to 40-45 decibels close to the stupa. The absorptive surfaces of the garden (such as gravel and plants) dampen the noise level, whereas water provides white noise (Table 1).

Table 1: Decibel level on site at Shanti Stupa
Source: Author

Space	Decibel
Traffic	90
Pathway- conversations	60-65
Green spaces-leaves rustling	65
Religious chants	70
Waterfall	50
Garden- birds chirping	45-55
Front of stupa	40-45
Footsteps	50-60
Pradakshina path	48-50
Stupa - birds chirping	40-45

3.3.2 World Buddhist Center, New Delhi

World Buddhist Centre offers facilities for pilgrims, meditation practitioners and those seeking a quiet place to stay. It is an international non-sectarian Buddhist temple founded in 1996. The temple strives to provide the local community with a public place for quiet reflection and prayer where everyone is welcome (Figure 3).



Figure 3: World Buddhist Centre, New Delhi
Source: Author

The case study observes the acoustic behaviour inside a closed space and to study the impact of built spaces on acoustics. This indoor study focused on built-space acoustics. Meditation rooms achieved acoustic isolation with levels of 35 - 40 dB. The double-height main hall (RT = 0.805s) created a specific resonance that users identified with a "sense of surrender to the divine" (Table 2).

Table 2: Decibel level on site at World Buddhist Centre
Source: Author

Space	Decibel
Meditation rooms	35-40
Main room	40-45
Corridors	45-50
Chants	50-55
Religious bowls	40-45
Bells	45-50

4. Results and discussion

4.1 Spatial design and acoustic behavior

The research findings reveal clear relationships between spatial design parameters and acoustic performance. Domed and hemispherical stupas create controlled reverberation ($RT \approx 0.99s$), enhancing spiritual immersion. Rectangular meditation halls ($RT \approx 0.80 - 1.12s$) provide balanced clarity. Larger spaces create longer reverberation time as reverberation time is proportional to volume of the space. Smaller spaces absorb the sound quicker reducing the reverberation time.

Stone, marble and concrete increased reverberation and echo whereas carpets, cushion, timber and vegetation significantly reduced harsh reflections. The sites with layered soundscape transitions showed progressive acoustic isolation and smoother emotional transition.

Longer RT can create a sense of calmness and surrendering to the divine. Conversely, noise buildup and uneven sound distribution can induce negative emotions like anger or sadness (Table 3).

4.2 Auditory processing and stimuli

Sound environments in Buddhist spiritual spaces evolve gradually, beginning with external noise, moving towards gentler, harmonious and nature-inspired acoustics as one enters deeper zones. Boundary areas capture the noise of vehicles and conversations.

Transitional walkways merge the subtle noises of footsteps, breezes and distant chanting. Garden areas introduce soothing natural sounds such as

Table 3: Spatial characteristics affecting Acoustics
Source: Author

Parameters	Characteristics	Acoustic Impact	Emotional response
Geometry and layout	Rectangular rooms	Reverberation of sound	Predictable space
	Curved ceilings	Sound concentration	Increases focus
	Irregular shapes	Scattered sounds	Improving clarity
	Parallel walls	Flutter echoes	Disoriented audio
Form and Volume	Larger spaces	Longer RT	Calmness
	Smaller spaces	Absorb sound quickly	Improving speech
	Proportional imbalance	Uneven sound distribution	Negative emotions
Connectivity	Open plans	Noise build up	Negative emotions
	Zoning/ partition	Block unwanted sound	Improving clarity
Material Usage	Hard Surfaces	Amplify reverberation	Calmness
	Absorbent materials	Prevent dead spots	Keep the space lively

References: (Zhang, Lai, Zhang, & Kang, 2020) (Algargoosh, Soleimani, O’Modhrain, & Navvab, 2022) (ISO 3382-1:2009, 2009)

birdsong and the rustle of leaves, lowering sensory tension. Inside prayer halls, the reverberant sound of collective chanting is carefully managed, while meditation halls approach an atmosphere of profound quiet. This stratified acoustic journey deepens mental clarity and spiritual experience (Algargoosh, Soleimani, O’Modhrain, & Navvab, 2022). Transitional walkways merge the subtle noises of footsteps, breezes and distant chanting. Garden areas introduce soothing natural sounds such as birdsong and the rustle of leaves, lowering sensory tension (Table 4).

4.3 Acoustics through soundscape

This study identified a spatial and acoustic hierarchy that explains the spiritual progression from the worldly noise to the stillness of acoustic isolation. This transition is achieved by carefully controlling the sound level (dB) across different spaces. The data

confirms that the soundscape, through the interplay of built and open typologies and the integration of natural stimuli, the hierarchy of spaces for acoustic isolation can be created, making soundscape an important aspect for achieving acoustic stillness.

4.4 Discussions

This study suggests that in a spiritual context, echo is not a defect but a necessary element. Architecture must utilise hard surfaces and volume to create a reverberation that feels controlled rather than chaotic, suggesting that longer reverberation times contribute to a sense of the divine without destroying acoustic comfort. The acoustic blending is crucial for Buddhist chanting practices. The architectural volume (domes and double-height spaces) supports the communal aspect of worship, where the individual ego is surrendered to the collective chant.

Table 4: Stimuli for auditory experience
Source: Author

Typology	Elements	Loudness	Pitch	Perception	Decibel
Natural	Running water	soft	low	pleasant	40
	Birds chirping	whispers	low	harmonious	35
	Wnd	soft	low	pleasant	60
	Leaves rustling	moderate	low	pleasant	20-30
Human Related	Conversations	whispers	low	sharp	50-55
	Footsteps	soft	low	negligent	30-50
	Chants	moderate	high	harmonious	55-60
	Traffic	loud	high	noise	70-100

References: (Kang & Schulte-Fortkamp, 2016) (Zhao, et al., 2022)

5. Identified Issues and Recommendations

To incorporate acoustics into architectural practice the following recommendations has been proposed.

- a. Material choice: Use of hard and reflective materials such as stone, marble, or polished wood in floors, walls and ceilings causes excessive reflections. Lack of sound-absorbing finishes leads to echoes and poor clarity and outdoor courtyards with reflective paving amplify external noise instead of containing it. Using porous natural materials such as bamboo, jute, or hemp as sound absorbers and introduce textiles, carpets, or woven mats on floors and walls to soften reflections (Figure 4).

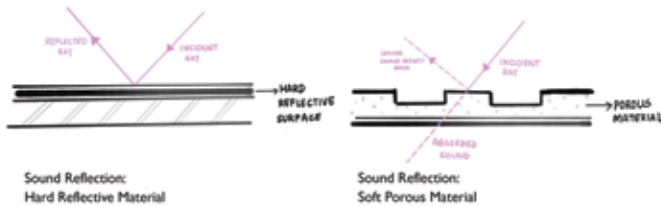


Figure 4: Sound reflection on materials
Source: Author

- b. Layout and proportions: The layout and proportions of many Buddhist temples are designed primarily for ritual or symbolic meaning. Large volume halls (e.g., prayer halls, meditation halls) lead to long reverberation times (>3 seconds), reducing speech intelligibility. Domed or vaulted ceilings create focal points of sound, producing echoes instead of uniform sound distribution. Optimised proportions of prayer and meditation halls (height-to-width ratio of 1:2 - 1:3) is essential to maintain balanced reverberation. Avoiding perfectly concave surfaces and using segmented domes that diffuse rather than focus sound also enhances the acoustic experience of the space (Figure 5).
- c. Acoustic zoning: Spiritual centres often combine contrasting functions - chanting, meditation and communal activities in adjacent zones. Spaces requiring silence (meditation halls) are placed near high-activity zones (prayer, drum areas) without acoustic separation. Hence division of the site in public, semi-public and private spaces is required for appropriate acoustical treatment. Introducing buffer zones such as cloisters and landscaped courtyards between noisy and quiet areas could achieve the acoustical zoning (Figure 6).
- d. Sound source placement: Placement of chanting areas, gongs, or speakers are often neglected for acoustics. Sound sources are positioned near

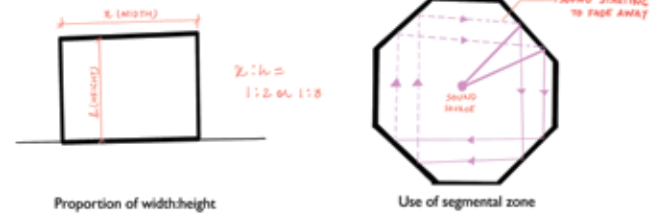


Figure 5: Spaces and layout
Source: Author

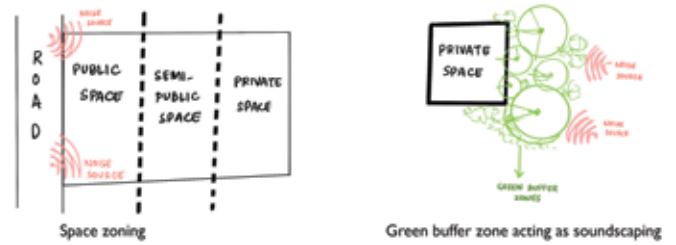


Figure 6: Acoustic zoning
Source: Author

reflective surfaces or corners, creating flutter echoes and sound distortion (Soeta, Shimokura, Kim, Ohsawa, & Ito, 2013). Thus, bells, gongs and chanting platforms should be placed in acoustically favourable zones. Directional loudspeakers can be integrated for sermons to enhance clarity without increasing volume (Figure 7).

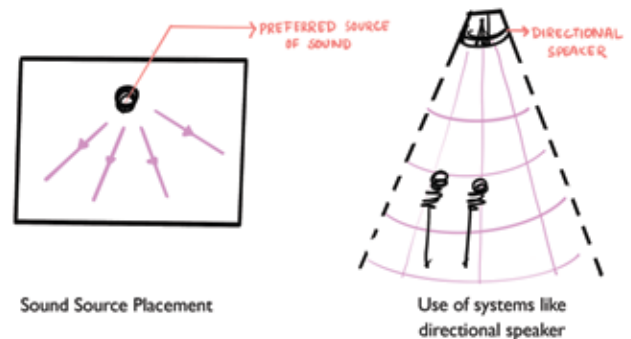


Figure 7: Sound source placement
Source: Author

6. Conclusion

The research concludes that acoustics in architecture is not just a comfort factor but a requirement which directly influences the user's emotional response and evokes a sense of peace and calm. The article focuses on significance of acoustics in spiritual practice, interdependence of spatial design and acoustics, acoustic zoning and spatial hierarchy, soundscape integration with natural elements and emotional and physiological responses towards the

acoustic experience. To conclude, it is suggested that design solutions like segmented domes, natural absorbent materials, optimised spatial proportions and the proper positioning of sound sources should be integrated in architectural design according to the use of the space. The goal of these suggestions is to establish a harmonious auditory environment that enhances the emotional response for the users.

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Sona is a final year student at Aayojan School of Architecture, Jaipur. With a belief that architecture acts as a bridge between the urban environment and human emotion, she is passionate about creating spaces that blend functionality with aesthetic appeal.

Email: sonaa.mishraa25@gmail.com



Ar. Priya Arora (A29983) is an Associate Professor at Aayojan School of Architecture, Jaipur. She holds a Bachelor degree in Architecture from NIT Hamirpur and Master degree in Urban Planning from MNIT, Jaipur. Her area of interest is in urban infrastructure, water management and universal accessibility.

Email: pra@aayojan.edu.in

Spaces of Solace

The Evolution and Anatomy of a Good Home

By Ar. Kiran G Singh, Ar. Savar Suri and Ar. Aruna Bhardwaj

The mystery of houses is the mystery of our mind. We move from room to room and only inhabit the present. Abandoned rooms are like abandoned thoughts. We can remember them and so we can return to them. As the shell of a house encompasses external rooms for our body, the shell of our body encompasses the interior rooms of our thoughts. We rummage through the attics of our houses. The idea of a house is the idea of forever.

- John Hejduk (from *Mask of Medusa: Works 1947–1983*)

The Human Instinct

Ever since man became conscious of his existence, having a home became his obsession, his primary need and his fort of protection. Whether one is a businessman or a professional or serving in an office, each one has a common need of an enduring relationship which only a home can give. "Home sweet home" is an age-old saying. Inscriptions of this kind in the form of decorative plates are often seen in many homes. Another famous saying is "east or west, home is the best". A home is a place where one creates memories and later recollects them. It consists of a family, the physical surroundings, social and cultural environments along with other psychological factors a home governs, influences and nurtures a person.

Inspiration from Nature

The desire for a sweet little home, automatically is followed by a need for a good, compact house. It is an essential instinct in all the living creatures. It can be traced in the entire animal kingdom. Birds build their nests in such a delicate form that many a time, it touches the inner depth of one's heart. The fine

accuracy and art of knitting the web is not only very interesting but amazing too. Right from childhood, human beings work under the instinct of building a house. At a later stage, this sentiment becomes so intense that a person seeks to invest the entire life's savings in building or possessing a house, unmindful of the meagre share of return from this investment. A little conscious effort, an expert advice and clear understanding of one's needs is all that is required in the beginning. Most unfortunately, nowadays, this instinct in human beings is hiding behind mists of anxiety, frustration and fast life style. Population explosion and fast pace of living is making wide cracks in this institution called a 'home'.

A Magnified View of a Home

Experiments to create collective healthy homes away from family homes have always been made. *Yogis* established their *ashrams*, collected several disciples and tried to bring in all the pleasure of a family home in them. Some countries tried to develop national homes in which all children belonged to the nation and not to a parent. Audlous Huxley had given a similar concept in his novel "Brave New World". But again the experiments have remained at their experimental stage only. These so-called national homes could not impart the pride of belongingness. If one goes a little further in this search, they find a home being dimensionless.

The mystery of houses is the mystery of our mind. We move from room to room and only inhabit the present. Abandoned rooms are like abandoned thoughts.

— John Hejduk (quoted by Hanson, Chapter 1, p. 2) (Hillier & Hanson, 1984)

An Exemplary Home: Solace and Spirituality

Great sages have said that the real detachment or *moksha* lies in the truthful living within a family. A real home is where families grow together, interact and give true meaning to one's love and affection. A home provides protection, gives solace, showers affection and bestows grace. These very lines bring to the surface the basic functions of a home. When we study the lives of great people, we find that for most of them the guiding force behind all their attainments and achievements has been a healthy home. A village *haveli*, comprising a few mud walls dividing space into rooms and a big courtyard in the middle hosting a united family consisting of a grandfather, father and grandchildren living happily in and around it. All would join hands in tilling the soil, harvesting the crop and eating from the common kitchen. There could be a division of labour but the authority of the eldest would remain unquestionable. There is affection, there is regard. There is faith and there is respect. No doubt they have their problems. There are contradictions, there must be jealousy too but they would settle all their problems amongst themselves, without letting any crack appear in the walls of their home.

The Other Side: A Modern Perspective

When the same scene is shifted to a modern home built with costly materials, cushioned with rubber and a couple with two or three children residing in it, one is delighted to see the beautiful form of the building. In some modern families, the father leaves in the morning for his business, the mother leaves for her office and children go to their school, leaving behind an empty house. The house is built to provide comfort, to provide shelter but as a symbol of unity, it remains isolated. The family remains scattered in different parts of the city for most of the time. All this happens as a result of the imbalanced development of our society, economically, politically and as well as ethically. There are still people maintaining the tranquility which makes life worth living so that their homes become an attraction for them to return to from far and near to live in. The generation gap is bridged with kindness and consideration.

House form is not simply the result of physical forces or any single causal factor, but is the consequence of a whole range of socio-cultural factors seen in their broadest terms.

— Rapoport, A. (1969)

Buying a Plot

The design of a house depends on the plot, its situation, size and position with respect to the sun.

While buying a plot, one must check some basic factors which are:

- (a) Proximity to essential services.
- (b) Provision of roads, sewerage, water supply and electricity.
- (c) Free from legal encumbrances.
- (d) Obtainable sanction for building a house from the competent authority.
- (e) Above all, free from pollution and must be in a healthy environment.

Many of the government agencies like improvement trusts, municipal corporations or urban development authorities provide most of the facilities which are necessary for a comfortable living.

Choosing a Plot: Corner Plot and Wide Front Plot

It is commonly said that corner plots are more advantageous than single side open plots. The contention is quite valid when plots are for commercial use. Commercial plots at corners provide a two side open approach which is customer-friendly. Rates for corner plots are quantitatively more than single side open plots. A question hence arises, why are residential plots priced higher than other plots? Years ago, when there were no well-planned colonies and small plots were carved out having very narrow lanes in front, such plots did not enjoy much light and ventilation. In such cases, corner plots enjoyed two-sided openness. Thus, good ventilation and light was available for them. Such examples can well be noted even now in most of the city houses. Therefore, in those days corner plots were preferred, which continues to be the trend.

Paying an additional percentage for a residential corner plot may not be of much advantage especially when it is of 400 sq. yards or more. However being on the corner and having nil or very little set back, there shall be a big disadvantage of roadside noise and pollution. In many of the existing schemes, plots have additional disadvantages of compulsory set back lines on two sides thus dividing the open place in two parts i.e. in front as well as on the side. It is observed that at Chandigarh, Mohali and some other places, in newly planned schemes some open space is left along with the corner plots as a garden and side building set back line is omitted thus avoiding most of their disadvantages. In town planning schemes, open spaces, small gardens and building zones are worked out so that each building derives essential benefits of nature.

The Orientation

Orientation basically refers to the effect of sun, wind and rain on a building. Every building that is planned keeping in view the direction of the wind, movement of the sun and intensity of rain, is comfortable for its inhabitants. In its planning, the windows are placed in such a way that the house receives sun and wind where these virtues of nature are most needed. Sun shades and projections are placed at such a height and at an angle that unwanted heat and showers are avoided. All this holds true when plots are large but when the plots are small and width is narrow, proper orientation may not be achieved even with good, conscious efforts. Only light and air can be harnessed. With the advent of mechanical and electrical sources, much of the comfortable climate can be created inside the house with the help of air conditioners, air coolers, heaters and air circulators etc.

Budgeting: Design v/s Expenditure

There is a question most often asked - how one can construct a house that is economically sound? The beauty lies in the proportion and balance of various features of a house. Before venturing to construct a house, one must set the right one's own budget. One must check out the amount one can harness through their means, financing options and any other source at the person's command. They also should choose a dependable architect whom one can trust. Trust the architect for the knowledge, experience and professionalism as one trusts a doctor or a lawyer. A competent architect would make you understand the type of a house you could have within the desired amount and type of specifications that could be used.

The Importance of Drawings

An architect having a proper establishment of trained assistants does most of the work like preparing sketches, submission drawings, working drawings and details in the office. The design process is completed at the desk or the drawing board. Well worked out architectural drawings and details help the contractor to execute the building in proper order. The architect's visit to the site is required only either to check the work whether it is being done according to the drawings, or when he/she is to be consulted by the client at the site. Verbal instructions at site can cause confusion resulting in defective construction for which neither the architect nor the contractor would own responsibility. Proper drawings are a safe record. Moreover, these are useful at the time of any dispute. Preserved drawings could be helpful at a later date when further extension or addition to the building is required. These drawings could also be helpful for sale of the property or taking loan etc. Dwellings are not merely physical shelters or collections of functions (sleeping, cooking, bathing).

They are structured spatial networks governed by cultural rules, social conventions and behavioral norms. (Rapoport, 1969)

A good architect who loves his/her work would treat each of his creation like a child and just like a good parent, he/she would do the best to nurture it with utmost care and good intentions. It is an architect's duty to understand the requirements of the clients and transfer them into reality through the design.

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Kiran G Singh is an architect, housing planner and a PhD scholar. She works as an Associate Professor at Sushant School of Art and Architecture. Graduated from SPA Delhi, she has over a decade of experience and her work focuses on large scale housing typologies and energy neutrality.
 Email: kiransingh9121@gmail.com



Savar Suri (A23239) researches India's layered urban heritage, focusing on India's overlooked histories, urban villages and everyday cultural practices. Trained as an architect, he studies connections between built form, memory and social change, bridging research and practice. His work foregrounds narratives absent from mainstream urban discourse. He is a faculty member at School of Art and Architecture, Sushant University.
 Email: savarsuri@gmail.com



Aruna Bhardwaj (A20980) is a Professor at Sushant University's School of Art and Architecture and chairs the Women Empowerment Committee of the Indian Institute of Architects, Northern Chapter. With three decades of practice and teaching, she co-founded Vertex Designs. She also engages in research on girl children's urban spaces and promotes community advocacy through workshops.
 Email: arunabhardwaj@sushantuniversity.edu.in

DVARAM

By Ar. Shobha Dastapur

INTRODUCTION

The Door is an opening and closing mechanism that allows movements between rooms, interiors and an exterior of a structure. The door serves privacy, security, controlling the flow of people, air and noise, temperature regulation. The main door represents more than just a place of physical entrance; it also marks the boundary between a person's house and their place of safety. The main door of a house serves as both the family's entrance and entrance for energy. The door represents a transitional point where happiness and good fortune enter the house. The study hopes to add to the compilation of knowledge existing in the fields of cultural studies, architecture and aesthetic characteristics. It also seeks to bridge the knowledge gap between traditional wisdom and contemporary methods, promoting greater awareness of the influence of cultural traditions on the built environment and the human experience.

CULTURE AND HISTORIC INFULENCE

At the beginning of humanisation, shelters were created to protect themselves. As civilisation developed doors perception has changed lot in material, appearance and design. The different beliefs of civilisations played a role in shaping doors meaning, in the religions. Throughout history, doors have served as a reflection of beliefs, customs, preferences and personalities. The architectural, social and physiological dimensions of privacy became more essential to the daily life of people in community where a woman has no direct approach to the out world. Doors have always reflected the meaning of passing to the afterlife in many eras. Various objects are hung on the doors and thresholds of houses to protect them from evil spirits. Moreover, doors were also used as city gate acting as a defense to protect the ruler from enemies and control the movement from and to the city. The historic evolution of doors in India spans from

ancient stone pivots to scared woodwork, shaped by religion, regional craft and shifting empires. The iconography of doorframes transitions from Vedic to classical, medieval Fortress and temple gateways and colonial to modern domestic. The development of the doorframe emphasises the iconographical evolution of ancient door frame in different parts of India. Iconography of door frames, monumental Gopuram to town gateways, Fortified Iron-studded doors in medieval regional architecture, geometric and floral intricacy during Mughal Empire and metal reinforcement to the fort gateway. The door has many appellations in different languages- Darawaza (Hindi), Dvaram(Sanskrit), Baagilu (kanada), Kathavu (Tamil), Thalupu (Telugu), Vaathi (Malayalam), Daar (Marathi), Darvajo (Gujarati), Darja (Bengali), Dwara (Odia).

BACKGROUND AND SIGNIFICANCE

According to Vastu Shastra the main entrance is "as the archway to victory and progress in life". The main door's orientation and design affect the way energy floors through the house overall. As per Vastu the main door proportion is highlighted as 2:1 concerning height and width. The door designs, material and style of that context, vary from place and time. Doors have multifaceted roles in the interior as well as exterior of a building. Basic architectural forms that were created and produced for their practical needs during the process of "settling," or existing on earth, were transformed into religious metaphors involving the contrast between light (transparency) and darkness (opaque). This research highlights the factors, reasons behind shaping the door and analysis the characteristics of doors in Kalaburgi. In old wadas of Karnataka and Maharashtra, dominating features of the external façade was the large entrance doorway made of wood. This main entrance doorway had a smaller doorway within called the Dindi Darwaza small doorway, Indi kept open for regular use. This

was for security reasons. Lawrence (2000) argues “that traditions in architecture represent socially shared rules and practices, transmitted through generations, which regulate both form and meaning” (Figures 1 and 2).



Figure 1: Deshmukh Wada main door.
Source: Author

DESCRIPTION

The main entrance door displays community, religion and method of rituals followed in our Indian context and at regional levels. (Table 1) Environmental manipulation has a major impression. The area where the interior meets the exterior facilitates social interactions between the house and its surrounding environment. With their locks, doorknobs and keys, these buildings—which are utilised in every conceivable setting—from palaces to homes, temples to fortresses—occupy a prominent position in the history of culture today. The Doors



Figure 2: Main doors of middle-class people.
Source: Author

are considered as the main source for energy to enter any premises, position of the door, its angle, shape, size and design have a major impact on overall energy of the property. The main door should ideally face the north, east or northeast to attract positive energy and prosperity. It should be the largest door in the house, open inwards in a clockwise direction and be positioned above ground level, often with a threshold to prevent “wealth leakage”. Auspicious symbols and idols of deities like lord Ganseha and goddess Lakshmi are often incorporated into the design or placed nearby for protection and blessings. Doors have different challenges and opportunities as door size, material, direction varies and the design limitation alters. In vernacular constructions, the main door sizes and dimensions were typically tailored for accommodating the largest object. Traditional Indian chaukat (doorframes) vary by region, reflecting climate, materials and local

DOOR	Architectural information	Traditional architecture -Theme base
		Modern architecture- Theme base
	Enhanced privacy	Privacy and segregation of functions
	Aesthetic Impact	Elegance, ornate carving, unique finish
	Transition	Navigation of space and convenience of movement
	Light and ventilation	Design contribute to the influx of natural light and air circulation
	Safety and security	Ensuring the safety and security of occupants, creating comfort zone
	Sound control	Minimizing noise transfer from outside and inside o one place to other
	Flexible Design	Creative design solution to suit traditional or modern architectural theme
	Smart technologies	Advanced lock, access control systems, sensors, enhance security

Table 1 : Multifaceted functions of Door.
Source: Author

artistry. Chaukat doors were very delicately carved with various floral patterns, creepers, lotus festoons, peacocks and parrots. Two horse heads at the top either side of the opening vary according to the size of the door. They have a decorative as well as functional purpose. The block of wood, the end of which is carved as a horse head goes to the full depth of the wall. This boarding is placed above and then the masonry continues. Double-leaf doors heavy timber grid paneling reinforced with raised metallic bossed (phool/gulbas). Heavy brass embossing, cast-iron studs and polished knockers was a display of security and statement of elite status. A wider, taller and deeper frame constructed from sagwan(teak) or sheesham directly indicated the owner’s financial ability to procure and transport rare, high quality. The heavy door never opens without a crackling noise. Holdfast distributes loads of heavy wooden frames and massive shutters swinging weight and daily physical stress. Holdfast avoids sagging or movement of shutter vibrations while opening, closing and due to environmental changes. In traditional Karnataka vernacular architecture on the backside of the door “Guli or Adsar”, a wooden horizontal heavy wooden beam or sliding piece is used as a closing device. A hole made in the side of the walls on both sides, according to the length, size of the wooden beam or piece. A thin Shahabad floor slab is projected on the top of the door at lintel level to protect from the rain. In this many design varieties can be seen.The door has two small niches on either side for keeping the panti (mud diyas). The “Jahalji” or katta on either side of the main entrance door is a common feature to almost all houses. In rich people’s houses they

are by the darban who guards the house and also by the visitors till they get entry in the house. In the middle-class houses it is used as a place where the guests first meet the owner. In the case of very small houses, it even serves as the main living space for men (Figures 3, 4, 5, 6 and 7).



Figure 3 : Door Back lock’ Guli’or Adsar.
Source: Author



Figure 4 : Door with horses, Shahabad stone design.
Source: Author



Figure 6 : Main door plan and section.
Source: Author

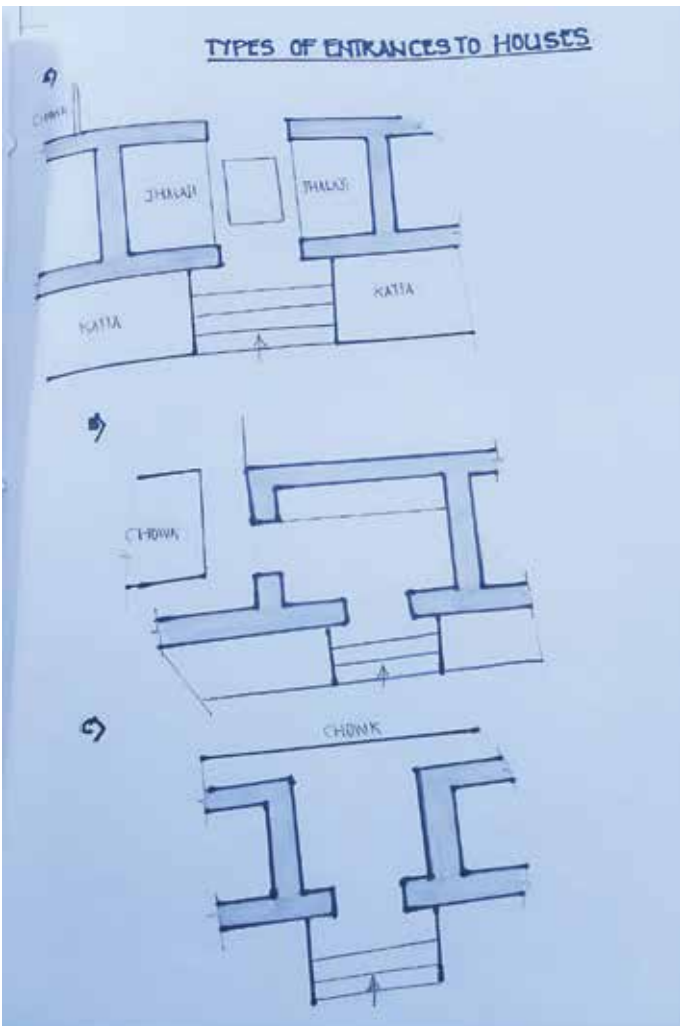


Figure 5 : Types of entrances to the houses.
Source: Author

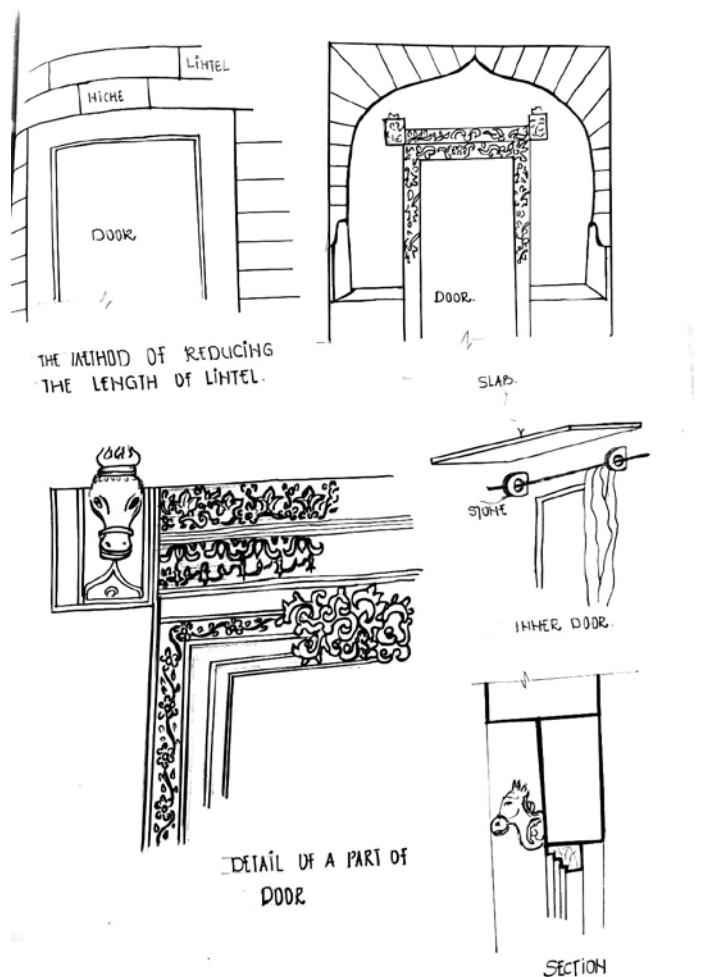


Figure 7 : Main door details.
Source: Author

CONTEMPORARY APPROACH

Modern architectural trends favor cost effective and design flexible synthetic materials, which may ignore the energy and durability benefits of natural materials. Smart technologies-biometric locks, 3D face recognition, motion detectors, touch keypads, automatic sensors, digital technological integration incorporated into the main door designs, enhanced security and convenience. Advanced technology must face power issues, environmental challenges like extreme heat, humidity, dust pollution, server crashes or Wi-Fi drops, sensor failures, major maintenance problems. Innovative design solutions should have more universal design approaches (Figures 8 and 9).



Figure 8 : Smart technology door-Biometric locks.
Source: <https://www.google.com/images>



Figure 9 : Smart technology doors
Source: <https://www.google.com/images>

CONCLUSION

Transformative potential symbolic importance of doors, door-thresholds as places where cosmic energy balance is restored and the boundaries of the world momentarily dissolve. The influence of divine powers and beliefs in shaping human experiences, representing these beliefs as inherently tied to the cultural fabric of Indian society. The door and threshold beliefs were found in all these ancient cultures. In addition to their functional use over time, doors have been carrying symbolic meanings such as hope, opportunity, openness, transition to a new life and transition between life and death.

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Ar. Shobha Dastapur (A25021) has been working as an Assistant Professor in Poojya Dr. Shivakumar Swamiji School of Architecture, Kalaburagi, Karnataka. Her area of research is vernacular architecture. She has published papers in Peer Reviewed journals and a chapter in IIP Proceedings. Her many Kannada poems are published in Heartfullness, "Sahaj Deepa" quarterly magazine.
Email: shobha.sd.glb@gmail.com

Devising a Governance Model for Metropolis Based on True Participatory Democratic Approach Which Is Truly Human Need Centric

Ar. Lalit Kasliwal

Introduction

Metropolis: The census of India defines metropolitan city (metropolis) as any city with a population of 10 lakh heads, residing in an urban agglomeration.

Governance model: Under 74th constitutional amendment act of 1992, constitutional status was given to urban local bodies like municipal corporations, municipalities and nagar panchayats. The 9th prime minister of India, often called the father of economic reforms, was PV Narasimha Rao at that time.

The 74th and 73rd constitutional amendment (1992 -1993) was done to strengthen grassroots democracy by giving constitutional status to panchayat raj (rural) and urban local bodies - ULBS (municipalities). The 73rd amendment focused on rural self-government whereas 74th amendment focused on urban levels by creation of 3 types of municipalities:

1) Nagar Nigams 2) Municipal Councils 3) Municipal Corporation

In addition, formation of a metropolitan planning committee in the metro region was undertaken.

Reservation for women in local bodies: There is 33 percent reservation for women in the whole Indian governance model for 73rd and 74th amendment, whereas at present in state assemblies there is no reservation as yet. In the house of people, Lok Sabha there is no reservation as yet; post 106th amendment, reservation of 33% seats in Lok Sabha and state assemblies will come in effect after next delimitation

expected in 2026 and 2027. Delimitation is the act of redrawing boundaries of electoral constituencies of Lok Sabha and state assembly based on latest population census data.

Under the 12th schedule of constitution of India, 18 functions are undertaken by urban local bodies (municipalities) under 74th constitutional amendment:

1. Urban planning including town planning
2. Regulation of land use and construction of buildings
3. Planning for economic and social development
4. Road and bridges
5. Water supply for domestic, industrial and commercial purpose
6. Public health, sanitation, conservancy and solid waste management
7. Fire services
8. Urban forestry, protection of environment and promotion of ecological aspects
9. Safeguarding the interest of weaker section of society including the handicapped and mentally retarded
10. Slum improvement and upgradation
11. Urban poverty alleviation
12. Provision or urban amenities and facilities such as parks, gardens and playground

13. Promotion of urban amenities and facilities such as parks, gardens and playgrounds
14. Burials and burial grounds, cremation grounds and electrical crematorium
15. Cattle pounds, prevention of cruelty to animals
16. Vital statistics including registration of birth and death
17. Public amenities including street lights, parking lots, bus stops and public conveniences
18. Regulation of slaughter house and tanneries

View on relation between state government and municipalities in Maharashtra (sphere of influence) control:

- a) Constitution and control – municipal corporation and council are constituted under different state laws like
 1. Maharashtra municipal corporation act 1949
 2. Maharashtra municipal council, nagar panchayat and industrial township act 1965

Here, the role of state government of Maharashtra is supervising, regulating and guiding urban local bodies. Government notifies the creation, dissolution or any boundary changes of urban local bodies

- b) Supervision and oversights
 1. State government (urban development department) issues rules, notifications and guidelines
 2. It has power to dissolve or supersede a municipal body, if it fails to functions
 3. State election commission of Maharashtra conducts municipal elections
- c) Financial control
 1. Limited taxation powers (property tax, octroi in past, development charges from building permission etc., user fees)
 2. Major grants in aid and funds (like say finance commission at central government level and state level like JNNURM, AMRUT, Smart City, PMAY etc.) are routed through state government after thorough procedure and checks
 3. Borrowing power of a municipal corporation (for say, large infrastructure) usually and compulsorily needs state approvals

d) Devolution of functions

Though 18 functions of urban local bodies are already in place in Maharashtra, many functions are controlled by state level agencies.

1. MMRDA – metropolitan planning
2. MHADA – housing
3. SRA – slum problems and eradication
4. MIDC – industrial land and regulation
5. MSRTC – transport

This creates an overlap and conflict between elected municipal bodies and state. This means local self-government exists, but with strong state government dominance.

Observations and understanding

Water supply - My local Ulhasnagar municipal corporation (ULB) buys water from MIDC at certain rates and supplies it to the local public by a network of elevated service reservoirs (overhead water tanks) and booster water pumps. This means ULB only offers a supply network.

On solid waste management – They collect daily waste from door to door. Segregation may or may not take place. Usually, they burn it openly.

Health and sanitation – They have a dedicated municipal hospital, also a central hospital at Ulhasnagar sector 3, which is state funded, whereas on sanitation lines, there is network of primary, secondary grid of grey and yellow pipes for various typologies of residences and commercial settlements.

Building permission and land use and land record – There is a town planning department under direct control of the urban development department of state where UDPR is applicable. Due to certain ambiguities, many major problems remain unaddressed.

Roads and bridges – Organically grown over time, rather than planned, some are governed by UMC, some by state government, some by central govt funds by road agencies. However, all internal roads are governed and maintained by UMC.

The relation between central government and municipalities in Maharashtra: The relation between the metropolis of ULBS in this case, with central government is limited to drawing policy and various schemes as mentioned before. The funds are usually routed through the state government which supervises and releases them to ULBS as per framed criteria and evaluation by bureaucrats.

The earnings of state and central government are largely dependent on residents of any and all ULBS:

1. Tax revenue (direct revenue) paid directly by individuals or organizations
 - a. Income tax from individuals and companies
 - b. Corporate tax / profit tax
 - c. Capital gain tax on sales of assets
 - d. Wealth tax, now abolished (earlier levied on net wealth)
2. Indirect taxes (paid by goods and services providers)
 - a. Goods and service tax (GST) – Shared between center and state (CGST + SGST) portion shared
 - b. Custom duty – on import and export
 - c. Excise / central excise – earlier was there, now merged with GST
 - d. Service tax – merged with GST

Non tax revenue:

- a. Dividends and profits from public sector enterprises like ONGC, Coal India, Indian Oil Corporation
- b. Interest receipt – loan given to state corporation
- c. Fees and penalties – for licenses, permits, airport fees, railway tickets
- d. Royalties – on natural resources – coal, mineral, natural gases and oils
- e. Fines and forfeitures – court fines, custom penalties

Capital receipts (loans and borrowing) – borrowings from:

Market loans, selling government bonds

Loans from foreign government or World Bank or IMF

They do not constitute regular income, but are used to fund deficits and large projects.

Now we have established that ULBS are interwoven, governed and jointly administered by municipal body, state and central governance. However, people are directly connected to ULBS in daily life, as 18 functional duties and services are directly governed by ULBS.

Since in the Indian democratic model, each and every citizen primarily votes in ULBS and various other elections so the democracy is complete in theory. Each of these administration level elections are held every 5 years. However, there are numerous problems which go unaddressed like slums, sanitation, excessive bureaucracy, building byelaws related and so on. The list is endless.

Challenges in current urban governance:

1. Indirect representation – citizen vote for corporators / councilors every 5 years, but day to day decision making is dominated by bureaucrats
2. Complex institutional structure – metropolitan governance involves ULBS, state agencies like (MMRDA, MHADA, SRA) etc. and central schemes making diffused accountability
3. Private sector dominance in redevelopment – large slum project like say Dharavi are done by private players , while the community often lacks a direct formal seat or involvement.
4. Limited real time grievance redress – mechanisms like R.T.I., online portals or municipal complaints exist, but citizen feedback rarely influences planning decisions

Principles for citizen integrated governance:

A: 21st century participatory governance model should:

1. Institutionalize citizens' voice:
 - a. Every large-scale urban project must include citizen representation in planning committee
 - b. Transparency and data sharing – project proposals, budgets and timelines should be published in accessible format (Digital Dashboard, local language)
 - c. Collaborative planning – use co-design workshops, where residents, architects, urban designers, urban planners and above all metropolitan architects jointly shape urban development plans
 - d. Performance based accountability – municipal authorities and private developers report progress against citizen approved benchmark or standard, approvals from end user, centered around them

B: Governance Model Proposed

CITIZEN GOVERNANCE PARTNERSHIP (CGPT)

- 1: Local citizens charter (LCC)
 - a. 10-15 elected volunteer members per ward gender and diversity – caste, minorities representation
 - b. Acts as a liaison between residents and municipal body
- 2: Proposed metropolitan governance board (MGB)
 - a. Includes municipal officials, state urban development officers and representative from each of local citizen council
 - b. All large urban projects (>200/>500 housing units, redevelopment > 5 acres) must be approved by MGB after citizen consultation

3: Independent Advisory Panel (IAP)

Urban planners, designers, architects, social scientists, economists, environmentalists along with heads of metropolitan domains should provide overall social, economic and ecological impacts.

Workflow model for any project to happen:

- a) Project proposal stage
 1. Developers submit plan to (metropolitan governance board) + IAP (independent advisory panel)
 2. LCC (Local citizens council) – circulates plan digitally and in meeting, collect community feedback
- b) Community consultation stage – co-design workshops, residents highlight priorities, risks and aspirations. This feedback is incorporated into a final citizen approved draft.
- c) Approvals and monitoring stage:
 1. Metropolitan governance board approves conditional on citizens feedback being addressed
 2. Digital dashboard tracks progress – public funds and grievances resolutions
- d) Post implementation review :
 1. Local citizens councils and independent advisory panel (ICC+IAP) evaluates outcomes against original citizens approved plans
 2. Lessons feed into future urban governance policies

Outcomes

1. Citizens' representation (LCC) – direct voice in planning
2. Co-design workshops – ensures projects meet local need
3. Digital transparency – reduces corruption and mis- information
4. Advisory panel – evidence-based planning
5. Post-implementation review – continuous improvement and learning

New terms and body proposed:

1. MGB: Metropolitan governance board
2. LCC: Local citizens charter / council
3. IAP: Independent advisory panel

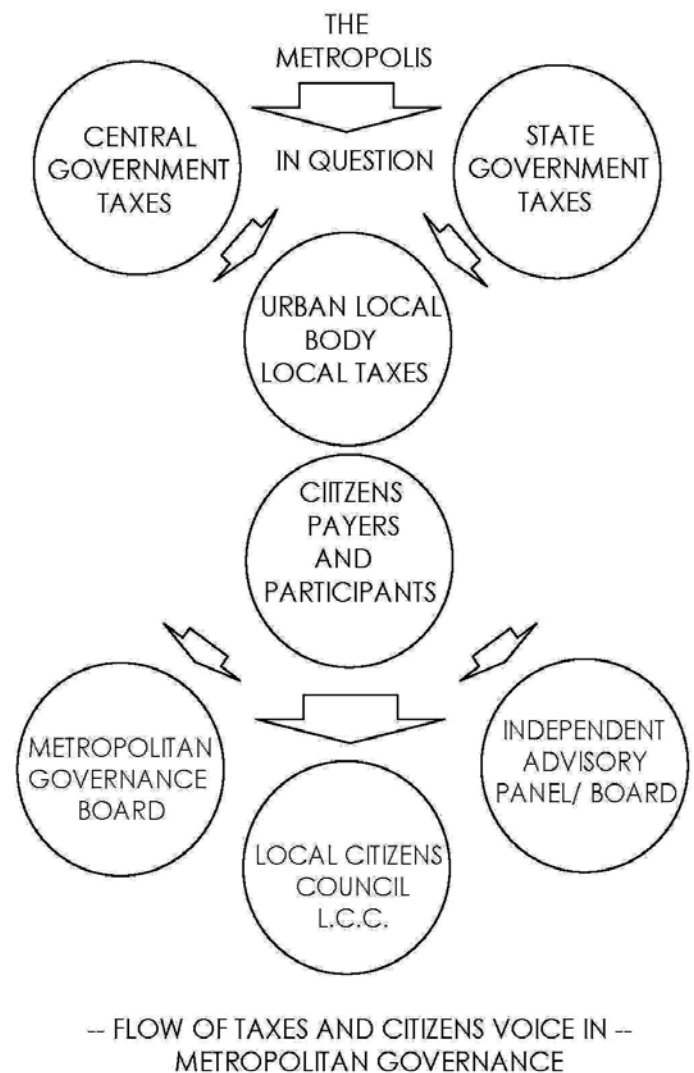


Fig 1: Diagrammatic representation of resources flowing downward while voice flowing upward, which is proposed governance model.
Source: Author

Technology enablement:

1. Mobile apps / portals - ward level complaints, feedback and voting on projects
2. GIS, based mapping – citizens can visualize redevelopment zones, environmental impacts
3. Periodic surveys and polls – include all stakeholders, especially marginalized communities – form reports and findings

End result – citizens are partners, not passive recipients and governance becomes more accountable and socially justifiable and inclusive.

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Ar. Lalit Balkrishna Kasliwal (A18286) is a practicing architect based in Mumbai. Graduated with first class from Allana College of Architecture, Pune in 2011, he also is Associate Member of Institution of Engineers He has done post-graduation with Masters in Public Administration from central University Delhi in year 2014. With a rich experience from diverse disciplines, he is currently doing Masters in architecture in Metropolitan Architecture from Sir JJ College of Architecture, Mumbai.
Email: larchitect999@gmail.com



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Women and the Built Environment in Bengali Cinema

A Historical Reading of Domestic, Public and Transitional Spaces

By Ar. R. N. Bhattacharya

1. Introduction

Cinema can reveal how everyday surroundings are imagined and used. For an architectural reading, the relevant spaces extend beyond buildings and interiors to courtyards, streets, workplaces, neighbourhoods, refugee settlements and the spaces between places. Their meaning comes from what people do in them, who enters them and how people move and interact.

Bengali cinema provides varied material for such a reading. From the early talkies of the 1930s to recent films, domestic interiors and changing urban environments have been closely woven into stories. Women characters are often represented through relationships to family, work, care, movement, privacy and social expectations. The built environment is consequently more than scenery; it establishes the physical and social circumstances of everyday life.

The study follows this relationship through selected Bengali films from different historical periods. It does not construct a straightforward story in which women move from confinement to freedom, since such a reading would flatten differences between households, communities and historical situations. Instead, it asks how spaces are used, occupied and negotiated and how these relationships change over time.

The films are considered under three broad spatial categories: domestic, public and transitional. Domestic space includes rooms, kitchens, courtyards, verandahs and other parts of the home. Public space includes streets, workplaces, markets

and urban institutions. Transitional space covers thresholds, stairways, entrances, trains and similar settings through which people move between spatial conditions.

The paper is positioned within architectural humanities. Earlier studies have examined domestic space in cinema (Cowan, 2000; Singh & Singh, 2024), while work on Bengali cinema has discussed urban transformation, popular culture and changing social identities (Chakraborty & Bhattacharya, 2015; Mukherjee & Bakshi, 2017). This study brings these strands together through a spatial reading of women's representation.

2. Methodology, Case Studies and Derivations Thereof

The study uses a qualitative, interpretive reading of selected Bengali films, chosen for their historical or cultural significance, treatment of women characters and the role of buildings, interiors and other environments in the narrative.

The analysis is not statistically representative. The films are treated as cultural texts from which recurring spatial situations can be identified. The reading focuses on:

1. Enclosure and access;
2. Domestic and public spatial relationships;
3. Thresholds and transitional spaces;
4. Patterns of mobility;

5. Privacy and visibility;
6. Occupation and use of space; and
7. Negotiation or appropriation of existing spatial arrangements.

The films are considered in broad chronological groups to identify continuities and changes without suggesting that what appears on-screen is a direct equivalent of social reality.

2.1 Domesticity and Spatial Enclosure: 1930s–1940s

Early Bengali cinema often placed women firmly within domestic settings. Chandidas (1932), Seeta (1934) and Devdas (1935), for example, connect their female characters closely with household environments and family relationships.

In Devdas, Paro's life becomes increasingly tied to the household into which she is married, while Chandramukhi occupies a markedly different social and spatial position. The contrast is useful from an architectural point of view because the difference is not simply a matter of location. The two women are associated with different kinds of spaces and those spaces carry different social meanings.

The interiors shown in many early films are relatively restrained, with limited furnishings and emphasis on the relationship between people and the household. The home consequently appears as a setting for family identity, duty and social expectation.

These representations should not be taken as straightforward evidence of how Bengali women actually lived. Their value here lies in cinema's repeated association between women, domestic life and particular spatial arrangements.

2.2 Displacement and the Changing Meaning of Home: 1950s–1960s

In post-independence Bengali cinema, the relationship between women and space becomes more complex. Partition and displacement raise another question: what happens to the idea of home when the physical home has been lost?

Nimai Ghosh's *Chhinnamul* (1950) is significant in this respect. The film depicts displaced people arriving in Calcutta from East Bengal. The movement from familiar rural surroundings to uncertain urban settlements changes the meaning of domestic space. Home is no longer necessarily a settled physical structure; it becomes connected with memory, loss and the effort to rebuild everyday life.

Ritwik Ghatak's *Meghe Dhaka Tara* (1960) presents a related condition through Neeta's life in a refugee-colony setting. Limited resources, narrow lanes,

industrial surroundings and displacement form part of the environment in which the family lives. Neeta's role as an earning member is therefore closely tied to the spatial and economic condition of the household. The home remains a place of belonging, but it is also a place where economic and family pressures are concentrated.

A different spatial relationship is visible in Satyajit Ray's *Mahanagar* (1963). Arati's move from the home into paid employment brings the city into her everyday life. Doorways, windows, stairways and passages mediate between household responsibilities and the workplace, linking the film's spatial structure to the changing organisation of family life.

Chidananda Dasgupta's discussion of *Mahanagar* draws attention to the relationship between home, office and family. For an architectural reading, the film is significant not only because Arati takes up employment, but because these environments become connected through her daily movement between them (Dasgupta, 2001).

In Uttar Falguni (1963), domesticity, social respectability and alternative urban environments are brought into relation through Debjani/Pannabai. The film suggests that leaving one spatial setting does not automatically bring social acceptance. Movement can create new possibilities while also exposing a woman to another set of social vulnerabilities.

2.3 Domestic Space, Surveillance and Mobility: 1970s–1980s

During the 1970s and 1980s, Bengali films increasingly showed women moving between domestic expectations and spaces outside the home.

In 'Ek Din Pratidin' (1979), the disappearance of a working woman becomes the focus of anxiety within a middle-class household. The home turns into a place of watching, questioning and uncertainty, making the everyday organisation of domestic space visible.

Tapan Sinha's 'Adalat O Ekti Meye' (1981) places a working woman in a public setting and then follows the social consequences of violence and stigma. The film makes clear that entering public space does not, by itself, remove vulnerability. How a space is experienced also depends on social attitudes and the response of institutions.

Aparna Sen's '36 Chowringhee Lane' (1981) presents a different condition. Violet Stoneham's flat carries memories of an earlier Kolkata and becomes a place of cultural continuity as well as isolation. The home here cannot be described simply as restrictive; it also

holds a sense of identity while the social environment around it changes.

In Satyajit Ray's 'Ghare Baire' (1984), Bimala's gradual movement out of the inner quarters is central to the narrative. She moves from inner rooms to the drawing room and then towards the outside world. The sequence suggests an expansion of experience, but it also brings her into social and political relationships that are less familiar to her.

Aparna Sen's 'Parama' (1984) offers another variation on the relationship between women and domestic space. The home remains important to Parama's life, but her identity is also worked out through photography, social encounters and spaces beyond the household. The domestic interior is therefore no longer the sole setting through which her identity is understood.

2.4 Interior Space, Privacy and Negotiation: 2000s–2010s

In Chokher Bali (2003), the inner quarters of the Bengali household form an important spatial setting. Courtyards, verandahs and rooms provide different degrees of privacy and visibility. Binodini's experience of these spaces is closely connected with her position in the household and the expectations attached to widowhood. What matters is the gradation between spaces rather than a simple division between inside and outside.

Paromitar Ek Din (2000) also shows how domestic and institutional spaces can change meaning as relationships change. The hospital room, in particular, becomes a setting in which a relationship altered by divorce is reconsidered through care and personal attachment.

In Alo (2003), the rural house and courtyard provide settings for education and interaction within the community. The courtyard and kitchen are not shown only as conventional female domains; they also become places where people can gather, learn and participate in collective activity.

Mondo Meyer Upakhyam (2002) presents a restricted environment. Rooms, corridors and shared areas within the marginalised settlement create different levels of exposure, privacy and vulnerability. Lati's small room is materially limited, yet also provides a measure of personal refuge. The film suggests that the meaning of a constrained space cannot be understood from its size alone.

Kaushik Ganguly's Chotoder Chobi (2014) brings another issue into the discussion: the relationship between bodily diversity and everyday environments

designed around an assumed standard body. The film draws attention to difficulties encountered in ordinary domestic and public settings, including furniture, sanitary fixtures and transportation. The architectural issue is not limited to physical access; it also concerns the anthropometric assumptions built into everyday objects and environments. Although not centred specifically on gender, the film extends the discussion by showing how assumptions about the standard user can exclude people whose bodily characteristics differ from those anticipated in everyday design.

3. Results/Findings

The analysis identifies four recurring spatial patterns.

First, the films do not give the home one fixed meaning. Depending on the situation, it can be a place of belonging, care, memory, privacy or refuge, but also a site of surveillance, economic pressure or restriction. Its meaning changes with social position and circumstance.

Second, mobility often accompanies a change in spatial role. In Mahanagar, Arati's movement between home and workplace changes her relationship with the city and her family. In Praktan (2016), the train provides a transitional setting in which a past domestic relationship is reconsidered. Movement is therefore not only physical; it can change how a person relates to the surrounding environment.

Third, thresholds repeatedly function as important spatial devices. Doorways, verandahs, stairways, courtyards and entrances sit between different levels of privacy and public visibility. Their in-between condition makes a simple division between inside and outside inadequate.

Fourth, the meaning of space changes with historical circumstances. Partition alters the idea of home in Chhinnamul and Meghe Dhaka Tara. Economic change affects the relationship between household and workplace in Mahanagar, while changing personal and social relationships reshape domestic interiors in Parama and Chokher Bali. Later films also extend the spatial field into transit spaces and other settings where relationships are renegotiated.

4. Discussion

Taken together, the films suggest that the relationship between women and the built environment is better understood as a process of negotiation than as a simple movement from confinement to freedom.

Domestic space continues to matter when women enter workplaces and other public settings. Public

space is not automatically shown as liberating: it may bring employment, mobility and visibility while also exposing women to judgement, vulnerability or institutional control.

This is relevant to architectural discussion because buildings are experienced through more than physical dimensions. Access, occupation, privacy and movement influence how space is understood and used. Cinema provides one way of observing these relationships by bringing everyday spatial situations into visual focus.

Thresholds are particularly revealing in this regard. A doorway, staircase, courtyard, verandah, railway compartment or entrance can become the point at which a character moves between two different social conditions. These spaces are neither completely private nor completely public. Their intermediate character allows films to represent transition, uncertainty and negotiation in spatial terms.

The historical setting also matters. The refugee settlement in Meghe Dhaka Tara, the middle-class home and office in Mahanagar, the colonial-era flat in 36 Chowringhee Lane and the rural household in Alo represent different spatial conditions, each shaping the relationship between women, family and society differently.

Cinema cannot be treated as an objective record of architectural or social history. What appears on-screen is shaped by direction, cinematography, production design, editing and narrative requirements. Even so, repeated depictions of spatial relationships make cinema useful for architectural humanities research.

5. Conclusions and Recommendations

The study shows that Bengali cinema can be read productively as a cultural record of changing relationships between women and the built environment. Across different periods, homes, courtyards, workplaces, streets, refugee settlements, institutional interiors and transitional spaces are used to frame questions of care, responsibility, privacy, mobility, visibility and social expectation.

The films do not support a simple chronological story in which women steadily move from enclosed domestic interiors into liberated public environments. The spatial situations are more varied: the same home may offer refuge in one circumstance and restriction in another, while public space may create mobility and new forms of vulnerability.

For architecture, this points to the importance of looking beyond spatial form alone. Patterns of occupation, access, visibility and movement also

shape how environments are experienced. Cinematic representations can complement conventional architectural histories by showing how spaces are imagined, occupied and emotionally experienced.

Further research could examine particular spatial types, including the Bengali middle-class home, refugee settlements, workplaces and transitional spaces. Comparisons with Hindi and other regional cinemas, along with audience studies and closer examination of production design, could provide evidence beyond the interpretive approach used here.

The paper is intended as an architectural humanities reading of Bengali cinema, with the built environment treated as an active part of representation through which social relationships, identity and everyday experience are made visible.

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R. N. Bhattacharya is an architect and academic currently teaching at Sri Sri University (IIA-IM-064). He has 14 years of professional experience and nearly 12 years of teaching experience. His academic interests include architecture, interior design, sustainable built environments, cultural ergonomics, heritage and research on the relationship between people, culture and spatial environments.

Email: rathindranarayan@gmail.com

Private Villa in Margao, Goa

By Ar. Amit Sukhthankar

Fact File

Name of project: Private Villa in Margao

Name of Firm: MSS Designs

Location of Project: Margao, Goa

Built Area: 1,732.97 sq.mt

Project Completion: 2024

Key Features: Climatic south façade screen, multiple courtyards, integrated landscaping, Vastu compliant water body, thermally insulated masonry walls and solar ready infrastructure.

Concept and Design Philosophy

Located in the heart of Margao, Goa, this residence reinterprets traditional Goan living through a lens of Regional Modern architecture. Designed as a home for three generations, the villa balances privacy, openness and longevity while embracing modern comforts, sustainable practices and evolving lifestyles.

Rooted in Goa's enduring tradition of creating homes that are passed down through generations, the design seeks to establish a lasting family legacy, one that is deeply connected to its context while being prepared for the future.

Site Context and Planning

The site presented a unique set of opportunities and constraints. A large open expanse to the east and an exposed southern facade required careful consideration of privacy, solar exposure and monsoon protection. Additionally, the site's natural slope informed the spatial organisation of the residence.

The design responds through two large rectangular volumes positioned along the site edges, creating a protected central spine of courtyards, gardens and outdoor living spaces. This arrangement generates shaded microclimates, enhances cross ventilation and establishes a seamless dialogue between architecture and landscape.

Architectural Strategies

A series of passive design interventions shape the performance and character of the house:

- A **secondary façade skin along the south** acts as a climatic buffer, reducing heat gain, filtering views and protecting interiors from heavy monsoon rains.
- **Thick masonry walls** provide thermal mass and insulation while referencing the robust construction of traditional Goan homes.
- A **water body located in the northeast corner**, aligned with Vastu principles, introduces a sense of calm and spatial balance.
- Multiple **courtyards** bring daylight and natural ventilation deep into the plan, creating adaptable spaces that respond to seasonal variations throughout the year.

Spatial Experience

The ground floor is conceived as a seamless sequence of interconnected indoor and outdoor spaces, allowing landscape to become an integral part of daily living. Shaded courtyards, landscaped terraces, water features and open living areas create a rich spatial experience that evolves with changing light, weather and seasons.

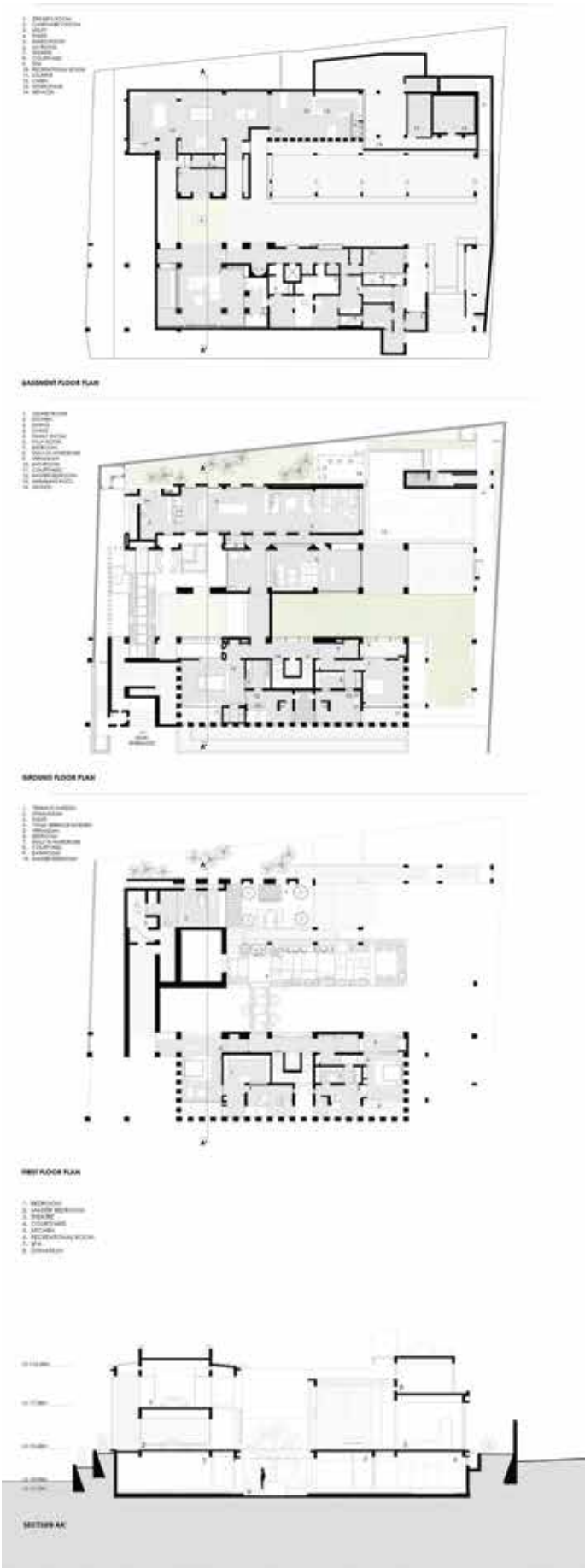


Figure 1: Floor Plans and Section.
Source: Author



Figure 2: Contemporary façade integrated with nature.
Source: Author



Figure 3: Aerial view showcasing site planning and landscape integration.
Source: Author

Natural light is carefully orchestrated throughout the residence. Textured surfaces along the eastern façade soften and diffuse the morning sun, while the smooth concrete planes of the southern façade provide a strong contemporary counterpoint. Together, these material expressions enhance both the sensory quality and environmental performance of the home.

Sustainability and Technology

Sustainability is embedded within the design through a combination of passive and active strategies. Climatically responsive planning, thermal mass, natural ventilation, shaded outdoor spaces and optimised daylighting reduce energy demands, while provisions for solar power integration and future-ready technologies support long term efficiency and resilience. The result is a home designed not only for present needs but for generations to come.



Figure 4: Entrance Lobby with water feature

Source: Author



Figure 5: Foyer with warm material palette.

Source: Author



Figure 6: Sunken Lounge overlooking the pool.

Source: Author

Design Language

The architectural language draws inspiration from Goa's vernacular traditions of thick walls, shaded verandas and linear openings, reinterpreted through a refined contemporary vocabulary. A restrained palette of textured plaster, exposed concrete, natural timber and lush landscaping creates a timeless expression that bridges tradition and modernity.



Figure 7: Double height passage with a skylight.

Source: Author



Figure 8: Open plan Dining and Kitchen.

Source: Author



Figure 9: Swimming pool and Outdoor Deck

Source: Author



Figure 10: A courtyard defined by exposed concrete and timber louvres.

Source: Author

The architecture establishes a strong connection between built form and nature, where light, material and landscape work together to define the character of the home.



Ar. Amit Sukhthankar (F11723), Principal Architect of MSS Designs, Goa, brings over two decades of experience across residential, commercial, institutional and hospitality projects. His work blends contemporary innovation with regional sensitivity, emphasising sustainability, thoughtful material use and contextual design. Under his leadership, MSS Designs creates enduring architecture connected to its environment.

Email: mssuctancar@gmail.com

IIA Signs Host Venue Agreement with JWCC for UIA International Forum 2027



A Landmark Milestone at the First National Council Meeting of the 2026–2028 Term

(L to R): Ar. B. Sudhir (Hon. Treasurer, IIA), Ar. Akshay Beuria (Vice-President, IIA), Mr. Punit Narula (Head of JWCC), Ar. Jitendra Mehta (President, IIA and Chair, UIA Forum 2027), Ar. Vilas Avachat (Imm. Past President, IIA and Director, UIA Forum 2027), Ar. Ashish Gupta (Jt. Hon. Sec., IIA), Dr. Shilpa Sharma (Jt. Hon. Sec., IIA) and Ar. Sandeep Kr. Saraswat (Jr. Vice President, IIA)

The Indian Institute of Architects (IIA) marked a significant milestone in its preparations for the UIA International Forum 2027, scheduled to be held in Mumbai from Thu. 23 – Tue. 28 September 2027, with the signing of the host venue agreement with the *Jio World Convention Centre* (JWCC), Mumbai, on 26 September 2026.

The agreement was signed by Ar. Vilas Avachat, Director of UIA International Forum 2027, on behalf of IIA, and Mr. Puneet Narula, Head of JWCC, on behalf of JWCC. The signing ceremony took place in the presence of IIA President Ar. Jitendra Mehta and members of the IIA Council, marking an important step towards the organisation of this prestigious international event.

The occasion was particularly significant as it coincided with the First National Council Meeting of IIA for the 2026 - 2028 term, held at JWCC on 26 September 2026. The meeting marked the beginning of a new term of leadership and provided an important platform for deliberations on the Institute's priorities, initiatives and future programmes.

The UIA International Forum 2027, centred on the theme of *Urban Regeneration*, will bring together architects, urban planners, academicians, policymakers and built-environment professionals from across the globe. The Forum will provide an international platform for exchanging ideas, sharing innovative practices and exploring sustainable approaches to the transformation and revitalisation of urban environments.

Hosting this prestigious international event in Mumbai presents a significant opportunity for IIA to showcase India's architectural excellence, rich cultural heritage and contemporary urban development initiatives to the global architectural community. It will also foster international collaboration and strengthen professional exchanges among architects and allied professionals. The association with JWCC, one of India's premier convention and exhibition destinations, represents an important step in securing the venue for the Forum and advancing preparations for its successful execution.

The agreement-signing ceremony, held alongside the first Council Meeting of the 2026–2028 term, symbolised both the commencement of a new chapter for IIA and its commitment to strengthening India's presence on the international architectural stage.

As preparations gather momentum, the UIA International Forum 2027 is poised to be a landmark event for the Indian architectural profession, reinforcing IIA's commitment to advancing architectural discourse, promoting sustainable urban development and fostering meaningful global engagement.

NEW MEMBERS ELECTED AT THE IIA 1st COUNCIL MEETING OF THE TERM 2026-2028 AT MUMBAI ON 26-09-2026.

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1	Ar.Devesh Mani Tripathi	Uttar Pradesh	F16403
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3	Ar.Anup Moreshwar Gadgil	Goa	F20353
4	Ar.Mangesh Ulhas Bhandekar	Maharashtra	F11102
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3	Ar.Sujata S Govada	Telangana	F30897
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5	Ar. Cecon Swain	Karnataka	A30904
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7	Ar. Dhulipudi Rajendra Prasad	Telangana	A30906
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10	Ar. Nita Indrajit Kumbhavi	Karnataka	A30909
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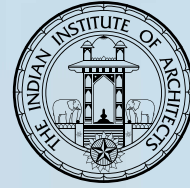
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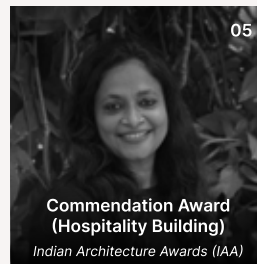
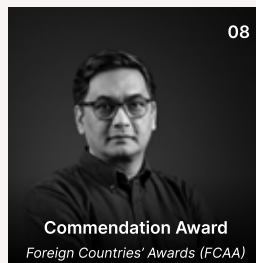
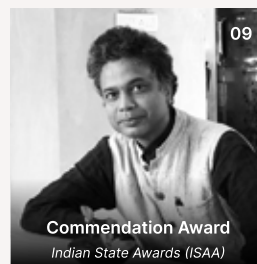
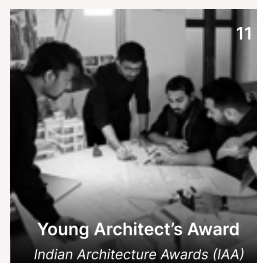
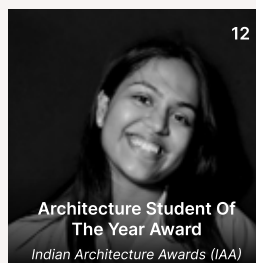


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