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Layers of Privacy

Shaping personal space through screening
in small apartments of Mumbai.



A thesis presented in partial fulfilment of the requirements for the degree of

Master of Design

at Massey University, Wellington, New Zealand.

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01. Abstract:

This research explores how spatial design can facilitate privacy in small apartments and thereby sustain social and psychological wellbeing of inhabitants in high density housing of Mumbai, India. High density cities are the inevitable future of the developing world, and are being shaped by two key factors, namely, rapid urbanization and population growth. This has resulted in enormous environmental, social, political, economic and cultural problems. The lack of privacy has emerged as a major issue in high density housing and is regarded a major cause of anxiety in people today. It is related to a sense of loss and can lead to antisocial behavior. However, with careful design of the privacy and proximity requirements of these challenging spaces, social interaction can be managed and facilitated in a manner that promotes a safer, cohesive living experience, that in turn engenders a healthier neighborhood. This research interrogates into the socio-cultural dynamics of Indian society in relation to the ever-increasing density of human population and high density living in Mumbai. It looks in particular at the social and cultural requirements of personal space for '1 room kitchen small apartment units' for middle class families and individuals. A spatial analysis of the realities and demands on such small apartment living is combined with a selection of product development methods to create a screen based interior design product solution. The design proposition seeks to provide families and individuals with living conditions that negotiate privacy needs with the reality of high density urban living demands to provide living experiences of quality and dignity.

Keywords: Interior Design, Apartment Living, Privacy, High Density Housing, Mumbai.

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03. Introduction :

Indian civilization is one of the oldest civilizations of the World. As a result, the society is strongly influenced by its culture and traditions and is patriarchal in nature. In India, men and women required separate spheres for social interaction. This can be traced through history to the various dynasties which has ruled the country until 19th century. Women have historically bore the brunt of these socio - cultural dynamics and continue to do so even today, though the scenario is changing gradually. This has led to gender tension. Travelling to different parts of the World has also helped me to understand, how conservative the social fabric of India is and how grave the scenario is at large!

“In India, the past continues as living tradition,
both relevant and valid for the present.”
- Pandya, Y. (2005).

Today, it is standing at a threshold between traditional values and progressive outlook. Coexisting between these two extreme values, Indian society witnesses a turbulent struggle in the everyday lifestyle, especially in high density cities like Mumbai. One of the main concerns is managing personal space and privacy in the residential apartments and living environments of these cities.

In eastern culture, the family is considered an integral part of an individual’s life and plays a crucial role for psychological, social and physical wellbeing. A joint family system has still held its roots in the progressive society as developing countries don’t get social securities from the government unlike western developed countries. In such a scenario, family only becomes the life insurance for an individual during the time of crises. As a result, concepts of individual privacy exist weakly in eastern culture and family space is always given a priority over an individual space.



Figure 01. Political map of India.

03.1 Background :

My aspirations to work on spatial privacy in high density cities were fueled by my personal experiences and testimonies from peers at the work place and from within my social circle. The lunch and tea breaks became a platform to vent my peers' sufferings and vulnerable state of life due to lack of privacy at their home. At times, I witnessed emotional breakdowns due to the distress caused by experiencing low quality of life & loss of dignity.

The most powerful incident which gave this whole aspiration a new zeal and seriousness was when a very close friend of mine said she would like to come and stay over my place as she did not want to go home. She explained: "That's not my home, I go there as I don't have a choice." As in many other cases, a lack of privacy and personal space were the main reason that families were disintegrating.

Having born and raised in a 1 room kitchen apartment of 18 sqm with four other family members in Mumbai until my teenage years, I understand the repercussions a lack of privacy has on an individual's psychological, social and physiological wellbeing. One of the biggest issues for privacy was neighbours peeping into our apartment, intentionally or not, as the main door and windows opened directly into the common passage/corridor. Another important issue was when guests or relatives were present. Being an orthodox and conservative family, it was expected to behave in a certain way in order to respect the guests at home. This was suffocating, especially for the women and girls of the family. The liberty to act and feel as per your desire seemed a distant dream. The presence of one's own family members started becoming a burden.

As kids, our escape from this situation was by creating privacy forts of any material available at Home (refer figure 07). But this strategy failed to cater for personal space as we grew up and we had no choice but to give in to the reality of the situation.

Though personal experiences and testimonies form the motivation for this thesis, the Masters level research rigour, including access to academic literature, has helped me to analyse and comprehend this problem from a wider perspective. It helped me to combine a creative and a pragmatic approach to contribute in my own way to the enhancement of the quality of life for Mumbaikars and society at large. As a trained interior designer with a few years of practice experience, I really want to give back a spatial and sustainable solution to achieve a better tomorrow and holistic wellbeing of the Mumbaikars.



Figure 02. Feeling of being over crowded at home especially with guests and relatives.



Figure 03. Loss of privacy during important religious ceremonies



Figure 04. Me in the common passage outside our home. Main door and window is seen in this pic which was the only source of daylight for us.



Figure 05. Me and my brother standing at the main door of our home which opened directly into the common passage.



Figure 06. A large piece of plywood was placed against the window to achieve privacy especially during my mother's pre and post pregnancy days to keep the neighbours' gazes at bay. This in turn diminished the source of daylight entering the room.



Figure 07. Types of privacy fort constructed during childhood days at home.

03.2 Research topic and questions:

In recent decades, rapid urbanization, population growth and high density housing has resulted in an increasing convergence of the private and social domains in cities like Mumbai. This has resulted in increasingly complex situations of social interactions in living environments such as the very common '1 room kitchen apartments'. The rush to fulfill the demand of housing needs has led to ill-conceived housing developments which fail to consider the aspect of social cohesion. This hampers the psychological, physiological and sociological well-being of the residents dwelling in these developments. The loss of privacy is of crucial concern.

This research interrogates into the socio-cultural dynamics of Indian society in relation to the ever-increasing density of human population and high density living in Mumbai. The following fundamental questions were posed to get a clarity for a design brief and design process:

1. Why privacy?

Having lived in a 1 room kitchen apartment for nearly 18 years, I understand the intense repercussions that a lack of privacy can have on an individual. Millions of Mumbaikars suffer and experience a low quality of life due to lack of privacy at their home. Everyday, after experiencing the noisy traffic jams for hours, along with a hectic & demanding work lifestyle, it is a basic human need to receive or have a bit of solace or privacy at their own home. However, because of a lack of privacy, families have been disintegrating. Our privacy shapes our thought process and who we are and who we want to be. It builds relationships and provides us with identity in society. It is an important part of constructing a sense of self. It is also important to achieve and maintain social harmony.

2. Why the 1 room kitchen apartment?

Of all the typologies of apartments in Mumbai, inhabitants of 1 room kitchen apartments suffer the most and experience a low quality of life due to a lack of privacy. It is also the type of apartment where the private and the social spheres converge the most. The 1 room kitchen apartment is a very popular solution for developers and constitutes a considerable market. Hence this type of apartment was chosen for my research.

3. Why screening as a solution ?

Considering the conservative social fabric of Indian society, many activities are considered private and need concealment from view in order to achieve a dignified life at home. Many housing developments, however, have overlooked this crucial cultural aspect. This research proposes that considering the renting status and economic reality of families living in these type of apartments, a simple retro-fitting solution was the most viable and effective option to pursue. It is envisaged that its presence will also help in increasing awareness of the problem of privacy.

03.3 Design methodology and process:

This interior and spatial design study focuses on the socio-cultural dimensions of high density apartment living in Mumbai. Hence the design process is largely governed by principles of human - centered design. The design and brief is based on an analysis of the users' lifestyles and their everyday tasks and on the influences and relationships with the built environment.

In a complex context, a single person fails to fathom various facets of a challenge, hence different voices were engaged to develop a more comprehensive design solution (refer figure 08). A flexible and disciplined process of the 'Double Diamond', (refer figure 09) as is outlined by the Design Council (2005), has been adopted along with a pragmatic approach. This acts as the foundation to articulate a design thinking process for this thesis.

Due to the nature of the screen based solution, the interior and spatial analysis is complemented with a product design based task analysis and design development approach. The aim is to effectively develop a process that folds a thorough understanding of the spatial issues with that of a product based design. A further aim is also to express and profess an interior design interface knowledge to effectively develop and communicate design propositions to product design and engineering experts in order to achieve a seamless design and detailing process to a manufacturing stage.

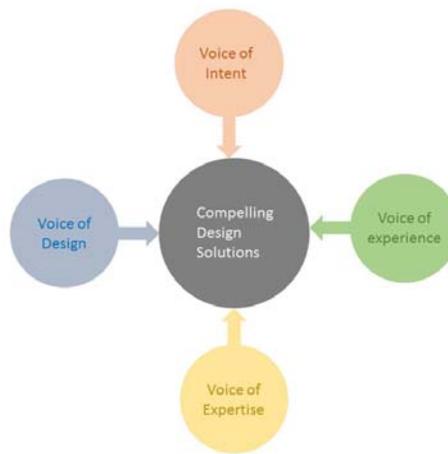


Figure 08. Process of engaging different voices for compelling design solutions.

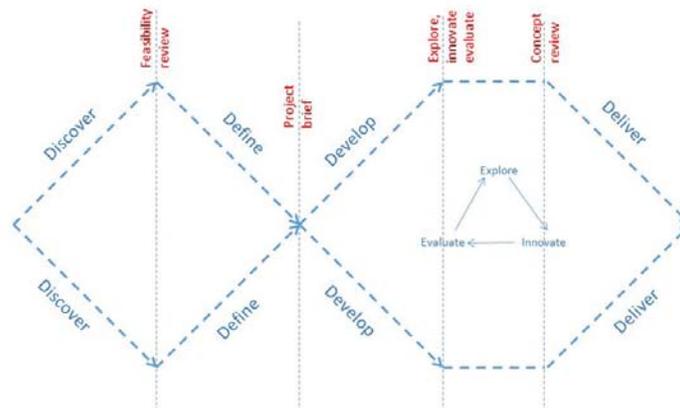


Figure 09. 'Double Diamond' process.

04. Research context:

“High density living is the inevitable future of many developing cities.”, Ng, E. (2010). The density of urban environments vary across the globe, but the highest densities can be found in developing countries. Cities like Hong Kong and Mumbai have an urban density of more than 20,000 people per square kilometer, while their European counterparts have an urban density of 2000 to 5000 people per sq km¹.

The increase in density is further aggravating at a time when most of the population are already living in substandard conditions. As projected by the United Nations in a 2011 report, the concentration of urban dwellers in developing countries is expected to rise from 46.5% to 64.1 % by 2050². This rapid increase in high density living is giving rise to many cultural, social, physical, psychological, emotional and political challenges – a loss of privacy being one of the primary concerns. Rapid urbanization and a mushrooming population are far too complex problems to be solved in the near future, hence in the short-term, we can only find ways to mitigate the adverse effects.

Mumbai is one of the megacities, which is coping with the adverse effects of the two above mentioned factors. Mumbai has come a long way. It started as a small fishing village and today is the second largest megacity in Asia. Located on the west coast of India, it acts as a gateway for international trade. It also houses the Reserve bank of India, the Bollywood film industry, and is the nation’s financial centre. It houses some of the richest businessmen and industrialists as well as the world’s largest slum. As a result, the migration rate from rural areas have risen multiple fold in recent decades, making it the 4th most densely populated city in the world in 2007, with a population count of 19 million³, and is anticipated to reach 25.97 millions by 2025⁴.

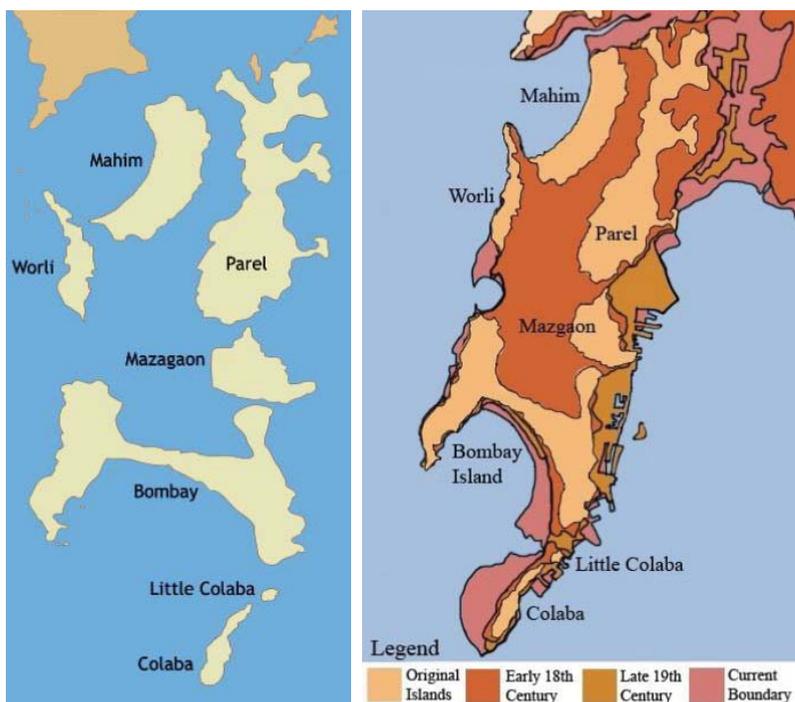


Figure 10. Original seven islands and subsequent reclamation of Mumbai.

1. Ng, E. (2010).
2. Mandal, A. (2015).
3. Ng, E. (2010).
4. Ng, E. (2010).
5. Mandal, A. (2015).

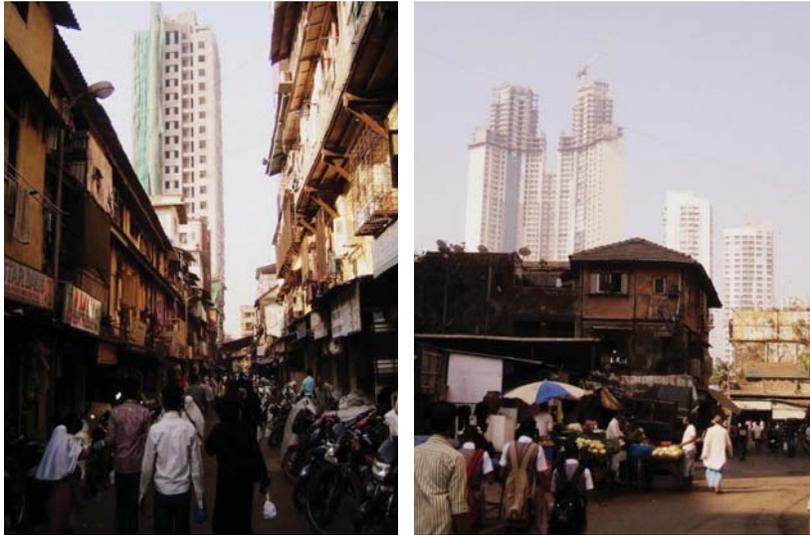


Figure 11. Changing skylines of Mumbai. New tall towers (background) replacing the traditional and medium – rise buildings (foreground).



Figure 12. Mumbai cityscape from 75th floor of The World Towers.

Mumbai's population represents the ethnic and linguistic diversity of all the 29 Indian states and its 7 union territories. Its strategic location and importance makes the cost of living and property prices unaffordable for most, and impacts on the cost of the ever declining personal space of an individual in Mumbai. Households of Mumbai consume an average 2.9 sqm of floor space per person which is one of the lowest residential floor areas per person in the world.⁵

Apartment buildings are the predominant residential building typology in Mumbai and an ever-growing segment. Of all the various types of apartments, many developers are providing '1 room kitchen units', due to their efficiency and market demand. This type of apartment mostly caters to the lower income group, but considering the high property prices and the rising cost of living, it also increasingly caters for the middle class population.

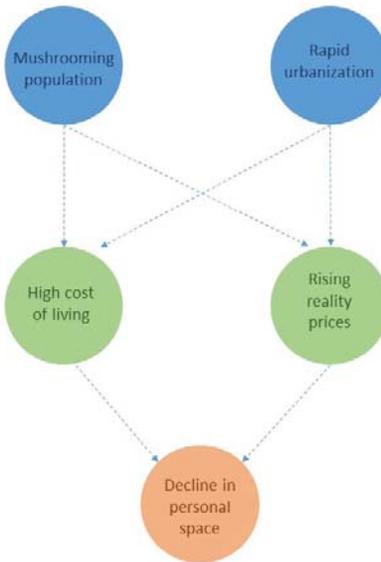


Figure 13. Analysis of the factors for decline of personal space in Mumbai

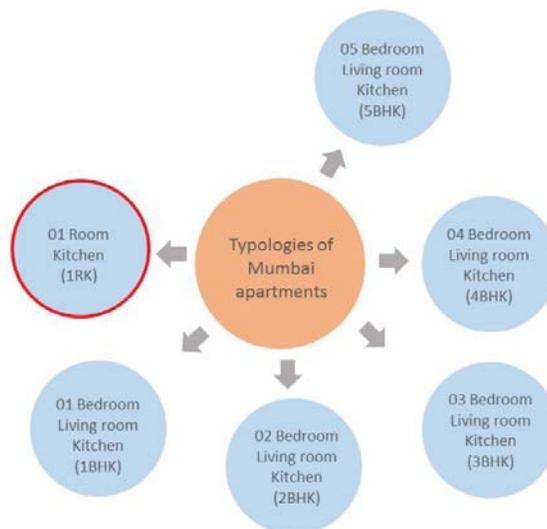


Figure 14. Typologies of Mumbai apartments

The Government of India and Maharashtra, under MHADA (Mumbai Housing And Area Development Authority), have also been providing housing for this population segment over the past few decades. Hence, there are millions of existing housing developments consisting of the 1 room kitchen unit, or apartment.

A) Existing developments:

MHADA had developed an outward oriented scheme for housing developments where the main door, and only window, can be accessed through a common corridor, which impacted privacy to a great extent. Though these typologies were built decades ago, they still form a major component of the existing housing stock. As the buildings are redeveloped by private developers, they are also consuming the surrounding surface available in exchange of providing individual utilities to each unit. This has resulted in loss of common public areas and the diminishing of the distance between the buildings. The following images reflect this typology in detail:

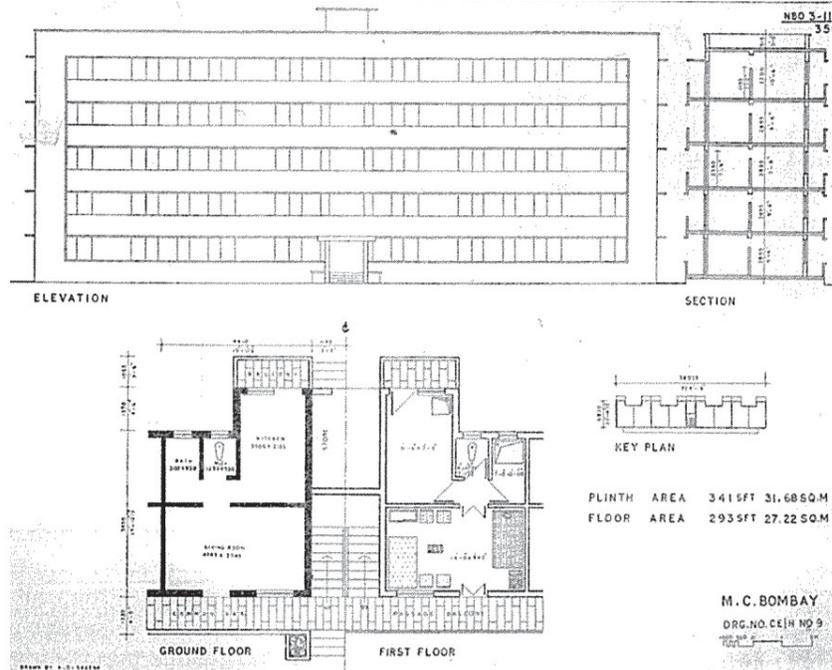


Figure 15. Design for 'Economically weaker sections' by the Municipal Corporation of Bombay, 1968.

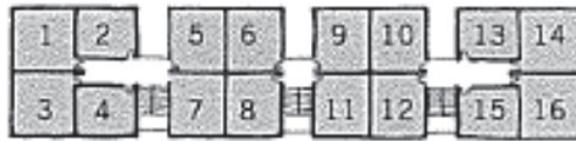
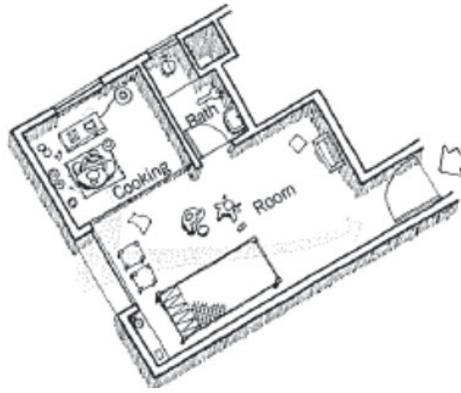


Figure 16: Floor plan and typical unit of MHADA housing (1999)



Figure 17. Typical floor layout of Housing development in Tilak Nagar, Mumbai.



Figure 18. Current state of the above building layout in Tilak Nagar, Mumbai.

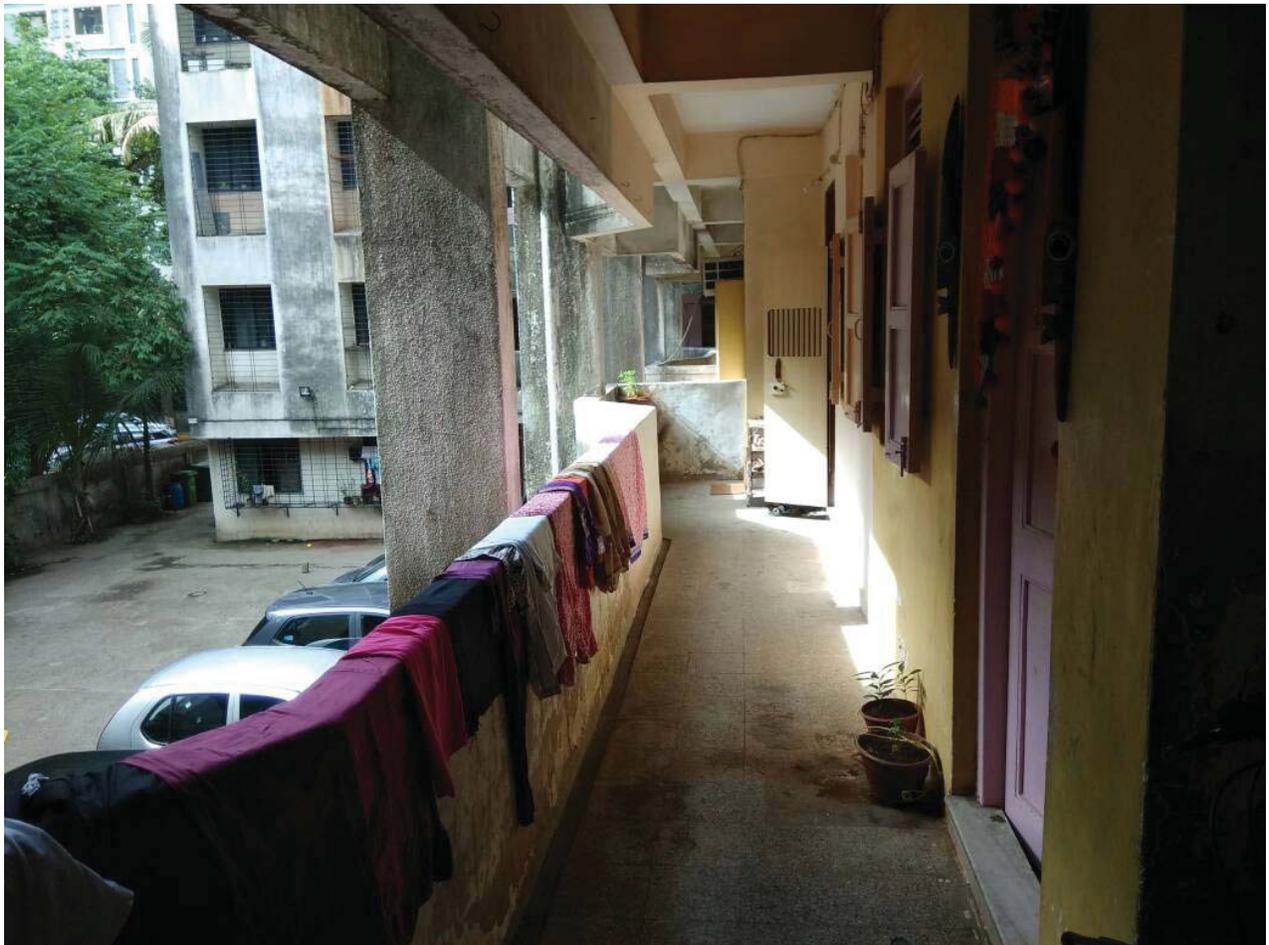


Figure 19. Typical floor view of housing in Tilak Nagar, Mumbai



Figure 20. Existing building (in front) along with the redeveloped wing constructed (background) is the trend to provide additional housing developments.



Figure 21. Interior of the one room kitchen unit with main door and only window accessed through the common corridor and the loss of privacy with neighbors.

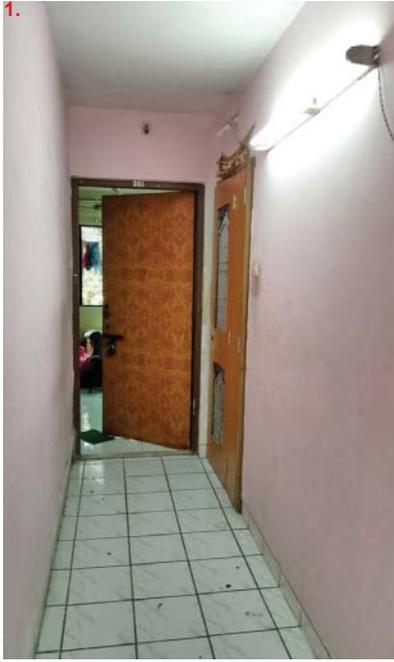


Figure 22. Common passage leading to the unit, along with the interior of 1 room kitchen of the redeveloped wing. The window gets daylight from exterior wall, not from main corridor, unlike older typologies.

B) Future developments :

These housing types are inwardly oriented where the window is located on the exterior wall surface of the building. This provides for a healthy source of daylight.

Following are some of the upcoming developments of the 1 room kitchen apartment in Mumbai:



Figure 23. Upcoming project with one room kitchen apartment in Mumbai

Project details:

Project : Thakural Dois.
Developer: Thakural Constructions.
Location: Santacruz, Mumbai.
Carpet area: 32 sqm.
Possession: December, 2016.
Scale: NTS.



Figure 24. Upcoming project with one room kitchen apartment in Mumbai

Project details:

Project : Rupaji Akansha.
Developer: Rupji Constructions.
Location: Ghatkopar, Mumbai.
Carpet area: 30 sqm.
Possession: December, 2020.
Scale: NTS.

04.1 High density housing and privacy :

“Density need to be thought of not as a statistic but as an experience”, Ng,E. (2010).

According to Edward Ng, even though physical density can be calculated, it is more about the perception of density that matters (refer figure 25). Ng emphasizes that it is through a perceived density that an individual interacts and can relate and experience the built environment. The perception matters more than the size or amount of space. Research data establishes that perceived density is governed by three main factors:

1. Individual cognitive factors;
2. Socio-cultural factors;
3. The built environment.

The development of high density housing has resulted in an ever increasing convergence of the private and the social domains. This has resulted in increasingly complex situations of social interactions in living environments where an individual’s needs cannot be accommodated sufficiently.

In ‘The Poetics of Space’, Gaston Bachelard’s describes ‘Home’ as a place where an individual anchors his primary world and represents his materialistic sense of human experience in its unity and complexity, Poldma, T. (2015). He considers it an ‘analysis instrument of the soul’. Design academic Tiiu Poldma (2015) has analysed Serfaty - Garzon’s (2003) theory where, likewise, home is considered an active component of spatial rooting for an individual’s moral, psychological and affective sense. These ideas about home and their centrality for an individual’s well-being and sense of place are highly important for any family or individual’s dwelling.

However, considering the robust demand for housing projects against the limited peninsular supply of land in Mumbai today, the resulting apartments are mainly driven by mass production design and pure economic benefit.

On the other hand, the important and central traditional and contemporary socio-cultural aspects which forms the essence of an Indian Society today, are disrespected and disregarded (refer figure 26). As a result, the inhabitants are left with no choice but to adapt to a lifestyle irrespective of their personal. This profoundly affects their social and psychological wellbeing.

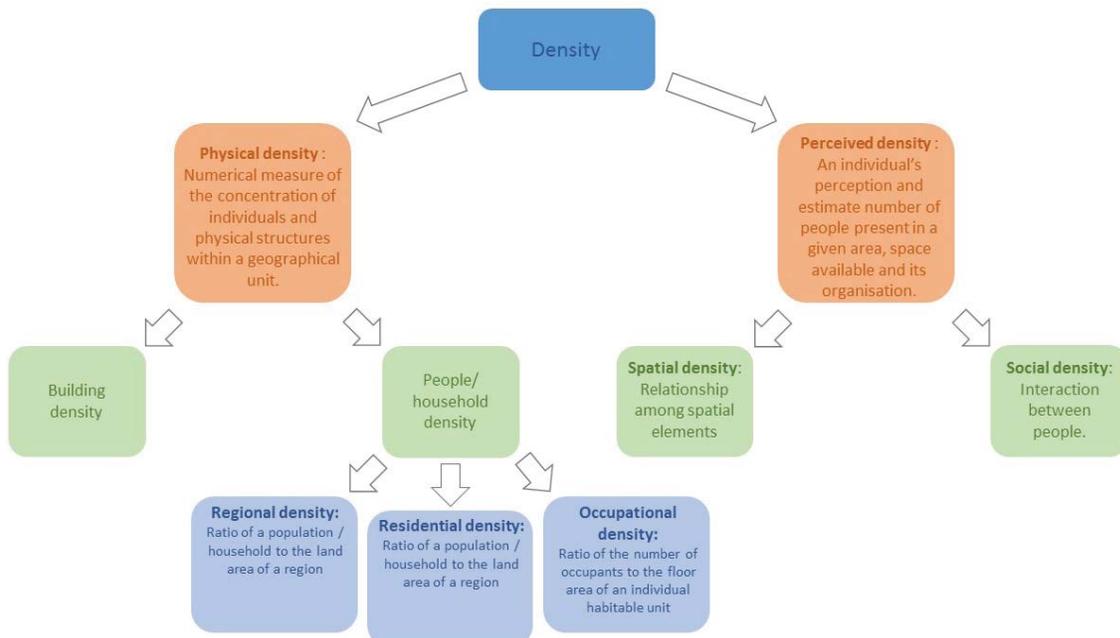


Figure 25. Types of spatial density.

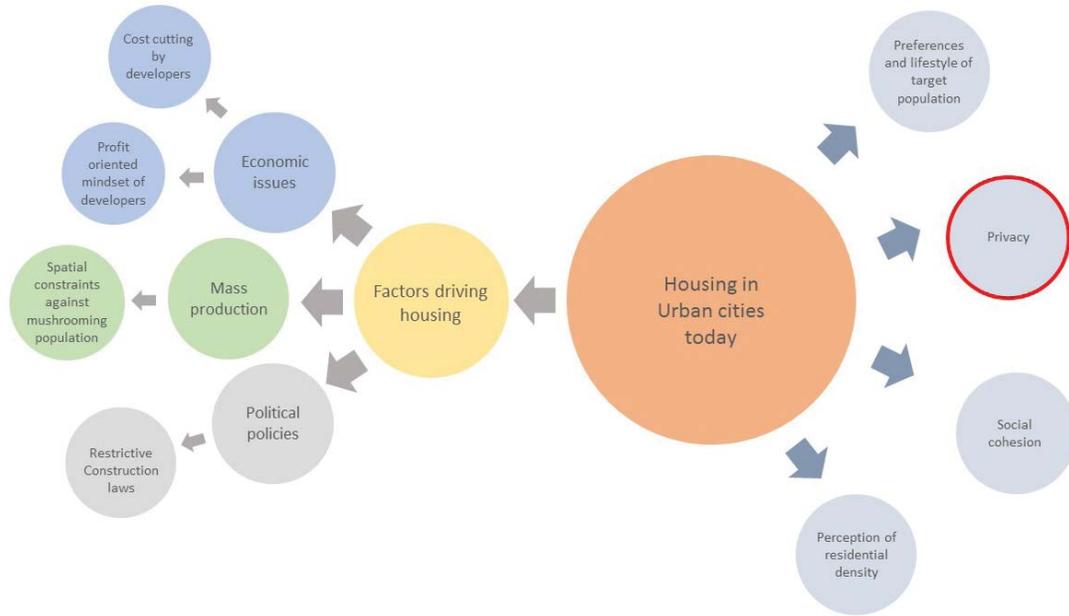


Figure 26. Analysis of the housing in urban cities

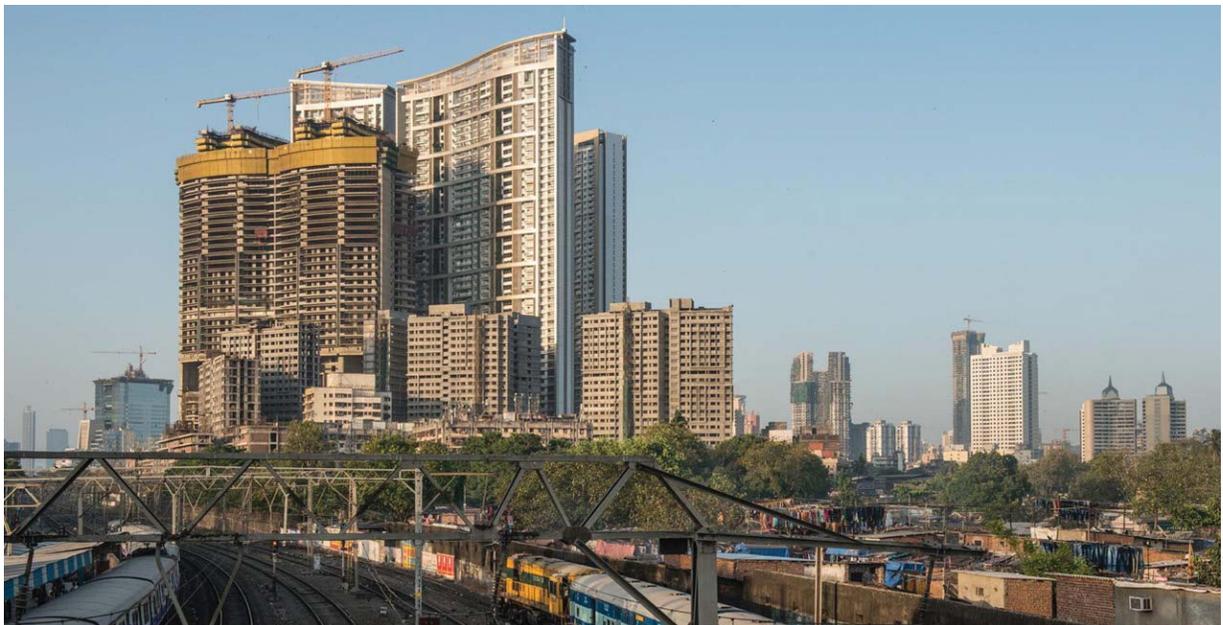


Figure 27. Urban density of Mumbai

Two of the most crucial repercussions of high density housing, due to modifications of FSI (Floor Space Index) laws and the limited supply of land, has resulted in the converging of social and personal spheres. Important vestibules effectively vanished from residential housing developments across all the typologies. Vestibules, however, have played a vital role in maintaining privacy of a home as they have acted as a protective zone and a transition space from the private to the public sphere. It is an area that mitigates intrusion and is a true in-between area. Traditional Indian living required separate zones for male and female during social interactions, the intention being not only to create physical distance but also visual barriers, privacy being of paramount importance. A traditional home will restrict a stranger's viewing at the front *verandah* outside the main door of the house (refer figure 28), thus retaining family privacy and safety. The courtyard at the back of the house, allows female members to socialize while the men dominate the front of the house in the living room.



Figure 28. Traditional Indian home with *verandah*.

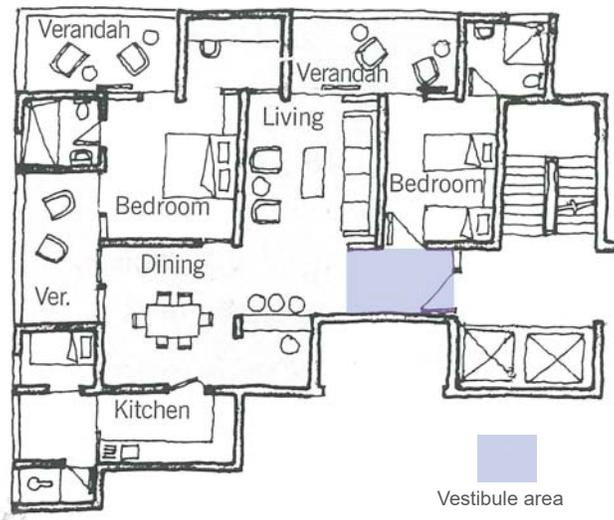


Figure 29. Apartment with vestibule constructed in mid 70's in Mumbai.



Figure 30. Absence of vestibule leading to loss of privacy for family in apartment living.



Figure 31. Absence of vestibule leading to loss of privacy for family in apartment living.

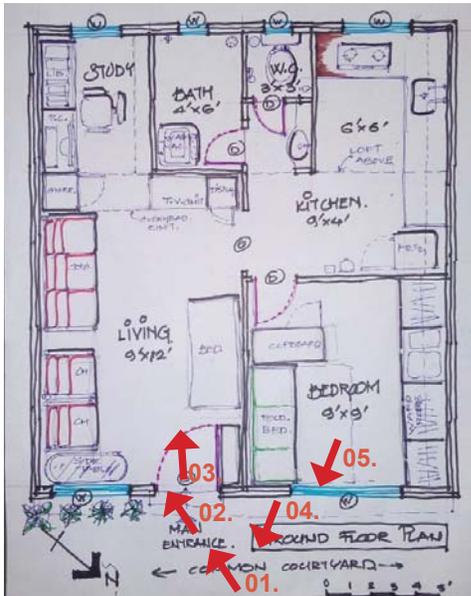


Figure 32. Case study of an 1 Bedroom Hall Kitchen apartment in Mumbai, where privacy is a concern due to the absence of a vestibule. The situation becomes even more problematic in the case of ground floor apartments,



Figure 33. Loss of privacy in family area of a 2 Bedroom Hall Kitchen apartment in Mumbai due to absence of vestibule at the main entrance.

04.2 Privacy :

The notion of privacy is largely culturally defined and ranges in complexity and social function.

Anthropologist and sociologist Hall, E. (1969) defines privacy as the “control of personal space”. It is about the ability to control your amount and type of social interactions. However, privacy is often confused with privatization, isolation and loneliness. The main difference is that privacy exists by choice unlike isolation and loneliness. However, the desire for privacy is replaced during the need for survival, especially in community living, Moore,B. (1984).

Othman,Z. (2014), Mortada (2011) and Omer (2010) define privacy as “a safe and private place for personal and family’s sanctuary.”

As there is no particular unit to measure privacy, Altman (1975) believes that a state of privacy can be described through three conditions. This is also echoed by Al- Kodamany, K. (1999):

1. **achieved privacy = desired:** if the achieved privacy is equal to the desired privacy, an optimum state of privacy exists, resulting in psychological comfort;
2. **achieved privacy < desired:** if the achieved privacy is less than the desired privacy, a sense of invasion of privacy results; a person has more interaction than s/he wants and intended to achieve; the person feels ‘crowded’;
3. **achieved privacy > desired:** if achieved privacy is more than desired privacy, the result is a sense of loneliness and social isolation.

Privacy is also subjective depending on people’s past experiences, upbringing and cultural background. People may respond differently to the same scenario according to their gender, age, previous experiences, culture, values and interests. There is no absolute standard to predict privacy.

Moore,B. (1984) states: “In seeking privacy, a person seeks at least temporary escape or surcease from contact and conversation with other human beings because their presence has become overly demanding, oppressive or simply boring.”

This is also supported by Othman’s concept of ‘Layers of privacy in a traditional home’, which explains the socio-cultural dynamics between men and women in a traditional eastern society (refer figure 34). Space and behavioural patterns are mutually interdependent. They define social maps that are different for men and women, and define social behaviour in everyday activities.

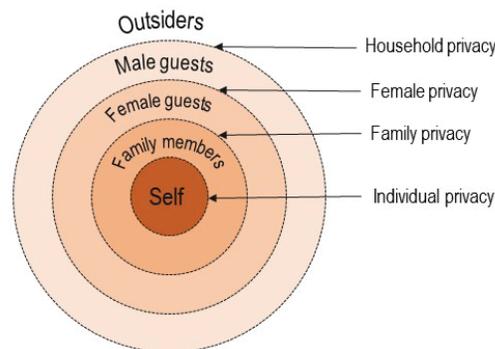


Figure 34. Layers of privacy in eastern culture.

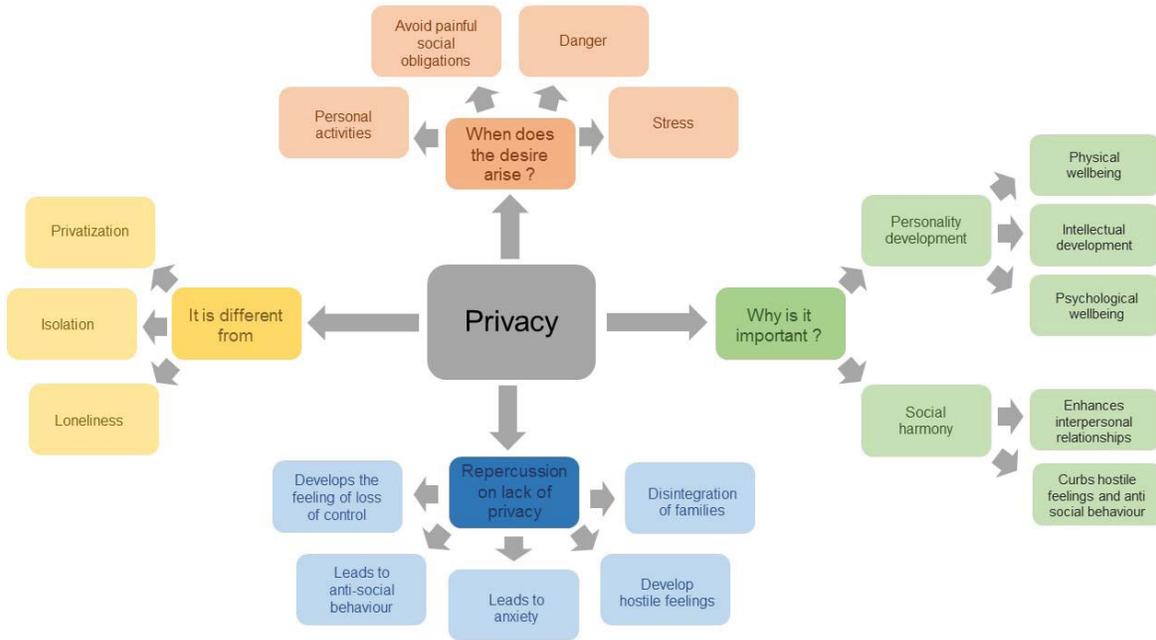


Figure 35. Analysis of literature review on privacy

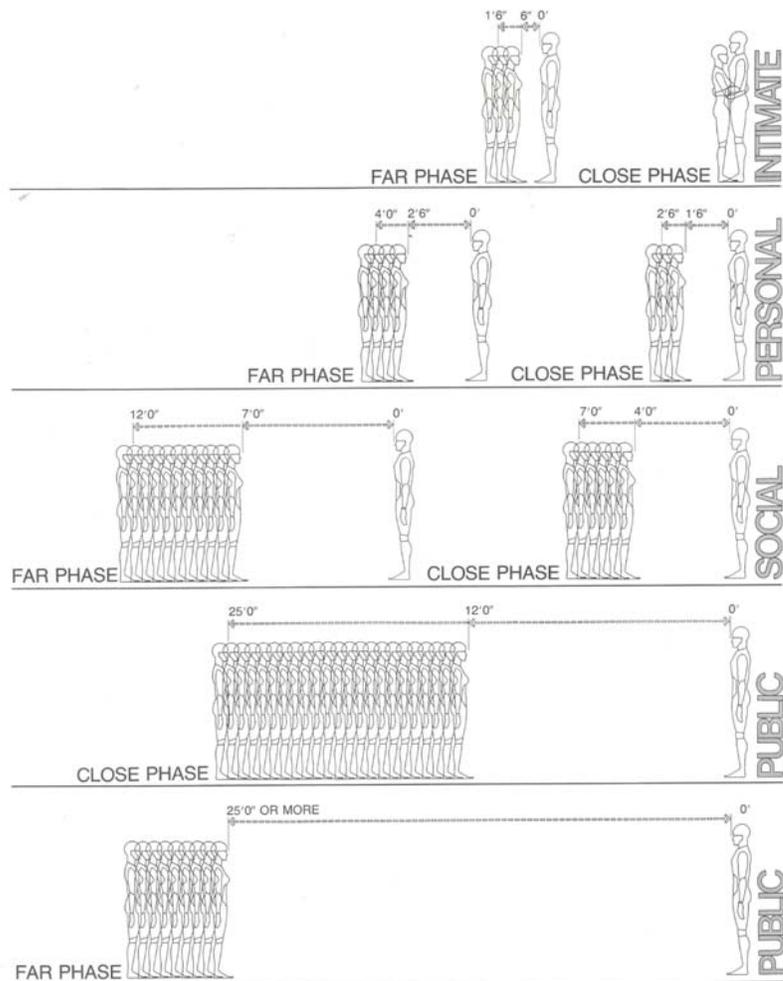


Figure 36. Graphic illustration of the distance zones suggested by Hall.

04.3 Influence of the sensory perceptions and culture on the built environment and behavioral patterns:

To understand the importance of privacy in a society, it is important to consider its foundations. Indian culture is one of the oldest existing civilizations of the World. Today, it is standing at the threshold between traditional values and a progressive outlook.

In eastern culture, the family structure and life is considered an integral part of an individual and plays a crucial role in the psychological, social and physical well being of an individual and community. Joint family systems are still holding their importance – also in a contemporary, progressive society, as developing countries do not have government based social security systems compared to affluent nations. In such a scenario, the family becomes the life insurance for an individual during the time of crisis. As a result, the concept of individuality, and an individual's privacy exists weakly only in eastern culture, and family space is always given a priority over an individual's needs.

Theorists like Hall, E. (1969), Moore, B. (1992), Malnar, J.M., & Vodvarka, F. (2004) and Poldma, T. (2015) all describe how cultural components and various human sensory perceptions form an integral device to formulate behavioural responses to environmental stimuli. People respond to stimuli through five sensory perceptions (refer figure 37). They are :

1. Eyes for vision/ sight
2. Ears for hearing
3. Hands for touch
4. Tongue for taste
5. Nose for smell

Vision and touch are more conducive to mental processes with regards to spatial privacy in eastern culture and hence become primary considerations for designing. They are also the most immediate and intimate senses that mediate between the conscious self and the built environment. People living in high density cities are prone to a certain noise level and hence the audible factor is given a secondary consideration while designing. Hence, behaviour is determined by perception as an organised sensation, and is further illustrated in figure 38.

They state: "Perception itself is a product of cultural context and the world as 'collective field of experience' is different for different cultures". Hence, same stimuli will incur different responses for various reasons (refer figure 39). Serfaty – Garzon furthers this argument: "Material character and ways we personalize the space are in part identified by a cultural model and then adjusted by our own particular individual expression that informs our identity and how we construct oneself through our inhabited space", Poldma, T. (2015).

Poldma extends this argument further by including gender as a cultural factor and influence: "From the moment of birth, spaces shape who we are and how we function as males and females. The social construction of space and place, at least in part, create the social roles and relations that govern how we live, work and play. I believe that there is a relationship between gender and space, and that social constructions affect this relationship", Poldma, T. (2015).

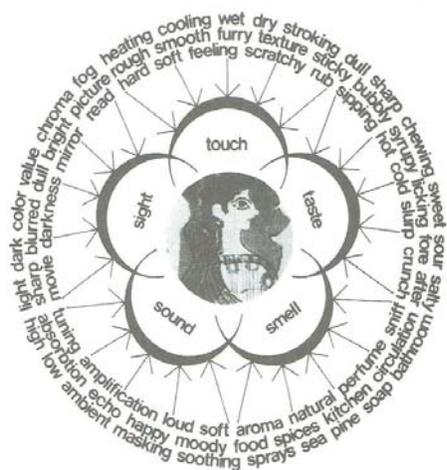


Figure 37. Sensory realms by Richard Williams.

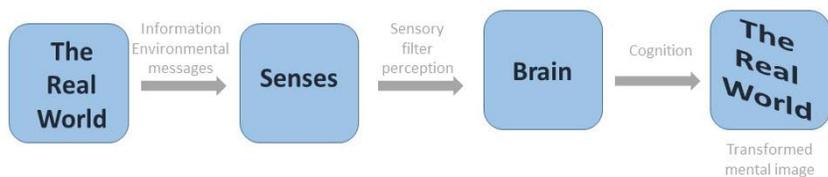


Figure 38. Formation of images.

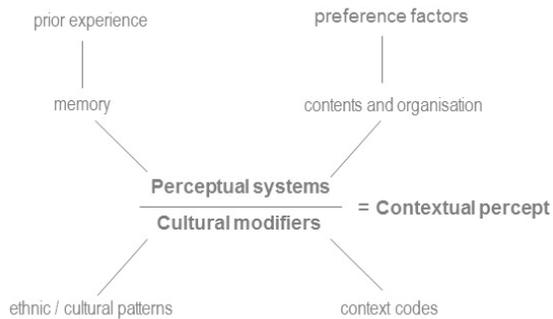


Figure 39. Contextual percept schematic.

04.4 Spatial and task analysis :

The 1 room kitchen unit is used to analyze the privacy needs for women inhabitants as part of family living. The analysis combines the cultural patterns and the limitations of the spatial environment, with the privacy needs of the specific tasks. Four activities were prioritized out of many everyday and formal activities occurring within the apartment. They are:

1. Changing clothes
2. Breastfeeding
3. Sleeping
4. Gazing neighbours

Multiple activities and their respective spatial situations were studied to derive design criteria for conceptualizing and developing a screen design. Anthropometric data by Tilley, A. R. (2002) was utilized and plotted into the dimensions of a typical 1 room kitchen apartment unit (see figure 25). Distances for privacy zones were based on Edward T. Hall's theory of proxemics and used for evaluating the distance for personal, social and public activities and realms, Panero, J. & Zelnik, M. (1979), (refer figure 42).

1. Breastfeeding:



Figure 40. Image of Indian mother breastfeeding in saree.

a) Activity analysis:

- | | |
|--------------------------------|---|
| i) Time taken: | 15-20 mins |
| ii) Type of activity: | Primary |
| iii) Repetition in a day: | 5-6 times |
| iv) Performed by : | Mother |
| v) Importance of the activity: | For physical, psychological well being of the infant and mother |
| vi) Activity performed: | Sitting on floor, sofa, bed or a chair |

b) Situation analysis: Evaluating privacy concerns while performing the activity:

- i) Neighbours gazing while passing by in common passage.
- ii) Presence of adult house guest or family members in a joint family structure.
- iii) Presence of young family members or child. eg an eight year old boy.
- iv) Sudden presence of uninvited guests or people from service industry viz - delivery boy, courier boy, watchman etc.

Some of the above situations are depicted below and analysed to understand the requirement of screening required in various scenarios:

Situation 01. Breastfeeding sitting on a sofa: Neighbours /passerby gazing and invading into the intimate interaction between mother and baby.

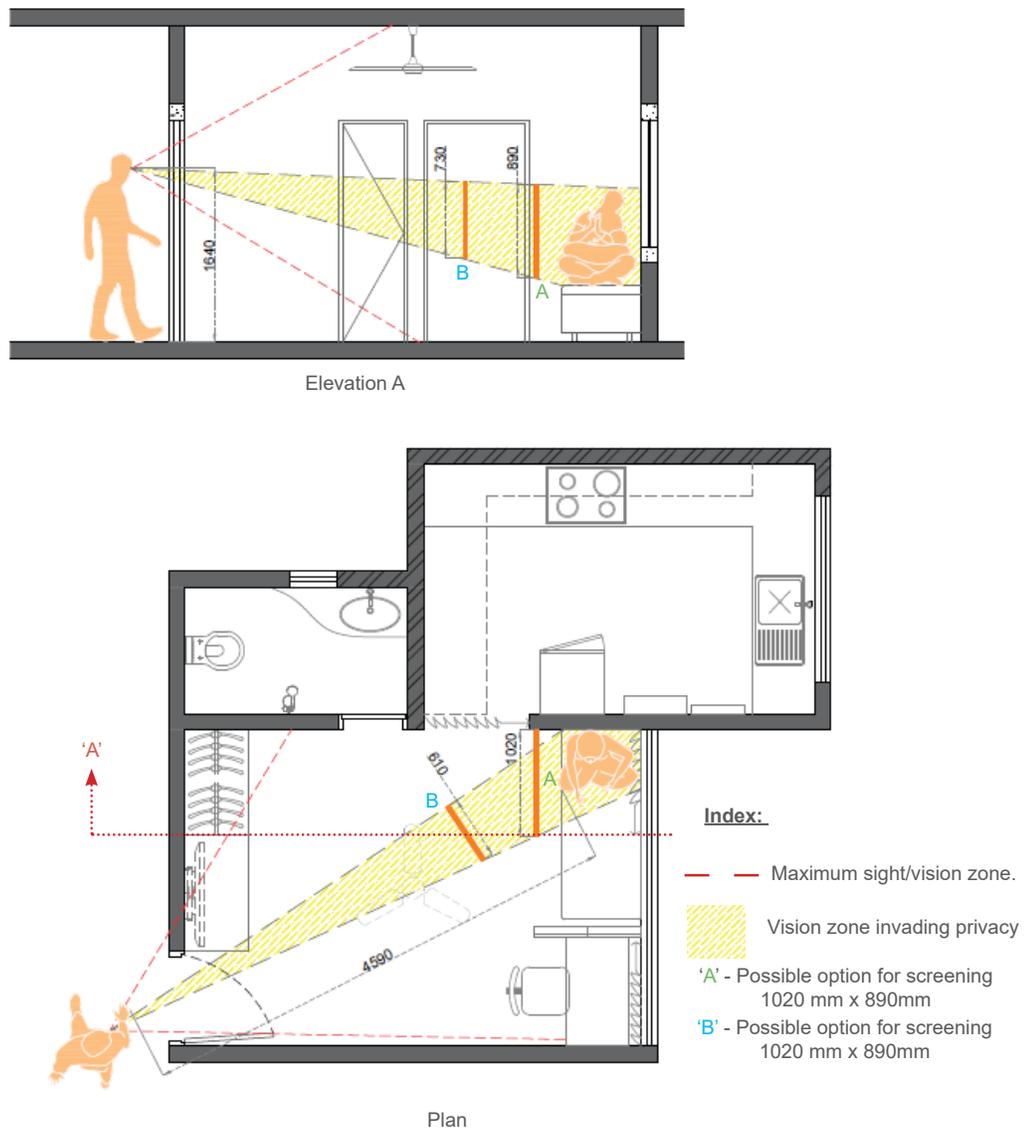


Figure 41: Analysis of the screen requirement for situation 01.

Analysis: In this particular housing typology, every apartment has a common passage in front of the main door which is accessed by many of the apartment building residents. The main door tends to remain open most of the time as it diminishes the feeling of loneliness and helps in engaging with the social life for the inhabitants. However, it becomes a concern while performing certain activities which needs privacy such as breastfeeding. Often other family members of the unit walk in and out of the inbuilt space while this activity is performed causing great inconvenience to the mother and baby. Evaluating the above scenario helps to understand the two possibilities of screening. The closer the placement of screen to the mother, the wider the requirement of the screen. The above situation demands total screening for the woman to help her be comfortable and adjust to the desired position to feed the baby. The baby makes lots of body movements while performing this activity which leads to the disruption of the mother's clothing. This requires the need for complete visual screening.

Situation 02. Breastfeeding sitting on floor: Presence of an adult guest or family member in a joint family structure.



Figure 42: Analysis of the screen requirement for situation 02.

Analysis:

A mother feels more comfortable to breastfeed sitting on a floor as it gives the comfort to adjust to desired posture while feeding the baby. The baby also needs free movement to change the sides while being fed. The presence of multiple people and their constant shift of location, requires for the screen to have extra height. This will conceal the activity so that it causes psychological & physiological comfort to mother and baby.

Situation 03. Breastfeeding sitting on floor: Presence of young family member.

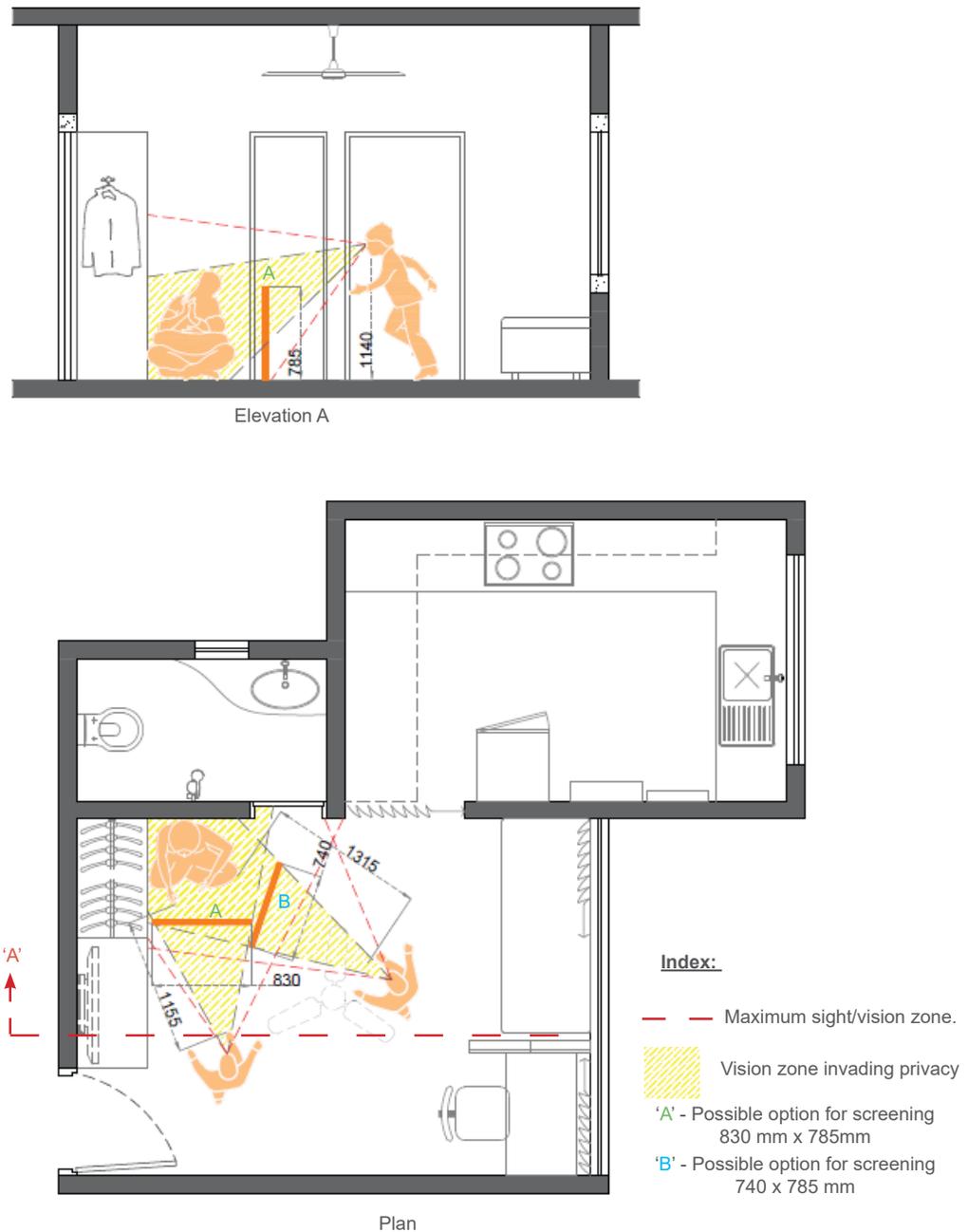


Figure 43: Analysis of the screen requirement for situation 03.

Analysis:

As a cultural requirement, the mother needs partial privacy from her own older children when feeding a newborn baby. However, in the above scenario, she also needs to keep an eye on the activities of her older child. Hence the proposed screening is below eye level. The older child will keep changing his position and tend to encroach into the personal space of mother and baby while playing around. Therefore, maximum coverage around the mother is required to retain her privacy.

2. Sleeping:

a) Activity analysis:

- i) Time taken: 30-45 mins
- ii) Type of activity: Primary
- iii) Repetition in a day: 1-2 times
- iv) Performed by: All members of the family
- v) Importance of the activity: For physical & psychological well being of the individual
- vi) Activity performed: Sleeping on floor, sofa, bed or a chair

b) Situation analysis: Evaluating concerns with regards to privacy while performing the activity:

- i) An individual becomes conscious of their sleeping habits in presence of stranger, guest or relatives.
- ii) Presence of maid during morning rush hours at home creates situational tensions.
- iii) Presence of milkman, newspaper boy or watchman at main door during morning hours also creates tension in house when other family members are sleeping, especially girls.

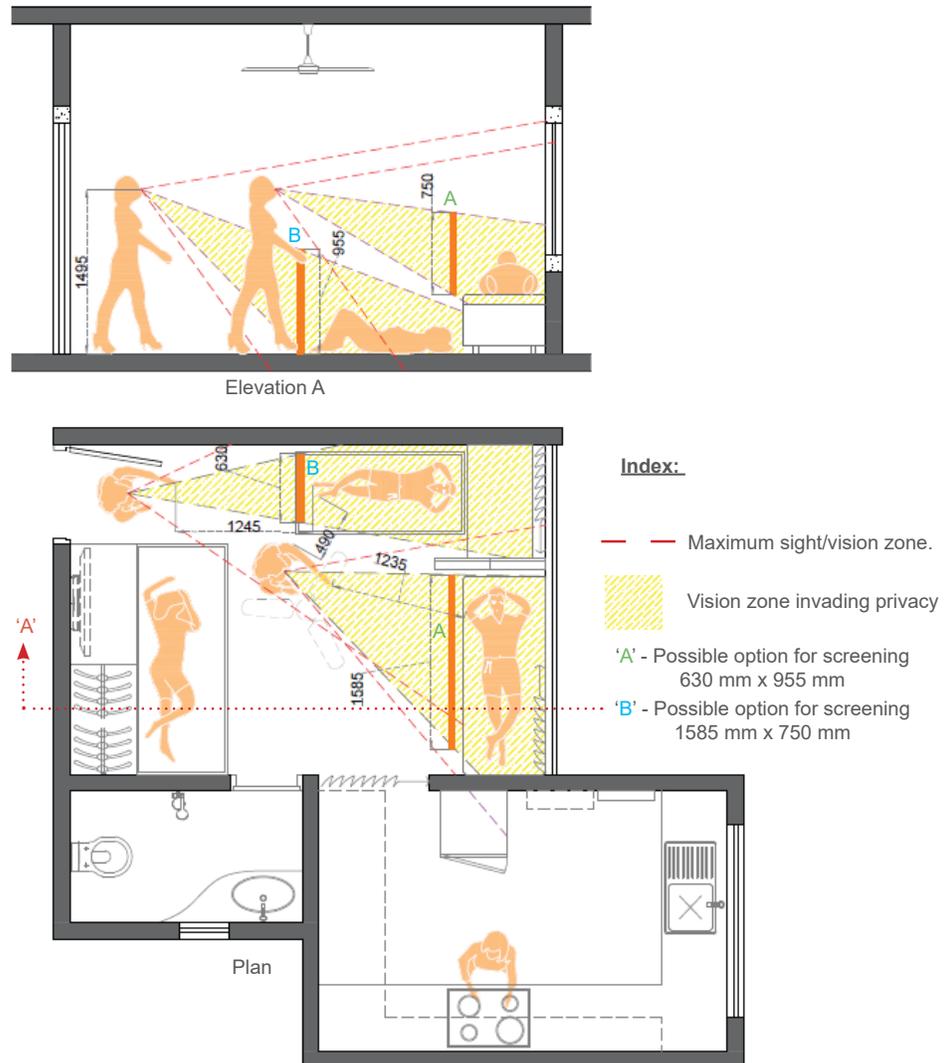


Figure 44: Analysis of the screen requirement while sleeping.

Analysis :

Most middle class families have a maid servant at different times of the day to help with domestic activities. This becomes problematic with especially male members while they are resting or sleeping. Sleep/rest also tends to leave the sleeper in a vulnerable body position.

The above diagram illustrates a morning scenario when members of the family are sleeping. The presence of the maid creates an uncomfortable situation. Also, while performing domestic tasks, the maid has no choice but to step into other people's personal space. This creates everyday tension which disturbs everyone's wellbeing. This scenario requires the screening at multiple locations and at different heights.

3. Changing clothes:

a) Activity analysis:

- i) Time taken: 15-20 mins
- ii) Type of activity: Primary
- iii) Repetition in a day: 2-3 times
- iv) Performed by: All family members
- v) Importance of the activity: For physical, social, psychological well being of an individual.
- vi) Activity performed: Standing on floor.

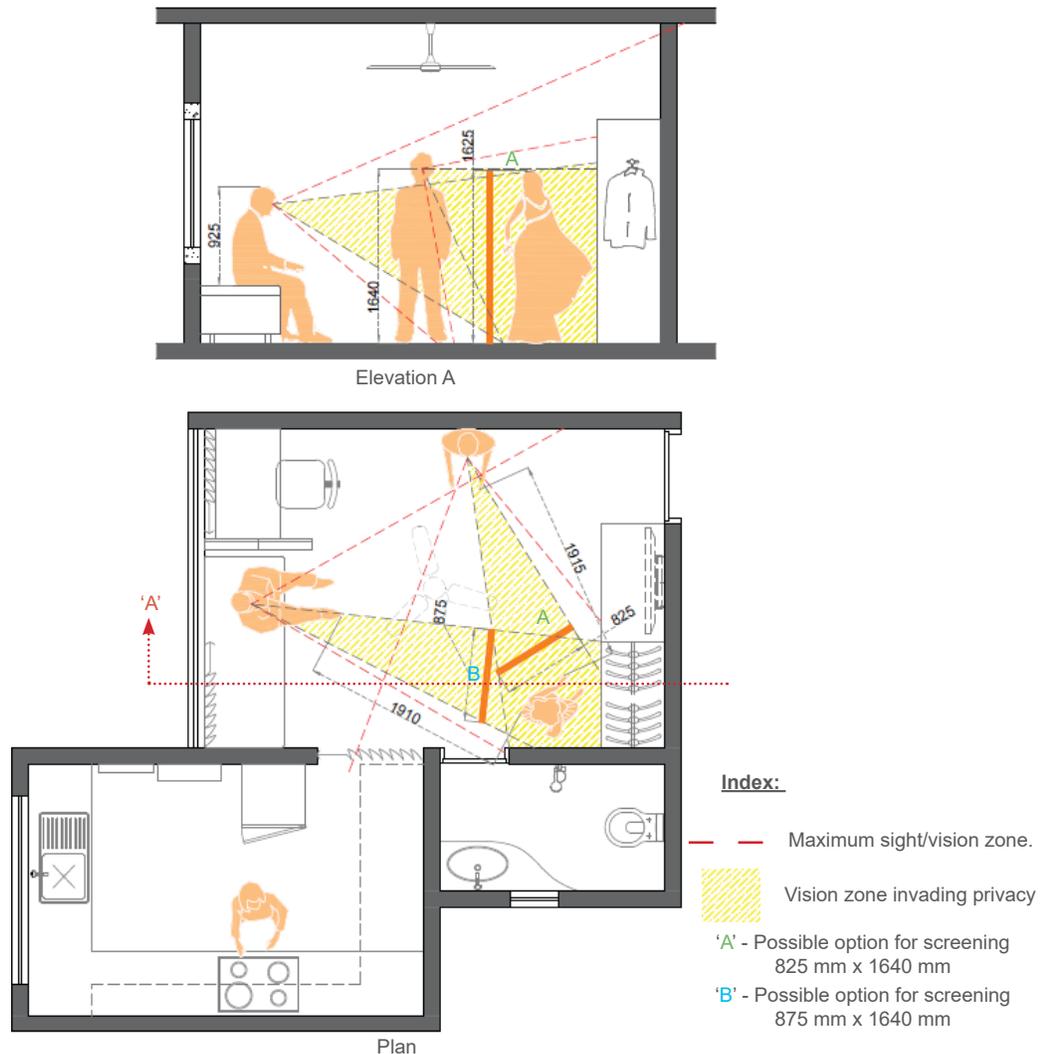


Figure 45: Analysis for screen possibility for changing clothes.

Analysis :

In the above situation, the daughter feels trapped with the presence of a guest, or a relative, while she is in a rush to get ready for work, domestic or business. During the presence of a guest, the kitchen and living room are constantly accessed by the father and mother and while continuing with their domestic work. The daughter can't access the bathroom as there is no dry and wet zone in bathrooms of such small units and as a result the bathroom floor is always wet. The daughter will need complete concealment from head to toe while changing her clothes in the presence of guests and her father. A screen at a height above her head is required to completely conceal her body.

4. Gazing neighbours:

The common corridor has a constant flow of residents, be it for transit or as break out space. The intentional or unintentional gaze from neighbours during these activities create uncomfortable situations for the family members. The unexpected presence of a delivery boy, courier boy, or postman during morning hours or while having lunch and dinner, or with a party at home, also creates uncomfortable situations.

Strangers also try to take advantage of such a situation if they understand that kids are alone at home. This is leading to increased crime rate. The family members seek privacy from these uncomfortable situations for personal well-being, and for the well-being of his/her family.

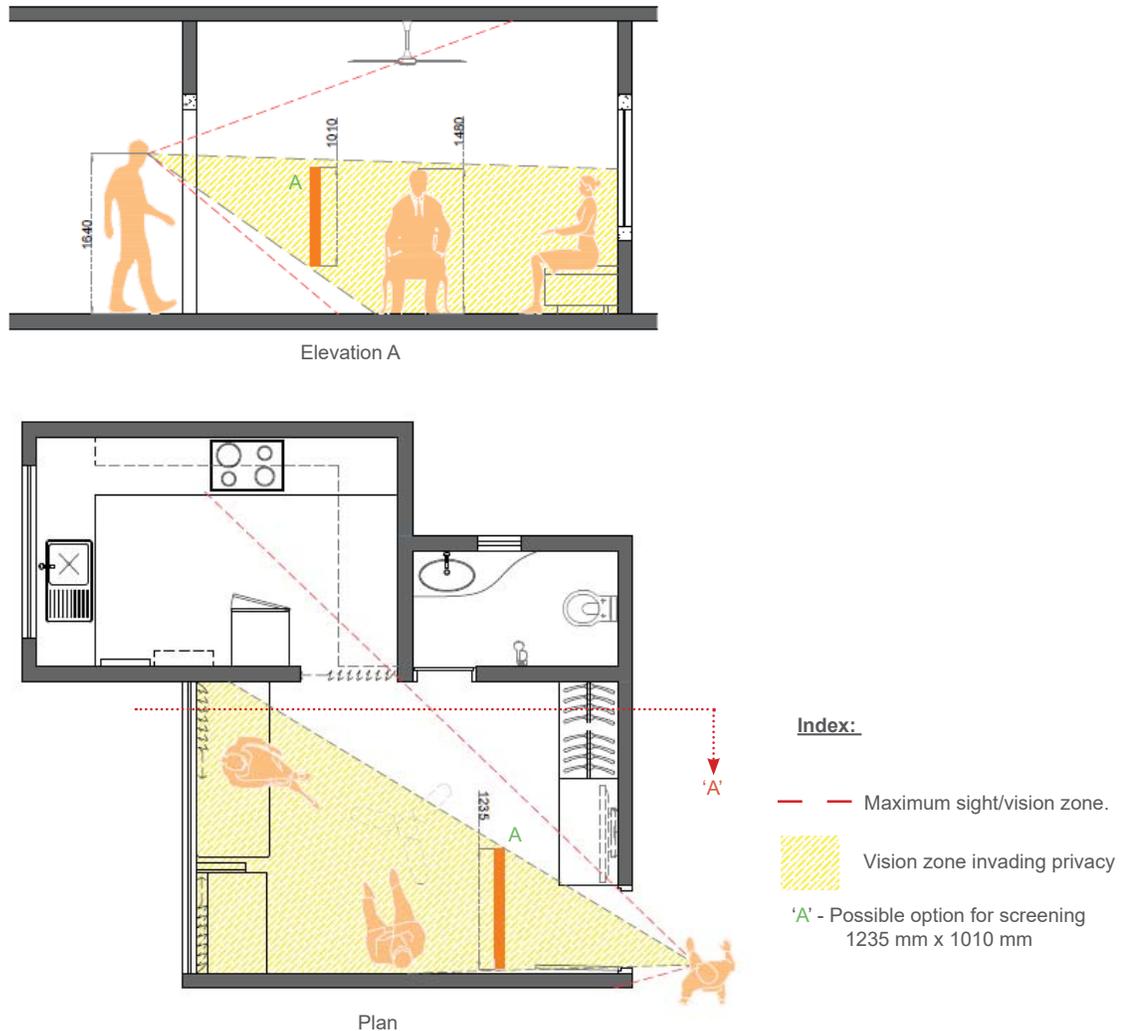


Figure 46: Analysis for screen possibility from gazing neighbour.

Analysis:

In the above situation, a guest is interacting with a female family member of the house. Neighbours are gazing intentionally or unintentionally while passing by which is a big concern. The social norms also require that the door cannot be closed when a guest is present while only a single woman is in the apartment. To mediate this situation, a screen near the main door would help to achieve privacy and yet respect the social requirement.

05. Design development :

“Design = Culture + Behaviours”

- Poldma, T. (2015).

“Design springs from experience”, Caan, S. (2011).

An understanding of cultural values together with lived experiences, can serve as a foundation and tool to express and create a dialogue between objects and users, Poldma, T. (2015). In this way, design can have a positive impact on the way we engage and inhabit space. My approach is developed and informed by ‘Principles of Good Work Design’, and human - centred design, to articulate the design criteria and brief for product development.

The concept exploration was generated through an investigation on how privacy was achieved using various techniques from Indian’s cultural history, and case studies of existing market solutions along with a specific spatial and task analysis. This, together with a concern for compact space design and sustainable materials, formed the basis of the design exploration. As a guide for iteration and development, I sought to mediate between the fundamental concerns of given by society and culture, and the pragmatic requirements of the design’s construction and usability. An effort was also made to explore a screen design that not only provides spatial privacy but also expresses the aesthetic taste of the users.

05.1 Techniques for privacy:

Throughout history, techniques like camouflage, gradiency and drapery have been used to achieve privacy in Indian culture and architecture. Over centuries, pragmatic sustainable methods were discovered which integrated privacy into social life. Following are a range of architectural precedents that illustrate these techniques:

1. Camouflage:

Camouflage is a technique to hide, blend, conceal or disguise an object with its environment or surroundings. In Indian culture, the use of the '*Jali*' has been a common method to achieve privacy in residential dwellings. " '*Jali*' means a net or a fine web", Kamath, L. G., & Daketi, S. (2016).

"The small holes increase the velocity of air as it passes through them, similar to the function of a funnel, enhancing even the mildest breeze outside and allows for a deeper penetration. The air also cools down while moving through the small apertures which function like an air conditioner compressor. Thus comfort of the occupants is increased as the *jali* put both Bernoulli's and Venturi's law to effect", Kamath, L. G., & Daketi, S. (2016).

The *Jali* it is a passive method to provide comfort without being dependent on mechanised systems. The fenestrations also allows the light to penetrate into the space which creates dramatic shadow patterns and prevent the user from experiencing a claustrophobic sensation. The thickness of a *jali* plays a vital role for camouflaging objects. In India, men and women required separate spheres for social interaction and this can be traced historically to the influences of Islamic culture. The *Jali* was a method to mediate between these spheres so that both could engage with social and cultural functions. Hawa Mahal or "The Palace of Winds" is an iconic example located in Jaipur City, Rajasthan, India. The whole facade and the courtyards of the palace are delicately carved with honeycomb patterns where the royal women could engage and view everyday life of the kingdom and yet keep themselves away from the sight of strangers. "It functioned like a veil for the women in the conservative social setup", Kamath, L. G., & Daketi, S. (2016).

Many other palaces & forts like the Akbar's tomb at Sikandara(refer figure 46), Neemrana Fort Palace in Neemrana, Rajasthan(refer figure 47 & 48), City Palace in Jaipur, Rajasthan(refer figure 49 & 50) have used the *Jali* as a technique to mediate between spaces and at the same time to retain privacy.

A Rich Reservoir

"It is necessary to understand history,
and he who understands history knows how to find continuity between
that which was, that which is, and that which will be."

- Le Corbusier

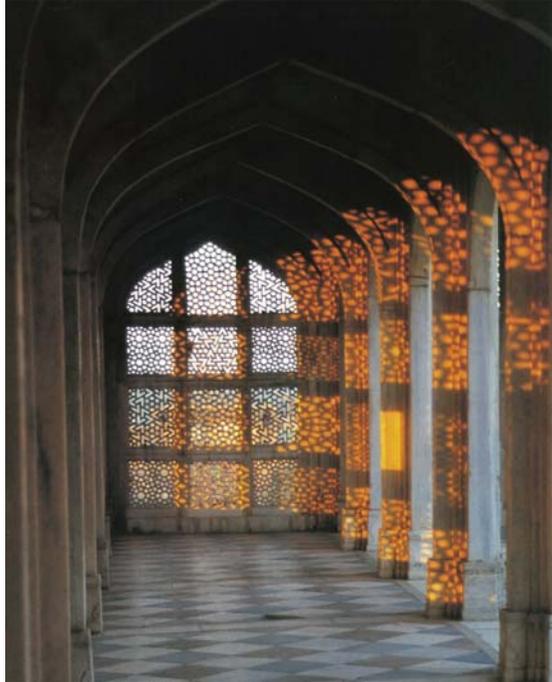


Figure 47. Dramatic effect created by *jali* with the infiltration of light at the courtyard of Akbar's tomb at Sikandra, India.

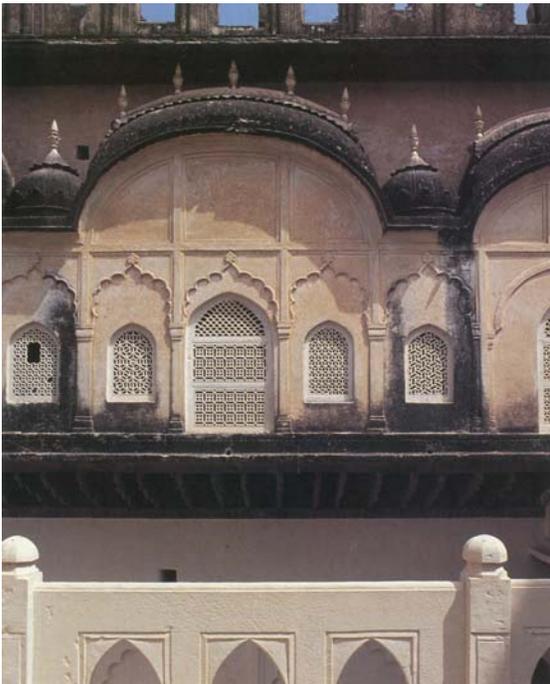


Figure 48. Use of the *jali* in one of the private chambers of Neemrana fort Palace in Rajasthan, India.



Figure 49. Corridor on the other side of figure 48 which was used by the Maharaja's wives to get in and out of their private rooms without being seen by visitors of the fort.



Figure 50. A *jali* mediating between the interiors of the palace which was occupied by royal women and the courtyard where the social functions took place at City Palace of Jaipur, Rajasthan, India.

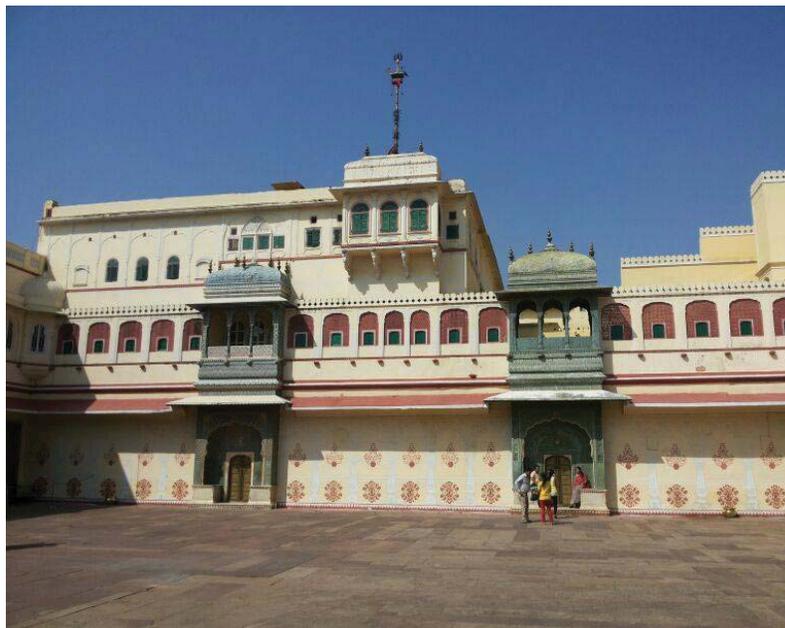


Figure 51. A *jali* mediating between the interiors of the palace which was occupied by royal women and the courtyard where the social functions took place at City Palace of Jaipur in Rajasthan, India.

2. Gradiency :

The technique of gradiency has been used effectively in Indian architecture of temples, palaces and home to respect privacy and maintain different spheres of social interaction for men and women. 'Vastu - Purusha Mandala', which forms the basis of Indian architecture principles since Vedic times, is gradient in nature depicting different spheres of human life (refer figure 52). A palace or a fort is hierarchically zoned into different realms for men and women, and which are called *mardana* and *zenana* respectively. It also bifurcated the private and social spheres for the royal families. An example of this can be seen in the City Palace of Jaipur (refer figure 53). The objective was not only to create physical distance between the sexes but also to create visually isolated zones. The *mardana* sphere was located at the lower levels which would be accessed by courtiers, visitors or the common people of the kingdom. The upper levels were largely accessed by members of royal family and invited guests only. This hierarchy assured privacy to the female members of the family (refer figure 54).



Figure 52. Vastu-Purusha Mandala



Figure 53. . Entrance courtyard depicting the hierarchy of zones for privacy in the City Palace of Jaipur, Rajasthan, India.

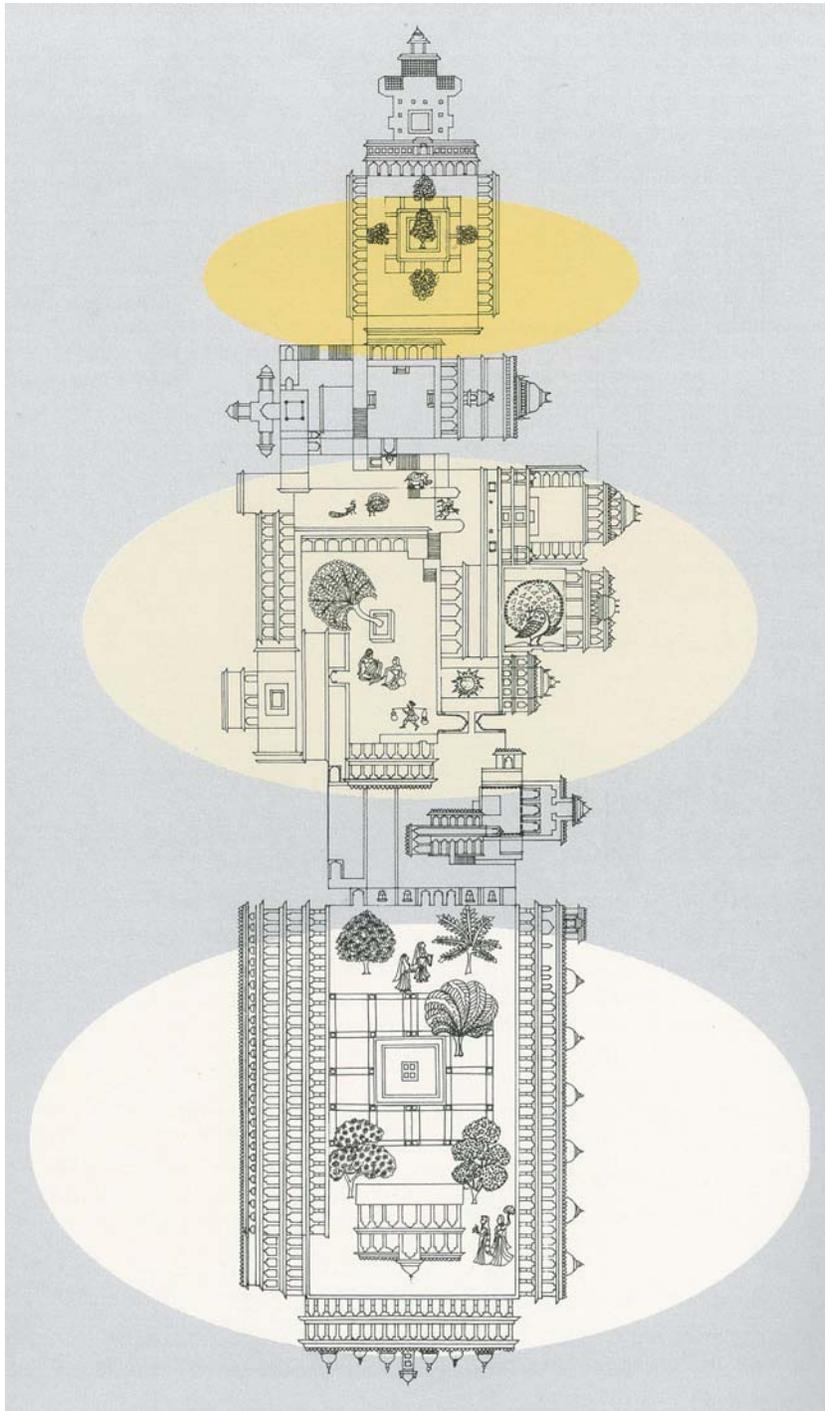


Figure 54. View of the City Palace, showing the varied hierarchy of spaces which are tied together into an ensemble.

3. Drapery:

India has a long history of textile making and design. The technique of drapery, to achieve individual privacy through clothing, and spatial privacy through tents, has been used since Vedic times. Mobile palaces and tents were made of fabrics for royal family members during their expeditions into the countryside (refer figure 55). Saris and odhnis form an inseparable component of an Indian woman's wardrobe as they become the legacy of a family, and part of the family heirloom (refer figure 56 & 57). The wide range of sumptuous fabrics and vibrant colours can accommodate the taste and requirement of any strata of society. Traditional forms of drapery continue to be an integral part of India's contemporary and everyday lifestyle (refer figure 58).

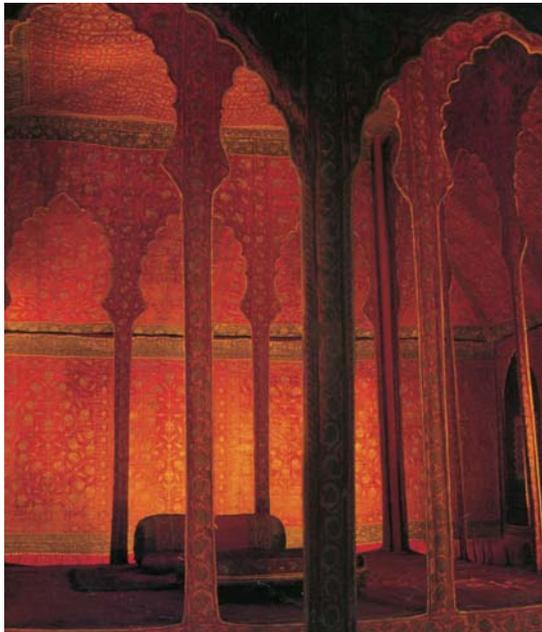


Figure 55. The temporary palace of Shahajahan constructed from red silk velvet which was embroidered with gold and silver yards.



Figure 56. Royal Woman's wear during the 18th Century.



Figure 57. Traditional Indian Saree with *ikat* dyed.



Figure 58. Me with my family members and office colleagues on various festive occasions and everyday life in Mumbai.

05.2 Case studies on screens :

There are many examples of screening solutions for specific environments and purposes. The following examples showcase flexible deployment, commercial linear screening, and traditional domestic screening. Each provides various potentials and challenges for the 1 Room Kitchen environment.

1. Versipanel privacy screen: Designed by Australian manufacturer Portable Partitions, this self-supporting screen rolls up for storage and achieves stability through a serpentine shape when deployed. The screen provides acoustic as well as visual privacy. The free standing surface offers full height visual privacy and is constructed of dense foam acoustic panels covered with acoustic ribbed fabric.



Figure 59. Versipanel screen

Analysis:

The screen however is bulky requiring floor space to provide stability for the rolled screen in storage mode. Unrolling the screen needs to be carefully managed to achieve stability and avoid toppling. As such its spatial performance requirements require access to a greater surface area of floor space to achieve stability. Versipanel, cannot be deployed in a linear format. Transmission of light through the panel is an issue where there may be poor or limited internal lighting provisions. Although a useful screening system for more spacious environments, within a heavily constrained domestic environment such as the 1 Room Kitchen environment the product would lack utility.

2. Instant space by Scheiderscham : Designed by German furniture designer Scheiderscham, this mobile cylindrical solution is wheeled into space and then extended as a screen. Scheiderscham, claims that it unrolls with a single hand and is made of double textile fabric of two metres high and four metres long. It is a privacy screen along with a display panel, or it can be used as a projection surface. It is designed for commercial exhibition display use.



Figure 60. Instant space screen

Analysis:

This free standing screen provides some advantages for application in the 1 Room Kitchen environment, as it provided linear screening up to 4.5metres. However its easy adaptability to the demands of a working home environment would be challenging. The untethered cylindrical storage when not in use provides a potential toppling hazard in an active environment.

3. Traditional Indian wooden screens: These wooden screens have been used traditionally in Indian culture to achieve privacy in bungalows and palaces. The *jali* patterns provide an ornamental cultural reference which can blend with the traditional decor of the Indian home. They come in different materials and finishes. The *jali* pattern fenestrations achieve privacy through disruption of the visual field affecting a camouflage technique. The foldable arms help to achieve different forms to divide the space and critically provide a folded structure that allows these screens to stand upright.



Figure 61. Traditional Indian screen

Analysis:

With the ever shrinking residential floor plan of Indian homes as represented by the 1 Room Kitchen environment, users refrain from using these static traditional screens as they lack easy portability and flexibility. The design requires it to be deployed to remain stable, which takes up valuable floor space. Folded up, it needs to be leaned against a wall, and retained for safety.

Considerations for design criteria:

1. The design needs have high levels of usability in deployment, positioning and stability.
2. The design needs to store safely and with modest space requirements.
3. The design should be customizable for specific screening purpose.

05.3 Design concepts and development:

After careful review of the consideration for design criteria from, both the Spatial & task analysis, and case studies on screens, a revised criterion was established that integrated the recommendations into the following refined criteria set for design.

1. Revised design criteria:

1. The design needs to have high levels of usability in deployment, positioning and stability.
2. The design should be able to be deployed across a range of positions and extend to provide privacy for sleeping adults.
3. The design will have the ability to provide visual privacy when changing clothes.
4. The design needs to store safely and with modest space requirements.
5. The design should be customizable for specific screening purpose.
6. The design should have the possibility to be expanded to provide a range of screening solutions.
7. The design will provide visual screening of neighbour's gaze into the main room of the home.

2. Exploration:

Initial concept exploration was undertaken through ideation, prototyping, and sketching. The aim was to explore concepts and their variations for individual activities across the four key activities previously analysed. Physical exploration with materials helped to understand versatile forms and shapes which could be generated for screening purposes outside of the general concept investigation.

Below are a selection of the concepts generated which cater to one or more activities investigated:

A. Concept 01: Cloak

This concept addresses the importance of space and how every square metre matters in such small apartments. The concept, suspended from ceiling, leaves the space clear when not in use. Like a cloak, it conceals a person from head to toe to achieve total privacy. Fenestrations are provided above the eye level for the light and air to flow through. This design will provide privacy to activities like breastfeeding and changing clothes in small spaces.

There are certain limitations to this design. It provides privacy only at a particular place of the room. This forces activities to take place in a specific location lacking desired flexibility of deployment. It can create a claustrophobic feeling for the person who uses it, as there is no source of direct light and air. For activities such as changing clothes, a person will not be able to enter the private zone directly from bath area nor can they access the wardrobe which causes further inconvenience.

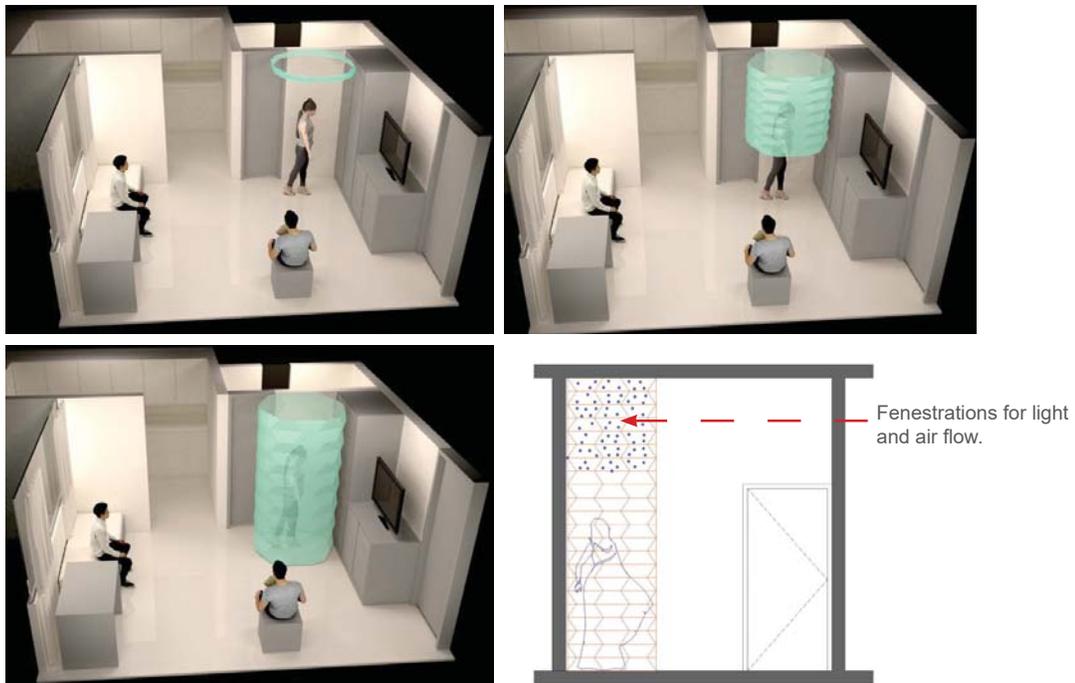


Figure 62. Visual exploration of concept 01.

B. Concept 2: Lego blocks

This concept addresses the fact that every individual has different spatial requirement of privacy and allows the individual to build the screen for individual requirement. The user may feel the product is more valuable if they are engaged in constructing it for their own specific use. Unlike lego blocks, the screen can be built to any length, width and height. It can create temporary individual space or create semi partitions especially when there are guests. The blocks can be made of translucent acrylic which will be infused with different colours, messaging and lighting effects to create an interesting feature wall in the space.

A drawback of this concept is the time taken to construct, which may become a barrier to everyday use, discouraging interaction over a period of time. For tasks such as breastfeeding where mothers often have one arm holding a baby, construction may be a too difficult on a daily basis. There is a significant storage component required by this concept when not in use.

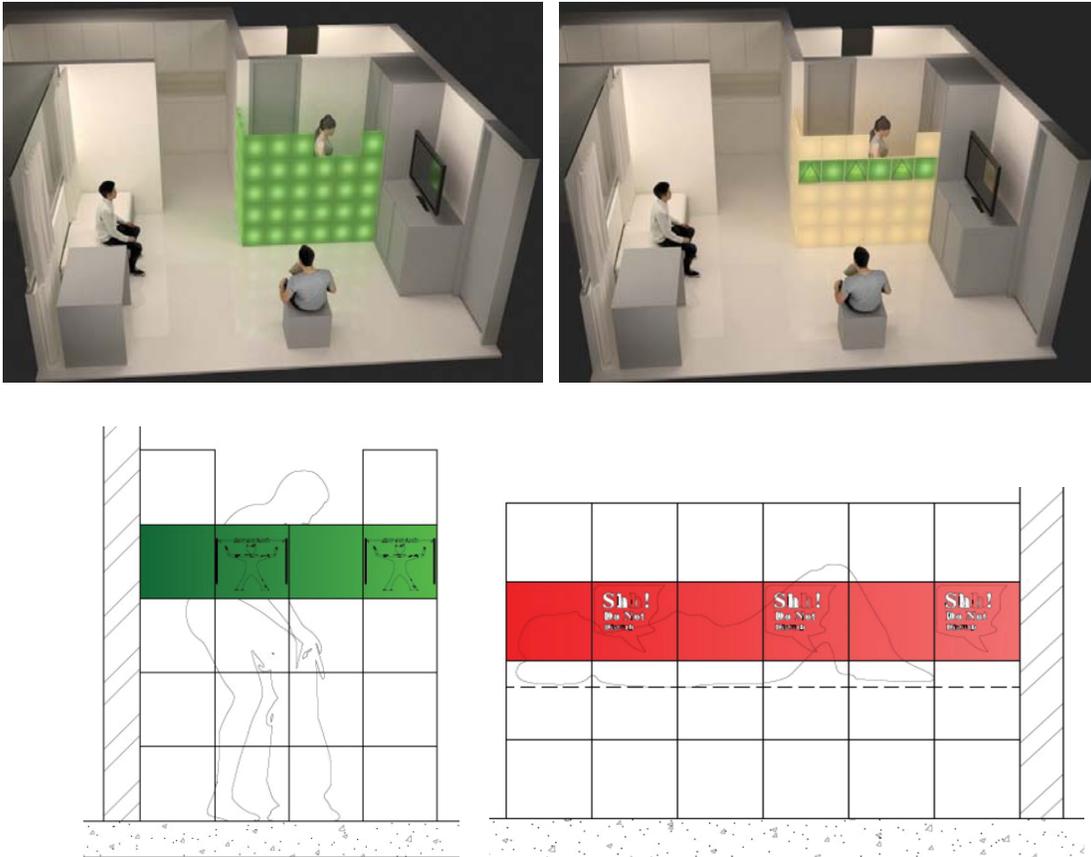


Figure 63. Visual exploration of concept 02.

C. Concept 3: Shell

A shell form was explored which could provide privacy while breastfeeding on a chair. Analysis identified this activity need complete as well as partial concealment depending upon the presence of people around. This concept could assist mothers to sit on a chair and breastfeed, as often mothers suffer back-pain post pregnancy and find sitting on floor a challenge. Many women prefer breastfeeding sitting on a chair. The shell shape helps a mother to adjust the screen as per her privacy requirement once the sides are fixed to the furniture .

This concept, has limited scope and caters to specific activities only. Considering the humid climate of many Indian cities including Mumbai, the baby may not feel comfortable with the thermal climate while inside the canopy of the shell, when the mother needs privacy. The design retains a form of flat strip in passive form when not in use and can be slid easily below the furniture and does not act as a added component to the existing furniture in small spaces.

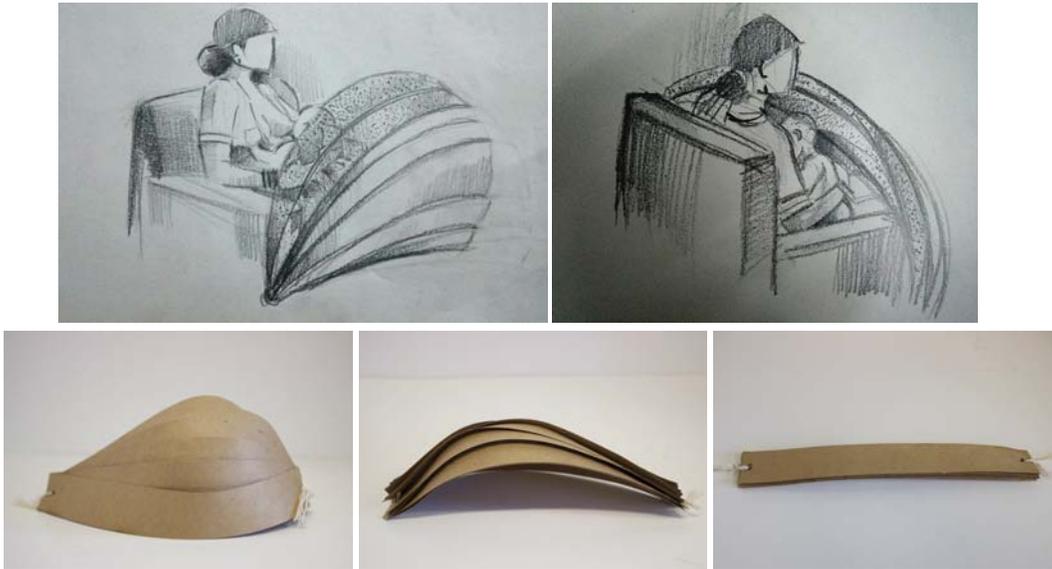


Figure 64. Visual exploration of concept 03.

D. Concept 4: Fandeck

Based on the technique of camouflage by using *jali*, this concept could be a free standing or a wall mounted module. The double layer of screening along with faceted surfaces helps to achieve more privacy compared to a single layer and plain surface. The screen covers an individual from head to toe and can be opened up to gain maximum length in case required. The concept achieves stability by an arm stabilising the panel vertically, married to mobility afforded by a modest castor base. Activities like sleeping, breastfeeding, changing clothes and avoiding neighbours can be achieved with this design. An addition of light source in between the faceted surface adds a dynamic look as the play of shadows gives an aesthetic vibe.



Figure 65. Visual exploration of concept 04.

E. Concept 5: Spider

This concept addresses different situational needs of screening for a range of deployments at any one given time. The design is divided into two components namely the hanger and screen. The top hanger acts as the common component for various types of screens which can be modified as per different user or situation requirement. The ceiling mounted hanger provides a minimum of impact on the home environment. Three different types of hanger design were explored at a conceptual level addressing different finishes and techniques to achieve privacy.

The initial concept exploration for the hanger began with the simple technique of folding arms (refer figure 66). These flexible arm modules helps users to extend the arms to any given length or height as desired. There are usability aspects that remain a challenge for easy deployment and adjustment. A set of hangers are provided considering that two activities needing privacy can happen at the same time in the same space. Understanding that there is generally only one source of light in these spaces, light provisions were made in the hangers as activities need enough light to perform them.

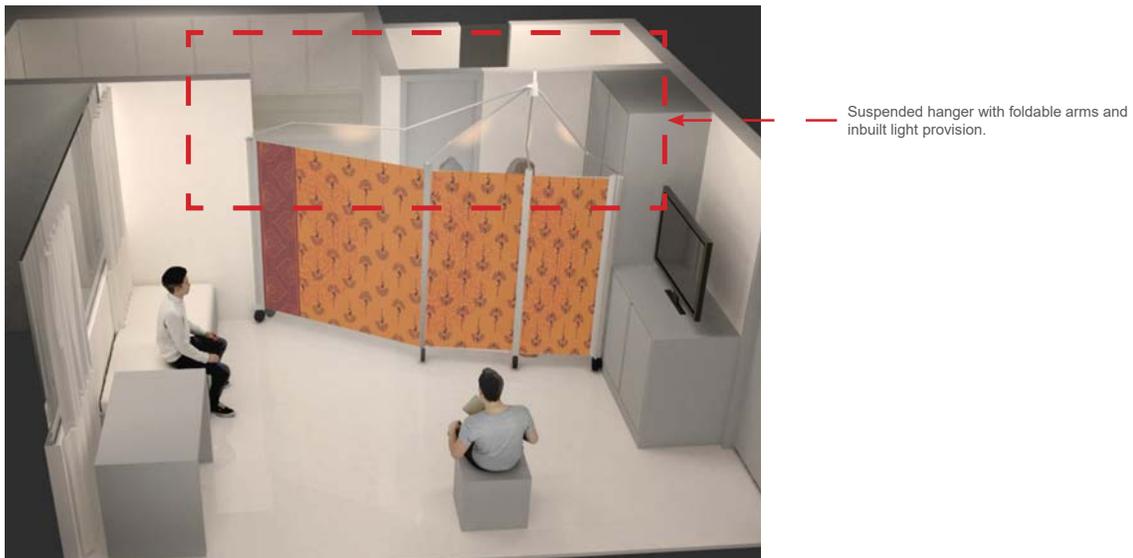


Figure 66. Visual exploration of concept 05.

A variation on this concept was based on the telescopic principle with a swivel at the end (refer figure 67 & 68). It would help users to extend the arm as required, and the swivel would allow rotation of the screen for orientation. The combination of telescopic arm and swivel could provide screening for any given location of the space as shown in image below:

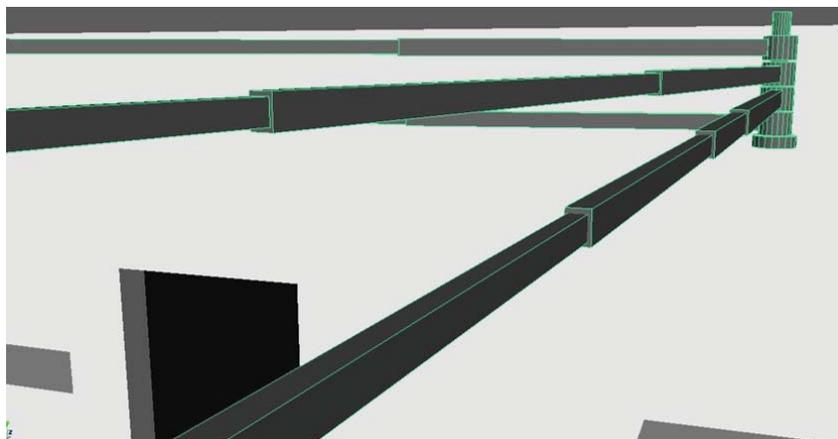


Figure 67. Exploring the telescopic hanger module.

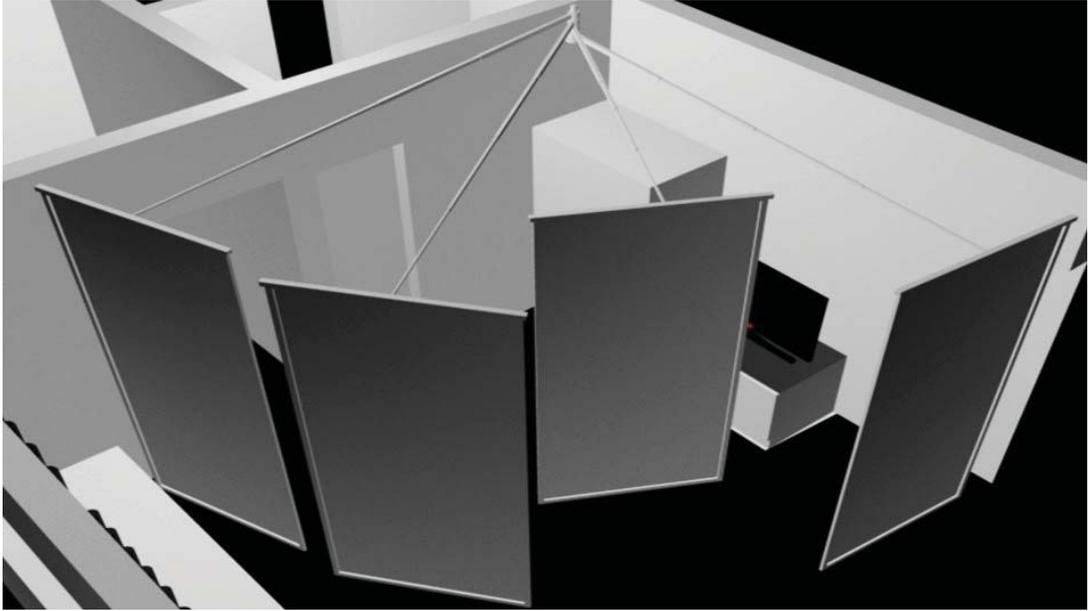


Figure 68. Visual exploration of telescopic hanger

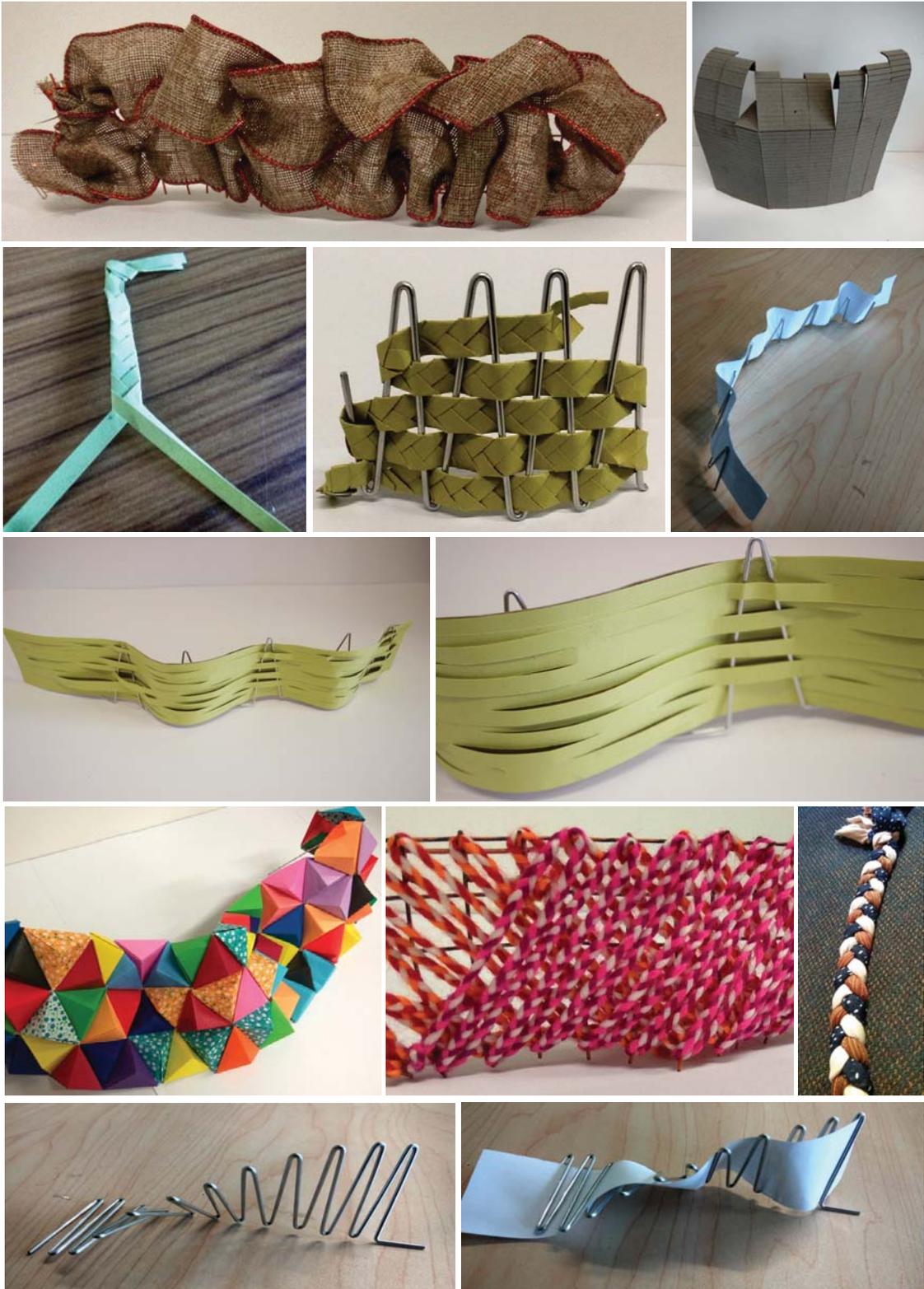


Figure 69. Conceptual exploration with different materials and forms.

3. Evaluating the concepts against design criteria:

Concept Evaluation						
Sr no	Design criteria	Concept 01: Cloak	Concept 02: Lego	Concept 03: Shell	Concept 04: Fandeck	Concept 05: Spider
1	The design needs have high levels of usability in deployment, positioning and stability.	x	x	x	✓	✓
2	The design should be able to be deployed across a range of positions and extend to provide privacy for sleeping adults.	x	✓	x	x	✓
3	The design will have the ability to provide visual privacy when changing clothes	✓	✓	x	✓	✓
4	The design needs to store safely and with modest space requirements	✓	x	✓	✓	✓
5	The design should be customizable for specific screening purpose.	x	✓	x	x	✓
6	The design should have the possibility to be expanded to provide a range of screening solutions.	x	✓	x	x	✓
7	The design will provide visual screening of neighbour's gaze into the main room of the home.	x	✓	x	✓	✓
Total design criteria's satisfied by the concept		2	5	1	4	7

Concept 1 provided a space saver solution, it was limited to few activities like changing clothes and breastfeeding with claustrophobic atmosphere.

Concept 2 looks promising by providing privacy to multiple activities but is too time consuming and required large amount of surface area when not in use.

Concept 3 caters privacy to a specific activity and at a specific location and hence lacks versatility.

Concept 4 provides portability and stability with its modular wall mounted and freestanding form but fails to provide flexibility for various activities.

Concept 5 draws the positive key elements from the above concepts and hence caters to a wide range of activities and situations for privacy .

Final concept is generated drawing the key aspects from all the above concepts.

4. The developed design concept: Ceiling/Wall Stabilised Screen.

A final design that combined the best characteristics was developed from the screening process. This concept incorporated some of the product architecture elements of Concept 4: the overhead arm stabilizing the panel vertically, married to mobility afforded by a modest castored base, and Concept 5: the telescopic arm with central swivel. The screen is designed as a modular component that can be fitted into the 'Hanger' frame and supporting structure, providing the ability to change screens easily for particular purposes and functions. This modular screen component allows for a broad range of solutions, from third party suppliers that could then be clipped into the 'Hanger' to achieve the desired screening experience.

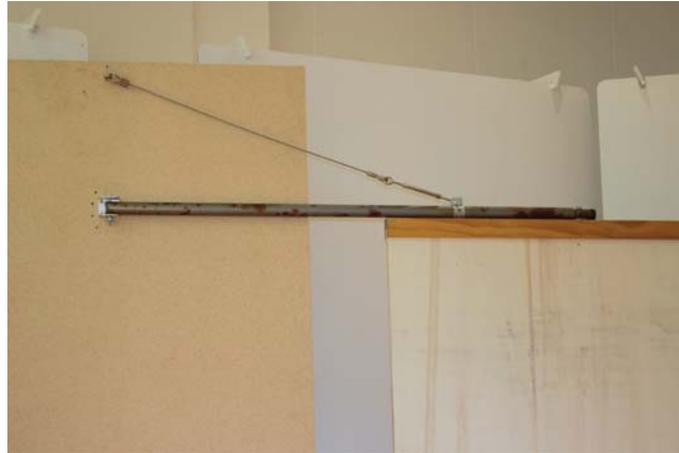


Figure 70. Hanger detail of telescopic channel in passive form.



Figure 71. Hanger detail of telescopic channel in active (extended) form.



Figure 72. Screen panel moving from right to left (passive form to active form and again to passive form).

As this concept brought together various key elements from the earlier investigation a 'Proof of Concept' functional prototype, was developed to check the viability of the basic design. After several iterations this was sufficiently proven to give confidence to the design concept. In addition, key factors for product development were identified including: tolerance control over the swivel mechanism and a physically light but stiff screen component.

B. Scaled model of prototype with different activities with screening:

1. Breastfeeding:



Figure 73. Top and eye level view of privacy provided with screening to mother & baby for breastfeeding with presence of guest and adult members of the family.



Figure 74. Top and eye level view of privacy provided with screening to mother & baby for breastfeeding from gazing neighbour.

2. Sleeping:



Figure 75. Top and eye level view of privacy provided with screening to a sleeping person.

3. Gazing neighbours :

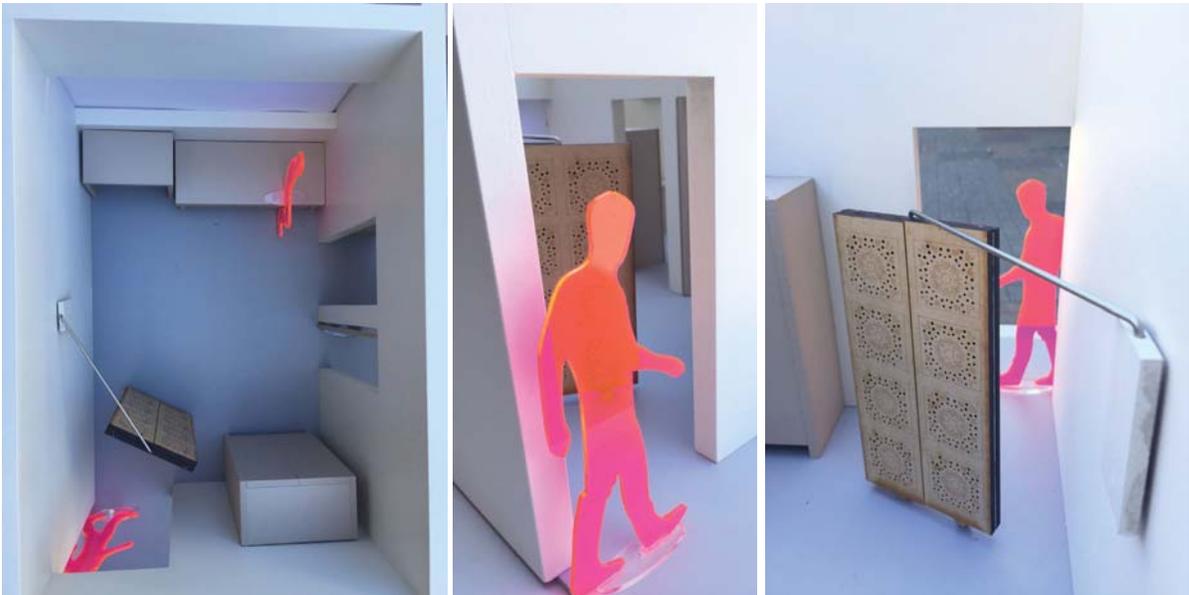


Figure 76. Top and eye level view of privacy provided with screening to family members from gazing neighbours.

3. Changing clothes:

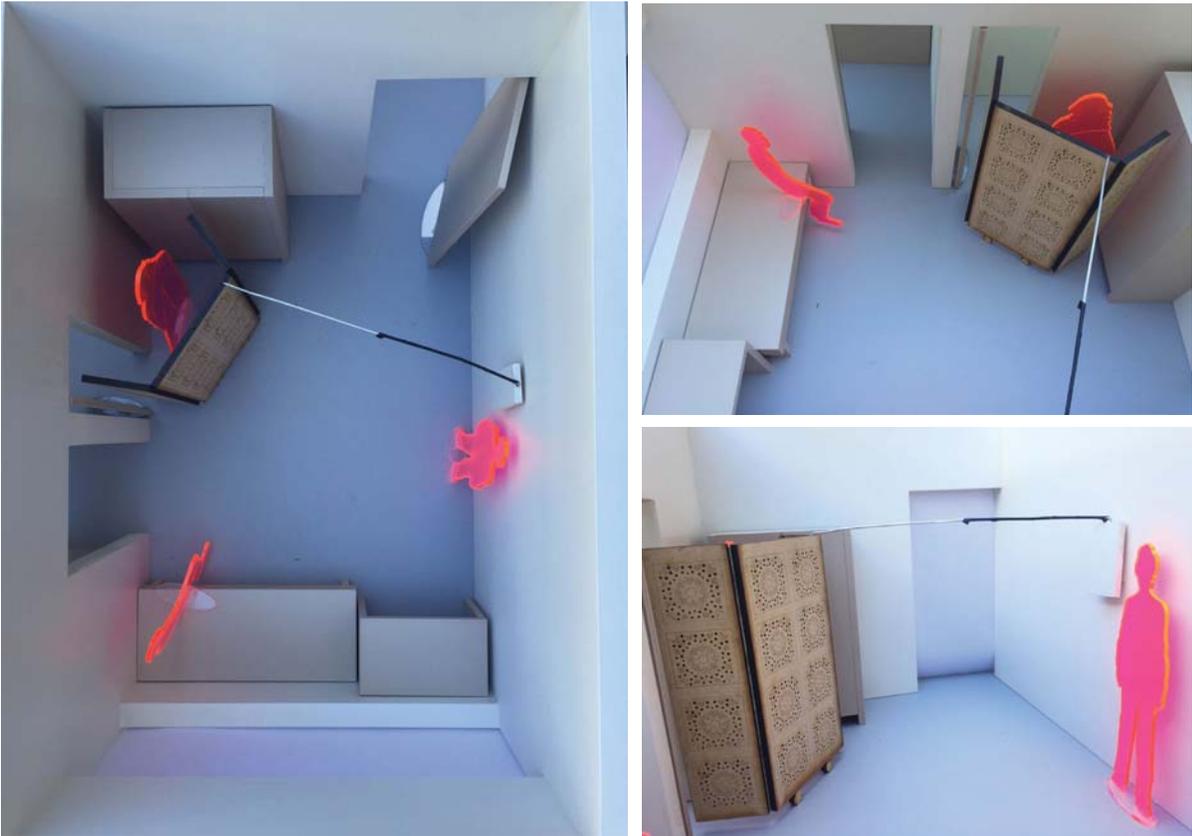


Figure 77. Top and eye level view of privacy provided with screening for changing clothes with presence of guest and adult members in the same space.

05.4 Exploring materials and finishes:

A. Modular Screen Investigation:

A combination of mesh and panel solutions were explored for further screen investigation. Surface textiles, finishes, decoration perforations were applied to each exploration. Materials such as recycled paper and fabric were explored as part of the screen solutions. These provided a viable creative opportunity at a modest cost relevant for the culture designed for. The screens are fitted with two inline castors for the ease of movement, portability and importantly to support the mass of the screening structure. The 'Hanger' only has to telescope and stabilize the vertical position.

Different mesh forms, curvilinear, grid patterns, vertical and horizontal bars were explored to understand the dynamic shapes developed, and their screening benefits. The curvilinear edges and the linear composition of the mesh gave a soft and soothing look and did not impose itself which is an important consideration when designing small spaces. Aluminium mesh could be bent allowing customization of form during daily use.



Figure 78. Types of modular screens.

1. Fabrics: Indian textiles are renowned globally, for their beauty, vibrant colours, and the diversity of their natural fibres. Individual states in India have their own textile techniques and distinctive graphic art form (refer figure 79). In many instances these techniques are passed from generation to generation within the family members. Due to advanced technology, many of these artisans are finding it difficult to maintain this valued tradition.

Investigation into these techniques encourage the use of natural fibres as they are chemical free and a positive step towards environment sustainability. This creates awareness of sustainability issues and contributes to maintaining a rich Indian textiles tradition.

As sustainability is always an important aspect for design, natural fibres solutions were investigated. These form one of the pillars of a rich and glorious Indian heritage. The following examples showcase some of the natural fibres considered in this exploration. All the fibre examples come in a broad range of vibrant colours shades and hues to cater to a broad aesthetic user taste. Fabrics play a vital role in Indian lifestyle be it everyday or during festive occasions. These fabrics form the basis for any of the textile techniques explored further :

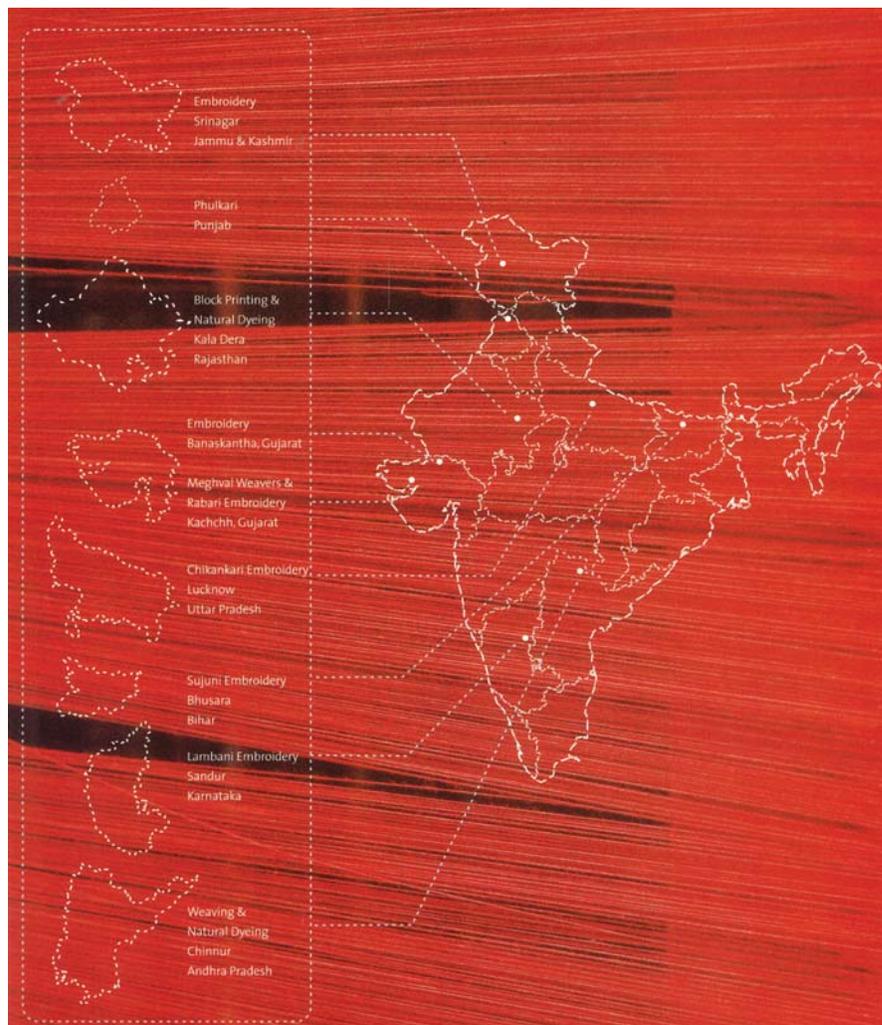
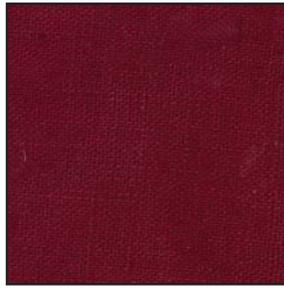


Figure 79. Map of India indicating speciality of different states in various fabric techniques.



Plain weave linen



Felted wool



Cotton silk



Duchess satin silk



Dupian silk



Canvas cotton



High density jute



Medium density jute

Figure 80. Types of natural fibres and fabrics.

Following are some of the traditional textile techniques investigated for screening design:

A. Chikankari from Lucknow: It is a traditional hand woven technique of very intricate embroidery on white muslin cloth which is an outcome of the interplay between different stitches for subtle effect. This interplay embellishes the white fabric without any play of colour through its ornamentation. The designs are versatile and can be adapted to changing fashion.

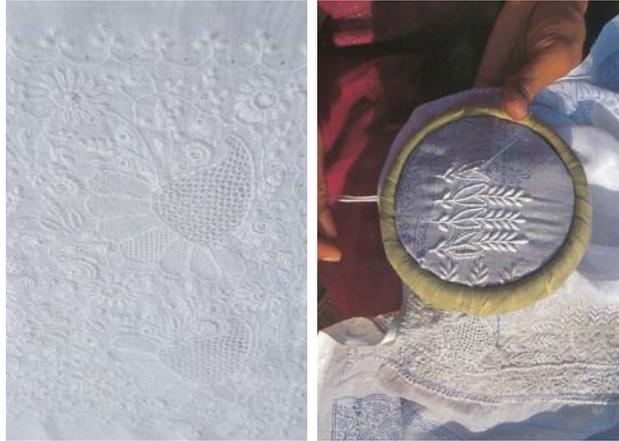


Figure 81. *Chikankari* work from Lucknow.

B. Chippas of Rajasthan: Using *bhatta* or *datta* (stone and wood blocks) to imprint designs on fabric is a traditional method from Rajasthan. Wooden blocks are made from teak or '*sisum*'. Traditional and contemporary designs are hand crafted to precision by craftsman to create fascinating combinations or even create a story as per request from consumers.



Figure 82. Block printing work on fabric.

C Embroidery: Different states have evolved their own style and speciality in embroidery work. Kashmir is known for *Ari* work while the western part of India have a strong presence of mirror work called *chakla* in their embroidery designs. The embroidery industry plays a vital role for the livelihood for woman in India. These embroidered garments are also high in demand in the international market. *Lambani* is another interesting form of embroidery from Karnataka which is a unique blend of mixed - media, application of fabric, metal, mirrors, shells along with traditional



Figure 83. Embroidery work from different states of India.

D. Tie & dye work: Tie and dye techniques are internationally known by its Malay - Indonesian name '*plangi*'. In India, it is called '*Bandhana*' which is derived from the Sanskrit word meaning '*to tie*'. Rajasthan and Gujarat are famous for their fine and versatile range of *bandhnais*. The artistic look appears to be an artwork in itself.



Figure 84. Dyed fabric in traditional *bandhani* pattern.

2. Autex: Autex are decorative wall covering panels with acoustic properties and are made of polyester fibre with 60% recycled content. The surface of Autex are pinable and receptive to hook and loop mechanics, making it a friendly product to be used for residential spaces. The variety of a fresh and pastel colours helps to cater for the wide range of demand from a user perspective. It is available in different thicknesses of 6mm, 12mm, 25mm and 50mm. The acoustic performance varies with the thickness of the material.

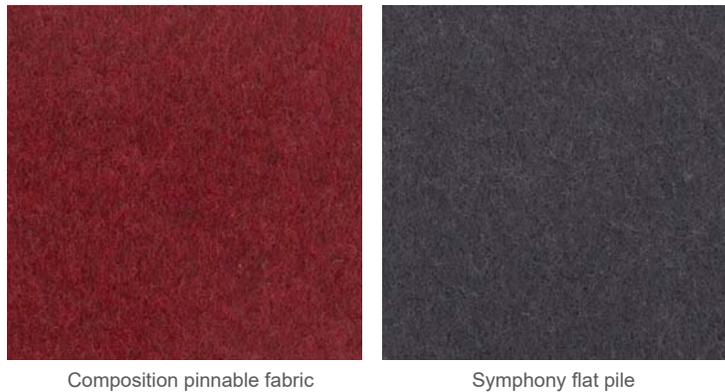


Figure 85. Types of Autex panels.

3. Paper: Paper brings a dynamic flexibility to the form and texture as a finished surface. It can be recycled and is easily available. Paper has the unique ability to blend and transform itself into any desired shape along with its soft visual and physical feel. It is available in an infinite range of colours and textures and so makes it an interesting material to explore.

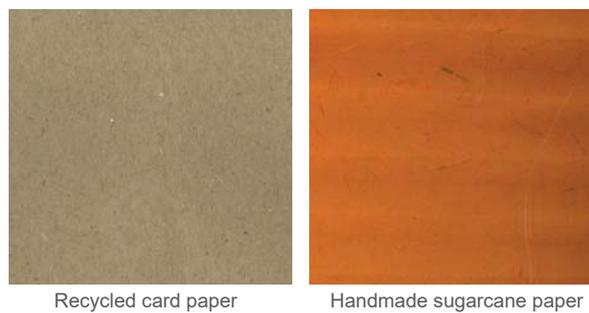


Figure 86. Types of paper.

Different screens can be attached to the above 'Hanger' frame component and hence a range of screens are developed to suit the wide user demand. Natural materials which can be recycled and reused is given priority to create sustainability as a way of life and ingrain this culture in society at large. Traditional and cultural techniques are used along with fabrics & paper as screening materials. Fabrics provide a soft look and feel conducive to design of modest living spaces.

In an Indian household furniture is mostly compromised of natural timber and medium density fibre board. A light weight manufactured board or ply can be used as the basis for the mesh to support fabric and paper screening with different designs to create various dramatic patterns (refer figure78). As not everyone can afford timber, aluminium frames can be considered as an alternative also making the screens light weight and easy to move around. A combination of fabric, paper and wood is considered for final design modular screen prototypes.

Screen 01: Understanding the fact that festivals and culture form an integral part of Indian society, this screen exemplifies aesthetic desire. Providing privacy from neighbours, especially during the festive season when the common passage is always buzzing with neighbours and the presence of guest and relatives, is an unavoidable situation at home. This larger than life design pattern celebrates the festive mood, yet provides privacy in a sophisticated form. Mesh with circular cut-outs at regular intervals, supports the drapery and gives the user an opportunity to drape their own pattern and fabric as per the festive mood, thereby generating good vibes.



Figure 87. Scaled model of screen 01.

Screen 02: The traditional way of passively cooling space, along with providing privacy and 21st Century technology, is an interesting way for sustainable life. Deriving its Jaali pattern from 'mandala' symbols, it creates a dramatic effect with its presence, with or without a light source. This piece of traditional carving will help to connect to the cultural roots in a positive way and continues the relationship between private and public life. This screen can best be used to achieve privacy from neighbours as placing it near the main door will keep the daylight and airflow penetrate through, yet retain private hemisphere of the family. The screen can be used as a night lamp with a light source located between the panels creating dramatic night lamp effect.

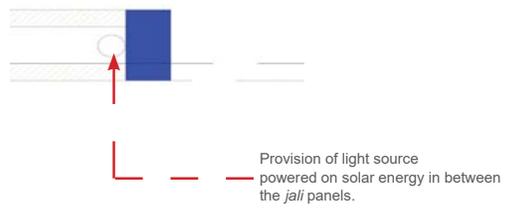
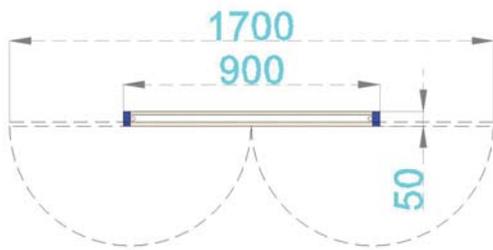


Figure 88. Scaled model and drawings of screen 2.

Screen 03: This design is based on 'recycle and reuse'. *Odhnis* and *sarees* are a wardrobe essential for every Indian woman irrespective from which culture or religion. Waste fabric materials, irrespective of its length or width, are woven together to form plaits. These plaits are later draped around the skeleton of a timber frame to create privacy. These woven plaits create different shapes in Indian culture generally, and are also used as a mat to sit on the ground. These mats can also be hooked onto the screen to achieve privacy .



Figure 89. Scaled model of screen 3.

Screen 04: Inspired from the traditional method of block printing, this paisley based design is a mark of Indian culture. This design helps to achieve any larger than life patterns in a traditional way. Made of linen fabric which is naturally breathable, it provides a break from the busy lifestyle of an urban city. Patterns like meditating Buddha or peacock feathers can be imprinted. They are believed to have soothing and relaxing effect on the mind. These designs can easily be replaced to adjust to the ongoing trend changes, and fabrics are washable for reuse and recycle purpose. The ethnic connection provides a feel of tradition and culture, and acts as a piece of art in itself. People can also imprint their own stories to further impart a sense of personal connection to the space.



Figure 90. Scaled model of screen 4.

Screen 05: The combination of old *odhnis* or *sarees* are used to create interesting drapery patterns. Dyed fabric create a statement in itself with the pattern and appears like a piece of art without any add-ons. They are easy and quick to drape. They can be changed at regular intervals to avoid monotony and to keep up with current trends, or can be changed as per particular occasions or season. The reuse of fabrics also helps to reduce waste.



Figure 91. Scaled model of screen 5.

Screen 06: Screen painting as a technique is explored to create portraits. It is a well known technique in India and is widely used including rural areas. Prints can be customized as per user preference and a wide range of consumers can be catered for this technique.



Figure 92. Scaled model of screen 6.





06. Final design documentation:

The final design can be wall mounted or ceiling mounted. A wall mounted hanger component provides easy installation and relocation if required for the mobile tenant renting accommodation in a high cost Mumbai rental market. For a more permanent solution a ceiling mount is also offered. In the hot and humid climate of Mumbai, every home has a ceiling fan for which provision is made by developers and is mandatory. The wall mounted hanger will easily navigate this situation. Ceiling mount in this situation requires further consideration and is achievable, and provides the potential of greater flexibility and greater range of deployment.

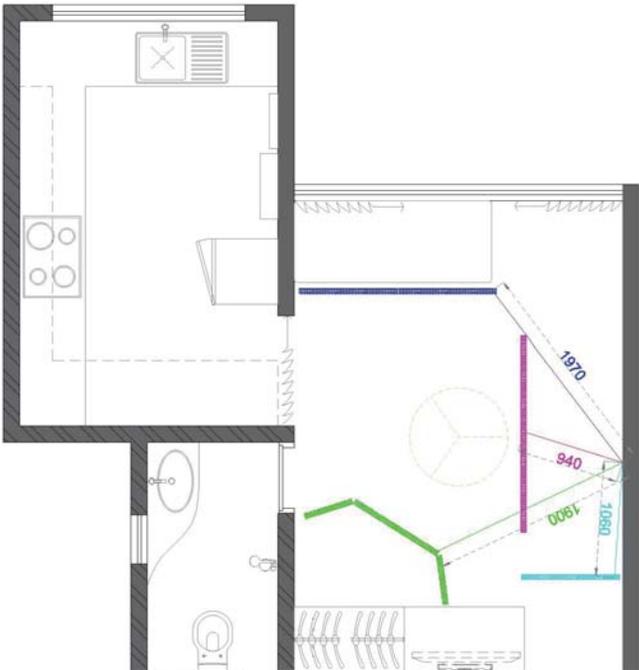


Figure 93. Analysis of screening distance from central wall mounted hook for various activities.

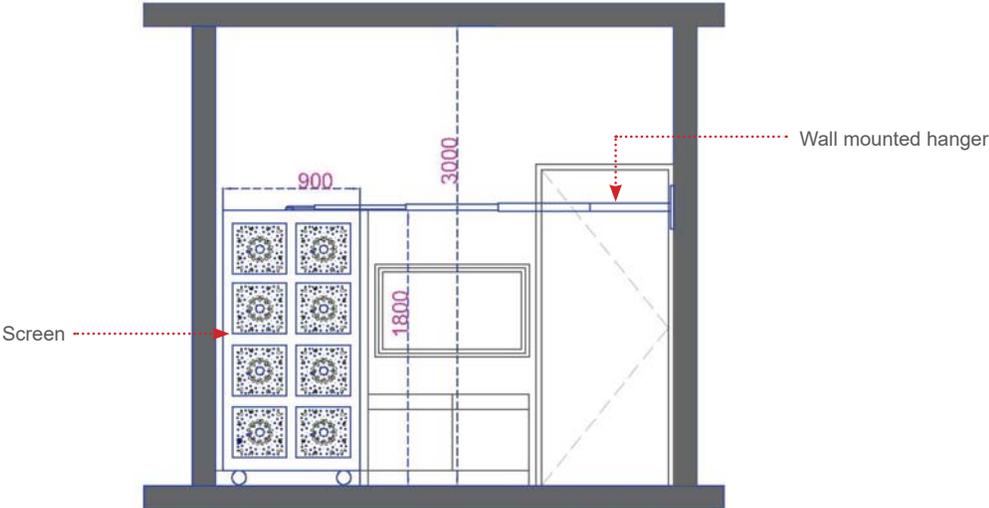


Figure 94. Elevation of wall mounted hanger with screen.

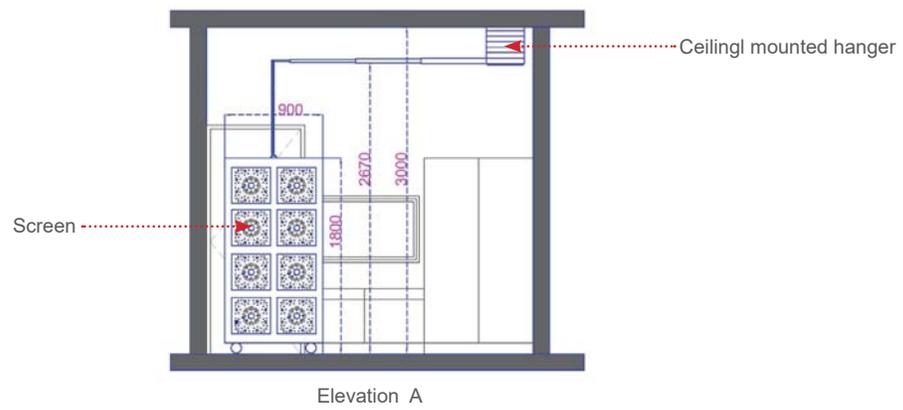
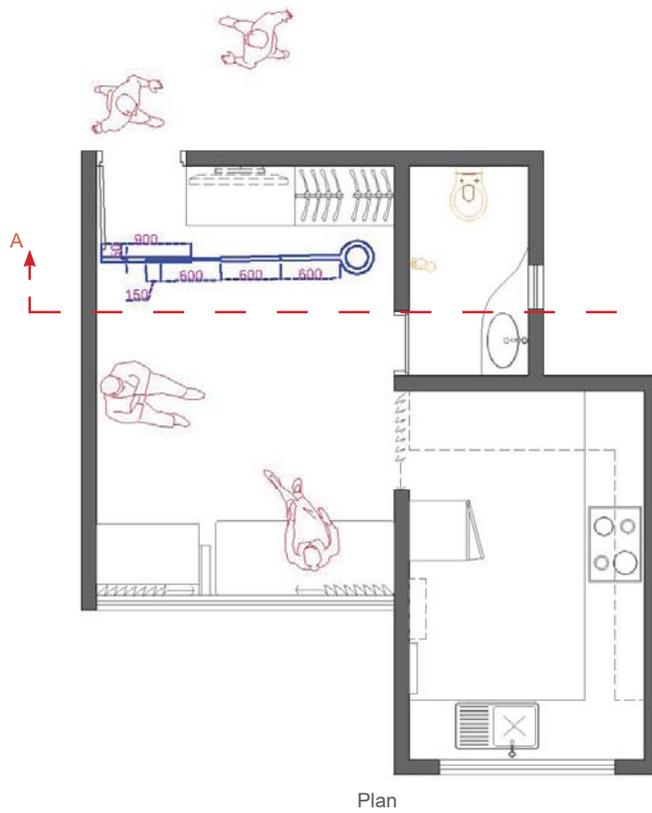


Figure 95. Plan and elevation of ceiling mounted hanger with screen for privacy.





Figure 96. Final design.

The final design provides a high degree of usability, positioning, and a satisfactory level of stability. The design extends and deploys across a range of positions and for the desired range of circumstances. With selection of an appropriate expanding screen component, the design provides privacy for a sleeping adult or for changing clothes. Customization for a specific screening purpose is enabled through the modular screen component attached to the 'Hanger' frame. The design folds safely away against a wall and with a modest space footprint.

07. Conclusion:

As I had embarked on this project, I had asked how could I better the quality of life for Mumbaikars through spatial design. Using a defined design process and research methods have helped me to explore a wider range of possibilities and expanded my design horizons for critical thinking and into the specialised area of Product Design.

This design research project sought to develop a conceptual solution to privacy, in the challenging spatial environment provided by the '1 Room Kitchen' apartment common in Mumbai and many other parts of India. After having completed my task and activity analysis, it became clear to me that an object based solution was the most promising and appropriate response. Importantly, it led me to understand the interface knowledge required to achieve a product-based design with the support of product and engineering expertise. This formed the design exploration and design development and resolution. Oscillating between spatial design and product design has only added a whole new dynamic perspective to my outlook and growth as a spatial designer.

Keeping environmental and sustainability concerns, along with focused consideration of the 'cultural milieu', the research developed a design solution that connects with the users, empowering them to engage with the manipulation of space to produce desired levels of privacy. This is achieved through the spatial configuration managed through a product type solution attached to the dwelling.

In this whole design process I have learned how privacy is an integral part of each individual's daily experience and that it varies from culture to culture. High density living is a concern not only in Asian countries but also in developed countries like the USA and many European countries. How we mediate and provide privacy in these challenging close living conditions is achieved through the interplay between spatial design components that mediate vision and sound transmission, and importantly provide the ability to engage easily with their constructions.

My research work, oscillating between spatial design and product design has only added a whole new dynamic perspective to my outlook and growth as an individual. I sincerely believe, coming back to academia and exploring the world of research is one the best decision I have ever made as it has awakened a strong desire to keep learning, irrespective of which stage of life you are at. This Masters journey will be cherished for the valuable lessons it has taught me. Taking this wealth of knowledge and experience, which has transformed me as an individual, I intend to use it for society at large not only in India but irrespective of which part of the World I travel to.

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