

Links Between Culture, Social Benefits and Courtyards: The Traditional and the Transformed Courtyard Houses of Kumbakonam, Tamil Nadu, India

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Abstract

Courtyards have been in existence since historical times and they remain as the primary open spaces in most residences. A courtyard is functionally a multipurpose outdoor space housed within a building to provide an extension for indoor activities, to create a central space for social gatherings/interactions and to create a private garden. Courtyards also help in modifying the microclimate. In India, courtyard houses exist throughout the country, and they reflect the unique identity of each region. Their use and activity patterns have strong relationships with the culture of the region in which they exist. Although courtyards have proven to be integral and significant spaces of houses that have withstood the testimony of time, they are gradually disappearing today. However, if these courtyards could be re-introduced to modern houses, they could provide greater relief to the occupants. In fact, this became abundantly clear especially during the recent pandemic.

Therefore, this paper examines the links between the social aspects and the courtyards in traditional courtyard houses and traces their significance in the present context. It demonstrates their values in transformed modern courtyard houses and highlight their importance. The cultural attributes include sense of community, gender segregation, gathering, interaction and connectivity. The social benefits were assessed in relation to the spatial attributes.

It is found that the cultural attributes had significant relationships with the courtyards. Spatial attributes such as form, size and orientation have strong relationships with the activity patterns. However, the changes in occupational patterns, technologies and people's needs have resulted in the modification of behavioural attributes. The paper shows that understanding the links between culture, social benefits and the courtyards can aid designers.

Keywords: Courtyard; Culture; Environmental benefits; Activity pattern; Transformation.

Introduction

Courtyard as a prototype has been in existence since the prehistoric times from the days of Mohenjo-Daro and it has proven to be one of the integral elements of a house that has withstood the testimony of time. A courtyard is defined as an area without a roof either totally or partly enclosed by fortifications or built structures which is a part of a house (Rapoport, 1998; Muhaisen and Gadi, 2006; Mai and Shamsuddin, 2012; Berkovic and Bitan, 2012). Courtyards occur over a wide range of spaces from a passageway or a corridor to a balcony or porch. It is functionally a multipurpose outdoor space housed within a building to provide an extension for the indoor activities, to create a central space for social gatherings/interactions and to create a space for a private garden (Bretonne, 1979; Tablada et al., 2005; Salama, 2006). Courtyards have been used for working, relaxing, and socializing, as well for creating a sense of community, safety, privacy and grandeur. They have also been used for gardening and to carry out household activities, as well as for storage, or as woodsheds. More significantly, they are used as transition spaces, as places for livestock, as tourist attractions and as signs of traditions. Needless to say, courtyards have cross-cultural validity, and the reason for their wide acceptance may vary from place to place depending on religion, social considerations, aesthetics, recreation, identity, status symbols and defense, etc.

In India, courtyard houses exist throughout the country. However, each courtyard house reflects the unique identity of each region: the *nalukettu* of Kerala, the *havelis* of Rajasthan, the *wada* houses of Gujarat, the *pols* of Ahmedabad, the traditional houses of Goa, and the *Chettinad* houses of Tamilnadu, etc. Nevertheless, these traditional courtyard houses have lost their significance in modern day houses.

During the 18th century, two to three storey courtyard mansions called Wadas were the preferred typology in Pune which have been replaced by the modern buildings without courtyards in the 21st century (Narkhede, 2008). Although traditional courtyard houses were rooted in tradition and culture, transformations are inevitable. Material innovations, technological developments, changes in spatial organization and changing functions and divisions within the houses are some of the reasons for the transformations of the courtyard houses (Vedamuthu, 2001). Courtyards aid in promoting social and cultural health and happiness of the residents (Zhang, 2016), thus highlighting the need to integrate the courtyards into modern residences.

Culture in a traditional courtyard house

Cultural studies related to the built-environments in developing countries are essential in tracing their unique cultural identity. Culture plays a vital role in understanding the mechanisms that link the interactions between people and their environments (Rapoport, 1998). Courtyards remained as an integral space of the houses serving the purpose of occupational related community activities, family interactions, social and cultural interactions, connectivity to the exterior, gender segregation and privacy. Indeed, the use of courtyards and activity patterns have a strong relationship with the culture and people of a particular region. For example, the courtyard houses located in and around Kancheepuram supported the weaving activities of the region. Dependence on outdoor spaces, such as the courtyard, front yard, backyard and streets, is very strong in a weaver's house or a potter's house (Vedamuthu, 2001). A strong relationship between the courtyard and the *Naatukottai Chettiar* community (a trading community in Tamilnadu) was evident, as their palatial houses had multiple courtyards serving the purposes of drying, processing and storing paddy and other food products and serving as an extended outdoor activity zone. They connected the indoors to Nature providing privacy and security within the house (Sasidhar and Vedamuthu, 2012). They also enabled gender segregation within the buildings. In fact, courtyards became a significant outdoor space within a house for interaction among women, as there were restrictions on their use of the public spaces (Sinha 1990). Moreover, they also served as spaces for the two genders to meet and interact (Vedamuthu 2001). Courtyards also enabled vertical segregation by using *jharokhas* in *havelis*, as well as screened windows or *jaali* work to control the views to the interiors. They certainly segregated the spaces between the two genders.

Courtyards are used also as social and cultural gathering spaces for the inmates and relatives (Edwards et al., 2006; Gangwar & Kaur, 2016). In the Chettiar community of Tamil Nadu, all ceremonial activities are held in the courtyards (Sasidhar and Vedamuthu, 2012). When there are two or more courtyards, the inner courtyard is used as a gathering space for the family members, and the outer courtyard is used for social gatherings. In the *wadas* of the Nagpur region, courtyards are used for family gathering, especially during festivals and as a space to entertain common guests (Kotharkar and Deshpande, 2012). The courtyards in the *pols* of Ahmedabad facilitated vertical interactions between family members on different floors and interactions between housing clusters (Myneni, 2013).

The vibrant usage of any space is possible when it caters to the needs of the inhabitants of different age groups in a house. When courtyards are located along the axis of the entrance as prevalent in most cultures, they provide visibility to the streets and intermediary spaces are introduced between the courtyard and the entrance when privacy is considered essential (Zamani et al., 2012). In Kuwait, for example, the stairways or graded tunnels at the entrances were connected to the interior courtyards through an L-shaped corridor to ensure privacy (Al-Mumin, 2001). Thus, courtyards in the past were found to have had a significant link with the cultural values of a community.

Spatial use of a traditional courtyard house

Courtyards greatly influence the activity patterns of the residents and dominate as the main space for rituals of a family (Salama, 2006). They, being the dominant space of a traditional house, encourage domestic and recreational activities such as eating, relaxing, gathering, playing, celebrating, and sleeping in the adjacent spaces. In the traditional dwellings of Badas, Madhya Pradesh, the living and sleeping spaces were organized along the courtyard, and the working space was located adjacent to it too (Patidat and Raghuvanshi, 2014). Courtyards also served as an extension of the kitchen by providing an opportunity for a flexible space within the house (Dolas and Mishra, 2019).

Courtyard houses generally adopt a compact form. The activity patterns in the courtyards continued changing for centuries, which led to the articulation of their positions and sizes. As Xu (1998) says, an increase in the number and size of courtyards is an indication of social status. Multiple courtyards and spaces within a single courtyard offer flexibility in the usage of spaces (Mahdavinejad et al., 2013). Moreover, a courtyard acts as a transitional space between the exterior and interior of a dwelling. Often, the private spaces of a family are accessed from the courtyards (Lee, 1991). The orientation and enclosure of space characterizes the microclimatic and social aspects of the built-environment (Raviz et al., 2015). At the same time, the orientation of the courtyards in the traditional environments provided favourable microclimatic conditions that suited the needs of the local culture (Shoukhouhian et al., 2007). Courtyards of traditional houses in India have been located in the central space of the house based on their religious beliefs, which indicated the “Brahmastana” (central point of the house) (Vedamuthu, 2013).

Soliman and Elkhateeb (2022) referred to all components, such as the walls, doors windows, corridors, and passages that surround a courtyard as enclosures. As known, the enclosure of a space defines the degree of comfort within a space. Traditionally, courtyards served as outdoor spaces enclosed within residences that offered various degrees of privacy.

On the contrary, courtyards are eliminated in modern houses for increased privacy and safety. The locations of the openings in the traditional courtyard houses were organized in such a way as to enhance both thermal and visual comfort of the occupants. The fenestration design was related to the location, form and size of the courtyards. The activity zone (where activities are predominantly performed) within the house comprised the spaces that were lit either by the courtyards or the fenestration. The fenestration design in relation to the courtyard varies with a culture and was based on the required degree of enclosure and privacy of a community.

Traditionally, courtyards accommodated flexible and adaptable spaces for multiple activities, enhanced visual connection with other indoor spaces, provided the required illumination and enriched human interactions (Priya, 2007). They function as inclusive spaces

when accessed by people regardless of age, race, gender, and mobility, etc. and the cultural and religious differences create different levels of accessibility. The usage of courtyards, which were traditionally activity-specific and user-reliant, has changed over time.

Wang (2006) states that the courtyard has a high potential to satisfy cultural, architectural, environmental and historical prospects and needs to be designed with utmost care. They should consider the changing lifestyles to provide required privacy and function as a community space. A courtyard residence is a sustainable form that satisfies the cultural needs and enhances the interactions with community and Nature (Zhang, 2016). The introverted planning of traditional courtyard houses, with most of the habitable spaces facing the courtyard enhances this interaction. The transformation towards the extroverted planning in recent times has led to the replacement and sometimes elimination of multi-functional courtyards resulting in diminishing the interactions among the family members and the community, as well as the connection with the natural environment resulting in several health issues. Even though courtyards have proven to be integral spaces of residences that have withstood the testimony of time, they are gradually disappearing from the modern-day houses. If these courtyards existed in the modern houses, they would have provided greater relief to the occupants, especially during the recent pandemic when people were confined to their houses. Therefore, it is essential to understand the cultural linkages of traditional courtyards and their associations with the built forms in enhancing the health and well-being of the occupants in order to retain their essence in the modern built environments.

The objective of this study is to analyze the links that exist between culture, social benefits and courtyards. For this purpose, a traditional courtyard house which has undergone transformations has been studied.

Research on the design transformation of Wonorejo Public Housing project in Indonesia reveals that the inhabitants of the dwelling prioritized development at the back of the site whereas transformations on the front yard were given least priority (Aryani et al., 2017). To understand the preferences and the patterns of transformations in National housing in Yogyakarta, Indonesia, qualitative research has been conducted. From research, it was ascertained that the backside of the site is the most preferred open space to be built upon to meet the spatial requirement. Least preference was given to vertical transformation (Aryani and Wahyuningsih, 2015). In Baasneere, a village in Africa, when courtyards were the central space of the dwelling, it has been easier to encounter one or more family members whereas it became a rare phenomenon in the newer dwellings. This is due to the reason that the courtyard was reduced in size and had one or two constructions within it (Lidón de-Miguel et al., 2022). A study about spatial patterns of transformed units in Northern Nigeria found that the initial public housing design layouts did not provide courtyards and as a result, the users improvised the layout by themselves. This led to the re-emergence of courtyards in urban public housing layout which signified the importance of courtyard as a space where activities were practiced at the root (Isah and Khan, 2016). When examining Shilinyuan (A modern interpretation of south Chinese vernacular courtyard garden housing) in Suzhou, China, it was found that the private courtyard-gardens are generally too small to carry out family activities (Zhang, 2020).

A comparative analysis of courtyard housing in a village and a new government-built housing in Lucknow, India revealed that environmental change has led to social change. The new housing design had a space which resembled courtyard, but its size was too small to be used for activities like socializing which happened in the village courtyards (Sinha, 1990). Research investigation in Ektaal village of Chattisgarh in India revealed that the central courtyard acts as a divider for different activities within the traditional residences and this concept of planning was followed in the transformed houses too (Jagatramka et al., 2022). Similarly, a comparative study of transformations has been carried out between the traditional houses in the Nagpur region of India. It was done at three scales of the settlement: the village, the town and the city. It has been noted that the focus of the house form of the traditional dwellings within the city has shifted from open spaces to enclosed spaces. The nature of the use of spaces has changed from flexible to rigid use (Kotharkar and Deshpande, 2012). When the spatial and climate responsive features of the vernacular weavers' settlement was studied in

Kanchipuram, Tamil Nadu, it has been observed that numerous houses had undergone transformations to adapt to the changing family needs while some old houses had been demolished and new concrete structures have been built upon (Vijayalaxmi and Arathy, 2022).

Globalization, regulations, economy and the social aspects are the main factors that have impacted the transformations of traditional houses in Laos. Additionally, income generation and housing demand were closely connected to the changes specifically in low and middle-income people (Vongvilay et al., 2015). In Bahrain, Courtyard- types have been abandoned due to the availability of mechanical devices for ventilation (Dayaratne, 2008). When transformation of old houses in the historic core of Kathmandu, Nepal was investigated, it has been found that root cause of these problems was the change in the building units at two different levels. The first reason was the conversion from residential use to commercial use. The second reason was extending the building vertically without proper infrastructure (Shrestha and Shrestha, 2009). It is noted that changing family structure and the land use are important factors influencing transformations (Kotharkar and Deshpande, 2012). These studies demonstrate that courtyards have been extensively studied. However, those that examine the transformations and particularly how they manifest in today's buildings are somewhat rare.

The Case Study

Kumbakonam is a temple town situated at 10.97°N latitude and 79.42°E longitude in the Thanjavur district of Tamilnadu, India. The history of Kumbakonam dates back to the Sangam Age (3rd century BC to 3rd century AD). During the Vijayanagara reign, Sourashtrians (an ethno-linguistic Hindu community) have been invited to weave silk for the Royals and their families. Over time, silk weaving flourished, and they settled at Kumbakonam permanently. The town of Kumbakonam was a prominent centre of Hindu culture, and it acquired the cultural name, the "Cambridge of South India", during the British rule. The Sourashtrian settlements in Kumbakonam adopted courtyards as a main feature in their dwellings. This study analyses a traditional courtyard house of the Saurashtrian community in Nadana Gopal Street near the Ramasamy temple at Kumbakonam. The Fig. 1 shows the location of the study area.

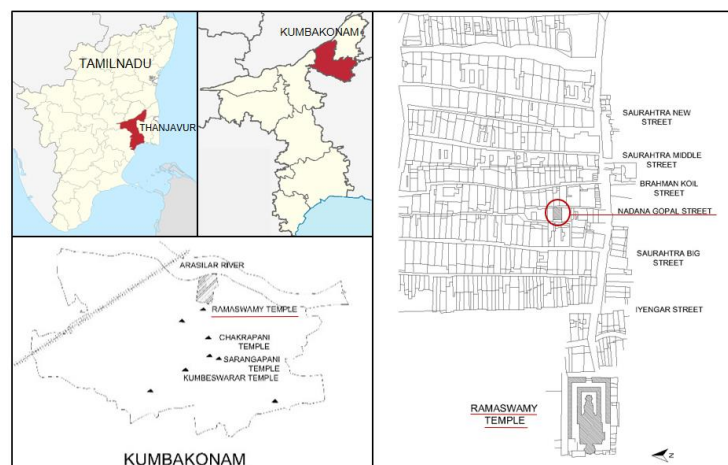


Fig. 1: Location of the traditional courtyard house

Source: Author

Research Methodology

Firstly, the study analyses the significance of the cultural attributes identified through literature such as community, gender segregation, gathering, interactions and connectivity in the traditional courtyard houses built in 1947 by recreating the plan with its original use. Unstructured interviews were conducted with the residents after informed consent, to understand the nature of the courtyard houses from the residents' perspective. Over the years, the houses have been modified to accommodate the varied needs of the people with little concern for culture. The study then traces the significance of the cultural attributes in a

transformed house. Secondly, the social benefits were assessed through the spatial attributes identified through literature such as form and size, orientation, enclosure and openings; and their impact on the activity patterns (spatio-temporal mapping of activities) in a traditional courtyard house and a transformed house. The

Table 1 shows the matrix of the attributes. Finally, the study establishes the links between the cultural and social benefits and the courtyards in the traditional courtyard house and the transformed house to highlight their significance in the modern built environments.

Table 1: Matrix of attributes used in the study for analysis

Source: Author

Spatiotemporal mapping of activities	
Cultural attributes	Spatial attributes
Community	Form and size
Gender segregation	Orientation
Gathering	Enclosure
Interaction	Openings
Connectivity	Social inclusion

Analysis and Discussion

Cultural significance and social benefits of the traditional courtyard house

The courtyard house chosen for the study was built in 1947 and belongs to a Sourashtrian joint family with 10 members. Traditionally, there were two courtyards in the house, one in the front used as an extended living area and another at the rear used as a backyard space, as shown in the Fig. 2. The house has an East-facing entrance from the Nadana Gopal Street. It has a traditional *thinnai* (raised platform) on one side, which was used as a seating space by the inhabitants and passers-by. The walls in the North and the South are shared with the neighbouring houses. The main source of lighting and ventilation is through the openings in the East and the West facades and the two courtyards. The door openings at the front and the rear entrances are aligned on an axis to have a visual connection through the front and the rear courtyards. The front courtyard has been traditionally used for dyeing, spinning, and yarning activities along with informal interactions between the members of the households. The rear courtyard has been used as a utility space for the house. The space between the front and the rear courtyards has been used as a multi-functional space for drying silk clothes and sarees and storing raw materials for weaving. Two looms have been used for weaving and were located in the spaces adjacent to the courtyards. The cooking activities have been performed in the space adjacent to the front courtyard on the South. The front courtyard remained the lung space of the house, with most of the daytime activities occurring around the courtyard with a single private space for sleeping. Additionally, during the night, family members have used the courtyard and its adjacent spaces for sleeping. The Fig. 3 shows the spatio-temporal activities of the traditional courtyard house.

The courtyard house of the Sourashtrian community known for their weaving activities has been planned predominantly to support their occupation. Traditionally, both men and women used the courtyard and its adjacent spaces for weaving and ancillary activities for most parts of the day. The women in the house spent their time primarily in the kitchen and the rear courtyard conducting the household chores. During other times of the day, they helped the men in weaving-related activities performed in and around the courtyard spaces. Courtyards remained as the primary gathering spaces for the family. They were designed to accommodate small gatherings and ceremonial activities at the household level. While the ceremonies have been carried out in the front courtyard, all the supporting activities for the ceremonies have happened in the rear courtyard.

In fact, the courtyards have been the *loci* of interactions within the house. The front courtyard has been used for the interactions between the family members, visitors and guests. The rear courtyard has been used for gossiping and personal interactions between the female members of the house and the neighbours or relatives. Courtyards have been planned along the axis of the entrance doors with intermediate spaces such as passages and other multipurpose spaces located in between. The linear axis along the courtyard and the visual connection between the houses along this axis have encouraged casual interactions between the neighbours. Although a strong visual access exists along this axis, the degree of visibility is reduced as one moves away from the entrance towards the rear zone of the house (Fig. 4) The other spaces that are not located along this axis provide visual privacy from the exterior. Within the house, the front courtyard is connected visually to all the spaces of the house.



Fig. 2: A traditional courtyard house

Source: Author

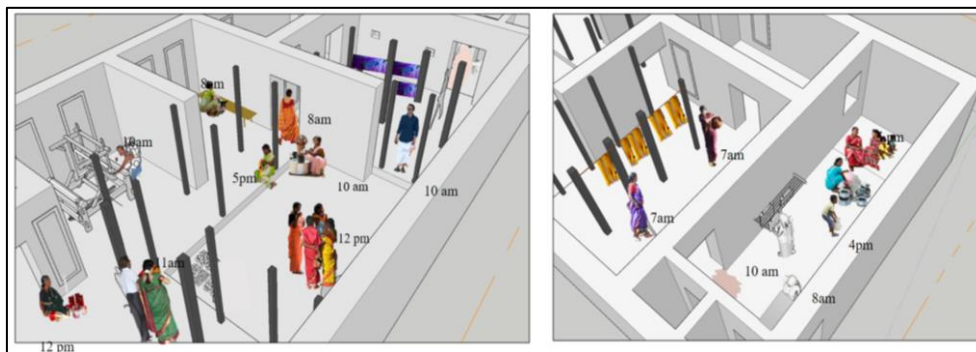


Fig. 3: Activity patterns in the traditional courtyard house (A) Front courtyard and surrounding spaces (B) The rear courtyard and the surrounding spaces

Source: Author

Traditionally, the courtyards have been either square or rectangular in shape. The size of the front courtyard was sufficient to perform weaving and related activities such as dyeing, spinning, and drying silk yarns while encouraging informal interactions between the residents. The rear courtyard was comparatively smaller and was used to perform household chores such as drying clothes, storage of vessels, washing larger vessels and ablutions.

A courtyard has a *tulsi* (holy basil) plant facing the East orientation, signifying the presence of the Hindu goddess Lakshmi (Goddess of wealth and prosperity) within the house. The *tulsi* plant is known for its high medicinal value and purification of the surrounding air. The front courtyard is oriented along the East–West direction, and it remained shaded for most

parts of the day due to its orientation and the shared wall of the neighboring house on the North. The rear courtyard is oriented along the North–South direction. Due to its location and orientation, the temperature in the rear courtyard increases from 10 am in the morning, making it unsuitable for carrying out activities. Therefore, activities in the rear courtyard are completed early in the morning, and activities shift to the interior spaces of the house after 10 am until 4 pm. Thus, the orientation of the courtyards has a strong relation with the culture and behavioural pattern of the occupants. The number of openings was minimal on the exterior walls facing the street, which is attributed to privacy considerations. As the sidewalls were shared with the neighbouring houses, the courtyards remained the major openings within the house, providing sufficient lighting and ventilation to the occupants. All of the openings of the interior rooms faced the courtyards. Thus, the courtyards and openings in the traditional houses were directly related to the climate and cultural behaviour of the occupants.



Fig. 4: Visual access within and outside the house
Source: Author

The open-to-sky courtyard spaces in the traditional houses were multi-functional. They provided safe and secure environments for both the leisure and occupation-based activities for individual members and in groups. Collective life existed where multiple families within the houses used these spaces for both formal and informal interactions. These spaces provided tranquility and improved the well-being of the residents. The courtyards were traditionally an inclusive space within the house, as they were used by all the age groups, races and genders. Courtyards stimulated social interactions between the users. Their flexibility in usage also offered functional inclusion.

Cultural Significance and Social Benefits in a Transformed Courtyard House

The traditional house has been later subdivided into two dwelling units as the family size decreased due to the recent shift to a nuclear family system. The larger dwelling unit is occupied by a joint family with five members. The smaller dwelling unit has been rented to a senior citizen to generate income for the family. Currently, the house has three courtyards: front, rear and kitchen courtyards. The size of the front courtyard has been reduced, and a portion of it has been attached to the kitchen as an extended utility area, as shown in Fig. 5. A bath area has been introduced in the courtyard, and a major portion in the front has been converted into a living area.

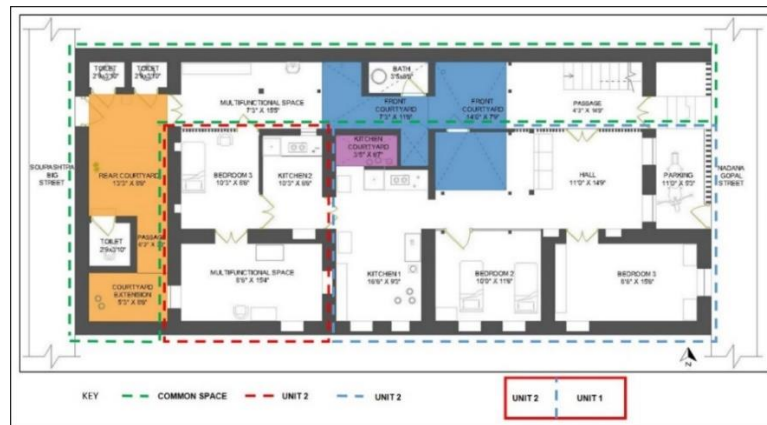


Fig. 5: Transformed courtyard house
Source: Author

After the transformation, the significance of the courtyards in the dwelling units has been reduced due to the increased considerations given to privacy. Hence, the spatial usage and the activity patterns have been significantly transformed. The front courtyard is presently used merely as a passage. The Southeast corner of the front courtyard is used predominantly by women for carrying out the preparatory activities for cooking and washing utensils. At times, it is also used as an open kitchen. The cooking activity is performed within the kitchen. The front courtyard no longer remains as the locus of the daytime activities. During the night, family members do not use the courtyard or its adjacent spaces for sleeping. Sleeping has been confined to the bedrooms located on the Southeast corners of the house. The rear courtyard is predominantly used as a utility zone and a service area. The multi-functional space between the front and the rear courtyards is presently used as a store area.

Fig. 6 shows the spatio-temporal activity pattern of the transformed courtyard house. The shift from weaving to other occupations in the community has led to a decrease in the need for courtyard spaces. At present, only the female members use the courtyard and the adjacent spaces for their daily activities since the men go out for work. The shift away from the traditional occupation of the community has disassociated the community from the courtyard. At present, there is no segregation between the genders in the use of the spaces within the residence. Women prefer to use the front courtyard and its adjacent spaces for most of the daytime activities when compared to the rear courtyard. This is due to the comfortable micro-climate created of the spaces adjacent to the courtyard. It is also for convenience of use since the front courtyard is in proximity to the kitchen. Gender segregation is not evident in their day-to-day activities. However, during the special occasions and the festivals, gender segregation can be seen, wherein men occupy the hall, the front yard and the *thinnai*. The women use the kitchen and the backyard for performing household chores and interacting with one another.

This is due to the social practice of gender segregation, which restricts women's access to use the spaces in the front zone of the house when visitors and guests use these spaces. In the recent years, technological advancements such as the increased use of television and the internet have restricted the use of courtyards for gatherings and have resulted in the use of specific designated spaces within the houses for various activities. The hall has replaced the courtyard for gatherings and has become the primary space for the family. The family members prefer to hold gatherings for special occasions in the rented halls to display their economic status to their relatives and friends. Hence, the relation between the gathering space and the courtyards has lost its significance in the present-day context.

In recent times, with an increased focus on privacy, family members have preferred enclosed spaces for various activities rather than the courtyards. The casual daytime interaction between the family members near the courtyard spaces has shifted to a formal forced interaction that occurs at specific times during the day at specific places. At present, the entrance doors of the houses are closed for privacy and protection, which reduces the opportunities for interaction.

Due to these lifestyle changes and the changing requirements of the user groups in the present-day context, courtyards partially serve as places for interactions. After the modifications, the degree of visual access to the front courtyard has been reduced considerably. The use of timber frames has provided visual accessibility to the semi-enclosed adjacent spaces surrounding the courtyard and to the streets, enhancing interactions. Thus, visual access to the courtyard has been maintained both in the traditional and present scenarios.

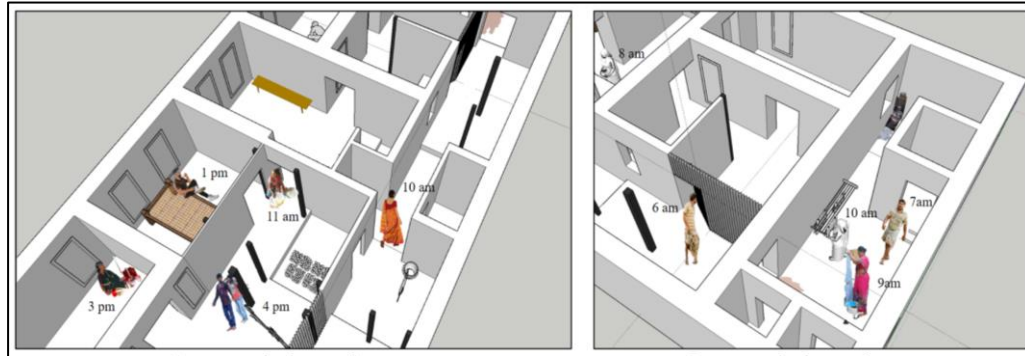


Fig. 6: Activity patterns in the transformed courtyard house (A) The front courtyard and the surrounding spaces
(B) The rear courtyard and the surrounding spaces
Source: Author

After the modifications, the size of the front courtyard has been reduced to create a narrow irregular form, which has resulted in the shift of activities from the courtyard to the other enclosed spaces. Due to its reduced size, the courtyard space is not currently used for interactions, but remains as a connecting passage to the other spaces of the house. A portion of the courtyard has been enclosed as a semi-open extension space for the kitchen. The reduced width, increased humidity and the reduced air movement has led to reduced activities within the courtyard. Flexibility in the use of the courtyards has been largely affected by the transformations. Hence, the form and size of the courtyards have a significant relationship with their patterns of use. When families became nuclear, individualistic spatial requirements increased within the house. Enclosed spaces have gained importance over the open-to-sky courtyard spaces due to the increased requirements for individual privacy. Thus, the present-day younger people spend most of their time within the confined indoor spaces, and the elders in the family find it difficult to use the courtyards without any interactions with their peer group or the youngsters.

In the transformed house, courtyards have not encouraged interactions and are used mostly by the females, especially during specific times of the day. Single-use spaces have replaced the multi-functional spaces of the courtyards, which used to be the breathing space of the house. However, they have lost their importance due to the behavioural changes and expectations of all age groups. This has led to the deterioration of the cultural connection of courtyards with the occupants.

Links between Culture and Social Benefits Associated with the Courtyards

Space has become a commodity in the modern world limiting the provision of courtyard spaces in modern residences. It is evident from the study that the activities that were traditionally linked to the courtyards have now shifted to the internal spaces. This development, due to the changes in the nature of work and user requirements, has an adverse effect on the physical and mental well-being of the inhabitants in turn. During the unstructured interview, residents' especially the women of the house expressed concern that the younger generation and men confine themselves to each of the rooms adjacent to the courtyard with the advent of technology. The rooms have less natural ventilation if the doors that open to the courtyard are closed for want of individual privacy which can affect their physical health. Interaction between

the family members does not happen in the courtyard as it used to be in the traditional house. Transformations in courtyards and internal spaces have led to decreased visual connectivity between the residents. This decreases the chances of informal interaction between the family members. Visual access discourages isolation among family members. Bonding with family members by interaction gives a sense of belonging and safety which leads to quality living. Open spaces within the house like the courtyards help in improving the mental health since it connects the inhabitants with Nature.

The study found that cultural attributes such as community, gender segregation and gathering spaces traditionally had a significant relationship with the courtyards, but their significance has diminished in the recent years. If courtyards are provided in the modern residences, then it can encourage interactions between the family members, which can enhance the physical and mental health of the occupants. Increasing the number of activities in and around the courtyard will increase the variety in the courtyard space. It will increase the frequency of the use of space. Using the outdoor space during the mornings and the evenings leads to improved physical health due to the presence of the sun and fresh air. The study also highlighted the importance of openness and visual access with the courtyard for effective usage. The visual connection with the courtyard provides opportunities to connect with the outdoor environment and Nature. When courtyards are designed as indoor garden spaces with seating, it can improve the mental health of the occupants. It can provide a positive association with the immediate environment. Courtyards can create a sense of belonging, opportunities for interaction, visual access and better thermal comfort and hence create a positive environment for the inhabitants of the house. It can be designed flexibly such that it is used by different age groups by acting as a shared space.

The study reinforced that spatial attributes such as form, size and orientation maintain a strong relationship with the activity patterns in the courtyards, whereas attributes such as the enclosures and the openings, which traditionally had a meaningful relationship with the courtyards, are losing their significance in the present context. The forms and sizes of the courtyards have had a significant impact on the use of the courtyard space. The study found that due to the reduction in size, the courtyard, which was primarily a gathering space and an activity locus within the house, lost its spatial significance. Therefore, the forms and the sizes of the courtyards, and the design of activity spaces adjacent to the courtyards play a major role in generating activities and interactions in and around the courtyards.

The orientation of a courtyard also plays a significant role in the activity patterns and duration of use. The study found that due to the comfortable micro-climatic conditions offered by the courtyards, women continued to perform their daily activities in the courtyard and its adjacent spaces even after transformation. The study also revealed that after the transformation of the courtyards, both social and functional aspects lost their significance. Thus, the location, openness and enclosure of the courtyard play a predominant role in providing social and functional flexibility to the courtyards. Hence, it is evident that conserving the essence of courtyards in modern residences can strongly reflect the cultural context and enhance the mental and physical health of the occupants.

Conclusions

Courtyards were once an element of constancy, but at present, they are the primary element within the house undergoing transformations. This paper analysed the culture and social benefits and courtyards in Nadana Gopal Street, Kumbakonam, Tamilnadu. It emphasizes the necessity to acknowledge the links that the courtyard has with the indigenous culture and its social benefits. The traditional house in this study has undergone transformations. Changes in occupational patterns, the permeation of new technologies within these houses and changing user needs are the main reasons for these transformations. In fact, this has resulted in the modification of behaviour in the courtyards. Despite the advantages, lack of awareness and sensitivity towards space, its symbolism and the use has led to dead spaces within the courtyards. Culture can be linked with the habitable space by revitalizing the courtyards through design.

Courtyards are vital spaces for housing. They lend easy and affordable solutions to several problems that are faced in the current environment. At the same time, increasing flexibility of the courtyard spaces and articulating them can improve the quality of a courtyard. A multitude of activities can be achieved within a courtyard space by encouraging better use of the space by all the age groups. This would help in the gradual revival of the courtyard and its culture. Creating awareness among the traditional folk about the benefit of the courtyards and their associated cultural values is imperative in the present situation. Thus, courtyards if included in modern residences along with indigeneity would enhance the cultural attributes of families and community interactions, visual connectivity to Nature, and the micro-climate. They will improve the health and wellbeing of the occupants by bringing in a sense of place, identity, security and social stability.

Reference

- Abass, F., Ismail, L.H. and Solla, M. (2016) 'A review of courtyard house: history evolution forms, and functions', *ARPN Journal of Engineering and Applied Sciences*, 11(4), pp.2557-2563.
- Al- Mohannadi, A., Furlan, R. and Major, M.D. (2020) 'A Cultural Heritage Framework for Preserving Qatari Vernacular Domestic Architecture', *Sustainability* 12 (18), pp.7295. doi:10.3390/su12187295.
- Al- Mumin, A. A. (2001) 'Suitability of sunken courtyards in the desert climate of Kuwait', *Energy and Buildings* 33 (2), pp.103-111. doi:10.1016/S0378-7788(00)00072-4.
- Sinha, A. (1990). 'From tradition to modernity: The role of the dwelling in social change', *Proceedings of the Environmental Design Research Association* 21, pp.151-162.
- Aryani, S.M., Sasongko, S. and Wahyuningsih, I.E.S. (2017) 'House design transformation by short-term owners', *International Journal of Technology* 6, pp.1168-1177.
- Aryani, S.M. and Wahyuningsih, I.E.S. (2015) 'The house design transformation: the preferences and the patterns', *Procedia Environmental Sciences*, 28, pp.717-724.
- Berkovic, S., Yezioro, A. and Bitan, A. (2012) 'Study of thermal comfort in courtyards in a hot arid climate', *Solar Energy* 86 (5), pp.1173-1186. doi:10.1016/j.solener.2012.01.010
- Bretonne, C. (1979) 'An interview with Amos Rapoport on vernacular architecture', *M.E.T.U. Journal of the Faculty of Architecture* 5 (2), pp.113-126.
- Dayaratne, R. (2008) 'Vernacular in transition: the traditional and the hybrid architecture of Bahrain', In *Proceedings of the 4th International Seminar on Vernacular Settlement*, pp. 1-10.
- Edwards, B., Sibley, M., Land, P. and Hakmi, M. eds. (2006) *Courtyard housing: past, present and future*. New York: Taylor & Francis group.
- Gangwar, A.G. and Kaur, P. (2016) 'Environmental, Behavioural and Aesthetic aspects of Courtyard Design: Literature Review', *Imperial Journal of Interdisciplinary Research (IJIR)* 2 (9), pp.1712 – 1716.
- Inclusive courtyard –<https://pavaarchitects.com/inclusive-courtyard>.
- Isah, A.D. and Khan, T.H. (2016) 'Re-emergence of Indigeneity in Transformed Layouts in Urban Public Housing in Nigeria', *International Journal of Built Environment and Sustainability* 3(1), pp.1-9.
- Jagatramka, R., Kumar, A. and Pipralia, S. (2022) 'Sustainability Attributes of Transformation in Vernacular Architecture of Chhattisgarh', *ECS Transactions* 107 (1), pp.18969-18978.
- Kotharkar, R. and Deshpande, R. (2012) 'A comparative study of transformations in traditional house form: the case of Nagpur region, India', *ISVS e-journal* 2 (2), pp.17-33.
- Lakshmi priya R. (2007) *Relevance of traditional architecture in the modern context*, Master of Architecture Dissertation, Department of Architecture and Planning, Indian Institute of Technology, Roorkee.
- Lee, S.H. (1991) 'Continuity and consistency of the traditional courtyard house plan in

- modern Korean dwellings', *Traditional Dwellings and Settlements Review* 3 (1), pp. 65-76.
- Lidón de-Miguel, M., García-Soriano, L., Mileto, C. and Trizio, F. (2020) 'Balancing Tradition and Development? Early Trials of a Methodology for Studying Vernacular Architecture and its Transformations', *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences (Online)* 44, pp.781-788.
- Mahdavinejad, M., Moradchelleh, A., Dehghani, S. and Mirhosseini, S.M. (2013) 'The adoption of central courtyard as a traditional archetype in contemporary architecture of Iran', *World Applied Sciences Journal* 21(6), pp.802-11. doi: 10.5829/idosi.wasj.2013.21.6.14
- Mai, M.M. and Shamsuddin, S. (2012) 'Urbanization and Globalization of Gbagyi Housing Transformation', *ALAM CIPTA, International Journal of Sustainable Tropical Design Research and Practice* 2(1), pp. 49-58.
- Mishra, R. and Dolas, S. (2019) 'Spatial Occupations within A Courtyard: A Case of 'Traditional Bada Typology' in Historic City of Gwalior', *International Journal of Architectural Heritage* 2 (2), pp.21-29. doi: <https://doi.org/10.37628/v2i2.565>.
- Muhaisen, A.S. and Gadi, M.B. (2006) 'Shading performance of polygonal courtyard forms', *Building and Environment* 41(8), pp.1050-1059. doi: 10.1016/j.buildenv.2005.04.027
- Myneni, K.K. (2013) 'Courtyard as a building component; its role and application in developing a traditional built form, creating comfort; a case of Athangudi Village, India', *International Journal of Chemical Environmental & Biological Sciences* 1 (4), pp.633-639.
- Narkhede, P.G. (2008) 'Changing Housing Types and Their Impact on Urban Design: A Case Study of Pune City', *ITPI Journal* 5 (4), pp.28-37.
- Patidat, S. and Raghuvanshi, A.B. (2014) 'Changes in culture and architecture from vernacular to modern: MP, India', In Ahmedabad. International Plea Conference, Ahmedabad, December Ahmedabad, CEPT University 8, pp. 16-19.
- Ranee Vedamuthu. (2001) Social manifestation of house in rural Tamil Nadu a classification of type, Ph.D. thesis. Anna University. <http://hdl.handle.net/10603/76838>
- Rapoport, A. (1998). 'Using "culture" in housing design', *Housing and society*, 25 (1-2), pp.1-20. doi: 10.1080/08882746.1998.11430282
- Rapoport, A. (2007) 'The nature of the courtyard house: a conceptual analysis', *Traditional Dwellings and Settlements Review* 18 (2), pp.57-72.
- Raviz, S.R.H., Eteghad, A.N., Guardiola, E.U. and Aira, A.A. (2015) 'Iranian courtyard housing: the role of social and cultural patterns to reach the spatial formation in the light of an accentuated privacy', *ACE: Architecture, City and Environment = Arquitectura, Ciudad y Entorno* 11 (29), pp.11-30, doi: 10.5821/ace.11.29.2653.
- Salama, A. (2006) 'A typological perspective: the impact of cultural paradigmatic shifts on the evolution of courtyard houses in Cairo', *M.E.T.U Journal of the Faculty of Architecture* 23 (1), pp. 41-58.
- Samadi, J. (2014) 'Investigating the courtyards of traditional houses and the effect of Western architecture', *Research Journal of Environmental and Earth Sciences* 6 (2), pp.112-117.
- Sasidhar K., Vedamuthu R. (2012) 'Dwelling architecture as an expression of culture establishing continuum in the place of migration- the case of nattukkottai chettiers of Chettinadu in the urban context of Chennai', *ABACUS, Architectural History and Regionalism* 7 (2), pp.16-21.
- Shokouhian, M., Soflaee, F. and Nikkhah, F. (2007) 'Environmental effect of courtyard in sustainable architecture of Iran (Cold regions)', In 2nd PALENC Conference and 28th AIVC Conference on Building Low Energy Cooling and Advanced Ventilation Technologies in the 21st Century, pp. 969-973.
- Shrestha, B.K. and Shrestha, S. (2009) 'Transformation of traditional building stocks in the historic core of Kathmandu: Looking through the prism of culture and climate', *Protibesh: Environment, Journal of the Department of Architecture* 13(1), pp.5-16.

- Sinha, A. (1990) 'From tradition to modernity: The role of the dwelling in social change', *Proceedings of the Environmental Design Research Association* 21, pp.157-162.
- Soliman, S.E.S. and Elkhateeb, A.A. (2022) 'Comparing user's feelings in courtyard and durqa'a: A case study of Mamluk madrassa in Cairo', *Ain Shams Engineering Journal* 13 (2), pp. 101546., doi:10.1016/j.asej.2021.07.002
- Tablada, A., Blocken, B., Carmeliet, J., De Troyer, F. and Verschure, H. (2005) November 'The influence of courtyard geometry on air flow and thermal comfort: CFD and thermal comfort simulations', *Proceedings of 22nd conference on Passive and low energy architecture* 1, pp.75-80.
- Verma, K. and Panchal, V.V. (2021) 'Symbolism the Understated Aspect of Vernacular Practices', *International Journal of Research in Applied Science and Engineering Technology (IJRASET)* 9 (1), pp.249-255. doi: 10.22214/ijraset.2021.32797
- Vijayalaxmi, J. and Arathy, K.K. (2022) 'Critical evaluation of socio-cultural and climatic aspects in a traditional community: a case study of Pillayarpalayam weavers' cluster, Kanchipuram', *Built Heritage* 6 (3), pp.1-16. doi:10.1186/s43238-022-00050-4
- Vongvilay, X., Kang, Y.H. and Choi, J.H. (2015) 'The Impact Factors Causing Transformation of Lao Traditional House-Case Study of Luangprabang, Lao PDR', *Journal of the Korean Housing Association* 26 (2), pp.1-12.
- Wang, H. (2006) *Architectural intent and its vernacular process: a morphological study of the spatial planning concept in traditional settlements and courtyard houses in Huizhou, China*. HKU Thesis Online. HKUTO.
- Xu, P. (1998) "'Feng-shui" models structured traditional beijing courtyard houses', *Journal of Architectural and Planning Research*, 15 (4), pp.271-282.
- Zamani, Z., Taleghani, M. and Hoseini, S.B. (2012) 'Courtyards as solutions in green architecture to reduce environmental pollution, *Energy Education Science & Technology, Part A: Energy Science and Research*, 30 (1), pp.385-396.
- Zhang, D. (2016) 'Juer hutong new courtyard housing in Beijing a review from the residents' perspective', *ArchNet – International Journal of Architectural Research* 10 (2), pp.166.
- Zhang, D. (2020) 'Shilinyuan new courtyard-garden housing in Suzhou: residents' experiences of the redevelopment', *Journal of Chinese Architecture and Urbanism* 2 (1), pp.1-20.