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Courtyard as Timeless Architectural Typology: Past. Present. Furure

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Abstract- The courtyard has traditionally played the role of climate mediator, social interaction facilitator, and spatial hierarchy structure in Indian built environments. However, this ancient typology has been carefully sidelined in mainstream Indian urban housing in the last 50 years despite its demonstrated environmental and social advantages. The present paper follows a socio-spatial path of the courtyard in Indian architecture in three climatic regions, such as hot-dry, warm-humid and temperate. The study, through the comparative analysis of the traditional precedents, patterns of decline documented, and the current reinterpretations, demonstrates that the loss of the courtyard is due to the overlapping forces: the floor area ratio regulations that punish the open-to-sky spaces, the economic pressures that prefer to maximize the built area, the ideological hegemony of the modernist planning models, and changing household patterns. Still, as the paper also reveals, the underlying principles of the courtyard, which include shallow plans, transitional spaces, hierarchical organization, and climate-responsive geometry are actively being reclaimed and modified by modern practice. Other projects such as House of Secret Gardens (Ahmedabad), Narsighar House (Nakhomah), House of Voids (Vijayawada), Pirouette House (Thiruvananthapuram), House of Memories (Karnataka), and The Earth House (Mukteshwar) represent various approaches to the re-use of courtyard logic. The paper contends that the courtyard is not a nostalgic artefact but a resistant, flexible spatial tool whose logic is urgently needed to tackle the twin challenges of increasing urban density and the accelerating climate change. At the end of the paper, there are design principles and regulatory recommendations on how to integrate courtyard strategies into the future urban development.

Keywords- Courtyard typology, passive architecture, climate-responsive design, Indian vernacular architecture, urban housing, spatial adaptation.

I. INTRODUCTION

The historically significant feature of Indian architecture is its courtyard, which mediated the climate, facilitated social interaction, and an arrangement of spatial hierarchy in domestic and institutional spaces (Nelson, 2014). The traditional Indian houses including Havelis in Rajasthan, Chettinad mansions in Tamil Nadu, and Pol houses in Gujarat used courtyards to control temperature, optimize daylighting, and natural ventilation, and at the same time, served as areas of social interaction, meeting, and ceremonial space (Rodriguez Sanchez & Kapoor, 2025 ; Dutta et al., 2022).

In spite of these positive aspects, the courtyard architecture is no longer being utilized in modern Indian urban housing. Restrictions on floor area ratio (FAR), economic demands to maximize built area, modernist planning ideologies, and the development of changing household forms have all pinned residential housing in urban housing by sidelining open-to-sky spaces (Gupta & Joshi, 2021).

The modern architectural projects are an example of a revival of the principles of courtyards. Buildings such as the House of Secret Gardens in Ahmedabad (https://www.archello.com/project/the-house-of-secret-gardens), Narsighar House in Nokha (https://www.archdaily.com/1017714/narsighar-house-sanjay-puri-architects), House of Voids in Vijayawada (https://www.archello.com/project/house-of-voids-6), Pirouette House in Thiruvananthapuram (https://www.archdaily.com/948757/pirouette-house-wallmakers), House of Memories in Karnataka (https://www.riba.org/explore/awards/international-awards/asia-pacific-awards/house-of-memories/), and The Earth House in Mukteshwar (https://www.habitusliving.com/projects/earth-glass-house-

india) demonstrate how traditional courtyard logic is being adapted to contemporary urban conditions while maintaining environmental, social, and cultural functions (Vedhajanani & Amirtham, 2024).

Research Questions

The research seeks to examine socio-spatial development of the courtyard in India and determine its applicability in contemporary urban residential buildings. The questions of the research are:

1. How have traditional courtyard designs in India mediated climate, facilitated social interactions, and structured domestic spaces across diverse regions and climatic zones?
2. What socio-economic, regulatory, and ideological factors have contributed to the marginalization of courtyard architecture in contemporary urban housing?
3. How are contemporary architects reclaiming and adapting courtyard principles to address urban density, sustainability, and cultural continuity?

The study combines the historical contexts, trends of decline, and current case studies to provide an in-depth insight into the courtyard as a flexible and resilient architectural typology (Lakshmanan et al., 2023 ; Gupta & Joshi, 2021).

Theoretical Framework

The theoretical background of the present research is based on three interconnected theories, namely vernacular architecture theory, passive design, and spatial morphology:

- Vernacular architecture theory analyzes design approaches within the context of the traditional practices in terms of the local climate, culture, and materials (Dutta et al., 2022). Courtyards fulfilled environmental, social and hierarchical roles and provided the balance between privacy and social interaction (Rodriguez Sanchez & Kapoor, 2025 ; Vashisht & Rao, 2025).
- The passive design principles evaluate the environmental performance such as natural ventilation, daylighting, thermal comfort, and energy efficiency (Verma & Parmar, 2019).
- Spatial morphology and socio-spatial theory discuss the circulation, hierarchical structure, and culturally or gender-biased uses in the spaces of the courtyard (Vedhajanani and Amirtham, 2024 ; Lakshmanan et al., 2023).

The modern architectural theory is centered on the aspects of adaptation, reinterpretation, and hybridization. The use of vernacular courtyard logic in modern urban projects shows that it is not mutually exclusive with vertical construction, multi-generational family structures, and regulatory controls but still allows climatic and social functions (https://www.archdaily.com/948757/pirouette-house wallmakers; Gupta & Joshi, 2021). The policy and regulatory implications including FAR requirements and building codes play a vital role in deciding whether courtyards will be included in modern houses (Chawhan & Kamal, 2021 ; Vashisht & Rao, 2025).

Structure of the Paper

The paper will continue as follows:

- **Section 2:** The literature on the environmental performance and social functions of the courtyard is reviewed (Nelson, 2014 ; Dutta et al., 2022).
- **Section 3** presents the comparative case study methodology that was applied in this study (Patil, 2025).
- **Section 4** introduces the empirical analysis, sorted by the climatic zone, where each zone is split into traditional precedents, evidence of decline, and modern reinterpretations, presented in the list of newly added projects (Vedhajanani & Amirtham, 2024 ; https://www.archello.com/project/the-house-of-secret-gardens; https://www.archdaily.com/1017714/narsighar-house-sanjay-puri-architects).
- **Section 5** provides comparative discussion and outlines patterns of continuity and change, and suggests design principles and policy recommendations (Rodriguez Sanchez & Kapoor, 2025).
- **Section 6** concludes, cogitating about the long-term relevance of the courtyard as an ancient typology of Indian architecture and its ability to adapt to the modern city needs (Lakshmanan et al., 2023).

This building guarantees a logical flow between the knowledge of the past, the new discoveries and the perspectives of the future, with the courtyard as a stable, flexible, and culturally integrated spatial typology.

II. LITERATURE REVIEW

The Courtyard as Environmental Regulator

The courtyard has been known to be a good environmental controller in Indian architecture. Conventional courtyards accommodate natural ventilation, enable daylight to penetrate, and form microclimatic conditions that lower the indoor temperatures, especially during hot-dry seasons (Verma & Parmar, 2019). The courtyard is promoted to facilitate cross-ventilation and passive cooling through spatial arrangement,

which facilitates the flow of air between the surrounding rooms (Agarwal & Thussu, 2020). In topographic areas like the Himalayas, Kath-Khuni type courtyard houses have a high level of climatic adaptation through local timber and stones that store solar heat in winter and cool the air in summer seasons (Dutta et al., 2022). Modern research also emphasizes the use of the courtyard to minimize energy use and enhance thermal comfort indoors with the help of passive design (Tabadkani et al., 2022).

The Courtyard as Socio-Spatial Organizer

Courtyards have arranged social encounters and space hierarchy other than environmental performance. They serve as spaces between the public and the private where households can preserve their privacy and at the same time facilitate communal activities (Nelson, 2014). Functional zoning in dwellings includes gendered spaces, service areas, and ceremonial zones, which is organized around courtyards and considers socio-cultural norms (Lakshmanan et al., 2023). The Nalukettu typology characterizes a central courtyard in Kerala to control people movement and socialization and by doing so, it shows how architecture supports familial and communal connections (Kannan & Khan, 2016). In the current academic discourse, the potential of the courtyard to support multigenerational co-residence and promote spatial communication is also highlighted even in the contemporary context (Gupta & Joshi, 2021).

The Decline: Intersecting Forces

Although historically important, the courtyards have gone through systematic degradation in Indian urban housing. There are a number of convergent forces that are causing this trend. The open-to-sky spaces are punished with regulatory constraints, including FAR restrictions and building codes, which diminishes the viability of classic courtyard designs in high-density cities (Chawhan & Kamal, 2021). Economic pressures prefer maximisation of built area to gain returns on investment at the expense of communal or open space. Furthermore, the paradigms of modernist planning, with a focus on small and homogeneous floor plates, have excluded the logic of the courtyard (Williamson, 2016). The functional necessity of large internal courtyards is also reduced by changing the structure of a household, such as increased nuclear families, apartment life, and so on (Agarwal & Thussu, 2020). All these have collectively changed the socio-spatial and environmental role of the courtyard, which has resulted in the decrease of its usage in modern housing projects.

Contemporary Reinterpretations

Contemporary architects are revisiting the principles of courtyard in response to the drop in order to deal with modern climatic, social and urban issues. Other projects include the House of Secret Gardens in Ahmedabad (https://www.archello.com/project/the-house-of-secret-gardens), House of Voids in Vijayawada (https://www.archello.com/project/house-of-voids-6), etc. Pirouette house in Thiruvananthapuram (https://www.archdaily.com/948757/pirouette-house-wallmakers), and House of Memories in Karnataka (https://www.riba.org/explore/awards/international-awards/house-of-memories) demonstrate the approaches to incorporation of courtyards into dense, multi-generational, and vertical housing environments (www.archello.com, 2026; www.archdaily.com, 2026).

The projects do not lose the key characteristics of the traditional courtyards, such as shallow plans, hierarchical spatial structure, and climate-responsive geometry, but adapt to the modern functional and regulatory demands (Vedhajanani & Amirtham, 2024; Patil, 2025). Moreover, the study of adjacency matrices and deep-learning predictive models has also given the designers the quantitative tools to optimize the performance of courtyards in modern houses (G & R, 2024; Tabadkani et al., 2022). These reinterpretations prove that the courtyard is not a nostalgic part but a flexible typology that could resolve the density and sustainability issues of urban areas at this stage.

III. METHODOLOGY

The research paper is based on the comparative case study approach to examine the socio-spatial development of the courtyard in Indian architecture. The method enables deep vernacular, transitional, and contemporary examples to be studied in each of the different climatic zones and temporal scales, focusing on environmental performance as well as socio-spatial organization (Rodriguez Sanchez & Kapoor, 2025).

Climatic Zoning

The study divides the Indian subcontinent into three different climatic belts to take into consideration the climatic differences in the region:

1. **Hot-Dry:** Rajasthan and Gujarat, which have significant diurnal temperature swings and are very dry (Verma & Parmar, 2019). The use of courtyards within this area was a historic way of reducing the amount of heat in the

building, encouraging the cooling of the environment through evaporation, and giving people a shaded outdoors area where they can socialize and carry out household chores (Agarwal & Thussu, 2020).

2. **Warm-Humid:** Kerala, Tamil Nadu, Karnataka and Andhra Pradesh, where high temperatures and high humidity prevail all year round. Courtyards in these areas also promote cross-ventilation, penetration of daylight, and water management of rainwater, as well as socio-cultural activities associated with community life (Kannan & Khan, 2016; Lakshmanan et al., 2023).
3. **Temperate:** Himalayan foothills of Uttarakhand and Himachal Pradesh, which are cold in winters and mild in summers. In this case, the courtyards are enclosed to cushion against harsh winds with the addition of solar heat in colder months as observed in Kath-Khuni vernacular houses (Dutta et al., 2022; Vashisht & Rao, 2025).

This zoning enables the comparative analysis of the functions of the courtyard, emphasizing the strategies of adaptation to climate conditions in a variety of environmental conditions.

Temporal Bandwidths

The research covers three time arcs:

1. **Pre-1950s vernacular archive (the past):** This category involves traditional types of courtyards, vernacular principles, recorded in historical sources, drawings, and existing dwellings (Nelson, 2014; Dutta et al., 2022).
2. **Post-independence era 1950-2000s (reduction):** Encompasses transitional architecture due to modernist influence, regulatory adjustments and socio-economic shifts that led to the marginalization of courtyard spaces (Williamson, 2016; Chawhan & Kamal, 2021). The 1950-1990 period is presented as a transition period, which records the process of changes in spatial layouts and functional adaptation gradually.
3. **Early 21st century to current (reinterpretations):** An exploration of current projects that put courtyard reasoning into action in urban, multi-generational, and climate-responsive settings (Patil, 2025; Vedhajanani & Amirtham, 2024). House of Secret Gardens (https://www.archello.com/project/the-house-of-secret-gardens), the House of Voids (https://archello.com/project/house-of-voids-6) and Pirouette House (https://www.archdaily.com/948757/pirouette-house-wallmakers) are examples of houses that combine the principles of vernacular with new design innovations.

Analytical Framework

The case studies are discussed in three dimensions:

1. **Spatial Construction:** Analysis of plan structure, spatial structure, and inside-outside edges. This involves the layout of functional areas, movement routes and incorporation of transitional areas (Verma & Parmar, 2019; G & R, 2024).
2. **Environmental Behavior:** Evaluation of daylight, airflow, thermal modulation and microclimatic performance, passive design approach and climate-responsive geometry. (Verma & Parmar, 2019; Tabadkani et al., 2022).
3. **Socio-Occupational Patterns:** Examination of the connection between the spatial organization and social activity, such as gendered usage, social events, and multi-generational interaction (Lakshmanan et al., 2023; Gupta & Joshi, 2021).

The scheme makes possible both qualitative and comparative analysis of the courtyard forms in terms of climatic, temporal, and socio-cultural factors.

Data Sources

Data sources are :

- Architectural drawings and archival plans of vernacular and historical houses (Nelson, 2014; Dutta et al., 2022).
- The research sources related to the analysis of environmental performance, spatial organization, and social functions of courtyards reviewed by the peer (Rodriguez Sanchez & Kapoor, 2025; Patil, 2025).
- Architectural journals, online databases, and secondary sources that offer information about modern reinterpretations, such as project documentation, images, and spatial analyses (https: archello.com/project/the-house-of-secret-gardens; archdaily.com/948757/pirouette-house-wallmakers).

There was no primary field work or real-time environmental observation undertaken; the analysis is strictly qualitative, based on documented evidence to make comparisons between the climatic zones, temporal arcs and case studies.

IV. CASE STUDY ANALYSIS

Hot-Dry Zone (Rajasthan, Gujarat)

- Traditional Precedent: Patwon Ki Haveli, Jaisalmer

Patwon Ki Haveli is a series of five separate havelis built between 1800 and 1860 around a series of courtyards of

different sizes, with the outer accessible areas leading to inner, private ones. More than sixty spaced out balconies on both facades ensure the airflow and thermal comfort without any mechanical interference (Verma & Parmar, 2019). The havelis has thick walls of sandstone that offers thermal mass to absorb heat in the day and emit it at night, with narrow shaded streets creating a cooled urban microclimate (Agarwal & Thussu, 2020). The courtyards are a form of social gathering, aiding ceremonies, family reunions, and interactions with the community, and they reveal a space logic that is climate-sensitive and culturally integrated (Williamson, 2016).

Figure 1: View patwon ki haveli Jaisalmer
(source: https://www.flickr.com/photos/asienman/22852711333/in/photostream/)

Decline: Generic BHK Apartments, Ahmedabad (1990s–2000s)

The Ahmedabad suburbs generic BHK apartment typology is a perfect example of the fall of the courtyard-based design. These commercial blocks are market-driven and maximize the built space at the cost of transitional spaces. Otherwise, floor plans organize the private rooms around an internalized circulation center instead of an outdoor room (a central living-dining room). The 1.2 1.5 meters deep balconies are not compatible with social or environmental functions, and the envelope is not thermally connected to its environment, but solely relies on mechanical cooling (Vashisht & Rao, 2025). This typology describes how the pressures of regulations, economy, and market are what pushed the marginalization of the courtyard in city dwellings.

Figure 2: Decline: Generic BHK Apartments, Ahmedabad (1990s–2000s)
(source: Vashisht & Rao, 2025)

Reinterpretations

House of Secret Gardens, Ahmedabad (SPASM Design Architects, 2018)

Key Features:

The House of Secret Gardens uses a cruciform layout that has four sunken gardens that have different scales, orientation, and purpose. This makes all habitable areas enjoy the direct access to daylight and cross-ventilation. The incident shadows formed by stone fins, vertical cuts, and vegetated courtyards help to cool the building facade, and the water elements help to regulate the microclimate. The cruciform shape maximizes the amount of building perimeter that makes every room connected to the outside and open to social activity (https://archello.com/project/the-house-of-secret-gardens; https://www.theplan.it/eng/architecture/the-house-of-secret-gardens-spasm-design-india).

Reinterpretation Strategy:

The classical concepts of courtyard are rethought in the city, with a one-room-thick approach that enables cross-ventilation of the house. The courtyards serve as secret gardens, a combination of greenery and water to play the mediation of temperature and offer peaceful social spaces. The structure is well-balanced in terms of environment and space hierarchy; it provides an intimate, stratified experience to residents (Vedhajanani & Amirtham, 2024).

Seminar Note:

The project is an example of how the logic of vernacular courtyard can be applied to dense urban lands and shows that such concepts as passive cooling, natural light, and human interaction can coexist in modern buildings (Tabadkani et al., 2022).

Figure 3: House of Secret Gardens, Ahmedabad (SPASM Design Architects, 2018)
(source: https://volzero.com/articles/view/the-house-of-secret-gardens-by-spasm-design-architects)

Narsighar House, Nokha, Rajasthan (Sanjay Puri Architects, 2019)

Key Features:

The Narsighar House has a grand central courtyard, jali-screened patios and a series of smaller courtyards which fill more than 40% of the layout. Passive cooling and thermal comfort are produced through the use of thick sandstone walls, evaporation water features and stacked ceiling heights between 4 and 12 meters without mechanical cooling. The volumes of the building are expressed separately, and it seems that the house is a miniature village, keeping the modern functional demands (https://www.archdaily.com/1017714/narsigarh-the-house-embodies-the-traditional-planning-principles-of-rajasthans-regional-architecture-sanjay-puri-architects).

Reinterpretation Strategy:

The house is a reinterpretation of the traditional values of a haveli to suit a modern nuclear family and it is climate responsive. Courtyards are planned in a way to maximize airflows, daylight, and spatial hierarchy illustrating how vernacular design can be incorporated into modern architecture to achieve environmental and social performance (Tabadkani et al., 2022).

Seminar Note:

The Narsighar House is an example of high-performance vernacular revival, which demonstrates that regional technologies in building can offer state-of-the-art architectural and environmental solutions (Patil, 2025).

Figure 4: Narsighar House, Nokha, Rajasthan (Sanjay Puri Architects, 2019)
(source: https://volzero.com/articles/view/narsighar-by-sanjay-puri-architects)

Amdavad ni Gufa

- **Key Features:**

Amdavad ni Gufa is a semi-underground gallery that has sculptural, irregular courtyards and light wells through which the daylight and air are directed to flow through the interior. The architectural design incorporates natural light, organic shape, and passive cooling techniques to produce a visual dynamic interior that is both environmentally comfortable (https://www.world-architects.com/en/vsc-vastu-shilpa-consultants-ahmedabad/project/amdavad-ni-gufa/).

Reinterpretation Strategy:

Courtyards are redefined as spatial and sculptural objects instead of the conventional planar empties. Daylight, ventilation and thermal comfort are mediated by light wells, open-air pockets, and circulation voids and help to enhance the experience of the building (Rodriguez Sanchez & Kapoor, 2025).

Seminar Note:

The project demonstrates how courtyard logic can be applied to a non-residential building to reveal that environmental and spatial functions can be effectively combined into experimental and sculptural architecture (Jodidio, 2020).

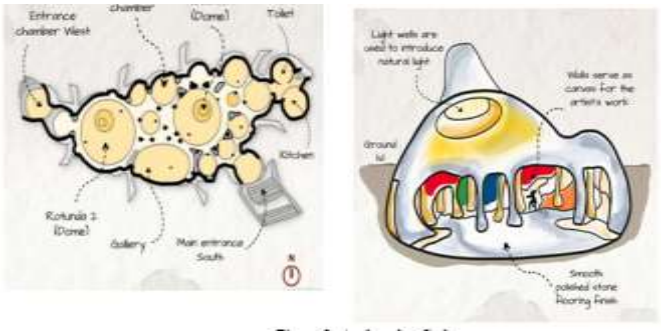

Figure 5: Amdavad ni Gufa
(source: https://www.re-thinkingthefuture.com/case-studies/a14831-amdavad-ni-gufa-by-b-v-doshi/; https://www.kaarwan.com/blog/architecture/amdavad-ni-gufa-an-architectural-masterpiece-inspired-by-nature?id=815)

Warm-Humid Zone (Kerala, Tamil Nadu, Karnataka, Andhra Pradesh)

Traditional Precedent

Nalukettu, Kerala

The Nalukettu typology, a characteristic of the traditional Kerala architecture, is a family structure that is structured around a central open court known as the Nadumuttam, which serves as the main environmental controller as it allows air to ascend and cooler air to circulate into other rooms, thus ensuring passive cooling and thermal comfort in the house (Kannan & Khan, 2016). The courtyard is also a multifunctional space that combines social and environmental logic, being a family area, rituals, and seasonal collection (Lakshmanan et al., 2023). The sloping and elongated tile roofs ensure the protection of the courtyard and interior areas against heavy rains of the monsoon season and preserve the cross-ventilation and sunlight entering the house (Kannan & Khan, 2016).

Chettinad house, Tamil Nadu.

Traditional to Tamil Nadu, the Chettinad house features a central courtyard with rooms and deep verandahs, which serve as thermal storage and air regulators (Lakshmanan et al., 2023). The courtyard is a social space and promotes multigenerational homes, ceremonial activities, and it also helps to counteract the consequences of high humidity and temperature (Kannan & Khan, 2016). The spatial arrangement focuses on hierarchy,

privacy, and continuity of the culture so that every functional area can be linked to the courtyard in a manner that balances the performance of the environment and social demands (Lakshmanan et al., 2023).

Figure 6: Nalukettu, Kerala
(Source: https://www.bennykuriakose.com/post/evolution-of-kerala-architecture-over-the-years)

Decline

Gulf Boom Concrete Houses, Kerala (1970s-2000s)

In the Gulf remittance boom, the traditional Nalukettu structures were substituted by modern concrete structures, as a sign of economic well-being as well as a desire to be seen as modern (Vashisht & Rao, 2025). These were reinforced concrete, glass, and polished stone houses, which frequently did not include the central courtyard, to the detriment of passive ventilation, daylighting, and natural cooling (Lakshmanan et al., 2023). Ornamental facades and imported sophistication based on the aesthetic values instead of the environmental or social integrity undermined the initial combination of spatial hierarchy, climatic sensitivity, and social utility. This change shows that the cultural, economic, and regulatory forces have contributed to the exclusion of courtyards in urban settings (Kannan & Khan, 2016).

Figure 7: Gulf Boom Concrete Houses, Kerala
(source: https://www.bennykuriakose.com/post/evolution-of-kerala-architecture-over-the-years)

Reinterpretations

House of Voids, Vijayawada, Andhra Pradesh (Studio Urban Form+Objects, 2020)

Key Features:

The House of Voids presents a set of vertical voids which serve as a multi-story courtyard, linking the living areas on different floors, but allows for daylight penetration and passive ventilation (https://archello.com/project/ house of voids-6; https://archeyes.com/ house of voids-by-studio-ufo-vastu-guided-multigenerational-residence/). The perforated granite facades are used as shading devices and thermal buffers, and open spaces provide visual connectivity among the floors and uphold the hierarchy of personal and communal spaces (Vedhajanani & Amirtham, 2024).

Reinterpretation Strategy:

The architecture adapts the ancient functions of the courtyard into vertical city buildings. The voids mediate comfort in the environment, socialization, and visual continuity, and Vaastu principles mediate spatial organization, how vernacular logic can be used to fit into the constraints of modern urbanism (Patil, 2025).

Seminar Note:

The given project is an example of how well-suited the concept of courtyard logic can be in densely populated urban locations, which can deliver social and climatic performance without undermining the privacy and variety of space (G & R, 2024).

Figure 8: House of Voids, Vijayawada, Andhra Pradesh (Studio Urban Form+Objects, 2020)
(source: https://archello.com/pt/project/house-of-voids-6)

Pirouette House, Thiruvananthapuram (Wallmakers, 2020)

Key Features:

Pirouette House is designed on a basic funnel-shaped courtyard in an east-west direction to maximize cross-ventilation. It has a rat-trap bond brickwork, which is used as thermal insulation, and the tapered walls form Venturi effect that accelerates the air flow inside the buildings (https://www.archdaily.com/948757/pirouette-house-wallmakers; https://urbannext.net/pirouette-house/). The social centre is the courtyard where family meals are shared and the street is not visible.

Reinterpretation Strategy:

The principles of the traditional courtyard are implemented in a small urban lot, uniting the passive cooling, daylighting, social functionality, and modern materials and construction techniques (Patil, 2025).

Seminar Note:

Pirouette House shows that significant urban spaces are not the only ones that can effectively implement climate-responsive courtyards as a way to maintain social interaction and environmental performance (Gupta & Joshi, 2021).

Figure 9: Pirouette House, Thiruvananthapuram (Wallmakers, 2020)
(source: https://www.archdaily.com/948757/pirouette-house-wallmakers)

House of Memories, Karnataka (RIBA Asia Pacific Award, 2025)

Key Features:

House of Memories transforms the conventional Thotti Mane style by incorporating a central a yard which serves as the center of the house. It aids in ventilation, daylighting, and socialization within multi-generational households, and the expression of vernacular spatial logic is updated using modern construction materials

(https://www.riba.org/explore/awards/international-awards/asia-pacific-awards/house-of-memories/ ; https://www.theplan.it/eng/design/the-house-of-memories-studio-lagom).

Reinterpretation Strategy:

The courtyard serves as a visual reference point and the central social space, which is hierarchically structured and unites the traditional environmental approach with the modern-day city-centered lifestyle needs (G & R, 2024).

Seminar Note:

House of Memories exemplifies how modern buildings can preserve environmental, social, and cultural roles of traditional courtyards and address the architectural demands of the modern era (Verma & Parmar, 2019).

Figure 10: House of Memories, Karnataka (RIBA Asia Pacific Award, 2025)
(source: https://www.riba.org/explore/awards/international-awards/asia-pacific-awards/house-of-memories/)

Temperate Zone (Himalayan Foothills)

- Traditional Precedent: Kath-Kuni Dwelling (Himachal Pradesh, Uttarakhand)

Kath-Kuni construction tradition of the Western Himalayas is an indigenous building system that substitutes timber and stone courses (kath and kuni), respectively, adjusted to the steep slopes, earthquake activity, deep snowfalls, and drastic seasonal temperature changes (Dutta et al., 2022). Although it is not a courtyard typology in terms of the plains, Kath-Kuni dwellings have open-to-sky spaces, terraces, and transitional verandahs that serve a similar role as a courtyard by mediating air movement, daylight, and social interaction (Vashisht & Rao, 2025). The timber and stone walls alternate, which offers the structure thermal mass and insulation, which allows the interior to feel comfortable even in severe winter and hot summer (Nelson, 2014; Dutta et al., 2022).

These dwellings are characterized by multiple-level sectional organization: livestock live on the ground floor, storage is located on the first floor, and the living quarters are located on the higher levels, which was both functional and seismic (Kannan & Khan, 2016). The terraces and balconies are designed to receive winter sunlight and act as an outdoor room, which facilitates the relationship between the interior and exterior spaces, similar to the courtyards of the plains (Lakshmanan et al., 2023).

Figure 11: Traditional Precedent: Kath-Kuni Dwelling (Himachal Pradesh, Uttarakhand)
(Source: https://www.kaarwan.com/blog/architecture/kath-kuni-architecture-of-himachal-pradesh?id=704)

Decline: Modern RCC Constructions in Hill Stations

The development of reinforced concrete (RCC) buildings in Himalayan hill stations like Shimla, Manali, and Mussoorie is a planned shift away of local climatic, cultural, and seismic experience (Patil, 2025). Glass curtain walls, repetition of floor plates, and low thermal insulation of high-rise buildings do not introduce the use of terraces or open-to-sky spaces, thus removing the environmental and social functions that traditional courtyards used to offer (Narayanan et al., 2012).

Some of the environmental effects are thermal bridging using concrete frames, condensation, mould growth, high rate of heat loss and high amount of energy required to heat the building using mechanical means. Frames made of rigid concrete on sloping areas pose risky seismic conditions (Rodriguez Sanchez and Kapoor, 2025). These buildings, typologically, break the connection between the interior and exterior spaces and do not have any terrace aimed at the winter sun and the central or transitional courtyard, which minimizes visual and social connectivity (Chawhan & Kamal, 2021).

Figure 12: Decline: Modern RCC Constructions in Hill Stations
(Source: Nelson (2014))

Reinterpretation: Earth Glass House, Mukteshwar, Uttarakhand (Studio Lotus, 2020)

Key Features:

The Earth Glass House is a twist on the classic courtyard, placing the building in the forested hillside, 6,700 feet into the Kumaon Himalayas, the surrounding trees and sky are the open-to-sky room (https:// www.habitusliving.com/ projects/ earth-glass-house-india). It is built upon stilts to maintain the ground cover and natural water flow with entrances characterized by a 2-story, skylit courtyard with a sculptural helical staircase. The social and communal areas are sited on the middle level and open to the north-facing deck and south-facing court exposing the occupants to the canopy of the forest.

Construction Systems:

The house is made of three construction methods, which encompass, load-bearing rammed earth walls, mild steel framework, and exposed RCC slabs. The combination enables the structure to adapt to the steep land, the surrounding environment, and the seismic needs with a minimal footprint (Patil, 2025).

Reinterpretation Strategy:

The project redefines the concept of the courtyard as an experience as an outdoor room created by the natural landscape rather than cutting a formal courtyard inside the building. The architecture underlines engagement with the forest and the sky more than the traditional architectural voids, which successfully project the interior program to the natural setting (Williamson, 2016).

Environmental Performance:
Minimal intervention in the natural processes of the site rather than the conventional passive design in the building provides the environmental comfort. Microclimate, daylighting, and ventilation of the building are optimized by its location, orientation, and engagement with trees, proving that the principles of courtyards can be redone to suit the extreme topography and temperate climate (Rodriguez Sanchez & Kapoor, 2025).

Seminar Note:
The example of the Earth Glass House can be interpreted as a modern re-evolution of the typology of a courtyard, extending its principles beyond the planar void to a more immersive experience of landscape and environment, a re-application of the logic of the traditional to the contemporary, forested and high-altitude conditions (Vashisht & Rao, 2025).

Figure 13: Earth Glass House, Mukteshwar, Uttarakhand (Studio Lotus, 2020)
(source: https://www.re-thinkingthefuture.com/case-studies/the-earth-and-glass-house-by-studio-lotus/)

V. DISCUSSION

Patterns of Continuity and Transformation
Comparative study over climatic zones and arcs over time indicates continuity and change in the logic of court yards. The passive thermal control, induced by the natural ventilation and the natural daylighting as the key environmental role of the courtyard, does not vary between the traditional and modern reinterpretations (Verma & Parmar, 2019). But the official approaches towards the realization of these environmental and social functions have become quite varied (Rodriguez Sanchez & Kapoor, 2025).

Continuity 1: The Shallow Plan. In both old and new examples, an interior space should not be too far away to be open to the sky space, but it should also be close to the sky space to provide an effective ventilation and entry of daylight (Kannan & Khan, 2016). Vernacular buildings attained this by open voids that are installed in the building mass, whereas contemporary buildings utilize cruciform geometries, staggered vertical voids, broken roof planes, and volumetric composition to provide the same environmental performance (Williamson, 2016).

Continuity 2: Transitional Spaces. According to traditional architecture, a graded scale of the public street to the interior is formed: the street, the gates, the semi-public court, the verandah, the semi-private court, the interior room (Lakshmanan et al., 2023). Modern reinterpretations maintain this spatial gradient through sunken gardens, split-level buildings, recessed doorways devoid of compound walls, and more than one court with different levels of enclosure (Agarwal & Thussu, 2020).

Continuity 3: Courtyard as Social Condenser. Traditional and modern examples all share a role of courtyards as emotional and communal anchors (Nelson, 2014). The House of Voids expressly refers to the courtyard as a social center, the soaring central court of the Narsighar House is the ceremonial core, spreads this social role among the various specialized voids, strengthening family and communal relations (Vedhajanani and Amirtham, 2024).

Diversification of Reinterpretation Strategies
There are at least five different approaches to reworking the courtyard logic as illustrated by contemporary reinterpretations:

1. Subtraction of Solid Mass: Solid block projects such as the House of Voids cut a hole into the solid block, permitting the environmental and social activities to come to the forefront in dense urban plots where land is scarce and privacy is paramount (Williamson, 2016).
2. Multiplication and Differentiation: The House of Secret Gardens use a variety of smaller courtyards, which are adjusted to the particular functions and microclimatic conditions to add more richness to space and, at the same time, precision to the environment (Vedhajanani and Amirtham, 2024).
3. Sectional Not Planimetric: The Pirouette House, House of Voids, and the Earth Glass House projects use vertical organization as a way of applying the idea of the courtyard. Venturi airflow effects are formed by tapered sections, staggered voids serve as thermal flues, and there is multi-level terrace to the forest canopy to ensure environmental and social performance (https://www.archdaily.com/948757/pirouette-house-wallmakers ; https://www.habitusliving.com/projects/earth-glass-house-india).
4. Tradition as High-Performance Technology: Narsighar House and the House of Memories use traditional materials (masonry with stone, jali screens, evaporative cooling) not as historical references but as experimentally confirmed environmental systems of hot-dry and the warm-humid climate (Jodidio, 2020).
5. Vaastu as Generative Framework: The House of Voids honors the traditional spatial codes as generative concepts, creating a form using cultural continuity and generating functional novelty, proving that vernacular thinking can co-exist with modern design (Vedhajanani & Amirtham, 2024).

5.3 Design Principles for Contemporary Practice

On the basis of the analysis, the following principles are suggested to incorporate the logic of the courtyard into modern buildings:

Principle 1: Embed the Courtyard in the Section. Horizontal is no less significant than vertical dimension. Sectional techniques can be used in constrained urban locations, such as tapered voids, staggered light wells, multi-level terraces, to produce courtyard effects (Vedhajanani & Amirtham, 2024).

Principle 2: Multiply and Differentiate. Rather than one big courtyard, a variety of specialized open-to-sky areas should be designed, each of which is oriented, functional, and microclimate-adapted in order to enhance the environmental and social performance (Agarwal & Thussu, 2020).

Principle 3: Strategically Work with Building Envelope Regulations. FSI/FAR restrictions tend to disadvantage open space, yet as daylight, ventilation, privacy, social space, and stormwater management, courtyards fulfill numerous purposes and thus should not be excluded by economic measures (Nelson, 2014).

Principle 4: Find the Courtyard on Multiple Scales. The logic of a courtyard can be applied at room, dwelling, building, or urban block level, and in contemporary projects, the various scales can be combined to improve the environmental and social performance (Lakshmanan et al., 2023).

Principle 5: Use Tradition as a Technological, Not a Stylistic, Aid. Vernacular courtyard design is empirically tested knowledge regarding the environment. Modern architects need to find functional principles in tradition instead of imitating a form to become climate responsive and spatially efficient (Nelson, 2014).

VI. CONCLUSIONS

Summary of Findings

This paper has followed the socio-spatial development of the courtyard architecture in India, including the historical practices and modern interludes of the architecture in the various climatic regions (Verma and Parmar, 2019). Historical courtyards in hot-dry, warm-humid and temperate climates always offered passive thermal control, daylighting, and social space, as very localized climatic and cultural adaptation strategies (Rodriguez Sanchez & Kapoor, 2025). The comparative analysis revealed that the environmental role of the courtyards has been the same, but formal strategies have multiplied, with current projects using cruciform plans, staggered vertical voids, multi-courtyard sequences, and incorporating natural landscapes, to obtain comparable performance (G & R, 2024).

The study also discovered that the social role of courtyards as a communal and ritual place has been central, even in contemporary re-uses, and projects such as the House of Voids, Narsighar House, and Pirouette House have shown that courtyards still play a social condensing role in the contemporary urban and multi-generational environment (Patil, 2025). Urban densification, modernist planning, regulatory restrictions, and economic pressures were the main factors contributing to patterns of decline, substituting courtyards with

built mass and mechanically conditioned spaces (Chawhan & Kamal, 2021).

Design Principles and Recommendations

The research recognizes that there are several important principles of incorporating courtyards into modern buildings:

1. Sectional Design with Vertical Dimension: Horizontal restrictions can be replaced with vertical ones, staggered voids, light wells, and multi-level terraces to provide ventilation, daylighting, and social purposes (Vedhajanani and Amirtham, 2024).
2. Multiply and Differentiate Multiple smaller courts, with their specific functions and microclimatic needs, are better in environmental and social performance, compared to large courtyards (Agarwal & Thussu, 2020).
3. Leverage Regulatory Flexibility: Regulatory flexibility can be used regarding the inclusion of courtyards with multifunctional value, such as daylight, natural ventilation, privacy, social space, and stormwater management, which can justify their presence in spite of FSI/FAR limits (Rodriguez Sanchez & Kapoor, 2025).
4. Scale-Agnostic: Courtyards can exist at the level of individual rooms, specific dwellings, specific buildings, or even a block of buildings and generate layered environmental and social advantages (Lakshmanan et al., 2023).
5. Use Tradition as a technical resource: Vernacular courtyard design was built on an empirically proven understanding of the environment, and modern architects are supposed to critically engage with it to derive principles but not repeat forms (Nelson, 2014).

These values imply that the courtyard can be rediscovered as a developmental approach to the contemporary urban housing by the architects, planners, and policymakers to provide the environmental comfort, social solidarity, and cultural preservation (Williamson, 2016).

Future Research Directions

To confirm the use of passive strategies, quantitative analysis of the microclimatic performance of modern reinterpretations can be performed in the future by applying computational fluid dynamics, thermal modeling, and daylight simulations (Tabadkani et al., 2022). The effect of the courtyard design on family, multigenerational living, and the urban community network can be studied using comparative socio-cultural research in India (Kannan and Khan, 2016). Also, studies may be conducted on the application of courtyard strategies in high-rise and mixed-use projects, specifically in dense urban areas, to offer directions on how courtyard principles can be extended to the city planning in the future (Agarwal and Thussu, 2020).

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