

## Comparative Understanding Of Aesthetics And Functional Benefits Of Traditional Architecture Elements Of Rajasthan

Sahar Zehra<sup>1\*</sup>, Ar. Sneha Arora<sup>2</sup>

<sup>1\*</sup>Vth Year Bachelor of Architecture, Faculty of Architecture and Planning, Vivekananda Global University, Jaipur, Email: saharzehra2001@gmail.com

<sup>2</sup>Assistant Professor, Faculty of Architecture and Planning, Vivekananda Global University, Jaipur, Email: sneha.arora@vgu.ac.in

### ABSTRACT

Traditional architecture of Rajasthan incorporates a variety of elements that make it both aesthetically pleasing and climate-responsive, ensuring functional and passive design. These architectural features have potential to adapt to the harsh climate and cultural preferences of the region. The use of sandstone, Jaali, and wood creates a sense of warmth and beauty, while the use of windcatchers, courtyards, thick walls, and overhangs helps to keep the buildings cool in the hot desert climate. Therefore, this paper aims to provide a comprehensive overview of the aesthetics and functional benefits of integrating traditional architecture elements of Rajasthan in new developments. The integration of traditional architectural elements into contemporary building designs has gained significance as a means to harmonize cultural heritage with modern development. This review paper investigates the aesthetics and functional benefits of incorporating traditional architecture elements from Rajasthan, India, into new developments. The paper discusses the implications of this integration for climate responsive design, cultural preservation, and the creation of distinctive and contextually relevant architectural expressions. This comprehensive analysis contributes to the discourse on architectural innovation, bridging the past with the present and guiding the future of design by embracing the rich legacy of Rajasthan's architectural heritage.

**Key Words:** Mughal- Rajput architecture, Traditional architecture, Passive cooling techniques, Cultural preservation, Jaipur architecture, Climate-responsive design

### 1. Introduction

Rajasthan's traditional architecture contains indigenous wisdom and design concepts that provide profound insights for current architectural practices. In terms of beauty and utility, it has a lot to offer. One can learn from the past and apply this information to develop more sustainable, energy-efficient, and beautiful buildings in the future by examining the literature. The incorporation of traditional Rajasthani architectural components into modern constructions has the ability not only to enrich the aesthetic appeal of contemporary structures, but also to provide functional benefits that effectively respond to the problems of today's-built environment. The features employed in traditional architecture are mostly practical, although a few elements are added for aesthetic reasons, carrying on some tradition without knowing its function. Reviewing literature on this topic can offer insights into climate-responsive design strategies that can be applied to contemporary buildings to enhance energy efficiency and occupant comfort. The study examines and investigates the design of Jaalis over time, and other architecture elements from its various qualities based on geography, religion, and a variety of other aspects to its modern interpretations and adaptations by contemporary architects. (Lakshmi G Kamath, 2016). Oriels (Jharokha) are an old and effective feature seen in most Indian architecture. Oriels are façade extensions that can be placed in a variety of ways on building fronts and corners. (Irfan Ahmed Memon, 2018). Jaipur constructions are passive in one manner or another. They react passively to the hot and dry climate, and yet they remain in full grandeur. (Manmeet Singh, 2019). Traditional structures reflect the way of life of the people who live there. These structures have a strong influence on the era in which they were built. Similar conditions result in similar house styles; for example, courtyards, terraces, otalas, and balconies or chhajjas can be seen in Jaipur, Jodhpur, and Jaisalmer houses. (Upadhyaya, Transformation in Traditional Havelis: A case of walled city Jaipur, Rajasthan, 2017) Heritage preservation is an important component of city development since it helps in the establishment of landmarks within heritage zones while also generating revenue and supporting the tourism industry. (Nishtha Rathore, 2021). There are primarily two types of buildings: residences ranging from royal palaces to small Havelis, and religious structures like as temples and mosques. Given the local environment, most structures were designed in a courtyard arrangement with additional climate-responsive elements. (Upadhyaya, Traditional Walled Cities of Rajasthan India: A Sustainable Planning, 2015). A thorough analysis of the literature reveals climate-responsive techniques, providing a repertory of sustainable solutions that modern architects may draw on to improve energy efficiency and occupant comfort in current projects.

## 2. Research Methodology

The purpose of this paper is to evaluate the aesthetics and functionality of Rajasthan's traditional architectural elements. The chosen methodology includes an extensive study of literature, an architectural analysis, and a relevance of key structural features in contemporary context. As a result, this approach clarifies the intricate connection between aesthetics and practicality. By adopting a multidisciplinary approach that incorporates historical, cultural, and architectural perspectives, the primary goal is to uncover the principles that historically guided their implementation and design. It contributes to a deeper understanding of Rajasthan's cultural heritage and design elements by exploring the interplay between aesthetics and functionality.

## 3. Historical context of Rajasthan's Traditional Architecture

Traditional Rajasthani architecture is a beautiful and functional blend of natural materials and passive cooling techniques. A sense of warmth and beauty is created by the use of sandstone, marble, and wood, while windcatchers, courtyards, thick walls, and overhangs help to keep the buildings cool.

The Rajput's and the Mughals were two major dynasties that ruled Rajasthan, and their architectural styles have had a profound influence on the region's architecture. Sandstone is a major component of Rajput architecture, as are intricate carvings and imposing forts and palaces. (Manmeet Singh, 2019) Traditionally, Mughal architecture is characterized by domes, arches, and tilework.

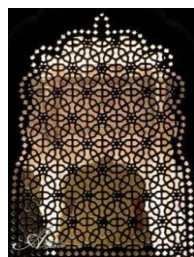
In traditional Rajasthani architecture, there are several architectural elements that have huge cultural significance. Rajput people are known for their strength and resilience; thus, the use of sandstone is symbolic of that. The intricate carvings are symbolic of the rich culture and history of Rajasthan. Symbolic of Rajasthani architecture are domes, arches, and tilework.

## 4. Traditional Architecture elements of Rajasthan

The following are some of the important architectural traits or elements of Rajasthan architecture that are discussed: The use of **sandstone** as a principal building material because it is environmentally benign, an excellent insulator, and a poor conductor. **Facades** and openings intended to respond to hot and dry climatic conditions, with a focus on minimizing sun exposure and increasing cross ventilation. Compact walled city construction with an introverted design centered on a courtyard and **narrow passageways** (gandigali) that serve as air circulation ducts.

Rajasthani architecture is distinguished by the use of arches, domes, **jharokhas**, and brilliant colors. Arches are utilized to convey grandeur and openness. Dome structures are used to represent power and authority. The openings are often identified by the use of cusped, trefoil, or pointed arches with rectangular or chhatra (vaulted dome) framing flanked by lotus columns.

**Jali** screens in Rajasthan architecture beautifully blend aesthetic beauty with climatic adaptability, screening harsh sunlight to create a pleasant, diffused interior illumination while enabling cross-ventilation for natural cooling.



*Figure 1- Jaali*

The **Turrets** or **Minarets** in Rajasthan's forts serve as viewpoints and defensive buildings, adding to their elaborate architecture and offering tactical benefits during battle.



*Figure 2- Turrets at Amer fort*

*Stepwells* were created to store and manage water in the desert heat, assuring a reliable water source and providing cooling relief through their architectural design.



*Figure 3- Baodi or stepwell*

*Domes* and *Arches*, which offer visual appeal and variety to the regularity of architecture on major thoroughfares. (Upadhyaya, Transformation in Traditional Havelis: A case of walled city Jaipur, Rajasthan, 2017)



*Figure 4- Arches*

*Jharokhas*, or balconies, provide views of the surrounding environment.



*Figure 5- Jharokha at Hawa Mahal*

The **Bangaldar** (curvilinear) roof first appeared in stone chhatris and chhajjas (sunshades), but it was later used in other places of Rajasthan as well.



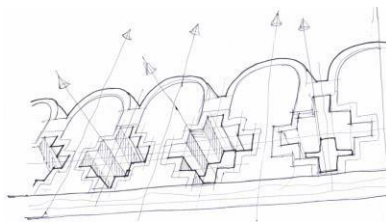
*Figure 6- Bengal Roof on Hawa Mahal*

*Chhatris* serve as attractive pavilions in the desert landscape, providing shade and honoring the state's royal heritage while providing elevated viewpoints.



*Figure 7- Chattris*

The parapets are lined with **Kangoore**, which allows the wind to circulate by also fulfilling their designated function.



**Figure 8- Battlements (kangoore)**

**Courtyards** serve as key thermal insulation and privacy features, acting as a buffer between the outside heat and the indoor environment. **Water bodies** increase humidity and create a cooling impact, reducing desert dryness.

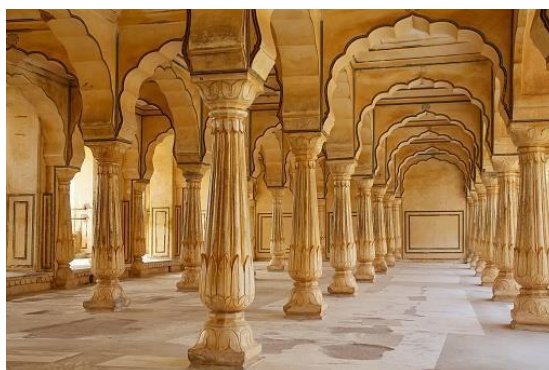
**Figure 9- Courtyard with water body at Amberfort**

A traditional pavilion or open-sided structure with twelve pillars known as a "**Baradari**" is frequently found in gardens or open areas.



**Figure 10- Baradari**

**Hallways** with rows of pillars and beautiful arches that provide shade, encourage ventilation, and blend artistic elegance with useful relief from the scorching heat.



**Figure 10- Hallways**

## 5. Aesthetic Aspect of Traditional architecture elements


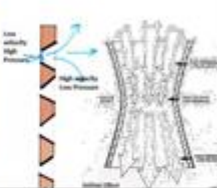

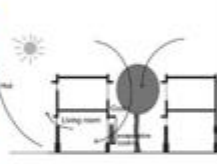




(Akshay Sharma<sup>1</sup>, 2018) In this study the author examines the aesthetics of traditional architectural features in Jaipur, India. It focuses on how functional ornamentation, such as kangoore parapet elements, were used to enrich the visual texture of the building while simultaneously serving its intended purpose. (Irfan Ahmed Memon, 2018) discusses Oriels can be used to determine and beautify the design of dwellings, street fronts, and plaza facades, as well as for façade and roof. They improve the aesthetic and accessibility of all structures. (Lakshmi G Kamath, 2016) reveals that Jaali are utilized for shading and ventilation, and their elaborate carvings give them a delicate and feminine appearance. They are also noted for their mystical aspect, with the light passing through them representing the heavenly world's charms falling on the earth.







## 6. Functional Aspect of Traditional architecture elements

Rajasthani architecture is designed to survive the region's hot and dry climate. Important architectural factors that contribute to this include: Thick walls: Rajasthani buildings' thick walls help to insulate and cool the buildings. Courtyards: Courtyards in Rajasthani buildings provide a shaded area for people to sit and cool down. Windcatchers are towers that are built on top of buildings to draw in cool air. Jaalis are elaborately made latticework screens. They are used for ventilation, dust removal, and heat removal. Jharokhas are balconies that offer views of the surrounding surroundings. They also provide airflow and a place to cool off. (Lakshmi G Kamath, 2016) According to, the Jali shields direct sun rays while allowing cross ventilation and providing privacy to family members, particularly the ladies of the house. The Jharokhas and projection balconies on the building's exterior attract cool air into the structure, which circulates through the rooms and eventually leaves via various apertures to the outside, generating hot air. The size of openings on the outer face of buildings is indicated in to cut out harsh sun and consuming winds, as well as to increase privacy. The buildings are decorated with arches, pillars, and attractive motifs. (Upadhyaya, Traditional Walled Cities of Rajasthan India: A Sustainable Planning, 2015)

## 7. Relevance of Traditional elements in Modern context

Traditional components can be used by architects to create a modern building that is nonetheless based in the local culture. (Gangwar, 2016) The study examines how architects might use historic components to create a modern building that is still culturally relevant. For example, the Project 72 screen uses only one characteristic, traditional Jali, but it is used so boldly that it has formed its own identity with only one element. It also highlights the Pearl Academy of Fashion's use of traditional architecture for its adaptability in the current setting, such as the usage of Jali, step well, sunken floor under the soil, and so on. The structure demonstrates how conventional features can be converted into a new identity in architecture.

Elements	Description	Modern context	Functional use
Jaali	The facade features folded planes in various directions producing external green areas for greater heat insulation and thereby cooling office interiors.		
Courtyard	The semi-sheltered courtyard features various angled pathways that connect the two parts of the school with landscaped play places that encourage participation.		
Turrets	the facade are linear turrets and the top dome is articulated in a sloping profile.		
Thermal Mass	The Jali double skin is 4 feet distant and serves the primary function of supplying air, privacy, and light.		

Water Body	Elements such as a courtyard, jail, and a water body in the form of a step well were influenced by Rajasthan's traditional baodi		
Small Openings	Air movement and visual interactions across corridors are enabled via perforated facades.		
Arches	Traditional components such as recessed circular openings, arches, and skylights are strategically placed to bring fresh air and daylight into the living rooms.		

## 8. Conclusion

Traditional architecture can be found in some of Rajasthan's most renowned tourist locations, including the Amber Fort, Jaisalmer Fort, and Jodhpur Fort. All of these forts are UNESCO World Heritage Sites, attracting millions of visitors each year.

Some of the advantages of retaining historic architectural aspects are as follows: It has the potential to enhance tourism and create jobs. It can aid in the preservation of Rajasthan's rich history and culture. It can provide small communities a sense of location and identity.

At the end, the investigation into the aesthetics and functional benefits of Rajasthan's traditional architectural characteristics reveals a complex interplay between cultural richness and practical design. It emphasizes the importance of preserving and adapting historic architecture to modern times, particularly in light of climate change. Using a comparative lens, it has decoded how these pieces perfectly integrate beauty and utility, embodying the spirit of a historic heritage. The lasting value of these architectural marvels demonstrates the region's creativity and perseverance, and they offer as important lessons for modern design. Preserving and creatively combining ancient elements into modern contexts not only maintains history, but also offers everlasting inspiration to the architectural world.

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