

Study on the Cultural Impact of Local Materials in Regional Architectural Design

Lingwen Sun^{1,a,*}

¹Shanghai SMIC Private School, Shanghai, China

a. lingwensun@ldy.edu.rs

*corresponding author

Abstract: As a result of globalization, architectural design has also integrated into the trend of becoming unified. However, regional architecture has become something that opposes unification, allowing each region to maintain its unique characteristics while also protecting the environment. This research focuses on the cultural meaning of natural materials utilization in regional architectural design, allocating the specifics for how the local materials influence both ecological and cultural importance. Positive results arrived at by case studies of architects who used local materials in architecture confirm the role of local architecture as a mediator between cultural heritage and sustainable development. Utilizing literature analysis as a mode of study to critically examine the historical background, technological advancement, and socio-economic condition helps the stimulation of regional architecture. The research elaborates on the importance of using regional materials as a way to develop architectural practices that reflect cultural identity as well as to ensure the ecology of the area. Finally, the paper gives a brief discussion on the future development direction and trends in the regional cultural aspects of architecture design.

Keywords: Architecture, Regional Architecture, Sustainable Design, Globalization, Culture.

1. Introduction

The 21st century is a time of rapid scientific and technological advancements. People's lives have become more colorful, and communication technology has led to globalization. The living space is intimately linked and has become a real "global village". The phenomenon of "cultural convergence" has a significant impact on national and regional culture due to economic globalization. Many dwelling designs disregard the true qualities of architecture and regional culture in order to align with global trends or owner needs.

Regional architecture is not just a kind of style, it is a reflection of the local weather, materials, and culture. Therefore, architecture comes up with buildings that blend with their environment. In the drive toward globalization, the uniqueness of individual regions may get lost. Uniform global tastes displace unique local designs. The present research underlines the role that regional architecture can play in the preservation of cultural heritage, besides its contribution toward sustainability.

Regional architecture originates from unique environmental and cultural parameters that are characteristics of a region. It responds to specific climates using materials found locally thereby producing aesthetically pleasing structures that also serve their purpose. For instance, traditional houses in hot dry zones such as Middle East have thick walls with small windows allowing for cool

interiors whereas Scandinavian homes in cold areas have steep roofs to prevent snow buildup and wood roofs that retain heat well. These adjustments reveal how architectural designs are influenced by local conditions, hence enabling buildings' suitability with respect for their surroundings.

The historical context of regional architecture reveals evolution through adaptation to environmental conditions and the use of locally available resources. Early human settlements maximized available materials. They reacted to the climatic conditions innovatively. This early architecture has been evolving since then, keeping up with the changing technology and socio-economic conditions. However, it strongly relates to the cultural and environmental contexts. The Theory of Critical Regionalism, postulated by Alexander Tzonis and Liane Lefaivre in 1981, promotes harmony between the global developments in technology and the traditional architectural language of a region. It thus ensures that the modern buildings would express the regional identity.

The best examples of regional architecture are represented by architects like Wang Shu and Laurie Baker. Wang Shu is a winner of the Pritzker Architecture Prize; he brings in traditional Chinese construction techniques by using recycled materials in his designs. For example, his work at the Ningbo History Museum embraces the cultural and historical aspects of architecture. The same case applies to Laurie Baker, an English-born Indian architect who is famous for using local materials and traditional working techniques in India. His designs are of low cost, eco-friendly, and responsive to local climatic conditions, hence making architecture affordable to people of different social statuses.

Architecture at regional levels not only preserves cultural heritage but also promotes sustainability through the use of locally available materials and traditional techniques of construction, thus reducing the environmental impact of construction which also supports local economies. Naturally abundant materials in any region improve the thermal performance and durability of structures. For example, this approach will ensure that buildings are sustainable as well as culturally significant.

1.1. Definition of Regional Architecture

Regional architecture embodies the unique characteristics of building styles and concepts that are distinct to specific geographic regions, driven by local climates, materials, and cultural influences aiming to help establish local identities that would otherwise be erased by Western-minded globalization (modern, ancient, traditional, postmodern, neoclassical, old, vernacular, structural, deconstructive, etc.) are integrated into the architectural design. Many architects regard "minimalism" and "modernism" as the most popular and advanced design principles in fact, leading to the appearance of the same cultural face in many regions and different nationalities [1]. Unlike architectural styles that can be applied worldwide, regional architecture is applied to fit the specific environmental and cultural needs of a region, ensuring buildings are aesthetically pleasing, functionally appropriate, and at the same time sustainable.

1.2. Historical Context and Evolution

In 1981, Alexander Tzonis and Liane Lefaivre first mentioned the term Critical Regionalism in their article "*The Grid and the Pathway*," followed by Kenneth Frampton's 1983 article on the same subject [2]. Historically, regional architecture has evolved through adaptation to environmental conditions and the incorporation of locally available resources, leading to distinct regional styles. Early human settlements created structures that maximized the use of available materials and responded to climatic conditions; by comparing two regions with extremely different climates, in hot and dry regions like the Middle East, buildings were designed with thick walls and small windows to keep interiors cool, as seen in traditional mudbrick houses. In contrast, Scandinavian houses in colder climates featured steep roofs to prevent the building up of snow and wooden construction to retain heat. The "culture of building" has always been influenced by technological advancements, the construction industry,

modes of production, and socioeconomic conditions. When industrialization brought mechanical tools to India, these technologies were imported from Western civilizations. This foreign concept of mechanization and modernism led to subdivisions in the construction process, illustrating how a country's building practices can be profoundly affected by Western cultures and countries. Global references adopted by the mainstream construction industry sometimes led to "homogenizing architectural styles" to a "universal pluralist average," masking the unique characteristics that set a location within the global context, but globalization has also made it easier for different fields of knowledge to interact with one another, increasing access to knowledge and research [3]. The traditional design process has evolved due to integrating global technologies and concepts from Western civilizations. Nations like India are adopting nationalism in their architecture more and more to those pressures. Through their distinct cultural and historical backgrounds, they hope to produce architecture that divides them from the mainstream worldwide aesthetics. Since the 1990s, the world has entered an era of diversification, and the cultural pattern of the world has undergone great changes. Generally speaking, the two basic orientations of architectural design in today's world are "globalization" and "localization". People began to consciously realize the use of local resources to develop "regional culture", and the pursuit of "regional culture" to highlight their uniqueness. In the 1930s, Frank Lloyd Wright used the Theory of Organic Architecture to perfectly combine architecture with regional environment. Wright's creation of "Fallingwater" is a villa cast over a waterfall and combined with the surrounding natural environment. Wright's bold concept and the world's most famous modern architecture are still unparalleled. After the 1970s, famous Finnish architect Alva, his works show not only the language of internationalism but also the humanistic culture and regional culture. The famous architects Charles Correa from India and Hassan Fathai from Egypt created modern buildings with distinct regional features through unique forms and layouts based on the local climate and lifestyle. Since the 1980s, Tadao Ando of Japan, Stirling of Britain, Botta of Switzerland, Yeang Jingqu of Malaysia, and many famous architects in China have devoted themselves to the further study and exploration of regional cultural architecture. Therefore, regional architecture is an important aspect for a country to preserve its identity, as buildings are more than just functional spaces; they are representations of cultural values, traditions, and histories. Looking at the architecture should make the audience recognize which culture the building is showcasing.

1.3. Importance of Regional Architecture in Preserving Cultural Identity

Looking through worldwide architecture, people express their unique identities and heritage, from the wooden structures in temples of Japan, and the adobe dwellings of Southwest America, to the colorful decorated houses of Caribbean islands all tell stories about the people who built them [3]. By maintaining regional architectural practices, communities can safeguard their cultural heritage against the unification forces of globalization. Additionally, regional architecture promotes sustainability by using locally sourced materials and traditional building techniques adapted to the climate, pays close attention to the information feedback from natural factors around, stands for the effective integration and orderly usage of the place factors, such as topography, climate, sunshine and so on, and objects the tendency of "universal civilization".

In an era of increasing importance of sustainability, the creation of regional architecture provides a unique value for the environmentally responsible and culturally sympathetic built environment. Therefore, regional architecture takes a role in the built environment, which reflects the diversity and richness of human culture, and at the same time, evolves through the extremely complex interaction of history, local environment, and social factors, to protect cultural identity and promote the sustainability of regional architecture.

2. Case Study

2.1. Wang Shu

Pritzker Architecture Award Winner Chinese architect Wang Shu is known for his study of regional architecture. His construction methods emphasized the combination of modern and traditional Chinese construction techniques, using recycled materials, such as abandoned houses or useless bricks in villages, incorporated into the old with the new [4]. Therefore, he advocated a thorough understanding of the cultural and historical background of the architecture. His methods are creating important architectural structures with solid Chinese culture. Wang Shu's most famous project is the Ningbo History Museum, which is a good example of how he uses local materials and practices. The front of the museum consists of some old bricks, tiles, and stone preserved from the old village [5]. This approach reduces the amount of waste generated while maintaining the historical continuity of the structure.

The Xiangshan campus of the Chinese Academy of Arts is another famous undertaking. It is a blend of bamboo and rammed earth, two traditional Chinese architectural elements, with modern educational characteristics — a complex but harmonious relationship of traditional and modern which makes up the main characteristics of the study [6]. Wang Shu's works not only had a profound cultural influence but also triggered a new cultural revival. If people look through the prism of contemporary growth, his works can be immediately named as the liberators of the times. His architectural solutions to urban problems, as well as the protection of nature and the connection of this all to the Chinese cultural tradition, are exemplified in his work. Furthermore, this particular way of conducting work, in parallel with the mere treatment of cultural heritage, adds the function of architectural image improvement and economic viability.

2.2. Laurie Baker

Laurie Baker, an English-born Indian architect, is known for his contributions to the architecture of the Indian regions. Baker is famous for using simplicity in his architecture and has been known to build structures that are both functional and aesthetical without the need for any ornamentation. His work mainly involves the installation of elements that are especially responsive to the local climate conditions, like the passive cooling systems, showing people how concerned he is with the aspects of local environmental and cultural identity. Laurie has gained a lasting reputation through his smart application of local materials such as bricks and stones in his designs which are primarily related to the Development Research Center and the Indian Cafe. He mainly used traditional methods like trap-bond bricks, which are known for the fact that they have improved the thermal properties and also lowered the prices of the materials. Baker's project is a model of simplicity with both cost reduction and sustainability being the main concerns and was especially directed towards creating buildings that are accessible to people of different social statuses. The intersection with Laurie Baker's work has been one of the elements in India's long-standing cultural influence over its time. Baker's architectural style was lauded in Kerala because it could adjust to the local climate conditions as well as represent local customs [3]. A total of the architect's posterity from the time of his first style to the latest one with emphasis on ecological approach and local resource utilization became the role model of many subsequent builders and engineers. The widespread use of Baker's approach and his structures have continued appeal that are now valued for their practicality, aesthetic appeal, and cultural significance as clear proof of his heritage.

3. Discussion on Cultural Impact and Development

Regional architecture has a significant effect on the protection of cultural heritage because while ensuring that the architecture blends in with the local landscape and technological innovations remain distinct in the face of urbanization and globalization, it also manages to keep the traditional architectural designs and materials [7]. The interconnection of historical aspects with the physical environment is the reason for geographical architecture to be the preserver, propagator, and reflector of the cultural events of the past. Conservation is not limited to aesthetics but also includes the skills and knowledge of local artisans and construction workers, which are essential to preserving the cultural heritage of the community. The principles of geographic architecture can greatly influence the spread of culture by showing the uniqueness of regional identities to a wider audience [8]. By recognizing local traditions, materials, and structures, architects promote cultural understanding and appreciation across borders. This dissemination can be achieved through tourism, scientific research, and international architectural exhibitions that highlight and celebrate the unique image of regional architecture. By placing greater emphasis on the value of local traditions and practices, regional architecture can inspire similar approaches in different parts of the world and help promote global awareness of cultural diversity. The future development of regional architecture lies in the continuing exploration of the relationship between tradition and modernity, past and now. Architects must find more innovative ways to integrate modern technology with modern needs into the historical and local cultural context. This includes the use of digital tools to improve traditional building techniques, the development of new materials for local architectural features, and the design of building structures that can adapt to climate change.

Before the development of the West, humans used to live in a world where each country had its unique characteristics. Due to the cultural differences left over from different regions and different historical periods, the diversity of national customs, ethnic backgrounds, natural conditions, and living environment forms this colorful world. After human evolution and development to the present, every country should have a different, relatively fixed history, which is why there are different religions, folklore, and different cultures. As a result, regional architecture is critical for reducing architectural style assimilation while preserving regional features. Furthermore, as sustainability becomes increasingly essential, regional architecture will play a critical role in developing environmentally responsible and culturally significant techniques to ensure that future generations may experience a rich and varied built environment [9]. Local materials are the foundation of sustainable construction practices, with environmental and economic advantages as their use reduces the transport-related carbon footprint and boosts local economies by providing jobs and sustaining traditional industries. In addition, local materials are often well suited to their environment, increasing the longevity and resiliency of buildings. For example, naturally abundant materials, such as stone in mountainous areas or clay in desert areas, can improve the thermal performance and durability of structures. Giving priority to locally sourced materials enables regional buildings to promote environmental sustainability while maintaining their cultural essence, resulting in structures that are both aesthetically pleasing and environmentally friendly [10].

4. Conclusion

To sum up, regional architecture is an important characteristic in the built environment that connects yesteryear and today, nearby and across the globe, traditional and modern. This helps to counteract the homogenizing effects of globalization and thus saves and promotes individual cultural identities as well as natural features of different parts of the world. Regional architecture preserves culture through construction techniques that have been passed through generations. It is also concerned about protecting or sustaining the environment by using local materials available around them.

Over time, these architectures evolved in response to their specific climates, materials, and societies. It is highly significant for them to deal with challenges like climate change, deforestation, etc. It can be determined from what architects such as Wang Shu, and Laurie Baker achieved that regional architecture can incorporate contemporary needs into conventional practices thereby generating buildings that are innovative but rooted in their cultural background. They revitalize without losing identity hence making sure they last long.

Moreover, the principles of Critical Regionalism support the merging of technology and local knowledge in architecture aimed at maintaining relevance and respect for the environment. This does not negate the homogenization of cultures by globalization. It also enhances architectural diversity through meaningful designs. The future of architecture looks forward to remaining innovative and at the same time respecting its heritage. Incorporation of tools and modern materials can transform building techniques into more efficient structures that can address contemporary needs. Architects have to keep searching for a compromise between tradition and modernity so that their works can reflect the mosaic image of human culture.

Regional architecture is more than just a style; it embodies an outlook that suggests culture, nature, and machinery are interrelated. It emphasizes identity as well as sustainability hence making way for architectural practices that are acted upon by cultural contexts. Within these challenges, regional architecture becomes part of 21st-century solutions in designing built environments inclusive, sustainable, and reflective of collective humanity.

References

- [1] Zhang, Q. (2011). *Regional culture in architectural space in the field of applied research (Doctoral dissertation)*. Nanchang University.
- [2] Botz-Bornstein, T. (2016). *Transcultural architecture: The limits and opportunities of critical regionalism*. Routledge.
- [3] Nanda, P. (1999). *The culture of building to craft--a regional contemporary aesthetic: material resources, technological innovations and the form-making process (Doctoral dissertation)*. Massachusetts Institute of Technology.
- [4] Wang, Z., & Sun, Y. (2018). *Analysis on the "regional" expression of traditional materials in contemporary architecture -- A case study of Wang Shu's design*. *Architectural Engineering Technology and Design*.
- [5] Zhang, C., Tian, Y., & Ren, D. *The effect of critical regionalism thoughts in architecture on contemporary Chinese architecture*.
- [6] Zhang, C. R., Tian, Y., & Ren, D. J. (2012). *The effect of critical regionalism thoughts in architecture on contemporary Chinese architecture-localization trend of Chinese architecture in the 21st century*. *Applied Mechanics and Materials*, 209, 183-190.
- [7] Guitart, M. (2023). *From local to global: Reconsidering material experience in the age of global regionalism*. *Change Over Time*, 12(1), 118-138.
- [8] Curtis, W. (1985). *Regionalism in Architecture session iii. Regionalism in Architecture*.
- [9] Hyde, R. (1998). *Regionalism in architecture as a cultural identity*. *Queensland Review*, 5(1), 61-68.
- [10] Golden, E. M. (2017). *Building from tradition: local materials and methods in contemporary architecture*. Routledge.