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Adaptive Reuse of Historic Buildings for Preserving the Past

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Abstract

Making an item from completely new raw materials has a significant negative impact on the environment. This can be significantly reduced by recycling or reusing items for purposes other than those for which they were designed. This logic also applies to buildings, where the structure may be retained even if the user is modified. Modifying existing structures—those that were once used for one purpose but are now employed for another—while preserving their original historic elements is known as adaptive reuse. It changes and revitalizes the historic fabric of the city. A building's adaptive reuse should preserve the building's and its surroundings' historical relevance while having as little of an adverse effect as possible on the environment. Adaptive reuse explores the alternatives between destruction and recreation by providing a location with a new cycle rather than locking it down in a particular moment. Adaptive reuse maintains its lengthy history by tackling the issue of land scarcity and adding a new layer without undermining the foundations of earlier levels. Countries tend to protect their historic monuments that symbolize their legacy in order to help communities keep their diverse environmental personality and heritage because of the world's rapid growth and development. The adaptive reuse technique is used for this purpose, and the phrases "adaptive reuse" and "renovation, refurbishment, and rehabilitation" are occasionally used interchangeably. This study intends to distinguish each word in relation to a framework that has been investigated in the literature while adaptively utilizing historic structures and determine the potential value that can be achieved by considering the three sustainability pillars.

Keywords

Restoration, Adaptive reuse, History, Heritage, Revitalization, and Re-architecture.

1. Introduction

Adaptive reuse will backfire if it fails to maintain the building's historical relevance. "Uncanny conversions: adaptive reuse's good, bad, and dirty aspects" (Hong and Chen, 2017). A successful adaptive reuse project adds a modern touch while maintaining the structure's original value. The history of India is extensive, spanning over 4,000 years. Over the years, our forebears have constructed some of the world's most amazing architectural marvels. The historical items are nonetheless divided into two groups (Ugaz et al. 2023). The first are monuments that have garnered historical value throughout time and draw a lot of tourists due to their original function, size, layout, and location. The second category consists of historic structures that are not listed, such palaces and havelis, which are important historical and cultural landmarks but do not attract tourists. Giving these antique buildings suitable modern usage is therefore essential to reviving them (Alhojaly et al. 2022). Nonetheless, our future generations might benefit from and be aware of our heritage and origins. It's critical that architects, historic preservationists, and municipal planners collaborate to talk about the environmental advantages of adaptive reuse (Yazdani Mehr, 2019). In order to address the environmental benefits of adaptive reuse, city planners, architects, and historic preservationists must work together as our cities continue to grow and new structures must be constructed to meet this need. As our cities continue to grow, new structures must constantly be constructed (Yazdani Mehr and Wilkinson, 2020; Nugroho et al. 2024).

Heritage buildings may be converted into accessible and usable spaces through adaptive reuse, which will benefit the neighbourhood in a long-term manner (Mısırlısoy and Günçe, 2016). Stronger ties between current and future generations are beneficial for the sustainability of society (Wong, 2024). In order to boost the economies, more jobs are created and tourists are attracted to the cities. Embodied energy, or the amount of energy used from the procurement of natural resources to the delivery of the product, was decreased in terms of environmental sustainability (Arfa et al. 2022).

1.1. Aim

This study's objective is to examine the opportunities and difficulties involved in modifying old buildings for modern use.

1.2. Objectives

- To investigate the legislative frameworks and quality standards related to adaptive reuse projects in historic buildings.
- To investigate the benefits and challenges of environmentally friendly adaptive reuse of historic buildings.
- To find cutting-edge technologies and design approaches that can help restore historic structures for contemporary use.

1.3. Intervention Types Used in Historic Structures

Preservation: The monument's reputation is maintained by every action. Preserving the site's current condition and minimizing degradation.

Conservation: include all proactive safety precautions and repairs that extend the building's lifespan and preserve its historic character (Jain and Babu, 2024). Every maintenance procedure protects the site's cultural value.

Maintenance: Both proactive conservation and preservation measures are included in maintenance throughout a building's life. Ongoing protection of a location and its surroundings.

Restore: steps to bring back the functionality or appearance of the former building. Renovation is the process of improving a structure to satisfy functional and/or financial needs.

Rehabilitation: is the process of giving a historic structure a new use that highlights its architectural qualities.

Renovations: are steps done to update a building's elements, such making a historic building more energy-efficient.

Restoration: is the process of restoring a site to a known prior state by removing accretions or reassembling existing pieces without the addition of new material. It involves mending an existing structure to its original state.

2. Restoration and Rebuilding

The globe is currently facing difficulties in using natural resources sustainably. The problems are particularly severe in developing nations like India, where raising the standard of living for the majority of people requires consideration of already depleted natural resources. Over the next 15 years, an estimated 200 million Indians would move from rural to urban areas. The magnitude of the shift will be almost equal to the combined population of France, Germany, and the United Kingdom, placing a significant burden on those cities (Plevoets and Van Cleempoel, 2012). India's construction sector is flourishing due to the country's increasing urbanization, and the country must continue to grow responsibly in the future. Even though cities play a significant role in our nation's economic development, it can be difficult to manage the expansion of both new and current metropolitan areas while providing basic facilities like housing, clean water, and air (Cantell, 2005). Since development is expected to grow at an unprecedented rate, the built environment has taken center stage in these talks (Hein and Houck, 2008; Gunasundhari and Induja, 2015). Strategy for Adaptive Reuse of Historic Buildings shown in Figure 1.

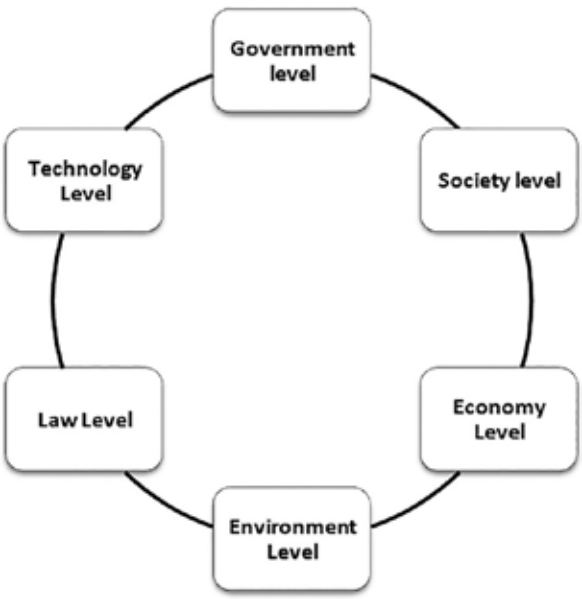

Figure 1. Strategy for Adaptive Reuse of Historic Buildings

The construction industry currently uses 35% of India's electricity. Furthermore, the commercial sector is currently increasing at a pace of 9% yearly, and it is predicted that this sector as a whole will develop at a rate of 6.6% annually until 2030. The built-up area is expected to grow from one billion square meters to four billion square meters for the commercial sector and from eight billion square meters to 37 billion square meters for the residential sector by 2030, according to a recent McKeown study (Yazdani Mehr, 2019). Education is the foundation of workforce development and plays a significant role in the development of professionals at different levels. As a subset of the larger educational system, architectural education must fulfil the same purpose as general education, albeit in a different way. The standard of architectural education ought to directly influence that society's architectural output. This focuses the significance of the Architecture profession in India and conspicuously generates huge need of the developing new architecture institutes to impart architecture education at very rapid pace in India. In last five to ten year, it creates immense demand of new specialized educators or teachers to inculcate present day contemporary needs of architecture profession in the incoming generation of architecture professionals, who should have the well-defined perception of architectural education with the knowledge of required components in the curriculum of B.Arch. But due to ignorance of this issue, the output result or new professionals generated are not playing the role which society demands from them. Although, the modification of B. Arch. level curriculum started to obtain satisfactory awareness, but demanded professionals are very few in overall architecture professionals every year. This requires a better understanding of pedagogies, methods for learn, teach and syllabus expansion for educational growth in architect academic organization. One of the most important ways to promote a sustainable built environment in India is to prepare the next generation of engineers and architects.

3. The Historical Development of Architecture

In the late nineteenth century, the British brought the architectural education system that we use today

to India. Producing assistants for the well-known British architectural firms in India was the goal of the establishment of architectural education in that country. As a result, architecture education course content was structured appropriately. Instilling and maintaining culture is the goal of all education. A subset of the entire educational system, architectural education must fulfil the same purpose as general education but in a different way (Conejos et al. 2011). The standard of architectural education ought to directly influence that society's architectural output. The British-introduced educational model did not align with the overarching goal of producing architects with academic credentials. The foundation of India's current educational system is the standardized architectural education pattern that the British brought, which has persisted in the majority of architecture schools even after 70 years of independence. The "Council of Architecture" (COA), a statutory agency of the Indian government, oversees architectural education in the country. Section 21 of the "Architect's Act," 1972, established minimum criteria for architecture education, which were thereafter applied to Indian "Schools of Architecture" in the 1980s. They must adhere to the bachelor's level minimal requirements. The disciplines to be taught in architecture schools, the educational format, the minimal infrastructure needed, etc. are all suggested by these minimum criteria of architectural education. Under the auspices of the Council of architectural, 463 architectural institutes offer bachelor's degrees in architecture (Chen et al. 2018). Strategy for Adaptive Reuse of Historic Buildings shown in figure 2.

However, the Council of Architecture has somewhat standardized postgraduate courses, and in general, postgraduate programs in India are intended to teach professional specializations such as master's degrees in architectural conservation, urban design, interior architecture, landscape architecture, etc. not for coping the present growing need of specialized architecture educators.

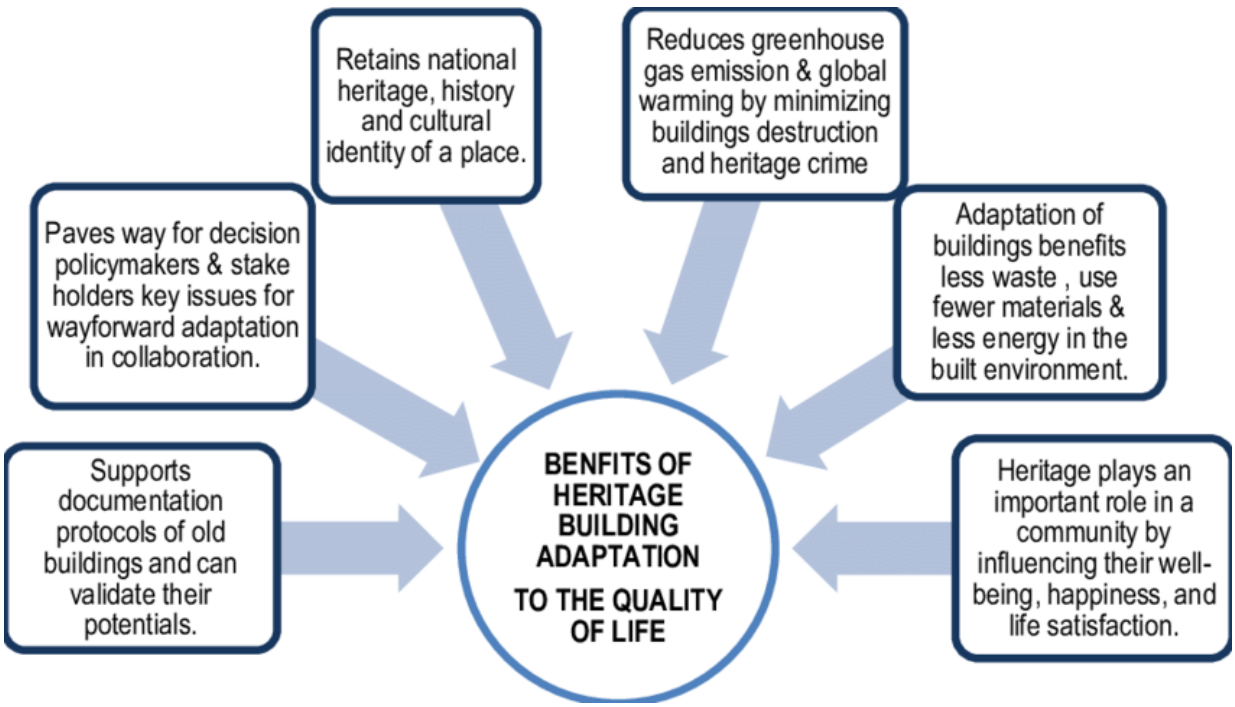

Figure 2. Strategy for Adaptive Reuse of Historic Buildings

4. Role of Architects to Stimulate Sustainable Built Environment

The people that work in building and construction are in charge of creating the constructed environment that influences our behaviour and way of life. Since students will be our future planners and architects, it is crucial that they understand how their attitudes, actions, and behaviours will affect both human health and the environment in the future (Sharifi and Farahinia, 2020). A sustainable built environment is defined as "the creation and responsible management of a healthy built environment based on resource efficient and ecological principles." By making optimal use of materials and energy, sustainably built buildings aim to lessen their negative effects on the environment. Sustainable design is the deliberate fusion of architecture with structural, mechanical, and electrical engineering. Additionally taken into account are the traditional aesthetics of massing, proportion, scale, texture, shadow, and light. In order to maintain a balanced ecological, social, and economic system, the multidisciplinary idea of sustainability calls for involvement from all societal levels. Architects are implicitly involved in preserving the sustainability process since socioeconomic and ecological conditions are reflected in the built environment. Since architects are essential to the construction of the built environment, they play a crucial role in illustrating and suggesting this idea. So, it is very crucial for the architects of India to be made aware of their responsibilities by incorporating the concepts of sustainability from a very elementary level of architectural pedagogy (Djebbour and Biara, 2020). The long-term costs of the environment, economy, and people must be a concern of the architectural design team. All sustainable design is not so much a specific architectural style as it is a building concept. At every stage of the construction industry, from design conception to building administration, the significance of resource management and energy efficiency is becoming increasingly apparent. That's mainly what the architect instills. In fact, sustainable development must embrace a wide range of human activities, including economic, sociocultural, ethical, and aesthetic values, in addition to environmental and technical concerns about energy consumption, resource management, and CO_2 emission reduction, in order to guarantee that future generations can meet their needs at the same level as they can now. Through their educational approaches, architecture schools significantly contribute to encouraging and motivating students to acquire sustainability competencies. At the operational level, however, it is imperative that architectural programmers incorporate sustainability into their curricula and training strategies. Few studies have been done on how to operationally empower the necessary coherency among components and how to institutionally express the curricula and pedagogical practices of architectural programmers. Given that the relationships between the courses create the curriculum's framework and contribute to the students' knowledge and abilities.

5. New Addition to Building

Expansion of the area and the introduction of fresh, ethically sound services. The historic estate was enlarged to accommodate guest rooms, a swimming pool, and facilities like air conditioning, lighting, a lift, water supply, drainage, water recycling, and a treatment plant in order to satisfy the standards of a contemporary hotel. The components, building methods, materials, finishes, and architectural style and character of Tamilnadu are all followed to maintain continuity. Additionally, new spaces are built with care for the existing historic fabric in order to meet the current requirements of a historic hotel. The following are the ways the new addition does this:

1. As a sill extension, adding a Thinai distinctiveness to the guest bedrooms.
2. Using hardwood tables, chairs, and drawers with traditional Tamilnadu detailing.
3. Using materials for the new addition that blend in with the existing mansion, such as baked brick for the walls, lime wash, Tamilnadu plaster, and a wooden false ceiling. Additionally used are old doors and door frames that were bought from run-down Tamilnadu homes.
4. To avoid taking away from the overall design, carefully positioned attached toilets have been put in guest bedrooms, with a channel in the walls to allow the plumbing lines.

Figure 3. Adaptive Reuse of Historic Buildings

5. Using new materials, little elements like electrical accessories like switches and switchboards have been replicated while maintaining the original standards.

The people who live in a location are responsible for protecting this identity. Tourists view the city as a means of getting to a tourist site and relate to a place on an emotive and evaluative level. Visitors experience and take back with them the sense of solidarity that the locals exhibit in a city's place identity. Adaptive Reuse of Historic Buildings shown in figure 3.

While the preservation paradigm concentrated on fossilizing the structure, the conservation paradigm protected it by assigning a more protected use, and we see a shift from object to process and outcome in the two paradigms. Scholars believe that structures and locations help to transmit historicity, which helps to meet a wide range of contemporary socioeconomic needs. The heritage paradigm aims to use the past by preserving it and using it to satisfy the contemporary space requirements. It does this by using relics, memories, and histories to create an image of the past that can be seen and utilized in the present. According to, heritage is about creating something new rather than only conserving what has already been done. A heritage approach differs greatly from a preservation strategy in how it views the three main temporal dimensions of the past, now, and future. According to a preservationist, it is the duty of the present to choose and protect artifacts from the past for the benefit of coming generations. Historic Buildings towards a Resilient shown in figure 4.

Additionally, a location may often act differently throughout the day and at night. The amount of interaction between users and the physical environment is restricted to the nearby area at night. On the other hand, the visual scope of the actual surroundings expands during the day when natural light is present.

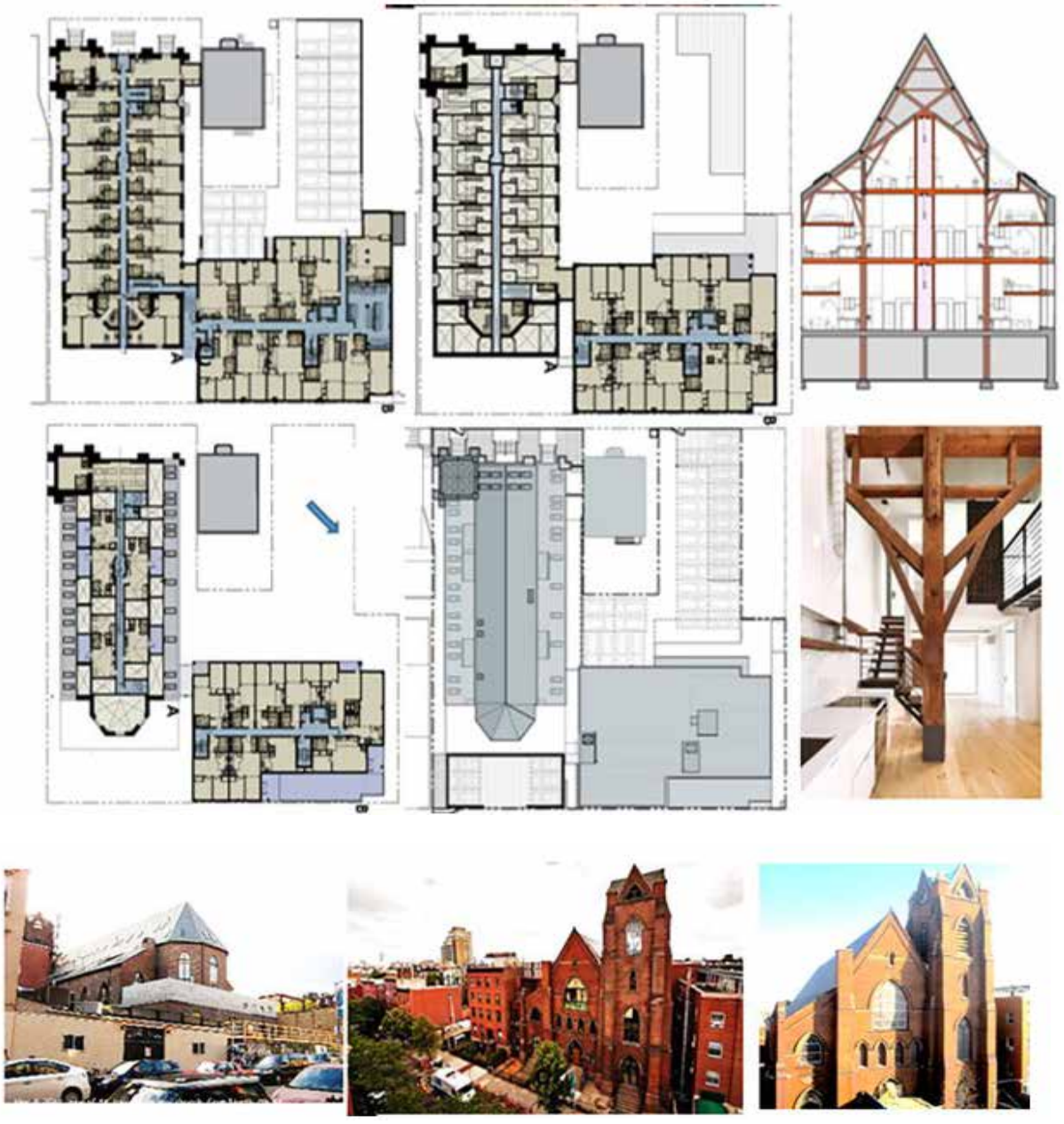

Figure 4. Historic Buildings towards a Resilient

This results in a larger visual canvas, and the place identity is likewise influenced by other items. Thus, the variables of natural and artificial light can be further examined in the research of place identity and architecture. As efforts to save old architectural spaces and monuments have continued for centuries, our built surroundings are growing more crowded. Land resources are under stress due to population growth, therefore we must reconsider how we allocate and use space. In nations that have not yet established efficient strategies for conserving historically significant building environments and the culture that surrounds them, this may appear overly dramatic. The architectural and functional features of a built area define how connected an individual is to their surroundings. The narrative is carried over into the future by the historic architectural environments. One way to support cultural continuity is to preserve the built surroundings' historic architectural settings. Community growth and the preservation of cultural heritage are interdependent and related. Users of a location are given a common identity by the heritage-built settings. It is possible to use this identity to create souvenirs and memories for the location. When tourists travel to a city with a heritage reputation, they can be carrying the identity markers. Therefore, we might deduce that a place's architecture affects its identity. A historic city's cultural legacy can be both material and immaterial. In order to preserve this legacy, we must take into account a location's historic significance. By maintaining the historic structures, protecting their constructed surroundings, and viewing it as a living heritage landscape, protection can be achieved. Depending on how the user perceives it, the architecture of a heritage area may be duplicated or abstracted during urban renewal or growth. For utility-based utilization of architectural heritage, the identity-creating components from the original precinct may be duplicated. Additionally, the heritage's identity-creating architectural aspects may be abstracted in order to appreciate its beauty.

6. Conclusion

This study demonstrates the significance of location and belonging as well as how they impact place identity. We have talked about how a city's place identity is influenced by its built environment architecture. The way a place is perceived affects its identity, and urban renewal or growth can make use of collective identity. We have identified a number of prospects for further research with this study. Future research will focus on using this knowledge in real-world urban planning scenarios. By building its brand value and promoting it, it finds use in the travel industry. The city may immediately promote itself as a heritage tourism destination and strengthen its brand image by utilizing the identity-creating qualities of its architectural legacy. Both economic growth and tourism are stimulated by a strong brand value. For the majority of Indian states, this concept of heritage and ecotourism is present. Future research, however, must examine a thorough perspective that integrates both elements for a state and its shared identity with regard to its tourist potential. It will assist in giving the inhabitants a renewed sense of place. Additionally, it will enhance visitors' experiences and boost the location's brand value.

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