

PASSIVE DESIGN STRATEGY IN REVIVING A HERITAGE BUILDING

Case Study on Penang Harmony Centre

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Abstract

This paper examines adaptive reuse as a powerful tool for community transformation through the case study of the Penang Harmony Centre, as a conservation project that reactivated a disused colonial building into a vibrant interfaith dialogue hub. While adaptive reuse is often framed under discourses of sustainability, this study emphasizes its potential to act as a catalyst for social cohesion and cultural resilience in a multicultural context of Georgetown. Drawing on architectural analysis, historical records, and diagrammatic studies, the paper situates the Harmony Centre within Penang's urban fabric and investigates how its transformation extended beyond mere building reuse to foster dialogue, inclusivity, and renewed public relevance. The findings highlight that adaptive reuse is not only a resource-conscious architectural strategy but also a socially impactful approach that strengthens community identity, especially in resource-constrained contexts with limited government funding. The study concludes that adaptive reuse, when aligned with community needs, can transform old buildings into living infrastructures of dialogue and inclusivity, serving as exemplary models for future urban regeneration efforts.

Keywords: Adaptive reuse; Community catalyst; Penang Harmony Centre; Social cohesion; Heritage transformation; Urban regeneration.

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1.0 INTRODUCTION

In an era of accelerated urbanization and environmental consciousness, the discourse surrounding architecture is often centered on the creation of novel forms to accommodate contemporary needs. Yet, a more significant and pressing challenge in many urban contexts is not the construction of the new, but the strategic and imaginative reimagination of the old. Across South East Asia, and particularly in the dynamic urban landscapes of Penang, a substantial number of heritage buildings are facing a critical juncture of neglect, vacancy, or the imminent threat of demolition. This decline is often attributed to limited financial capacity for maintenance and a broader lack of public awareness regarding their potential for continuous use. Within this context, adaptive reuse has emerged as a compelling, multifaceted strategy that simultaneously addresses issues of sustainability, heritage conservation, and social cohesion.

The Penang Harmony Centre stands as a pivotal example of adaptive reuse that transcends the conventional emphasis on material and environmental sustainability. Completed in 2020, the project transformed a derelict colonial-era bungalow into a state-funded interfaith dialogue centre. Its location within the historically layered and culturally rich environment of George Town, a UNESCO World Heritage Site, is particularly significant. What makes this case distinct is that the impetus for reuse was driven not only by pragmatic concerns of resource conservation but also by the explicit and ambitious goal of creating a new social typology: a shared space dedicated to fostering inter-religious dialogue and communal harmony in a multicultural nation.

1.2 Problem Statement

In Malaysia, the justification for adaptive reuse has been predominantly rooted in pragmatic economic arguments, such as cost-effectiveness over new construction, or in the principles of environmental sustainability. These arguments, while valid, tend to marginalize the practice's profound social and cultural dimensions. Consequently, there is a notable scarcity of scholarship that critically examines the role of adaptive reuse in fostering community resilience, particularly within the complex, multicultural, and multi-religious contexts that define Malaysian society. As urban pressures intensify and government funding for cultural projects remains constrained, the critical challenge is to ensure that heritage reuse projects extend beyond mere architectural preservation to become socially relevant, impactful, and truly inclusive community spaces. This study seeks to bridge this gap by offering a detailed examination of how one such state-driven project navigated these challenges to achieve a deeper, more meaningful form of urban transformation by integrating Passive Design Strategies.

1.3 Research Objectives

This paper aims to investigate the transformative potential of adaptive reuse, using the Penang Harmony Centre as a specific and illuminating case study. The research will focus on the following three key objectives:

a) To investigate the function of adaptive reuse as a catalyst for community transformation:

This objective seeks to analyze how the architectural and functional repurposing of the Penang Harmony Centre acted as a dynamic force for positive social and communal change. It will explore the specific mechanisms through which the project facilitated new forms of social interaction, fostered a sense of shared identity among diverse groups, and contributed to the revitalization of its surrounding urban fabric, thereby moving beyond simple architectural preservation to a socially generative act.

b) To explore the relationship between architectural strategies and community outcomes in adaptive reuse projects:

This research will conduct a deep dive into the specific design and planning decisions made during the adaptive reuse of the Penang Harmony Centre. It aims to establish a clear, evidence-based link between these architectural strategies, including the preservation and adaptation of historical elements, the strategic introduction of new public spaces, and the deliberate integration of community-oriented programs. This results in social, cultural, and economic benefits observed within the community.

c) To identify passive design strategies incorporated to improve building performance

Ultimately, this paper aims to elevate the concept of adaptive reuse from a pragmatic, preservation-focused approach to a recognized, intentional passive design strategy for transforming an abandoned building into an efficient one. By synthesizing the detailed findings from the Penang Harmony Centre, this study will provide a robust body of case study evidence to support a new theoretical framework, arguing that adaptive reuse, when executed with clear social objectives, can be a powerful and replicable tool for fostering resilient and sustainable building.

1.4 Significance of Study

This paper situates the practice of adaptive reuse at the critical intersection of architecture, heritage, and passive design strategy. The study on Penang Harmony Centre offers invaluable insights into how old buildings, traditionally viewed as static artefacts, can be transformed into living infrastructures of dialogue, inclusivity, and shared purpose. This contribution is particularly relevant to a wide range of stakeholders, including architects and urban planners seeking innovative design solutions, policymakers and cultural practitioners tasked with activating underutilized heritage assets, and academics exploring the socio-political dimensions of the built environment.

2.0 LITERATURE REVIEW

2.1 Adaptive Reuse and Material Sustainability

The dominant academic and professional discourse surrounding adaptive reuse has long been anchored in the principles of material and environmental sustainability. This perspective is well-founded and widely supported by research. Bullen and Love (2010) provide seminal work demonstrating that adaptive reuse projects generate significant carbon savings by conserving the embodied energy within existing structures, a concept that is gaining increased urgency in the face of the global climate crisis. Similarly, other studies highlight the reduction of construction waste and the preservation of finite material resources (Pena & Love, 2011). These environmental arguments are robust and indispensable, yet they often overshadow the equally, if not more, profound social and cultural dimensions of the practice. The challenge for contemporary discourse is to move beyond this well-trodden ground to explore how these projects can serve a higher social purpose.

2.2 Community-Centred Adaptive Reuse and Place-making

More recent dialogue has begun to re-interpret adaptive reuse as a process of community-building and place-making, arguing that its success hinges on its ability to align with contemporary community needs. Shipley et al. (2006) argue that heritage buildings can serve as powerful anchors for community identity and memory, creating a sense of continuity that is essential for social stability. This perspective is furthered by Yung and Chan (2012), who found that the most successful adaptive reuse projects are those that are deeply participatory and co-created with the local community. These studies suggest that adaptive reuse is not merely a technical or aesthetic process but an inherently relational one, actively linking past heritage with the present and future aspirations of its inhabitants. It is a form of social practice where the built form becomes a stage for evolving community narratives.

2.3 Heritage and Social Cohesion in Malaysia

Malaysia's pluralistic society, while a source of immense cultural richness, also makes the concept of heritage a particularly complex and contested space. Urban development and inter-group relations are often fraught with tensions, and religious or ethnic diversity can, at times, lead to social and urban fragmentation. While various government initiatives have sought to promote social cohesion, few have leveraged the built environment proactively and inclusively. As such, adaptive reuse projects, when intentionally designed to be inclusive and non-denominational, have the unique potential to serve as powerful counter-narratives to division by creating shared, neutral spaces. Yet, there remains a critical dearth of Malaysian studies that have critically explored adaptive reuse as a specific tool for fostering interfaith or intercultural dialogue and understanding. The Penang Harmony Centre case study fills this gap by providing empirical evidence of a project that directly confronts these social challenges.

3. METHODOLOGY

This paper employs a qualitative case study methodology to provide an in-depth and holistic analysis of the Penang Harmony Centre. This approach is well-suited for design-focused research as it allows for a rich, interpretive understanding of a complex social phenomenon within its specific context. The research leverages a triangulation of methods:

a) Archival Research:

This involved a systematic review of historical documents related to the colonial bungalow's original construction and use in the early 20th century. We also examined contemporary government policy documents on heritage conservation, interfaith engagement, and urban planning in Penang to understand the institutional context of the project.

b) Architectural Analysis:

A detailed analysis of the building's architectural transformation was conducted using publicly available design drawings, site plans, and architectural photography. This included a close examination of the pre- and post-renovation floor plans, material palette, and spatial configuration.

c) Interpretive Analysis and Diagrammatic Studies:

The core of our methodology involved a series of interpretive and diagrammatic studies. We analyzed the architectural intervention not merely as a functional change but as a social catalyst. This process was informed by theoretical frameworks, notably Henri Lefebvre's concept of "the right to the city" (1968), where architecture is understood as a dynamic stage for community life. We created diagrams to visually represent the transformation from an insular colonial residence to a porous public facility, mapping changes in circulation, spatial flow, and the relationship between public and private zones. This qualitative approach allows us to articulate the "why" and "how" behind the project's success, a level of detail that quantitative methods alone cannot capture.

4. FINDINGS: THE CASE OF PENANG HARMONY CENTRE

4.1 Historical Context and Project Genesis

The Penang Harmony Centre is housed in a colonial-era bungalow that was constructed in the early 20th century, a period when Penang was a bustling trading city under British rule. Originally a private residence, it was designed with a typical colonial bungalow layout, reflecting the social norms of the time with clear distinctions between public and private zones. Following Malaysia's independence, the building changed hands and purposes but eventually fell into vacant use.

For several decades, it was used as a government office and subsequently became vacant for many years before it became earmarked as a Community Hall and events building. The government's decision to intervene was inspired and, at the same time, constrained by limited funding, making the costly option of a new community hall for each religious group unfeasible. Instead of the high cost of building many community halls in a compact city, the decision was to build one new hall, which will run on a space-sharing approach. A novel approach inspired by the office coworking trend, the various religious groups will have access to the new hall at a subsidized rate. With this innovative typology, the state created a building that brings together all religious groups, uniting a multicultural society via architecture.



Photo 1 (L-R) shows the inward-looking ambience and existing condition of the building before renovation.

4.2 Design Strategy

The architectural strategy for the Harmony Centre was elegantly simple: minimal intervention, maximum impact. The project's designers made a deliberate choice to preserve the structural integrity and historical character of the original bungalow. The exterior facade was meticulously restored, and original elements like the pitched roof and wide verandas were retained.

The true transformation occurred within the interior spaces. Selective insertions of modern, light-filled spaces, such as a series of multipurpose halls, seminar rooms, and a café were seamlessly integrated. This reuse strategy was built on three core design principles:

a) Spatial Openness:

The rigid, hierarchical plan of the colonial bungalow was reconfigured into a flexible, non-denominational space. Walls that once separated rooms were replaced with flexible partitions, allowing for a variety of communal activities. The design prioritized visual and physical permeability, inviting the public in.

b) Symbolic Neutrality:

The architects carefully avoided the use of overt religious or cultural motifs that might favour one group over another. The architectural language was a clean, modern aesthetic that complemented the heritage features without introducing any symbolic baggage. This neutrality was a deliberate design choice aimed at creating a welcoming and inclusive environment for all faiths.

c) Landscape Integration:

The project extended its design philosophy beyond the building itself. The surrounding land was transformed into landscaped courtyards and gardens, creating outdoor spaces for quiet reflection and informal gatherings. This focus on harmony with nature and the external environment was a symbolic echo of the multicultural ethos of Penang, where different communities live and interact in proximity.

4.3 Green Design Qualities: A Passive Approach

Beyond the aesthetic and functional strategies, a core tenet of the project was the integration of several passive green design qualities that enhanced the building's environmental performance while also creating a more comfortable and inviting social space. This approach underscores a holistic view of sustainability that moves beyond material conservation to prioritize user well-being and reduces operational costs.

a) Restoration of the Old and New:

A deliberate intent by the Architect was the harmonious blend of the old and the new. The roofline of the new Community Hall was meticulously designed to borrow from the profile of the existing mansion, creating a seamless visual integration. The height of the new structure was also carefully controlled to avoid overpowering the historical dominance of the existing mansion. By faithfully restoring and repairing the existing bungalow, the project actively avoided the need for new construction, significantly reducing its carbon footprint and mitigating environmental harm.

b) Natural Lighting as a Passive Strategy:

The interiors of the original colonial bungalow were dark and poorly lit. To remedy this, a passive natural lighting strategy was implemented. Internal timber stud walls were selectively removed to allow sunlight to penetrate the interior spaces. In the central zone of the existing mansion, a skylight feature was created by removing ceiling panels and adding simple clear roofing sheets.

This subtle intervention introduced a powerful, indirect source of light, celebrating the original roof structure and heritage character. Additionally, accordion walls flanking the new Community Hall were designed with alternating rows of solid and clear glass, creating a diffused glow of natural light. The strategic placement of strips of skylights at the roof of the new hall provided an uplifting sense of space. These interventions ensured that the building benefits from 100% natural daylighting during the day, significantly reducing the need for artificial lighting and its associated energy consumption.

c) Natural Ventilation:

The project also prioritized natural ventilation to create a comfortable internal climate without reliance on air conditioning. The existing mansion was redesigned to be naturally cross-ventilated along its longitudinal spine. This was achieved by removing interior walls in strategic locations between spaces, creating a clear path for air flow from the front to the back of the house. Furthermore, the Central Jack Roof of the original bungalow was restored to facilitate passive stack ventilation, where hot air rises and escapes vertically. These passive systems not only contribute to the building's sustainability but also make it a more pleasant and comfortable place for community gatherings.

d) Rear Garden as Cooling Element:

The landscape design was a key component of the overall green strategy. The "Secret Garden" was conceived to provide an authentic, kampung-like sense of place. The landscape was designed with a network of footpaths meandering through garden shrubs and hidden pockets of gardens with benches and swings dotted among existing palm trees. This lush, green environment acts as a natural cooling element for the site. The whimsical addition of a large-scale "snakes and ladder" game, created with rustic concrete pavers, infused the space with a playful spirit. These gardens are more than just aesthetic; they are an integral part of the building's passive cooling system and a crucial element of its social function.

4.4 Community Reception and Social Outcomes

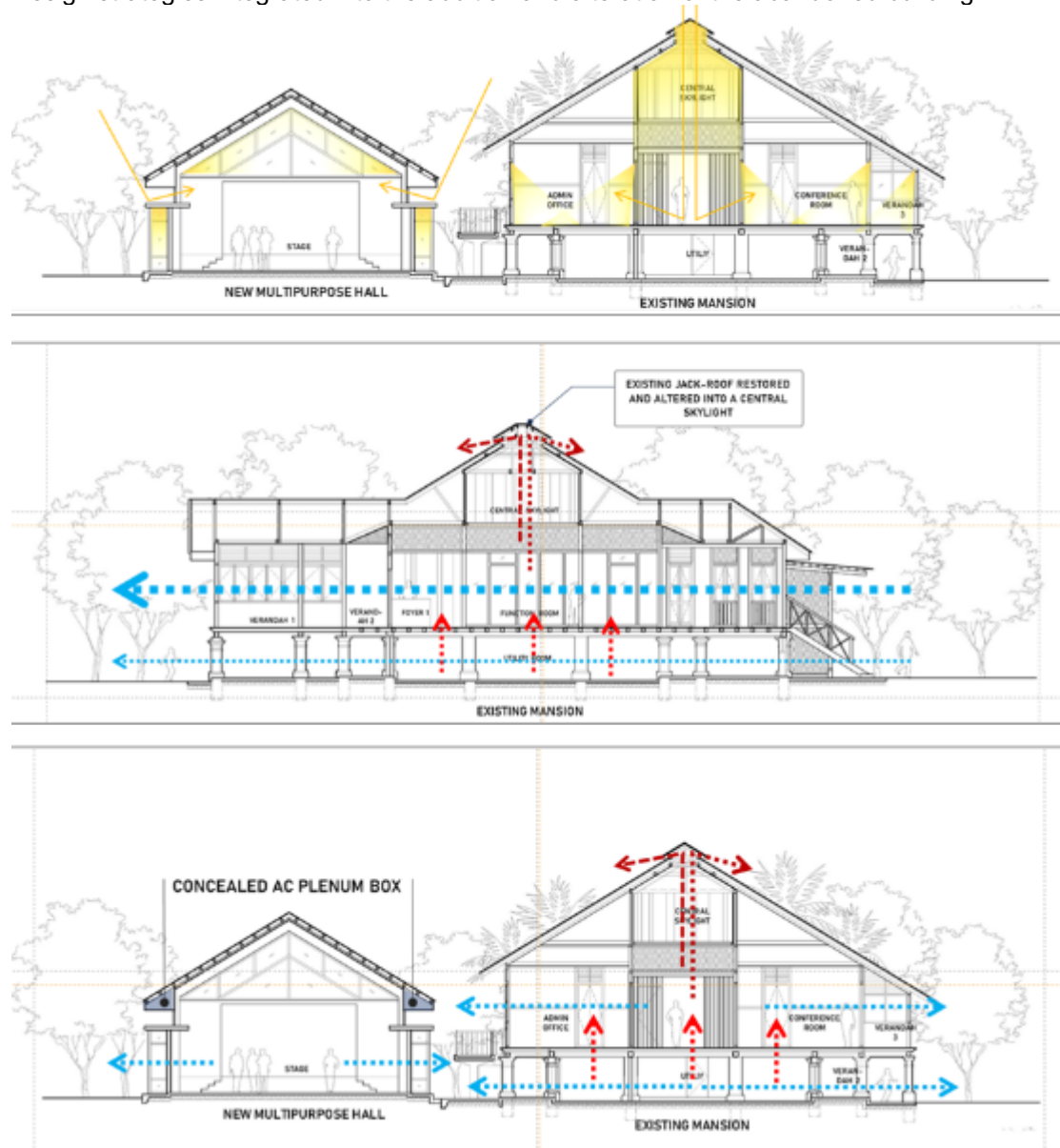
Upon its completion, the Penang Harmony Centre quickly became a landmark for interfaith dialogue and cultural exchange. It regularly hosts forums, workshops, art exhibitions, and community events that bring together people from different religious and ethnic backgrounds. The centre's success can be measured by the positive community reception, which highlighted its role not merely as a functional physical facility but as a powerful symbolic gesture toward coexistence and mutual understanding. Community feedback often underscored how the project had created a "neutral territory" for dialogue, a rare and valuable commodity in a society where public spaces are often culturally or religiously siloed.

4.5 Architectural Spatial Analysis

Our diagrammatic analysis reveals the fundamental transformation from a colonial residence into a porous, community-facing facility. Before the project, the bungalow's circulation was linear and hierarchical, designed for private use. The new design introduced a networked circulation system, with multiple entry points and flexible pathways that encouraged free movement and spontaneous interaction. Transparency and light were emphasized throughout the building. The addition of large glass panels and open-air courtyards created a visual link between the interior and exterior, reinforcing the project's core tenet of openness. These diagrammatic studies demonstrate how a series of strategic architectural interventions effectively broke down the building's original insularity to create a fluid, inviting public space.

4.4 Diagrammatic Sectional Analysis

Diagrammatic analysis on the completed intervention was carried out to demonstrate the Passive Design strategies integrated into the addition and alteration of the abandoned building.



5. DISCUSSION

5.1 Adaptive Reuse as a Community Catalyst

The case of the Penang Harmony Centre demonstrates that adaptive reuse is far more than a simple cost-saving strategy or an act of architectural preservation. It illustrates how old buildings can be transformed into dynamic community catalyst spaces where architectural heritage facilitates social dialogue and reconciliation. The project's success lies in its ability to leverage the existing structure's historical gravitas while simultaneously re-shaping its function to serve a contemporary social need. It is a powerful example of how the built environment can actively facilitate social change and foster a sense of shared purpose.

5.2 Addressing Constraints Through Creativity

Limited government funding was a significant constraint, initially shaping the project towards reuse rather than new construction. Paradoxically, this financial limitation became an impetus for profound architectural and social creativity. The Architects were forced to leverage the symbolic and structural value of the heritage building rather than relying on the monumental gestures often associated with new, grand public works. This experience suggests that resource limitations can paradoxically redirect architectural practice toward more socially generative solutions, forcing designers to prioritize impact and innovation over scale and cost. This provides a crucial lesson for urban development in a world of finite resources.

5.3 Implications for Heritage Practice in Malaysia

The Penang Harmony Centre provides a new and vital direction for heritage practice in Malaysia. It challenges the conventional perception that adaptive reuse is a secondary or inferior alternative to new development. Instead, it demonstrates its potential as a proactive, primary cultural strategy. By emphasizing adaptability, inclusivity, and community ownership, the project provides a replicable model for transforming underutilized heritage assets into active, living parts of the urban fabric. It sets a precedent for future projects to prioritize the building's social and symbolic value over its purely commercial or historical one.

5.4 Broader Theoretical Insights

The Penang Harmony Centre exemplifies how adaptive reuse can catalyze profound community transformation. This study has demonstrated three key principles: first, reactivating old buildings generates new cultural meanings; second, financial constraints can become opportunities for innovative and impactful design; and third, beyond sustainability, adaptive reuse is a powerful vehicle for dialogue, inclusivity, and resilience. This reframing positions the practice not merely as an architectural choice, but as a critical form of social infrastructure. The project's success is a testament to the idea that true architectural transformation is achieved not by changing the physical form alone, but by a deliberate act of socio-spatial repositioning that turns a structure into a vibrant hub of communal life.



Photo (L-R) shows the versatility of the heritage building performing multiple purposes, serving the community with a singular building transformation.

6. CONCLUSION

The Penang Harmony Centre stands as a powerful testament to the transformative potential of adaptive reuse. This study has demonstrated three key principles that define its success: first, reactivating old buildings generates new cultural meanings that resonate with contemporary communities; second, financial constraints can be leveraged as opportunities for innovative and socially impactful design; and third, beyond its well-established benefits in sustainability, adaptive reuse is a powerful vehicle for fostering dialogue, inclusivity, and community resilience. Ultimately, the project reframes adaptive reuse not as a mere preservation strategy, but as a central and socially generative practice for urban development. The lessons from Penang offer a vital framework for future projects, showing that true architectural transformation is achieved by prioritizing human connection, turning static structures into dynamic and vibrant hubs of communal life.

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