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Case study-centred approach to the adaptive reuse of traditional malay houses: The single case of Tok Abu Bakar Alang Ketak (TABAK)

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ABSTRACT

Adaptive reuse represents a sustainable conservation strategy that safeguards the cultural and historical significance of traditional buildings while accommodating contemporary needs. This study adopts a case study-centred approach to examine the adaptive reuse of the Tok Abu Bakar Alang Ketak (TABAK) house, a significant traditional Malay dwelling located in Bota, Perak, Malaysia. As a representative example of Malay vernacular architecture, the TABAK house embodies cultural values, environmental responsiveness, and heritage identity. However, like many heritage structures, it is vulnerable to neglect and obsolescence due to evolving socio-economic dynamics. This single case study investigates the adaptation of the TABAK house for modern functions without compromising its architectural integrity. The research explores its transformation from a private residence into a multifunctional space encompassing a gallery, research centre, community hub, academic facility, and historical workshop venue. Findings reveal that, when approached with cultural sensitivity and architectural respect, adaptive reuse can successfully preserve key elements of traditional Malay settings while ensuring ongoing relevance and utility. By focusing on a detailed case, this research contributes to broader discussions on sustainable heritage management and offers practical insights for future efforts in the adaptive reuse of traditional Malay houses across Malaysia.

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1. INTRODUCTION

Adaptive reuse offers a sustainable alternative by integrating modern functions into heritage structures, enabling them to retain their historical and cultural significance (Kayhan Tunalı & Güneş, 2024). This method not only prolongs the functional lifespan of these buildings but also revitalizes them, creating a meaningful bridge between historical legacy and contemporary life (Alauddin et al., 2022).

The concept of adaptive reuse in architectural conservation involves repurposing traditional Malay houses for new functions while preserving their historical and cultural significance. This sustainable practice helps reduce the environmental and economic costs associated with demolition and new construction (Gravagnuolo et al., 2024; Foster & Kreinin, 2020). In recent years, the adaptive reuse approach has gained popularity as a means of preserving heritage buildings, including traditional Malay houses in Malaysia, especially those that have lost their original function due to changing societal needs. By adapting these traditional Malay houses to modern uses, they can remain functional and relevant in contemporary settings, contributing to cultural sustainability, economic vitality, and community engagement. Additionally, adaptive reuse can serve as an academic and research hub, attracting conservation practitioners and students from around the world and fostering knowledge exchange and education on heritage preservation. In the case of Malaysia, traditional Malay houses are essential components of the nation's architectural heritage. These types of buildings are not only representative of the Malay way of life but also represent the environmental adaptation of local building techniques. However, with modernization, many of these houses have fallen into disuse or decay, often due to changes in family structures, economic pressures, or rural-to-urban migration (Feng, 2024). The challenge lies in finding ways to preserve these cultural assets while making them adaptable to modern needs.

The Tok Abu Bakar Alang Ketak (TABAK) house is an exemplary model of successful adaptive reuse in Bota, Perak, Malaysia. Originally built as a traditional Malay dwelling known as Rumah Limas Bumbung Perak, the house has been transformed into a multifunctional space that serves various community and academic purposes. The TABAK house is now home to a gallery showcasing local history and art, a research centre for traditional Malay architecture, and a community hub that hosts events and competitions aimed at celebrating and preserving Malay culture (Zakaria et al., 2022). This transformation highlights the potential of adaptive reuse to not only preserve heritage but also foster a sense of identity and belonging within the local community. This research examines the effectiveness of adaptive reuse in the context of the single case TABAK house, assessing both its adaptations and socio-cultural impacts. By analysing the post-conversion performance of the house and its role in community engagement, the study aims to

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contribute to the broader discourse on sustainable heritage conservation. Additionally, the research offers insights into the challenges and opportunities associated with adapting traditional Malay houses for modern functions, providing valuable lessons for future conservation efforts.

2. LITERATURE REVIEW

Adaptive reuse is recognized as a crucial strategy for addressing the obsolescence and deterioration of heritage buildings, particularly traditional Malay houses. These houses are especially vulnerable to obsolescence and loss due to their timber construction, which is more prone to decay over time. Adaptive reuse involves repurposing buildings by modifying their original functions to suit new needs. This practice, although not new, plays an important role in preserving historic buildings. Such structures are valuable assets, contributing significantly to the economic, cultural, and environmental sustainability of rural areas, towns, and cities (Mohamed & Alauddin, 2023).

2.1 Definition of Adaptive Reuse

Adaptive reuse refers to the process of repurposing a site or building for functions other than those originally intended or designed. According to Douglas (2006), adaptive reuse can be defined as "any building work and intervention to change its capacity, function, or performance to adjust, reuse, or upgrade a building to suit new conditions or requirements." This practice is a critical strategy for maintaining and revitalising existing buildings, especially when they have reached maturity within their lifecycle. Adaptive reuse offers significant economic, social, and cultural benefits by providing new purposes for existing structures, thereby enhancing their relevance in contemporary settings (Feng, 2024). Furthermore, adaptive reuse is a key approach to sustainability, as it preserves the durability of original building materials and reduces the carbon footprint associated with demolition and new construction (Kayhan Tunalı & Güneş, 2024). This practice also addresses the conservation and preservation of built heritage, aligning with broader strategies and policies for sustainable development. Once a building's original purpose becomes inadequate for current functional or programmatic needs, adaptive reuse emerges as a viable and sustainable option for repurposing the site.

In the context of building adaptation, the term "adaptive reuse" has been widely interpreted and defined by numerous researchers (Douglas, 2006; Bullen, 2007). The concept is often synonymous with terms such as conversion, retrofitting, adaptation, refurbishment, and rehabilitation. Bullen (2007) describes adaptive reuse as "rehabilitation, renovation, or restoration work that does not necessarily involve a change of use," emphasising its role in extending the useful life of buildings through a combination of improvements and conversions. Wilkinson and Reed (2008) further define "adaptive" as the process of maintaining as much of the original structure as possible while improving its performance to meet modern standards and evolving needs.

2.2 Issues Related to Reuse the Traditional Houses

Adaptive reuse entails transforming existing, often historic, buildings for contemporary functions. In adapting traditional Malay houses, key challenges must be addressed to ensure a successful outcome. These include preserving cultural identity while accommodating modernisation, maintaining structural and architectural integrity, and adhering to current building regulations. Additional considerations include

functional space planning, sustainable material use, integration of modern functions, engagement with historical practitioners, and financial viability. These factors are essential to achieving a balance between heritage conservation and contemporary relevance.

Traditional Malay houses, characterised by their vernacular timber architecture and rich cultural symbolism, face complex challenges in adaptive reuse efforts. These structures often require interventions that risk compromising their architectural integrity, authenticity, and heritage value. Adaptive reuse necessitates structural modifications to accommodate contemporary functions, which may disrupt the original craftsmanship, spatial organization, and construction techniques inherent to traditional Malay houses. The delicate timber joinery, symbolic carvings, and stilted foundations demand preservation strategies that uphold structural integrity while facilitating functional upgrades (Feng, 2024). The selection of materials plays a critical role in preserving the authenticity and longevity of traditional Malay architecture. The use of incompatible modern materials can accelerate deterioration and visually conflict with original elements. Sustainable reuse must incorporate environmentally responsible, context-sensitive materials that align with traditional methods while improving energy efficiency and overall building performance (Sirror, 2024).

The incorporation of modern utilities, such as plumbing and electrical systems, poses significant risks to the architectural coherence of traditional Malay houses. These buildings were not originally designed for such systems and retrofitting them often requires intrusive interventions. Ensuring concealed, minimally invasive installations is essential to maintain visual harmony and structural stability, particularly in timber-framed constructions (Feng, 2024).

Adaptive reuse can inadvertently disrupt the intangible heritage associated with traditional Malay dwellings, including customary practices and spatial rituals. Community and stakeholder involvement is therefore crucial to ensure that reuse initiatives reflect local values, foster cultural continuity, and build collective ownership. Participatory planning mitigates resistance and aligns conservation outcomes with the community's socio-cultural identity (Gravagnuolo et al., 2024; Dasgupta & Shendkar, 2024). Financial constraints remain a significant barrier to adaptive reuse, particularly due to the high costs of restoration, specialised craftsmanship, and material sourcing. Limited access to public funding and the prioritisation of new developments over heritage projects often force property owners to self-finance conservation, resulting in compromised preservation outcomes. Strategic funding models and public-private partnerships are required to support the long-term, sustainable reuse of traditional Malay houses (Gravagnuolo et al., 2024).

2.3 Suitability of New Functions for Traditional Malay Houses

The spatial configuration of traditional Malay houses often presents limitations for extensive functional transformation. However, the adaptive reuse concept remains inherently flexible, allowing for thoughtful integration with modern needs while respecting the original architectural and cultural context. A preliminary analysis of existing literature suggests that many traditional Malay houses across Malaysia have been successfully adapted for various new purposes, as depicted in Fig. 1. Fig. 1 highlights both the most and least common functions assigned to repurposed traditional Malay houses. The most prevalent adaptive reuse projects include cultural institutions such as heritage centres, museums, galleries, and community hubs. These functions are widely favoured because they promote cultural preservation, public

engagement, and educational tourism, all while maintaining the architectural integrity and original spatial logic of the structures (Daramola et al., 2024). Conversely, commercial adaptations such as retail outlets or contemporary office spaces are among the least utilised. Their limited adoption can be attributed to significant challenges, including the complexity of installing modern infrastructure, the need for extensive structural alterations, and the risk of diminishing the historical and aesthetic value of traditional architecture (Dasgupta & Shendkar, 2024). These uses are often perceived as incompatible with the cultural identity of traditional Malay houses, thereby reducing their appeal in heritage-focused reuse strategies.

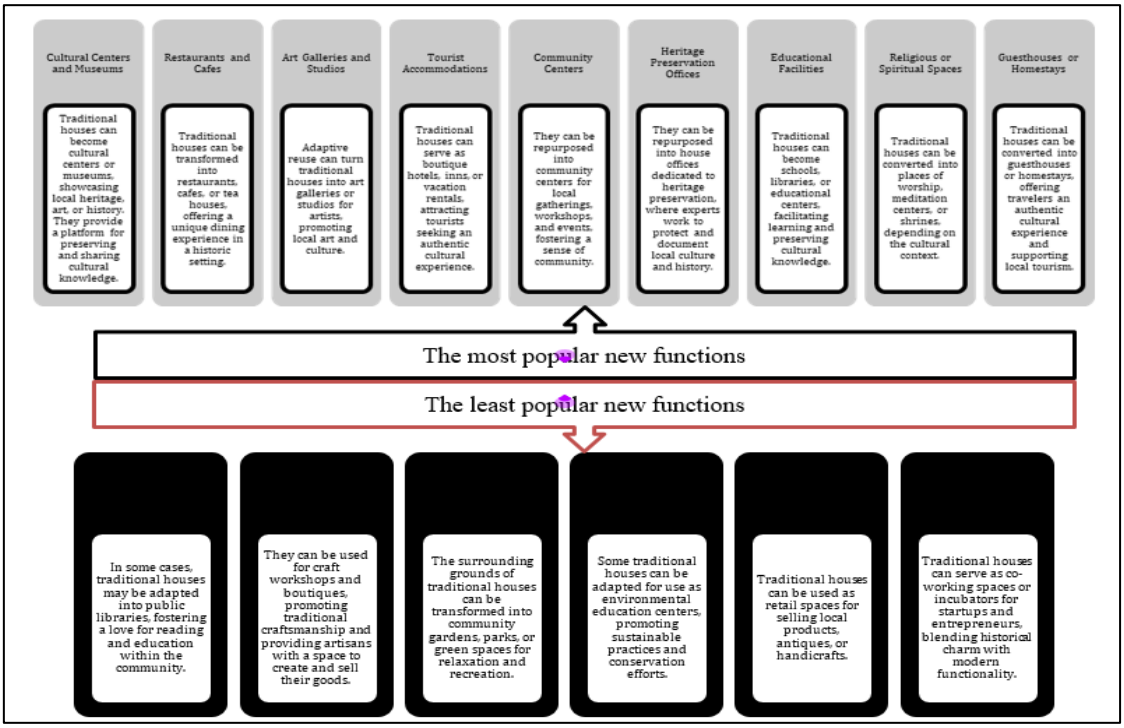


Fig. 1. The Most and Least Popular New Functions for the Reuse of Traditional Malay Houses
Source: Authors

2.4 Research Methodology And Case Study Integration

As illustrated in Fig. 2, this study adopts a purely qualitative approach to systematically explore the adaptive reuse of traditional Malay houses, with a central focus on a single, vital case study. The research begins with the formulation of a clear aim, specific objectives, and guiding research questions. This step is followed by an in-depth review of existing literature on adaptive reuse practices, with particular emphasis on the contextual challenges faced in repurposing traditional Malay houses in Malaysia. Subsequently, the study investigates the new functions that align with both heritage values and contemporary needs, identifying the suitability for traditional Malay houses. At the core of this research is a detailed single-case study of the Tok Abu Bakar Alang Ketak (TABAK) house in Bota, Perak. This house serves as a successful example to ground theoretical insights in practical application. The TABAK case exemplifies successful adaptive reuse, having been thoughtfully transformed into a multifunctional facility that includes a gallery, a research centre, a community space, and a workshop venue. The insights drawn from this single case are

critical in demonstrating how traditional Malay houses can be adaptively reused while maintaining their architectural integrity and cultural significance.



Fig. 2. The Research Methodology of Single Case Study
Source: Authors

3.1 Case Study of Rumah Tok Abu Bakar Alang Ketak (Tabak), Bota, Perak

Background

This house is located on the banks of the Perak River in Bota Kiri within the sub-district of Bota, Perak Darul Ridzuan. It was built by the homeowner, Tok Abu Bakar Alang Ketak, along with several other craftsmen in the 1920s. The house was constructed in the architectural style known as the Perak Roofed Gabled House (Rumah Limas Bumbung Perak or RLBP) (Abdul Halim Choo et al., 2022). This architectural style is prevalent throughout the state of Perak, especially along the Perak River. Fig. 3. Shows TABAK in 1920s.



Fig. 3. TABAK in 1920s
Source: Authors

From a geographical perspective, this house is situated on the banks of the Perak River at coordinates 4°20'47.6"N 100°52'35.6"E (4.346545, 100.876559) in Bota Kiri, Sub-District of Bota, Central Perak District, Perak Darul Ridzuan. Similar to many traditional houses in Perak, it is river-oriented, with its front facing the river. The river is a significant element in the development of settlements. Besides being a water source, the river serves as the primary transportation route connecting villages and small towns along the

Perak River. It is a vital source of local and regional economic activity. The TABAK house is designed with several essential spaces, including the veranda, entrance hall, the Mother's Room (Rumah Ibu), the Selang Room, and the Kitchen House (Rumah Dapur).

Conservation Works

In 2019, TABAK underwent a conservation effort, transforming it into a gallery and educational hub dedicated to traditional houses, traditional architecture, and related subjects as shown in Fig. 4. Since then, a range of activities and events have taken place at TABAK from 2019 to 2023.



Fig. 4. TABAK house at Bota, Perak
Source: Authors

3.2 Findings on New Functions of TABAK from 2019 – 2024

Since the pandemic, the TABAK house has hosted numerous activities, particularly related to education and research. UiTM and other local universities have participated in these events, including painting competitions, which have significantly increased the house's visibility and popularity. As previously mentioned, traditional Malay houses can be adapted for various new functions. The TABAK house exemplifies this success, having undergone conservation and been repurposed for multiple uses. It now serves as a centre for academic activities, history workshops, and painting contests, where it acts as the hub for competitions. Additionally, TABAK has been transformed into a gallery showcasing paintings and artwork, attracting history enthusiasts and art lovers alike (refer to Table 1 to Table 5).

Table 1: Adaptive Reuse of the TABAK House Through Educational Activities

New Functions	**Activities**
Educational Activities	Involved with National Universities, including Public Universities and Private Universities from 2021 to 2024
Photo Evidence Drawings Competition and Sketching Demonstration in TABAK	
	
	

Source: Authors (2025)

Table 2: Adaptive Reuse of the TABAK House Through Workshop and Gallery

New Functions	Activities
Workshop and Gallery Activities	Between 2022 and 2024, TABAK has actively served as a venue for workshops involving both government and private sector participants.
Photo Evidence The Workshop and Galleries at TABAK are involved with various industries and Majlis Bandaraya Ipoh, including the Archaeology Workshop.	







Source: Authors (2025)

Table 3: Adaptive Reuse of the TABAK House Through Drawing and Colouring Activities

New Functions	Activities
Drawing & Colouring Competition Activities	In early 2023, TABAK became the venue for a notable colouring competition organized by the Fine Arts Department of Universiti Teknologi MARA (UiTM).
Photo Evidence The Painting Competition at TABAK featured participation from renowned national artists from across Malaysia. The event was a resounding success, receiving prominent coverage in the national press.	






Source: Authors

Table 4: Adaptive Reuse of the TABAK House Through Arts and Research Galleries Activities

New Functions	Activities
Arts and Research Galleries	In early 2024, TABAK hosted a series of activities centred around its art and research galleries. During the open days, heritage practitioners were invited to

	visit the site, where the owner of TABAK provided explanations about the paintings and research conducted by a group of researchers known as KUTAI.
Photo Evidence Visitors from the Perak Museum expressed a strong interest in the gallery at TABAK.	




Source: Authors (2025)

Table 5: Adaptive Reuse of the TABAK House Through International Student Workshop of Vernacular Architecture Activities

New Functions	**Activities**
International Student Workshop of Vernacular Architecture	The latest function of TABAK is to serve as a venue for international student workshops, which are part of the 15th Nusantara Symposium held on October 7 and 8, 2024
Photo Evidence The bamboo expert demonstrated the creation of bamboo lighting and the construction of tree houses during the SIMPORA activities.	





Source: Authors

3. DISCUSSION

TABAK has emerged as a dynamic model for experiential learning and heritage engagement, particularly in the fields of architecture and the arts. Through participant observation and photo documentation, the site was observed to facilitate educational activities involving students from both public and private Malaysian universities. TABAK has enabled architecture and fine arts students to engage directly with traditional Malay architectural forms, offering tangible inspiration for sketches, paintings, and design analyses. This model aligns with place-based learning strategies that emphasize real-world immersion as a means of enhancing academic understanding. Lecturers and guest speakers have capitalized on this contextual setting

to demonstrate artistic and technical drawing techniques. These practical sessions, held outside of conventional studio environments, allow students to work directly with traditional spatial arrangements and material textures. This hands-on approach aligns with the architectural education literature, which underscores the value of field-based instruction in cultivating spatial awareness and historical sensitivity (Nasir et al., 2019). Between 2022 and 2024, TABAK also served as a platform for interdisciplinary workshops, many of which involved collaboration between academia, government agencies, and local communities. One such initiative was an archaeological workshop aimed at uncovering and preserving material culture from the site. This workshop, conducted in collaboration with the Ipoh City Council and university researchers, employed surface scanning and excavation techniques, resulting in the discovery of historical artefacts, including coins and ceramic fragments. These findings contribute to the narrative of TABAK's historical significance and reinforce its role as a living heritage site. In early 2023, TABAK hosted a nationwide colouring competition organized by the Fine Arts Department of Universiti Teknologi MARA (UiTM). The event drew participation from across Malaysia and focused on traditional motifs and symbols embedded in the architectural detailing of TABAK. This initiative not only encouraged creative engagement with heritage elements but also attracted media attention, broadening public interest in the conservation of traditional Malay houses (New Straits Times, 2023). Such community-centric events align with existing literature on heritage rebranding, where adaptive reuse is positioned as a method of generating contemporary cultural value.

Further extending its cultural relevance, TABAK continues to feature rotating exhibitions that highlight traditional Malay history and architecture through curated artworks and research posters. These exhibitions draw a consistent stream of academic visitors and are complemented by conservation briefings delivered by the house's owner. These sessions serve a dual purpose: they transmit traditional construction knowledge and promote advocacy for the preservation of vernacular heritage. Most recently, TABAK hosted an international student workshop as part of the 15th Nusantara Symposium on October 7–8, 2024. The event welcomed participants from Indonesia, including representatives from Universitas Bung Hatta and Universitas Islam Negeri Alauddin Makassar. The symposium featured various hands-on activities, including bamboo construction, sculpture, and collaborative mural painting based on TABAK's architectural elements. These initiatives fostered meaningful cross-cultural academic exchange, positioning TABAK as an international hub for heritage-based learning and collaboration. By functioning as a space for education, research, art, and international engagement, TABAK not only preserves its own heritage but also contributes to the evolving discourse on adaptive reuse and vernacular architecture in Southeast Asia.

4. CONCLUSION

Adaptive reuse of traditional houses provides an opportunity to celebrate and preserve cultural heritage while revitalizing historic structures. However, successful transformation requires careful planning, collaboration with experts, and a profound understanding of the house's cultural, architectural, and historical significance. Additionally, adaptive reuse enriches communities by creating spaces for cultural, educational, and economic activities. The selection of new functions typically depends on the house's location, its historical significance, and the needs and aspirations of the local community. This research serves as a preliminary step towards future heritage national grant applications.

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6. CONFLICT OF INTEREST STATEMENT

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

7. AUTHORS' CONTRIBUTIONS

All authors jointly contributed to the research design, questionnaire development, data analysis, and manuscript preparation. All authors have read and approved the final version of the manuscript.

8. DECLARATION OF GENERATIVE AI IN THE WRITING PROCESS

AI tools (e.g, ChatGPT, Grammarly) were used for drafting, assistance, paraphrasing and grammar checking. All content was critically reviewed and edited by researchers.

9. DATA AVAILABILITY/SUPPLEMENTARY MATERIALS

The datasets used and/or analysed during this study are available from the corresponding author upon reasonable request.

10. ETHICS STATEMENT

The authors declare that this research did not involve human or animal subjects.

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