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Identification of Concept, Factors Affecting and the Need for Adaptive Reuse of Government Teachers' Quarters in Malaysia

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Abstract

Government building quarters are essential for providing adequate accommodation and improving the quality of public service employees. Following independence, the government has allocated funds to each ministry to construct its own quarters. A portion of the Ministry of Education's budget has been allocated to the construction of residential quarters for teachers in Malaysia. However, some of these quarters, particularly those located in rural areas, are underutilised and are in a deplorable state. This is due to a number of issues, including poor building maintenance, the absence of adjacent amenities, and an inappropriate location. The adaptive reuse strategy is employed to mitigate the issue. As Malaysia aims to become a modern nation, adaptive reuse as a means of achieving sustainability in the built environment. Even adaptive reuse was utilised in Malaysia, the initiative focused mostly on heritage or historical buildings. Insufficient research has been conducted on the adaptive reuse of public buildings, notably teachers' quarters. This research offers a narrative literature review of the adaptive reuse concept and the factors influencing the adaptive reuse of teachers' quarters in Malaysia. Numerous parameters affecting adaptive reuse have been revealed by previous researchers. Each researcher specifies factors depending on their research; hence, these factors are compiled and discussed throughout this work. Such aspects include actors, adaptive reuse potential, building condition, economics, location, regulations and laws, architectural value, environment, and social and cultural factors. These variables may be relevant to consider when encouraging adaptive reuse for government quarters (teachers' quarters), as they may affect the building's future or new role. In order to make appropriate decisions, one needs to have a comprehensive awareness of the relevant aspects. The second half of the study discusses the condition of teachers' quarters and how the adaptive reuse concept could be of assistance. The study concluded with a number of research recommendations and suggestions for future research topics.

Keywords: Adaptive reuse, teachers' quarters, concept, factors affecting, narrative literature review

1.0 INTRODUCTION

The civil servant is a crucial participant in the delivery of the public service. The Department of Public Service was tasked to guide the transformation of the public service under the National Transformation Agenda, which sought to make Malaysia a high-income and developed nation by 2020. Housing is a basic need that must be met to ensure that public servants can perform their duties effectively. Housing is one of the essentials given by the government. This facility has been offered by the federal government to reduce the burden on civil personnel (Borham, 2013).

The 5-year development plan of Malaysia was utilised as a medium-term economic policy instrument to assist the government in mobilising available economic resources to attain particular socioeconomic goals. Since then, the Malaysian government has prioritised providing the greatest facilities, especially housing, for government employees; teachers in Malaysia are among the beneficiaries of these services. The government has budgeted RM690 million in the Ninth Malaysia Program (2006-2010) for the construction of teacher quarters, with half of this expenditure earmarked for rural teacher quarters (EPU, 2006).

However, many government housing units are underutilised and empty. The Ministry of Education reports that there are 48,076 teacher quarters in Malaysia, of which 32,305 are inhabited and 15,771 are vacant. Out of 15,771 units, 9,313 are in poor condition and are located in rural areas (BERNAMA, 2019). This issue unquestionably posed excessive dangers to the government in terms of land utilization's productivity and finances (Borham, 2013).

As a developing nation, Malaysia has a huge stock of existing structures, the majority of which, including government quarters, have not been well maintained. As an effect, it may reduce the building's lifespan, leaving it in a bad and irreparable state (Mohamed & Alauddin, 2016). The majority of empty quarters, including teachers' quarters, are located outside of the city, which is located in Kerian District, Perak, according to Borham (2013). The research indicates that in several categories, 43.3% of government housing units are vacant in remote locations. For example, in 2018, former Finance Minister of Malaysia, Lim Guan Eng said that RM400 million will be

spent on the maintenance and restoration of government quarters to provide a more comfortable living environment for civil officials, including the police, army, and teachers (BERNAMA, 2018).

The majority of prior studies conducted in Malaysia imply the application of adaptive reuse of heritage or historical structures. There is little research on adaptive reuse applications for different sorts of buildings, such as industrial, residential, commercial, and especially government structures (teachers' quarters). As a potential solution to this challenge, adaptive reuse is utilised to achieve sustainability. Adaptive reuse is defined as extending a building's useful life by increasing its original function (Kincaid, 2002; Tam & Hao, 2019). The process of finding a new use for a property is called adaptive reuse. It is frequently defined as a process wherein older structures are made physically sound for economically permanent new usage (Conejos et al., 2011). It is an alternative to building replacement and demolition because it uses less energy and waste. It also provides societal advantages by renewing and breathing fresh life into historic sites (Mısırlısoy & Günçe, 2016).

The government has made a few observations addressing the potential utilisation of government facilities. Former Youth and Sports Minister, Syed Saddiq Syed Abdul Rahman, stated in a recent remark that abandoned government quarters will be transformed into temporary or rental accommodation and made available to the public, especially young Malaysians. This endeavour may enable economically disadvantaged individuals to acquire a home (Tan, 2018). Additionally, former Deputy Prime Minister of Malaysia, Datuk Seri Dr. Wan Azizah Wan Ismail recommended repurposing government buildings or vacant teacher housing as temporary shelters for flood victims around the country – "In the future, if there are several abandoned locations (government buildings and teachers' homes), they can be utilised (as temporary housing) so as not to disrupt the teaching of children" (Ismail & Pauzi, 2019). Furthermore, other services, such as a student hostel, temporary shelter, and *Perumahan Rakyat 1 Malaysia* (PR1MA), might be accommodated by the quarters.

2.0 RESEARCH METHODOLOGY

The present research incorporates a narrative literature review, including the latest recent studies on adaptive reuse. Several databases, including Scopus, Google Scholar, ScienceDirect, Web of Science, as well as books and newspapers, have been scoured using keywords relating to the concept and factors affecting adaptive reuse.

This literature review was done by setting the research requirements and doing database searches using the study's unique keywords. "adaptive reuse concept," "adaptive reuse of public buildings," "factors affecting adaptive reuse," and "adaptive reuse in Malaysia" were used to locate the applicable article depending on the study scope.

To investigate the implementation of adaptive reuse in public buildings, many topics were examined, including the "concept of adaptive reuse," "factors affecting adaptive reuse," and "adaptive reuse practice". Therefore, the best content has been recognised and chosen based on its keywords. The article's scope and substance were summarised based on the abstracts of the chosen papers. Based on the abstract reading, the selected articles were analysed and reviewed to ensure that they fulfil the research criteria. After deleting extraneous items, only pertinent articles were picked and arranged for further evaluation. Subsequently, after selecting the pertinent publications, a comprehensive literature analysis was undertaken to create and combine the factors that were crucial for investigating the adoption of adaptive reuse in a number of government buildings in Malaysia. Figure 1 illustrates the research design, whereas Figure 2 demonstrates the research methodology.

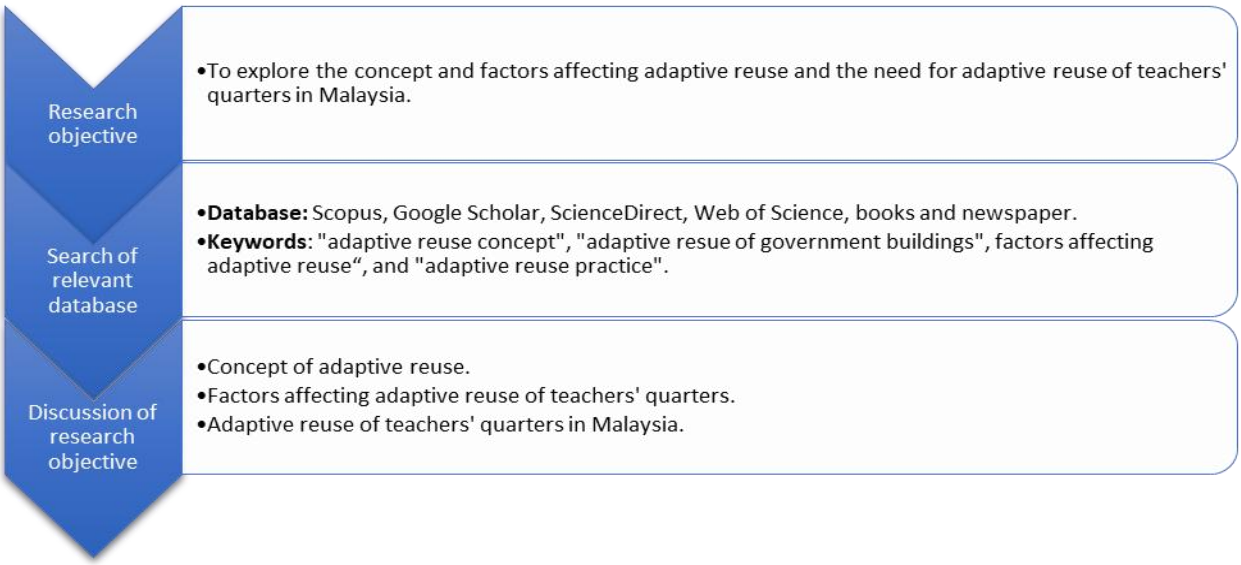

Figure 1 Research methodology

Figure 2 Research design

3.0 ADAPTIVE REUSE CONCEPT

In many regions, including Europe, the notion of adaptive reuse dates back to Roman times (Stratton, 2000). Adaptive reuse is influenced by a variety of different ideas, such as restoration, regeneration, rehabilitation, repair, and recycling. Adaptive reuse is the process of prolonging the life of a structure by altering its original use (Kincaid, 2002). Adaptive reuse is intended for abandoned buildings that have failed economically or socially. Adaptive reuse is the process of adapting ancient buildings and renovating a building or site to include characteristics that allow particular applications to occupy a space that was originally intended for a different use (Douglas, 2006). It is the act or process of allowing the compatible use of a property by repairing, changing, and adding those aspects or features that communicate economic, cultural, or architectural values while keeping these values. This may require only maintaining a portion of the current structure or renovating the entire structure. Reducing consumption, recycling, and reusing in order to achieve sustainability and conservation is a modern adaptive reuse strategy (McDonough & Braungart, 2001).

Adaptive reuse is the architectural transitory phase or condition that adapts to a new environment, situation, or change (Abdulhameed et al., 2019). In addition, Yildirim (2012) saw adaptive reuse as the successful renovation of old structures to fit newer intended functions and coexist in a different place than the original. Keeping something alive is the act or process of modernization (rehabilitation to the original function), full conversion to a new function, or a mix of the two. Brooker and Stone (2008) drew a connection between the need for building or site conversion and the most recent sustainable development trends.

Adaptive reuse techniques aid in supporting sustainable built environment development (Conejos et al., 2011). The preservation of architecture, on the other hand, provides metropolitan populations with economic, cultural, and social benefits. Consequently, the goal of architectural conservation has shifted from preservation to urban regeneration and sustainability (Ariffin et al., 2020; Bullen & Love, 2011). Adaptive reuse is considered a feasible alternative to building destruction and replacement because of its lower energy and waste demands. It provides extra societal advantages by revitalising and renovating well-known places (Conejos et al., 2011). Repurposing old structures provides local communities with environmental and social benefits and helps preserve our national history (Shen & Langston, 2010).

4.0 FACTORS AFFECTING ADAPTIVE REUSE

Adaptive reuse is one way for ensuring the longevity of a building. Numerous studies have opined that adaptive reuse decision-making involves a series of difficult steps (Mohamed & Alauddin, 2016) where it involves the whole stages of a building project from decision-making to building maintenance. According to Haroun et al. (2019), the process of deciding on new and optimum building use need to involve many factors. According to Yoon and Lee (2019), factors that affect adaptive reuse comprise all of those factors affecting adaptive reuse mentioned by the other scholars such as Mısırlısoy and Günçe (2016), Mohamed and Alauddin (2016), Kee (2014), Yap (2013), Wang and Zeng (2010) and Wilson (2010). They conclude that these factors are interdependent and can be applied to any type of building. The factors are gathered and tabulated as shown in Tables 1 and 2.

Table 1 Previous literature on factors affecting adaptive reuse

Source(s)	Factors Affecting Adaptive Reuse	Types of Building	Location of Building
Yoon and Lee (2019)	1. Stakeholder 2. Adaptive reuse potential 3. Social 4. Environmental 5. Economic 6. Cultural 7. Building codes 8. Asset condition 9. Location	Residential building	South Korea
Mısırlısoy and Günçe (2016)	1. Actors 2. Adaptive reuse potential 3. Regulation 4. Asset condition 5. Capital investment 6. Conservation action	Heritage building	Italy, United Kingdom, Hungary, Cyprus, France, Austria
Mohamed and Alauddin (2016)	1. Economic 2. Environment 3. Social 4. Legislative 5. Architecture	Industrial and residential building	Malaysia
Kee (2014)	1. Planning regulation 2. Government incentive 3. Housing affordability 4. Design 5. Built environment consideration 6. Outline zoning plan consideration	Residential building	Hong Kong
Yap (2013)	1. Market needs 2. Developer's risk 3. Micro environment sustainability 4. Financial incentive 5. Government guidelines	Industrial building	Hong Kong
Wang and Zeng (2010)	1. Cultural 2. Economic 3. Architectural 4. Environmental 5. Social Aspects 6. Continuity	Historic building	Taiwan
Wilson (2010)	1. Environmental 2. Location 3. Legislative 4. Financial 5. Market characteristic	Industrial building	Canada

Table 2 Summarisation of factors affecting adaptive reuse

Factors Affecting Adaptive Reuse		Actors	Adaptive Reuse Potential	Regulation and Legislation	Economic	Location	Architectural Value	Environment	Social and Culture
Source(s)	Type of Building								
Yoon and Lee (2019)	Residential Building	✓	✓	✓	✓	✓	✓	✓	✓
Mısırlısoy and Günçe (2016)	Heritage Building	✓	✓	✓	✓				
Mohamed and Alauddin (2016)	Industrial and Residential Building			✓	✓		✓	✓	✓
Kee (2014)	Residential Building			✓	✓		✓		
Yap (2013)	Industrial Building			✓	✓			✓	
Wilson (2010)	Industrial Building			✓	✓	✓		✓	
Wang and Zeng (2010)	Industrial Building				✓		✓	✓	✓

4.1 Actors

Actors are stakeholders with a role in adaptive reuse decision-making. Users, producers, investors, and regulators can be classed as actors (Mısırlısoy & Günce, 2016). To determine the optimal function for the new usage, it is necessary to define the perspectives of the decision-makers.

Actors and action are the main agents affecting adaptive reuse, such as planning authorities, local authorities, municipalities, original users, future users, and producers, such as architects, engineers, experts, and specialists. An action is a step taken by an actor during the assessment, decision-making, planning, and design phases of a project's management. Despite the fact that each item requires unique actors and actions, there may be common driving reasons among actors and actions (Yoon & Lee, 2019). The owner of a building who desires to alter the construction, for instance, will assess their financial means. The focus of investors is on the future, whereas that of marketers is on the most current market demands. When deciding to reuse a building, the producer (professional team) will evaluate the original architecture, structure, purpose, and space (Mohamed & Alauddin, 2016).

4.2 Adaptive Reuse Potential

Adaptive reuse potential is the realisation of benefits when adaptive reuse is adopted. Realization of a building's potential is essential for the development of plans for its sustainable adaptive reuse. This element influences not just the operating efficiency of buildings, but also their potential to achieve sustainability goals (Mısırlısoy & Günce, 2016). For instance, the physical state of the asset and the expense of converting it to a new functional use. Several owners and building managers indicated that, if the building was in good shape, the advantages of utilising their existing facility may include avoiding the upheaval of relocating and decreasing maintenance and operating costs (Bullen & Love, 2011). The adaptive reuse potential of a building can also be measured by determining the space's immediate usefulness in terms of how much structural restoration is required to implement the adaptive reuse design and how the space is intended to be converted (Vackier, 2014).

4.3 Regulation and Legislation

Regulation is defined as “the sustained and focused attempt to alter the behaviour of others in accordance with defined standards and purposes in order to produce a broadly identified outcome or outcomes, which may involve mechanisms for standard-setting, information-gathering, and behaviour modification” (Smith, 2002, p. 42). Legislation is defined by the Interpretation Act 1948 and 1967 as “any proclamation, rule, regulation, order, notification, bye-law, or other instrument made pursuant to any Act, Enactment, Ordinance, or other authorised authority and having legislative force” (p. 20).

According to Bullen and Love (2011), the fundamental motivation for investing in an adaptive reuse programme is the requirement of new building rules and regulations to bring existing buildings up to current performance levels. This poses an impediment to a change of use, as compliance with older structures may necessitate substantial alterations. In Western Australia, for instance, the performance-based building code allows for considerable flexibility in meeting current code standards, although adaptive reuse may still incur significant costs for the developer. According to Shipley et al. (2006), developers frequently complain about the rigidity of building rules and other regulations regarding the reuse of buildings. Any further relaxations for adaptive reuse projects would, however, have to be weighed against the hazards they could pose to the inhabitants' health and safety.

4.4 Economic

The allocation of capital may influence the strategy that will be used in adaptive reuse projects, making the economy one of the most influential aspects of adaptive reuse. When deciding whether or not to repurpose or demolish a property, building owners and managers do an abundance of financial analyses. Typically, they concentrate on development and building expenditures, operational costs, marketing and maintenance needs. In addition, cost-effectiveness and building value are practical methods for delivering buildings for new uses. This is due to the fact that the cost of new construction may exceed the cost of reusing an old structure (Bullen & Love, 2011).

4.5 Location

The building location plays a significant impact in deciding its future use. It is essential to begin these discussions by focusing on the primary attraction or activity of the location. Reusing structures and giving them new uses based on their location, size, and potential can aid future generations in comprehending their origins (Yoon & Lee, 2019).

The assignment of new purposes to a heritage property undergoing conservation depends on the building's location and accessibility. The range of users is determined by the nature of the new functions of repurposed heritage, which provides hints about their typical journey distance and the transport networks they utilise to reach their location. Therefore, it is vital to propose applications that are compatible with the conditions of the heritage building's site.

4.6 Architectural Value

The significance of the building facade to the surrounding community is based on the historical and conceptual content of its façade. Moreover, it appears that developers are beginning to respect age, character, and architectural excellence, and are willing to pay for space

and architectural standards not found in comparable new structures (Bullen, 2007). The concept of preserving buildings is not always associated with aesthetic value or architectural excellence, but rather with preserving the entire context and urban built environment.

When adapting historic structures for a different function, the new use and the intervention should preserve the originality and architectural character of the building so that future generations are not given incorrect or missing information. Throughout history, many buildings have served various purposes at various times. People are now increasingly aware of architectural preservation of the built environment, thus the selection of new uses for historic buildings should be conducted with greater professionalism (Mısırlısoy & Günce, 2016).

4.7 Environment

The climate change has resulted in a considerable reduction strategy for carbon emissions and low carbon urban development. With the construction of the new building, substantial amounts of raw materials and energy will be consumed, as well as substantial carbon emissions (Gorgolewski, 2008; Langston et al., 2008). According to Zuo and Zhao (2014), 40 per cent of overall energy consumption is attributable to buildings, which also emit greenhouse gas emissions that contribute to global warming during their life cycle.

Adaptive reuse is also a more efficient and effective method of building management than demolition. It is deemed safer since it decreases the amount of disruption caused by hazardous materials, polluted ground, and the risk of falling objects and dust. In particular, site work is facilitated by the existing structure's work enclosure, which saves downtime due to adverse weather. In a similar spirit, Itard and Klunder (2007) argue that demolition is an environmentally unfavourable operation. Adapting buildings for a new purpose generates less trash, uses fewer resources, and likely consumes less energy than demolishing and rebuilding, according to a study on renovations.

4.8 Social and Culture

Recognizing the original and new purpose of a heritage building should be considered in adaptive reuse projects, along with the building's history and original function. This is due to the potential for social and cultural disruption among some populations. Wang and Zeng (2010) stated that the new functions of heritage structures should not distort their original themes and values. Forcing a contemporary use, which is completely different from the original use, may be a better solution than forcing a fake imitation of the heritage use, because contemporary use can be easily identified, whereas inappropriate uses that are unrelated to the building's history can confuse visitors.

When implementing the adaptive reuse approach, society's impact should be considered. New usage must be consistent and meet the requirements of the populace. Aydın et al. (2015) verified that a new function should serve society, contributing to the interaction between individuals, the heritage building, and the society, as well as increasing community awareness and pride. Shehata et al. (2015) noted that reuse operations should involve multiple groups and attempt to identify space for conservation in order to reduce social gaps. New functions that have a semi-public or public nature and are housed in historic structures effectively contribute to conservation awareness.

5.0 ADAPTIVE REUSE IN MALAYSIA: A CASE STUDY OF TEACHERS' QUARTERS

Malaysian adaptive reuse strategies are primarily concerned with heritage preservation (Ali et al., 2019; Ariffin et al., 2020; Hanafi et al., 2018). The majority of adaptive reuse projects in Malaysia are for structures that are over 50 years old (Abdulhameed et al., 2019). Malaysia has a large number of historic and heritage structures that must be conserved. Even the knowledge of heritage building towards adaptive reuse practice is still imprecise and confusing, according to Hanafi et al. (2018), Tan et al. (2018), and Ariffin et al. (2020), adaptive reuse is a relatively new concept in Malaysia (Ali et al., 2019). Since the 1990s, when the Malaysian government made many steps to safeguard and preserve historical and cultural structures, heritage conservation has been ongoing throughout Malaysia (Ariffin et al., 2020; Hanafi et al., 2018). Conservation efforts, on the other hand, did not gain traction until 2008, when the United Nations Educational, Scientific, and Cultural Organization (UNESCO) declared Malacca and George Town as World Heritage Sites. The government has responded by taking further steps and putting up a great effort to conserve the heritage structures as a result of this appreciation (Ariffin et al., 2020). Because of the growing awareness, adaptive reuse is now a widespread trend in Malaysia's heritage building conservation (Aziz, 2020). As a result, many old structures in Malaysia have been converted for reuse, particularly in Melaka and Penang (Aziz, 2020; Hanafi et al., 2018).

It is worth noting that following UNESCO's designation, the government passed the National Heritage Act in 2005, which prioritised conservation work. In addition, each state is supposed to adopt its own conservation rules based on the National Heritage Act of 2005 to assist the government's initiative. The Municipal Council of Penang, for example, has made conservation guidelines known as 'Guidelines for Conservation Areas and Heritage Buildings' available to historical property owners as a reference. These concepts apply to every part of a structure, from the inside to the outside (Mydin et al., 2014). Penang's and Malacca's heritage buildings must be conserved in accordance with the respective Local Authorities' conservation principles and standards (Wahab et al., 2018). Conservation principles must conform to four criteria, as set by the Department of National Heritage of Malaysia, i.e. material authenticity, architecture, artistry, and construction plan (Wahab et al., 2018).

Malaysia has made adaptive reuse a primary priority in its efforts to strengthen the tourism industry (Ariffin et al., 2020). Apart from economic factors, adaptive reuse of heritage architecture has been implemented due to land shortages, particularly in Kuala Lumpur and other Malaysian cities. Adaptive reuse for historic properties has been adopted as a result of the current high property costs (Tamjes et al., 2017). This strategy involves changing the building's purpose or use in order to protect historical structures. For the preservation of a neighbourhood's and age's historic building character, an adaptive reuse approach is essential. This has mostly been overlooked and might be utilised to generate new jobs within the current urban fabric (Ali et al., 2019). The Sultan Abdul Samad Palace, the Old Courthouse, the

Square Tower, and the Kuching Waterfront have all been protected and rebuilt in accordance with the UNESCO World Heritage Sites of Penang and Malacca (Ariffin et al., 2020; Hanafi et al., 2018).

A study on government quarters in the Kerian district of Perak revealed research gaps on the factors that contribute to unoccupied government quarters (Borham, 2013). However, to the best of the researcher's knowledge, there are no empirical studies on teachers' quarters in Malaysia from an adaptive reuse perspective. The administration and circumstances of teachers' quarters in Malaysia will be explained in this part. Teachers' quarters are managed and maintained by the Ministry of Education's Asset Management Division (MoE AMD). This department was founded in 2018 with the primary goal of efficiently, systematically, and to a high standard of quality managing the assets owned by MoE. This department's major job is to organise, coordinate, and supervise any projects or activities linked to the maintenance and management of the Ministry of Education's assets, which includes teachers' quarters.

To assist individuals who cannot afford a home, the Malaysian government has begun to create quarters for government employees. Since the First Malaysian Plan (1st Malaysia Plan) was established to improve the welfare of civil officials and provide them with living facilities, these quarters have been developed (Borham, 2013). The Ministry of Education provides quarters to improve the welfare and lodging of teachers and staff workers in the educational sector. The supply of such quarters can also ease the financial load on low-income employees and aid in the proper, efficient, and ideal performance of official duties and responsibilities. Significantly, the government has allocated some funds to construct 80,000 units of teachers' accommodation or housing quarters in accordance with the Seventh Malaysia Plan (7th MP) (1996-2000), with a preference given to teachers' quarters in rural areas to attract and retain skilled and experienced teachers in those areas. There has been a substantial expansion of teachers' quarters under the 7th MP, with the Encorp Group being granted the permission to build 10,000 units of teachers' quarters at 109 sites across Malaysia at a cost of RM1.38 billion between 2000 and 2003. This project entails the construction of a four- and five-story apartment with three bedrooms and two bathrooms in each unit and a total space of 1,000 square feet. The initiative has increased the number of constructing quarters in rural and semi-rural areas by a significant amount.

According to the MoE's audit report, a total of 48,076 quarters were erected as of December 2018, with 15,771 units (32.8 per cent) remaining empty. Figure 3 shows the total number of inhabited and empty teachers' quarters in Malaysia. The abandoned units, on the other hand, might do significant damage. These concerns were linked to flaws in management and finance, insufficient planning for quarters demand, and a lack of standard practice in asset management, which led to unoccupied units. In 2019, the Ministry of Education (MoE) proposed a number of solutions to the problem of abandoned teachers' quarters in Malaysia, based on three strategies: short-term, medium-term, and long-term planning.

For the short-term plan, the Ministry of Education set aside RM70 million in 2020 to maintain and repair 12,000 units of teachers' quarters, focusing on both occupied and unoccupied quarters in demand. A medium-term plan, on the other hand, refers to a one- to the three-year rental arrangement between the private and public sectors. For the medium-term plan, the private or government sector, which rents these quarters throughout the agreement time, will cover all costs for repairing, maintaining and operating the buildings. The Ministry of Education, on the other hand, has planned for the outright sale of vacant quarters in the long run. The long-term plan is mainly focused on the 95-100 per cent vacant units of teachers' quarters outside the school compound and excludes quarters under the Encorp project, which is still under concession. As a result, suggesting an adaptive reuse strategy to rename the vacant quarters in order to meet the Ministry's requirements is an alternative. According to the Ministry of Education, the Ministry has devised measures to address the issue of teachers' quarters abandonment by renting the vacant buildings to private and public agencies and changing the function of the quarters.

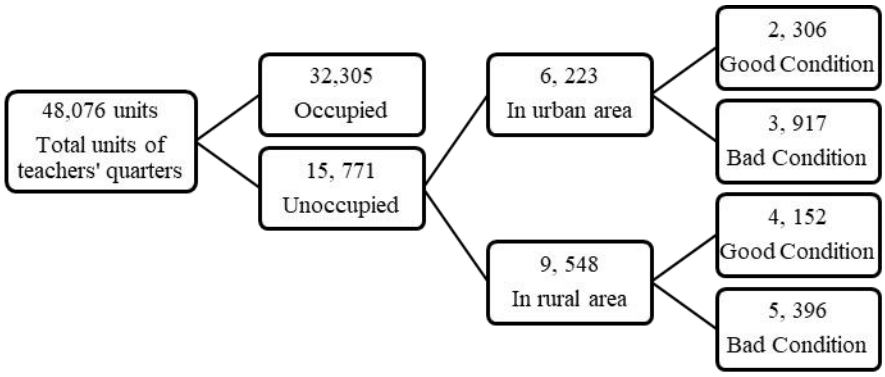

Figure 3 Total units of occupied and unoccupied teachers' quarters in Malaysia
(Source: Ministry of Education Malaysia)

5.0 FINDINGS AND DISCUSSION

This article is a review of the research on the concept and factors affecting adaptive reuse from the perspective of teachers' quarters. In accordance with the five-year National Plan, the provision of government housing has become a priority for the government since independence. From the first Malaysia plan through the fifth Malaysia plan, the Malaysian government has prioritised housing for government personnel (1981-1985). When the government proceeded with the Private Finance Initiative to create a massive number of teachers' quarters in the 7th MP, the number of teachers' quarters increased dramatically. Current figures indicate that there are 15,771 vacant teacher housing units in rural and urban locations. Therefore, the Ministry of Education must address this matter immediately.

As a preliminary research agenda on the adaptive reuse of public buildings, the objectives of this study are multifaceted. Initially, several concepts of adaptive reuse of buildings within the context of the built environment were presented. The notion has been widely utilised in conservation projects or sites to give older/unused buildings new building purposes. In addition, a narrative review has been done to present the opinions of several scholars on the idea.

The second objective focuses on an examination of the factors affecting adaptive reuse, including actors, adaptive reuse potential, regulation and legislation, economic, location, architectural value, environment, and social and cultural. In terms of actors, the Malaysian Ministry of Education (MoE) is the teachers' quarters stakeholder. Any decision about the reuse of the quarters is made completely by MoE. In addition, the current condition of teachers' quarters should be evaluated as a potential explanation for adaptive reuse. The immediate usability of the quarters may impact the cost or amount of work required to restore the quarters. As teachers' quarters are classified as government buildings, any decisions regarding those quarters should be directed by government-established regulations and laws. Depending on the condition of the quarters, any adaptive reuse project necessitates a specific allocation from an economic standpoint. The economic factor may have an impact on adaptive reuse applications, since certain teachers' quarters may require a substantial amount of money for restoration. The location of teachers' quarters is crucial because the new use of the quarters depends on the surrounding activity and facilities. Consequently, the new usage of the quarters may meet the requirements of neighbouring communities. Researchers argue that architectural value does not significantly impact the decision-making process for adaptive reuse of teachers' quarters, as it concentrates on the building's facade and architecture. The architectural value element typically relates to historic or heritage structures. In terms of environmental factors, adaptive reuse, the opposite of building demolition, will reduce material and land consumption, as well as energy consumption and construction-related pollution. The purpose of the new teachers' quarters should be tailored to local economic activity in order to enhance the economic gain and quality of life of local residents. Depending on the state of the structure, alterations or upgrades may be more cost-effective. It may need less labour, lower construction expenses, and shorten the duration of the contract (Shipley et al., 2006); however, poor building conditions may make it inappropriate. Therefore, the government and the construction industry should embrace adaptive reuse to ensure sustainability in their construction practices.

Research on adaptive reuse in Malaysia is a burgeoning field that began to attract increasing interest in the 2000s. As a result of the recognition of two cities as UNESCO World Heritage Sites, there is a greater focus on preserving or repurposing many heritage structures, especially in Georgetown and Malacca, to meet tourism demands. To serve the tourism business, many of these buildings were converted into boutique hotels, stationery shops, and restaurants. On the other side, there are various research trends concerning the adaptive reuse of public buildings. Regarding public buildings, the topic of adaptation is not widely discussed. Even in practice, there is a shift toward the building reuse agenda, although it has not been properly investigated. Our third objective focuses on the requirement for adaptive reuse of Malaysian teacher housing. On the basis of the greater number of unoccupied teachers' quarters, we argue that this is a good case for contemplating adaptive reuse for public buildings. With the government's limited maintenance budget, it is prudent to consider adaptive reuse for the structures. Unlike private structures, there are regulations regarding the new use proposal. Given the factors affecting adaptive reuse, a specific study must be conducted to verify that adaptive reuse would benefit the stakeholders. Thus, a research conceptual framework is provided below in Figure 4 as a guide for future research.

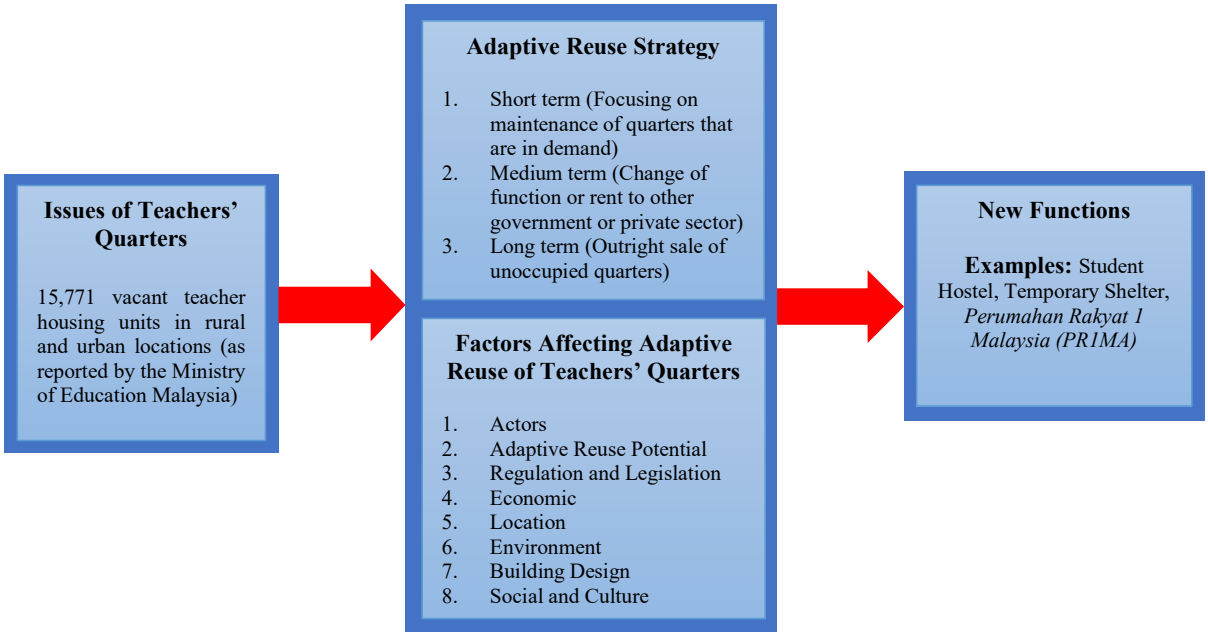

Figure 4 Research conceptual framework

6.0 CONCLUSION AND FUTURE RESEARCH

This article provides just a theoretical idea of adaptive reuse and highlights solutions to be adopted or adapted for teachers' quarters. Moving forward, this study indicated a number of research directions that might be pursued regarding public buildings in general or teacher housings in specific:

1. The obstacles and difficulties of adaptive reuse in general, including regulatory and legal issues.
2. The government's adaptive reuse vision and objectives.
3. The suitability of a public building for certain reuse, taking into account its current condition, location, and structure.
4. The optimal adaptive reuse model ensures a win-win outcome for all parties (private and public parties).

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