ADAPTIVE REUSE PRACTICE OF TEACHERS' QUARTERS IN MALAYSIA

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ADAPTIVE REUSE PRACTICE OF TEACHERS' QUARTERS IN MALAYSIA

by

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LIST OF ABBREVIATIONS

MoF	Ministry of Finance
MoE	Ministry of Education
BPA	Asset Management Division
JPN	Jabatan Pelajaran Negeri
PPD	Pejabat Pelajaran Daerah
ITP	Fixed Housing Allowance
COLA	Cost of Living Assistance
EPRD	Educational Policy Planning and Research Division
JPA	Jabatan Perkhidmatan Awam
SSB	New Remuneration System
SSM	Malaysian Remuneration System
IPS	Institut Pengajian Siswazah
USM	Universiti Sains Malaysia
BNM	Bank Negara Malaysia
PADU	Education Performance and Delivery Unit
DPAK	Dasar Pengurusan Aset Kerajaan
MPAM	Manual Pengurusan Aset Menyeluruh
TPATA	Tatacara Pengurusan Aset Tak Alih
SKATA	Sistem Kod Aset Tak Alih
SPATA	Sistem Pengurusan Aset Tak Alih
UNISHAMS	Sultan Abdul Halim Mua'dzam Shah International Islamic University

LIST OF APPENDICES

AMALAN PENGGUNAAN SEMULA KUARTERS GURU DI MALAYSIA

ABSTRAK

Kuarters guru adalah kemudahan penginapan yang disediakan oleh kerajaan kepada kakitangan Kementerian Pendidikan Malaysia (KPM). Walau bagaimanapun, kekurangan kajian empirikal mengenai isu, pengurusan, dan penggunaan semula kuarters guru telah menyebabkan banyak kuarters guru tidak berpenghuni di Malaysia. Bagi mencapai kelestarian kuarters guru, kajian ini telah menggunakan strategi penggunaan semula. Penggunaan semula bermaksud penggunaan semlua bangunan untuk fungsi baharu yang berbeza daripada fungsi asal bangunan. Justeru, kajian ini berhasrat untuk (1) meneroka isu dan faktor semasa yang mempengaruhi penggunaan semula kuarters guru; (2) mengenal pasti pengurusan (perancangan, pelaksanaan dan pemantauan) kuarters guru; (3) mengenal pasti strategi penggunaan semula untuk kuarters guru; (4) mengenal pasti faedah dan cabaran menggunakan strategi penggunaan semula; (5) mencadangkan penyelesaian yang mungkin untuk mengatasi cabaran strategi penggunaan semula untuk kuarters guru yang tidak berpenghuni. Lima jabatan di bawah KPM telah dipilih berdasarkan beberapa kriteria. Temu bual separa berstruktur telah dijalankan dengan responden daripada jabatan terpilih tertumpu kepada pengurusan dan penggunaan semula kuarters guru. Data yang dikumpul dianalisis menggunakan teknik analisis kandungan. Isu bilangan tinggi kuarters guru yang tidak diduduki dikaitkan dengan faktor yang mempengaruhi penggunaan semula, seperti aktor, potensi penggunaan semula, peraturan dan perundangan, peruntukan kewangan dan lokasi. Sebagai tambahan, penemuan jelas dapat diperoleh mengenai pengurusan dan strategi penggunaan semula kuarters guru. Walau bagaimanapun,

dalam menggunakan strategi penggunaan semula terdapat faedah, cabaran dan cadangan penyelesaian yang perlu dipertimbangkan. Penyelidikan ini menyumbang kepada pengembangan ilmu pengetahuan kerana ia adalah yang pertama untuk meneroka isu, pengurusan, dan aplikasi penggunaan semula kuarters guru di Malaysia. Penemuan ini bermanfaat kepada pemegang taruh (KPM) dalam merancang strategi bagi pembangunan masa depan kuarters guru.

ADAPTIVE REUSE PRACTICE OF TEACHERS' QUARTERS IN MALAYSIA

ABSTRACT

Teachers' quarters are accommodation facilities provided by the government to Ministry of Education (MoE) servants. However, a lack of empirical study regarding issues, management, and adaptive reuse of teachers' quarters has led to many unoccupied teachers' quarters in Malaysia. In order to achieve sustainability for teachers' quarters, this study advocated using an adaptive reuse strategy. Adaptive reuse applies to using a building for a new function that differs from the purpose of the building. Thus, this study intends to (1) investigate the current issues and factors affecting adaptive reuse of teachers' quarters; (2) identify the management (planning, implementation and monitoring) of teachers' quarters; (3) identify the adaptive reuse strategy for teachers' quarters; (4) identify the benefits and challenges of applying adaptive reuse strategy; (5) suggest possible solutions to overcome the challenges of adaptive reuse strategy for unoccupied teachers' quarters. Five departments under MoE were selected based on several criteria. Semi-structured interviews were conducted with the respondents from selected departments focused on the management and adaptive reuse of teachers' quarters. The collected data were analysed using the content analysis technique. Issues of the high number of unoccupied teachers' quarters were associated with the factors affecting adaptive reuse, such as actors, adaptive reuse potential, regulation and legislation, financial allocation, and location. Moreover, an apparent discovery is obtained regarding the management and adaptive reuse strategies of teachers' quarters. However, in applying adaptive reuse strategies, there are benefits, challenges, and possible solutions that need to be

considered. This research contributes to the body of knowledge in that it is the first to explore the issues, management, and application of adaptive reuse in teachers' quarters in Malaysia. This finding is beneficial to the stakeholder (MoE) to guide planning strategies for the future development of teachers' quarters.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This research looks at the management and adaptive reuse method for revitalizing government teachers' quarters in Malaysia. As a result, the next section will provide a broad explanation of adaptive reuse, government quarters, and teachers' quarters in Malaysia. In the following section, the problem statement is presented, focusing on adaptive reuse and teachers' quarters. This chapter has also described the study's objectives, significance, and scope.

1.2 Background of Research

The term "civil servant" refers to someone who works for the government. In Malaysia, government servants also work in the health care (doctors and nurses), security (military and police), and education sectors (teachers). In the civil service, there are various grades, with the Chief Secretary to the Government of Malaysia being the highest and grade 1 being the lowest. The civil service sector is separated into three (3) service categories as a result of the establishment of the New Remuneration System (SSB) and, later, the Malaysian Remuneration System (SSM) (Portal Rasmi Jabatan Perkhidmatan Awam (JPA) - Skim Perkhidmatan, n.d.). These comprise the Top Management Group, Management and Professional Group, and Support Group.

Civil servants were among the low-income classes in the early years of independence. It is difficult for a civil servant to own a home because of this financial constraint, especially in urban regions. As a result, the government must provide them with temporary housing known as government quarters. The government's policy attempted to tackle the settlement problem by establishing a centralised settlement for

civil officials, making work more accessible and creating an excellent social network (Borham, 2013).

The Malaysian Five-Year National Plan detailed the allocation of finances for each civil sector. This strategy was implemented to promote all inhabitants' well-being and enhance living circumstances in rural areas, particularly for low-income individuals. Malaysia has employed the Five-Year National Plan as a tool for medium-term economic policymaking. This strategy aims to assist the government in mobilising existing economic resources to achieve particular socioeconomic objectives (The Malaysia Plan, n.d.). Since then, the Malaysian government has focused on offering the most excellent facilities, including housing for government employees. Malaysian teachers are among those who benefit from these resources. Significantly, the Government has allocated RM690 million for the construction of teachers' accommodation or housing quarters in The Ninth Malaysia Plan (2006–2010), with half of this allocation going to teachers' housing quarters in rural areas (Ninth Malaysia Plan, 2006–2010 | Official Portal of Economic Planning Unit, n.d.).

Although the Tenth (2011–2015) and Eleventh (2016–2020) Malaysia Plans make no mention of government quarters, the federal government has set aside RM400 million in the 2019 budget for the maintenance and repair of government quarters. As a result, civil servants, particularly the police, army, and teachers, can live more comfortably (Budget 2019: RM1bil Fund for First House Purchase | The Star, n.d.). However, in the budget provided in 2020, there is no explicit provision for teachers' quarters, and the majority of the cash in the budget will be used to maintain and upgrade the facilities of Malaysian schools (Ministry of Finance, 2019).

As a growing country, Malaysia has a vast stock of existing buildings, most of which are in poor condition. As a result, the buildings' lifespan may be shortened, resulting in dilapidated conditions and a loss of value (Mohamed & Alauddin, 2016). According to scholarly research, most quarters, including teachers' quarters, are left empty and located outside the city, such as in Perak's Kerian District. According to the findings, 43.3% of government quarters units in all grades remain vacant in rural areas (Soffie, 2013).

According to Berita Harian (2019), the Ministry of Education (MoE) would continue to work with various stakeholders, including state and private governments, to alleviate teacher shortages. Former Minister of Education Dr Maszlee Malik stated that the Ministry of Education owns roughly 50,257 teachers' quarters in Malaysia, with 33,893 units occupied and 16,364 units vacant. In the rural area, 10,062 of the 16,364 units are in bad shape. This pattern has resulted in unsustainable government losses in land productivity and financial resources (Soffie, 2013).

In order to achieve sustainability for teachers' quarters, this study advocated using an adaptive reuse strategy. Adaptive reuse is described as extending the life of a structure while modifying its original use (Vivian & Jane, 2019). Finding a new purpose for a structure is known as an adaptive reuse. It is generally described as a process for converting structurally sound older structures into economically permanent new uses (Conejos, Langston & Smith, 2013). It is a more energy-efficient and waste-free alternative to demolition and building replacement. It also serves a societal purpose by rejuvenating and reviving familiar locations (Misirlisoy & Gunce, 2016). Giving existing structures a fresh lease on life provides environmental and social advantages to communities while preserving our national heritage (Misirlisoy & Gunce, 2016). Many

researchers also argue that dismantling and reconstructing historic structures is more expensive and inconvenient than converting them to new uses (e.g., Vardopoilos, 2019; Ariffin, Zahari, Radzi, and Kutut, 2017).

The adaptive reuse approach for decision-making has grown increasingly popular (Steen & Van Buren, 2017). In many circumstances, extending the life of a structure through reuse can reduce material, transportation, energy, and pollution consumption, contributing significantly to sustainability (Mısırlısoy and Günçe, 2016). According to academics, adaptation can significantly contribute to the long-term sustainability of existing structures (Mohamed, Boyle, Yang, & Tangari, 2017). Moreover, Bullen and Love in 2011 have identified the trend of architectural reuse and adaptation.

Former Deputy Prime Minister Datuk Seri Dr Wan Azizah Wan Ismail advocated that government buildings or unoccupied teacher quarters can be used as temporary shelters for flood victims around Malaysia. “In the future, if numerous sites (government buildings and teachers' quarters) are vacant, they can be used (as temporary housing) so that it does not interfere with students' learning (learning) in schools” (Shaarani & Shaiful, 2019).

Teachers’ quarters are under the Asset Management Division of Ministry of Education (BPA MoE) management. Teachers’ quarters are developed to serve as accommodation for teachers in Malaysia. However, the statistic for unoccupied teachers’ quarters is high (15,748 units) as in June 2020. As addition, the high number of unoccupied teachers’ quarters may badly impact the performance of MoE in long term. This is because more allocation will be needed to restore the dilapidated teachers’ quarters.

This problem is crucial as a report from mass media states that abandoned teachers' quarters located at Labis, Johor raises social issues such as drug addiction, students skipping school, and students loitering. Since then, some irresponsible people have stolen the household appliances such as furniture, windows, iron, plumbing, and anything valuable to resale them. The four-story teacher quarters were estimated to accommodate 80 residential units in five blocks and are currently experiencing severe damage due to the lack of scheduled maintenance (Badrul, 2018). In other news, teachers' quarters at Gerik, Perak are rented by a private company as a hostel for their foreign workers. Supposedly foreigners are not eligible for the teachers' quarters, and the case at Klian Intan could be considered a misuse of government facilities (Rohaniza, Mohd & Nadia, 2017).

In the year 1971, Malaysians began to practice building maintenance. It became increasingly active in 2007 when the government-mandated maintenance management as a new national culture (Zulakhmar, Syazli, Shuib, Siti, & Noraini, 2013). Many policies and manuals govern the management of government building assets in Malaysia, including Dasar Pengurusan Aset Kerajaan (DPAK), Manual Pengurusan Aset Menyeluruh (MPAM), Tatacara Pengurusan Aset Tak Alih (TPATA), Sistem Kod Aset Tak Alih (SKATA), and Sistem Pengurusan Aset Tak Alih (SPATA) (mySPATA). All three levels of government in Malaysia own public properties: the federal, state, and district governments.

1.3 Problem Statement and Study Rationale

Asset management in Malaysia is concerned with building operations such as maintenance, space, and security (Backer & Yusoff, 2014). Currently, asset management in Malaysia is based on ad hoc or reactive management, where

maintenance tasks are carried out without sufficient systematic planning (Abu Mansoor, 2011). As stated in subchapter 1.2, many policies or manuals govern managing government building assets. To understand how the management of teachers' quarters by each level of government works, a deep analysis of the planning, implementation, and monitoring should be done by correlating with the available policy or manual.

Currently, there is only one study regarding government quarters done by Borham (2013) on determining factors that lead to unoccupied government quarters within the Kerian district in Perak. However, based on researcher knowledge, there is a lack of empirical studies regarding issues, management, and adaptive reuse of teachers' quarters which has led to many unoccupied teachers' quarters in Malaysia. The literature review indicates that information regarding teachers' quarters is only available in mass media such as newspapers.

There are still unidentified specific roles for managing teachers' quarters for the parties involved. For example, according to the Executive Director of Ministry Transformation (PADU) at the Ministry of Education Malaysia (MoE), Mohamad Nazuir Ahmad claimed that the District Education Offices control this infrastructure. The Ministry faces the most difficulties in handling unoccupied quarters concerning the reuse asset management policy (News Straits Times, 2018). In managing teachers' quarters, there are three levels of management at MoE: federal, state, and district. Thus, there is a need to identify the management aspect of teachers' quarters and the reuse mechanism approach implemented by the ministry.

Data from BPA MoE shows an increasing percentage of the occupied building due to the new building utilization strategy implemented by MoE. A preliminary interview with BPA MoE shows that these quarters have been converted to multiple

usages proposed by public or private organisations such as university hostel, school hostel, police quarters, school classes, and a guest house without changing ownership. The MoE is modifying the function of unoccupied teachers' quarters. Proactive measures are being taken to address issues of housing across the country. For example, through the Kedah state government, the ministry has leased unoccupied quarters to the Sultan Abdul Halim Mua'dzam Shah International Islamic University (UNISHAMS) (Berita Harian, 2019). The report is only available in mass media. However, there has been no proper compilation of studies on teachers' quarters that have undergone adaptive reuse.

In terms of adaptive reuse concept, most of the previous studies focused on heritage and historical buildings, such as studies by Haroun, Bakr & Hasan, 2019; Yoon & Lee, 2019; Kee 2019; Silva & Perera, 2019; Yoon & Lee, 2019; Othman & Elsaay, 2018; Misirlisoy & Gunçe, 2016; Singla, 2016. In Malaysia, most of the studies regarding adaptive reuse are concentrated more on heritage and historical buildings for example, Ariffin, Zahari & Hanafiah, 2020; Hasan, Wahab & Ismail, 2019; Ali, Zawawi, Myeda & Mohamad 2019; Mohd Abdullah & Muhamad Shahril, 2018. Therefore, the relationship between heritage and historical building and adaptive reuse is quite established compared to quarters building. The lack of research on adaptive reuse of teachers' quarters motivates the researcher to identify the possibility of implementing the adaptive reuse method in teachers' quarters.

The most significant issue in adaptive reuse projects is the random selection of a new building function without thorough examination. The decision on the new use should be based on analytic and scientific methodologies to determine the most appropriate strategy for the adaptive reuse project (Misirlisoy & Gunce, 2016).

Otherwise, due to social and economic issues, buildings may be abandoned after a period, or the new use may compromise the building's originality. Thus, many important factors that are determinant for adaptive reuse should be considered before deciding on adaptive reuse (Misirlisoy & Gunce, 2016). There are lists of determinants factors of adaptive reuse from previous scholars for different types of buildings, such as residential buildings (Yoon & Lee, 2019; Kee, 2014), heritage buildings (Misirlisoy & Gunce, 2016), historic buildings (Wang & Zeng, 2010) and industrial building (Yap, 2013; Wilson, 2010). Example of determinant factors are Actors, Adaptive Reuse Potential, Regulation and Legislation, Financial Allocation, Location, Building Design, Environment, Social and Culture. Thus, established determinant factors are absent in adaptive reuse for government buildings, especially teachers' quarters.

A complex combination of criteria influences adaptive reuse decisions, including location, heritage, architectural assets, and market trends (Bullen, 2011). Adaptive reuse is a difficulty from various perspectives, including political, economic, environmental, social, technological/physical, and legal (Wilkinson and Remy, 2015). For example, Carey and Wilkison (2018) emphasise the relevance of the specialised character of the job and the players' competence when it comes to constructing adaptive reuse residential projects. These indicators could impact teachers' quarters' adaptive reuse decisions. As a result, comprehensive research should be conducted to examine the entire issue of teachers' quarters in Malaysia.

1.4 Research Questions

In particular, this study aims to answer the following questions:

1. What are the current issues and factors affecting adaptive reuse of teachers' quarters in Malaysia?

2. How is the management (planning, implementation, and monitoring) of teachers' quarters in Malaysia?
3. What are the adaptive reuse strategies for teachers' quarters in Malaysia?
4. What are the benefits and challenges of applying adaptive reuse strategy?
5. What are the possible suggestions to overcome the challenges of adaptive reuse strategy for unoccupied teachers' quarters?

1.5 Research Objectives

This study aims to focus on the exploration of management and adaptive reuse of teachers' quarters in Malaysia which includes five main objectives, namely:

1. To investigate the current issues and factors affecting adaptive reuse of teachers' quarters in Malaysia.
2. To identify the management (planning, implementation, and monitoring) of teachers' quarters in Malaysia.
3. To identify the adaptive reuse strategy for teachers' quarters in Malaysia
4. To identify the benefits and challenges of applying adaptive reuse strategy.
5. To suggest possible solutions to overcome the challenges of adaptive reuse strategy for unoccupied teachers' quarters in Malaysia.

1.6 Significant of Research

Studies related to adaptive reuse towards teachers' quarters are critical because until now, no proper study has been carried out regarding adaptive reuse towards government buildings. The term adaptive reuse is commonly used in projects involving historic or heritage buildings, either domestically or internationally. Moreover, according to BPA MoE, there are 48,076 units of quarters under their management. Among those numbers, 15,748 units are unoccupied, and 10,061 units are in dilapidated

condition as of Jun 2020. This statistic proves that these unoccupied quarters need immediate attention, as they will continue bringing losses to the MoE's economy.

This study is also seen as vital because it may resolve the social issues that happen in the communities surrounding the teachers' quarters. For example, mass media reported on the social that issues arise in the unoccupied teachers' quarters. Sinar Harian in 2013 stated the condition of the ten blocks of five-story teachers' quarters in Sungai Petani, Kedah, worries the nearby residents as it has been used as a place for teenagers to commit unprofitable acts. Reusing wrecked or underused buildings, according to Sahraiyan & Tumer, 2017, helps society reduce crime and unsafe acts in the zone and generate a better social life for the neighbourhood.

This study also may contribute to Malaysia's building occupancy rate because most new housing price is expensive in certain places, which means it is unaffordable for some people to purchase a house. Information gathered from the National Bank of Malaysia (BNM) in 2016 stated that Malaysia's typical property prices are 5.0 times the annual median household income, making housing "extremely expensive." The housing affordability issue is even more extreme in some areas, with house prices in Sabah and Penang being "severely unaffordable." The housing market's imbalances have been exacerbated by a large gap between supply and demand for affordable homes. An alternative to overcome the housing problem is to utilize the existing building, the unoccupied government quarters since the government quarters' rental price is way lower than the price of private housing. Moreover, Syed Saddiq Abdul Rahman, former Malaysia's Youth and Sports Minister, proposed to state governments that abandoned government quarters may be transformed into transit or rental homes and made

available to the public, particularly young Malaysians. This programme may assist those having difficulty purchasing a home in the current economy (Ben, 2018).

This research has a special interest in construction since it will positively impact the construction industry and the environment. Building longevity and overall waste reduction, according to Foster in 2020, are crucial for the building and construction sector. Building demolition is not environmentally friendly (Itard and Klunder, 2007). Adaptive reuse, which entails repurposing an existing structure for new functions, will be used to construct the quarters. Adaptive reuse of old buildings has been the subject of numerous studies.

On the other hand, this study will help advance knowledge in Malaysian government quarters. Previous studies have focused on heritage and historical buildings. Therefore, this study adds to the theoretical understanding of adaptive reuse quarters building management (Zulkanain et al., 2021).

1.7 Scope of Research

This research focuses on the adaptive reuse method for unoccupied teachers' quarters under the management of BPA MoE in Malaysia. This research will also look into the current issues, factors affecting adaptive reuse, management, benefits, challenges, and possible solutions to overcome adaptive reuse strategy challenges by gathering literature from different scholars in a time frame from 2015 until 2022. Detailed information regarding the management, statistic and current situation of teachers' quarters is gathered by interviewing officers from BPA MoE at the federal level and JPN at the state level. The selection of study location is based on states with these two characteristics: unoccupied teachers' quarters and teachers' quarters that have been applied adaptive reuse strategy.

1.8 Organization of Chapters

There are five chapters in this study. In chapter one, the researchers have discussed the introduction and background of the study. This chapter has also been in detail about problem statement, research questions, study questions, objectives, research importance, and scope of research. In chapter two, the researchers have comprehensively reviewed past studies related to the history, definition, application, factors affecting, and challenges of applying adaptive reuse strategy.

In addition, chapter two has also discussed the detail of each factor and how the factors affect adaptive reuse decision-making. Explanations about the history of government quarters in Malaysia, the definition, and types of government quarters are also included. Moreover, in chapter two, details regarding teachers' quarters are presented. Data such as types of teachers' quarters, the statistic of occupied and unoccupied teachers' quarters, and the location of teachers' quarters are also reviewed.

The study methodology has been presented in detail in chapter three. Research design, sample and criteria, sample selection, location of the study, and the rationale for the choice of study location have been discussed comprehensively in this chapter. Next, research instruments, data collection procedures, data analysis procedures, research results, validity and reliability of the data collected, and research ethics have also been discussed.

The results of the study have been analyzed in chapter four. Related information gathered during data collection has been explained in detail. The data in this study have been analyzed using content analysis. Narrative presentation is widely used in this

chapter because the data source depends on in-depth interviews. Overall, this chapter has reported the results of studies related to adaptive reuse towards revitalizing teachers' quarters in Malaysia. The study results reported in this chapter are based on the study's objectives.

In chapter five, the study's findings are discussed with the literature. Here, the researchers examine the significance, importance, and relevance of the findings. As a result, it focused on analyzing and explaining the findings, showing how they relate to the chapter's literature review and the research questions, and making an argument in the direction of the overall conclusion.

This chapter parsed and discussed the results of studies related to the issues, factors affecting adaptive reuse, management, and adaptive reuse strategy, benefits, and challenges. Lastly, a discussion on overcoming the challenges of adaptive reuse is made. Finally, chapter 5 also explains the implications, contributions, limitations of the study, and subsequently recommendations for future research.

1.9 Definition of Key Terms

Key terms that have been used in this research are presented in Table 1.1.

Table 1.1 Definition of Key Terms

Terms	Definition
Adaptive Reuse	Adaptive reuse refers to the use of a building (sometimes partially reconstructed) for a new purpose other than the one for which it was originally built. (Maas & Freschi, 2017). In this research context, adaptive reuse refers to

	reusing unoccupied teachers' quarters by renting or changing functions to other public or private sectors.
Teachers' Quarters	Focusing on landed and strata teachers' quarters which is for Grade 1 - 54

Source: Researcher's compilation

1.10 Summary of Chapter

This chapter provides an initial overview of the course for this study and its direction, which the researcher will achieve. Discussions are more focused on issues and research problems that are related to statistics and unoccupied teachers' quarters in Malaysia. In addition, this chapter also discusses the background of the study, research questions, research objectives, scope and importance of the study, and definitions for the main keywords of the study. In general, this chapter has helped the researcher evaluate the capability and feasibility of this study before running it.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter, previous scholars' literature regarding adaptive reuse is explored. A comprehensive summary of prior studies on this topic will be provided. This literature will contribute to the theoretical base and determine the research's nature. Selected studies that understand the term adaptive reuse are then evaluated and synthesized. This section will show how knowledge evolved within the field, highlighting what has already been done, emerging, and the current state of thinking on the topic.

2.2 Definition of Adaptive Reuse

The term adaptive reuse has been used widely in the build environment field, especially in the conservation of buildings. Throughout the literature of previous scholars, there were many definitions regarding adaptive reuse. Those definitions are gathered and presented in Table 2.1.

Table 2.1 Definition of Adaptive Reuse

Scholars	Definition
Abdulhameed, Mamat & Zakaria (2019)	Adaptive reuse is defined as "the change process or condition that suits a new environment or circumstance, or the subsequent modification" in architecture.
Maas & Freschi (2017)	Adaptive reuse refers to the use of a building (sometimes partially reconstructed) for a new purpose other than the one for which it was originally built.

Mohamed, Boyle, Yang & Tangari (2017)	Adaptive reuse is adapting a structurally sound structure for a new purpose that balances environmental, economic, and equity concerns.
Purwantiasning, Anisa & Sofiana (2015)	The repurposing of a structurally sound building for a new use that balances environmental, economic, and equity concerns is known as an adaptive reuse.
Vackier (2014)	Adaptive Reuse is the process of repurposing architecture or objects with expired or outdated uses.
Yildirim (2012)	Adaptive reuse is the process of making appropriate adaptive adjustments to existing buildings so that they can serve new roles and coexist in a location different from the original. It is the act or process of preserving something through modernisation (rehabilitation to its original function), total conversion to a new function, or a combination of the two.
Langston, Wong, Hui & Shen (2008)	Instead of eliminating such raw components through repair or demolition, adaptive reuse describes keeping the building's essential structure and fabric unaltered and adapting its usage.
Bezuidenhout (2008)	Adaptive Reuse, often known as reuse, is a method of adapting an existing structure to fulfil new applications while preserving the building's historic qualities.
Brooker & Ston (2008)	The conversion of buildings or sites to adhere to existing sustainable development ideas is also known as an adaptive reuse.

Douglas (2006)	Adaptive reuse also refers to transforming structures or sites to meet new sustainable development trends.
The Department of Environment and Heritage (2004)	The process of modifying old buildings, refurbishing a building or site to incorporate elements that allow specific applications to occupy a place originally designed for a different purpose is known as an adaptive reuse.
Kincaid (2002)	Adaptive reuse is defined as extending the life of a structure while modifying its original use.
Latham (2000)	It is a technique that preserves as much of the original structure as feasible while updating its performance to meet new standards and increase user demands.

Source: Researcher's compilation

In Table 2.1, the term adaptive reuse is defined differently by different scholars in their respective studies. However, those definitions are almost similar as the term used to explain adaptive reuse are also synonymous with each other such as "conversion," "change," and "repurposing." For this research, the most applicable definition of adaptive reuse is from Maas & Freschi (2017); adaptive reuse refers to the use of a building (sometimes partially reconstructed) for a new purpose other than the one for which it was originally built.

2.3 Concept of Adaptive Reuse

Adaptive reuse is a conservation concept that entails transforming an old function into a new one that is more useful to the surrounding area and current community. It is generally used as an alternative solution for protecting and preserving historical buildings by transforming an old function into a new one that is more useful

to the surrounding area and current community (Purwantiasning, Anisa & Sofiana, 2015). Adaptive reuse is typically described as a structural process in which a building's former function is replaced with a new function to meet new demand while simultaneously increasing the building's economic value. It is also a viable option for destruction, and it is used for a variety of reasons, including preserving the beauty of townscapes, conserving material resources, and reducing urban sprawl (Maas & Freschi, 2017). This design not only restores the physical architectural performance of the building, but it also respects its historical significance and has the potential to favourably impact the surrounding region and community (Purwantiasning, Anisa & Sofiana, 2015).

Adaptive reuse is for structures that have previously failed economically or socially and been abandoned. It is the act or process of repairing, altering, and adding to a property to allow it to be used in a compatible manner while keeping those elements or features that express economic, cultural, or architectural significance. This could be as simple as preserving an existing building component or as complex as entirely renovating the entire structure. Reducing consumption, recycling and reusing what was generated, and being ecologically responsive are new ways of thinking about adaptive reuse (McDonough 1998).

Adaptive reuse solutions aid in the creation of a long-term built environment (Conejos, Langston & Smith, 2011). On the other hand, architectural preservation ensures the economic, cultural, and social benefits of urban areas. As a result, architectural conservation's function has shifted from preservation to participation in urban regeneration and sustainability (Ariffin et al., 2017; Bullen & Love, 2011). Adaptive reuse is a better option than demolition and replacement because it uses less

energy and produces less waste. It also serves a societal purpose by rejuvenating and reviving familiar locations (Conejos, Langston & Smith, 2011). Giving heritage buildings a fresh lease on life provides environmental and social advantages to communities while preserving our national history (Shen & Langston, 2010).

If the goals of environmental sustainability and lower energy use are also to be realised, adaptive reuse options are preferable to demolition (van der Flier & Thomsen, 2006). The more adaptable a building is, the faster and easier it can adjust, which saves time and production (Wilson & Boehland, 2008). Adaptive reuse is also a more cost-effective and efficient way to deal with buildings than demolition. It is considered safer since it decreases the amount of disruption caused by hazardous chemicals, polluted ground, and the risk of falling objects and dust. Work on the site is also more convenient because the existing structure provides a work enclosure, reducing downtime due to severe weather. Scholars have recognised the benefits of adaptive reuse for various building kinds, including heritage, historical, commercial, industrial, and residential (Shen & Langston, 2010).

2.4 Application of Adaptive Reuse

According to previous studies or projects, there is much application of adaptive reuse towards different types of building worldwide. Those studies or projects are presented in Table 2.2 below.

Table 2.2 Application of Adaptive Reuse

No	Scholars	Types of building	Country
1	Haroun, Bakr & Hasan (2019)	Heritage building	Egypt
2	Abdulhameed, Mamat & Zakaria (2019)	Historic building	Malaysia
3	Tam & Hao (2019)	Heritage building	Canada
4	Silva & Perera (2019)	Historic building	Sri Lanka
5	Prestogeorge (2018)	Commercial building	United State
6	Aigwi, Egbelakin & Ingham (2018)	Historic building	New Zealand
7	Tan, Shuai & Wang (2018)	Industrial building	Hong Kong
8	Sugden (2017)	Industrial building	Canada
9	Damla Mısırlısoya & Kagan Günce (2016)	Heritage building	Turkey
10	Sofiana, Purwantiasning & Anisa (2015)	Historic building	Indonesia

Source: Researcher's compilation

According to Table 2.2, many studies regarding adaptive reuse worldwide in the range 2015 – 2019. Most of the studies involve historic and heritage buildings, while the others involve industrial and commercial buildings. Hence, there is still a lack of study involving public or government buildings, especially in Malaysia.

2.5 Factors Affecting Adaptive Reuse

Adaptive reuse is one way to ensure the longevity of a structure. A thorough understanding of the elements that influence adaptive reuse decision-making must be constructed to ensure the success of the outcome model. Previous studies have indicated that adaptive reuse decision-making consists of complex stages (Mohamed & Alauddin, 2016). Complex stages include the whole stages of a building project from decision making, site visit and survey, sketch design proposals, planning application, building regulations approval, construction drawings and specification of works, tendering by contractors, construction, and finally maintenance of the building.

According to Haroun, Bakr, and Hasan, 2019, deciding on new uses for buildings needs to consider several crucial factors to determine and select the optimum option. Many factors affect adaptive reuse decision-making. Based on previous research, the factors are gathered and tabulated in Table 2.3. These factors must be considered for a successful adaptive reuse project.

Table 2.3 Factors Affecting Adaptive Reuse Decision Making

Scholars	Factors affecting adaptive reuse decision making	Types of building	Location of building
Yoon & 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	Korea
Mısırlısoy & 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 & Alauddin (2016)	1. Economic 2. Environment 3. Social 4. Legislative 5. Architecture	Historical 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. Microenvironment sustainability 4. Financial incentive 5. Government guidelines	Industrial building	Hong Kong
Wang & Zeng (2010)	1. Cultural 2. Economic 3. Architectural 4. Environmental 5. Social Aspects 6. Continuity	Historical building	Taiwan
Wilson (2010)	1. Environmental 2. Location	Industrial building	Canada

	3. Legislative 4. Financial 5. Market characteristic		

Source: Researcher's compilation

Yoon & Lee (2020) have established factors affecting adaptive reuse decision making similar to previous researchers like Mısırlısoy & Günçe (2016), Mohamed & Alauddin (2016), Kee (2014), Yap (2013), Wang & Zeng (2010), Wilson (2010). It is also proved that these factors are interdependent and can be applied to any type of building. A summary of these factors is presented in Table 2.4 below.