الجامعة الإسلامية العالمية ماليزيا
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
يونيفرسيتي إسلام انتارابغسا ملسيا
(Company No. 101067-P)
Garden of Knowledge and Virtue

JOURNAL OF ARCHITECTURE, PLANNING AND CONSTRUCTION MANAGEMENT

VOLUME 15 ISSUE 1
2025

JAPCM

JOURNAL OF ARCHITECTURE, PLANNING AND CONSTRUCTION MANAGEMENT

Editor-in-Chief
Prof. *Ar.* Dr. Abdul Razak Sapian
Kulliyyah of Architecture and Environmental Design

VOLUME 15 ISSUE 1 (2025)

JOURNAL OF ARCHITECTURE, PLANNING AND CONSTRUCTION MANAGEMENT (JAPCM) TEAM 2024 – 2025

JOURNAL OF ARCHITECTURE, PLANNING AND CONSTRUCTION MANAGEMENT
VOLUME 15: ISSUE: 1/2025

Notes for Contributors

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors, and the reviewers. Any product that may be evaluated in this article, or claim that may be madeby its manufacturer, is not guaranteed, or endorsed by the publisher.

Published by

IIUM PRESS, Research Management Centre and Kulliyyah of Architecture and Environmental Design, International Islamic University Malaysia

ISSN 2231-9514
e-ISSN 2462-2222

PREFACE

السَّلاَمُ عَلَيْكُمْ وَرَحْمَةُ اللهِ وَبَرَكَاتُهُ

Dear All,

Journal of Architecture, Planning and Construction Management (JAPCM), Kulliyyah of Architecture and Environmental Design is one the official journals of International Islamic University Malaysia (IIUM), under IIUM Press. It embarked in 2011 and is dedicated to the publication of original articles on the specialized fields of Architecture, Planning, Landscape Architecture, Quantity Surveying, Building Technology and Engineering,Applied Arts and Design, Construction Management and those related to the Built Environment. JAPCM is also the ardent forum for the reports of research that bridged the Built Environment and the Islamic worldview.

Prof. *Ar.* Dr. Abdul Razak Sapian
Editor-in-Chief

JOURNAL OF ARCHITECTURE, PLANNING & CONSTRUCTION MANAGEMENT
Volume 15 Issue 1, 2025 E-ISSN: 2462-2222 ISSN: 2231-9514

THE ḤIJĀB IN THE ISLAMIC HOUSE

Received: 4th September 2022 | Accepted: 7th October 2023 | Available Online: 30th June 2025

DOI: 10.31436/japcm.v15i1.724

Faredah Mohsen Al-Murahhem [1*]

[1*] *Department of Interior Architecture, Umm al-Qura University, fmmurahhem@uqu.edu.sa*

Corresponding author: **Faredah Mohsen Al-Murahhem*
Corresponding author's email: fmmurahhem@uqu.edu.sa

ABSTRACT

This study examines the history of the Islamic house of the ḥijāb. It discusses the application and forms of the ḥijāb across major cities in the Islamic world. The concept of the ḥijāb is traced from its origins in the Muslim community during the Prophet'sProphet's time to the end of the twenty-first century. Accordingly, this study demonstrates how the Islamic doctrine and the ḥijāb as a phenomenon are being applied across Islamic regions. The evidence reveals the adaptation of Islamic rules within the house and solidarity in obeying these rules to maintain the well-being of the inhabitants. The discussion illustrates how the ḥijāb governs daily Muslim life and shapes the house from within. Conversely, segregation from the same concept shapes zones and interior layouts. The study is based on descriptive historical literature alongside the analytical methods of the case studies. It illustrates the narrative through some real examples of Muslim societies where the ḥijāb has been fully practised. Confronting the rapid movement of global change, this analysis of the ḥijāb and its forms in the Islamic house is timely. Finally, this analytical reading aims to demonstrate the application of the ḥijāb and its impact on Islamic architecture in general. The main objective is to learn from past and current examples to secure the concept of the ḥijāb within the house, as the study shows that the need for such a concept is still significant.

Keywords: Islamic house, ḥijāb, ḥarīm, privacy, segregation, screening.

1.0 INTRODUCTION

The Qur'ān governs every aspect of a Muslim's daily life, including defining Islamic etiquette inside the house. The practice of the *ḥijāb* within the house is discussed in detail in the Qur'ān and the Sunnah (Ḥadīth: the tradition of the Prophet) The Prophet tradition), including the obligation to ask for permission before entering. Obeying the rules of the *ḥijāb* as a garment reflects the concealment of women's physiques when they leave the house. Similarly, architectural *ḥijāb*, such as screens and women's quarters (*ḥarīm*), demonstrate concealment within the house. This architectural concealment gives women freedom and privacy, as they cannot remain veiled outside and inside. The house is a haven for women, the main occupants. The notion of privacy is a wider Islamic concern; the geographical spread of the application of the *ḥijāb* ranges beyond the Arab world. The presence of women plays an important role in shaping the Islamic house, where privacy can be enhanced and where each sex can be at ease in their world. Gender identity is still a significant feature in some regions of the Islamic world. Privacy is one facet of this sanctity, which includes inhabitants' respect

for each other's needs and prevents intrusions for the sake of individuals and the family as a whole. Privacy on a personal level means the cover, clothing, and ownership and defence of the private sanctuary within the dwelling. In Islamic society, it means a balance between the privacy of the individual and the community, as privacy does not prevent social communication and does not mean total isolation or separation from society. Therefore, privacy is a tool for regulating communication and interference, informed by the controls of religion and the behaviours of the individual's society (Mohammad, 2008).

Similarly, the concealment of the architectural fabric of a building is more than a necessity in the Islamic house. The unique concern of *ḥijāb* within the Islamic house, which goes beyond privacy, is as old as Islam. The base concept of the *ḥijāb* is the need to preserve the house's privacy and shield it from the public gaze. The house is a spatial enclosure created for the family's sake and is considered a fundamental nucleus of a community. Akeel Hwaish claims that an "Islamic house" means a house built with the values of Islam, starting from good intentions and clear philosophy and then conceptualised until the completion and construction of the building. Such a house should follow Islamic principles as architectural design guidelines and provide a complete living web that reflects the Muslim lifestyle. He adds that privacy is paramount in Islamic households, where separating the male and female areas within the house is significant. In the Islamic faith, a home is a "microcosm of Islamic culture and civilisation" that is of "matchless delight" (Hwaish, 2015). Abdel-Moniem El-Shorbagy stated that the heritage of traditional Islamic-Arab houses was developed in response to religious, cultural, and traditional factors along with the specificity of the local built environment. The most subtle characteristics of the Islamic-Arab house come mainly from its array of elements tested by people's traditions and culture (El-Shorbagy, 2010).

Modernity and its changing values are slowly absorbed into the urban fabric worldwide, and Islamic societies are no exception. Studies confirm the necessity for the hijab in its holistic metaphorical essence in the 20th century: a study of housing and women's needs in the Middle East in 1991 in Cairo found that the need for privacy, which is primarily affected by religious beliefs and inherited cultural norms, was the main concern of Middle Eastern women. The aim was to compare satisfaction between living in traditional versus modern apartments regarding values. The study found that the inhabitants — women mainly — indicated that visual privacy was critical within the context of their cultural values. They tended to make physical changes in the dwellings to increase privacy. The main finding concerned the necessity for privacy when designing dwellings for Muslim cultures. Interestingly, the study suggested that in the Middle East, rapid cultural changes have created a confusing environment where modern design has not met social norms (El-Rafey, 1992). Despite considerable cultural differences, in Islamic societies of South Asia, Tasneem Chowdhury argues that the design and layout of the typical Muslim home reflect and facilitate the segregation and seclusion of women. The conceptual similarity in the built environment of the Muslims is an expression of a common faith and a unifying religious culture. She adds that using the veil implied segregating the females from males and high family status, where veiling and seclusion regulations can be disregarded only during war and emergencies (Chowdury, 1993).

In the Far East of the Islamic world, another study was conducted to assess the physical implementation of the concept of the *hijab* in what is called “the Arab house” in Indonesia. The study states that Islam is a way of life in the Arab culture, and the house of Arabs is an Islamic architectural product that applies *hijab,* thus appreciating the preservation of tradition. The concept of the *hijab* in the Arab house in Pasar Kliwon is symbolised by the

physical *hijab* via the separation of public and private spaces and the non-physical *hijab* via the etiquette of visiting implemented in Islamic culture (Azizah & Putri, 2013). It prohibits physical contact between the occupant and the non-family guests when visiting. A recent study of traditional Indonesian houses, in line with Islamic values, confirms that privacy is physical and non-physical. Physical privacy comprises a separator or divider as a transitional space and a distinction entrance.

In comparison, non-physical privacy involves spatial agreement and a gender spatial consensus that requires agreed space between men and women (Hazrina Haja Bava et al., 2021). All studies demonstrate the concept of the *hijab*, its implementation, and its continuation within Islamic societies regardless of their regions. The necessity is vital, even in recent years where women as occupants still ask for privacy. The question is, are we in a time where the hijab enters the dilemma of modernity vs tradition? Therefore, let history narrate the old story of the hijab and the Islamic house, especially in the Arab world and the Indian subcontinent regions during the 20th century.

2.0 THE ḤIJĀB AND ḤURMA

Based on the Arabic origin of the term *ḥijāb* 'حجاب', as a noun, it comes from the verb *ḥajaba* 'حجب. That is from the root 'ب-ج-ح' *ḥ-j-b*, which means 'to hide from view or to conceal'. The verb *ḥajaba* translates as 'to veil, to seclude, to screen, to conceal, to form a separation, to mask', whereas the noun '*ḥijāb*' translates as 'cover, wrap, curtain, veil, screen, and partition' (El-Guindi, 1999). *Ḥijāb* means concealing and veiling, whereas *ḥarīm* حريم' means women, and 'حرمة' *ḥurma* is the singular that means woman and means sacredness (Figure 1a). All words derive from the verb *ḥaram* 'حرم', from the root *ḥ-r-m*, which means prohibited. The term *ḥurma* (woman), embodying the literal meaning of sacredness, obliges the drawing of a screen or a curtain to convey respect. At the same time, *ḥurma* (sacredness) of the space expresses the utmost privacy as a means of protection. That is, the *ḥurma* of the masjid, the tomb, and mainly the *ḥurma* of the house and its households (Figure 1b). The sanctuaries of the Islamic cities Makkah and Madinah are called Al-Ḥaram Al-Sharif. On the other hand, Ḥarīm as a space also means prohibited, forbidden. Therefore, the concept of the *ḥurma* and the presence of *ḥarīm* (women) play a crucial part in the concept of the *ḥijāb*, concealing and veiling, and the *ḥarīm* as inner spaces. "*Ḥarīm*" means the women's section and is a plural of the term "*ḥurma*, " meaning a woman. The *ḥarīm* is not just an enclosed space for women; it is a name for a group of women or any area occupied by women without physical boundaries. It is a defined place for a specific gender but does not have to be an enclosed space (Al-Murahhem, 2011).

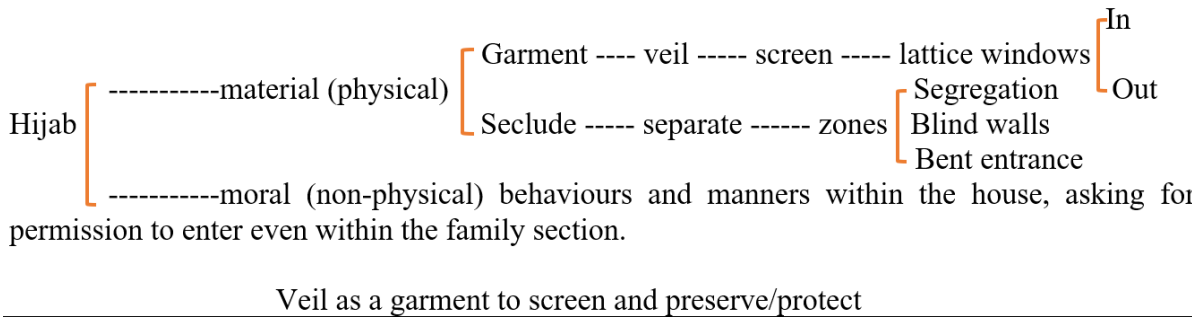


Fig. 1a: The term *ḥijāb* metaphorical meanings

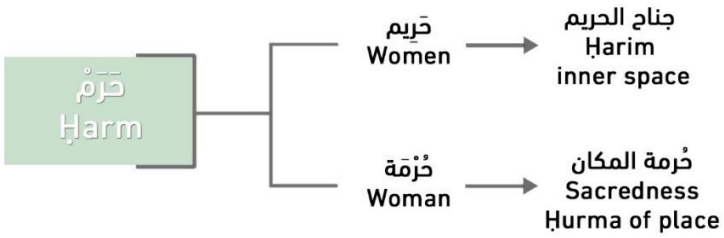


Fig. 1b: The term *ḥurma* metaphorical meanings

The *ḥijāb's* main function is as a shield for protection and privacy purposes. Sometimes, it does not have to be attached to the body that wants to be concealed; it aims to wrap and preserve. Similarly, valuable things ought to be covered, wrapped, and protected somehow; this is the main idea of the *ḥijāb*. The *ḥijāb* was proclaimed by the ProphetProphet Muhammad (ﷺ)in the second year of the hijra (the seventh century), based on what was inscribed in the holy Qur'ān. Since then, the *ḥijāb* has played a significant role in Muslim domestic life in the Islamic world. The *ḥijāb* is concerned with the safeguarding of family honour, as discussed in some verses (*āyāt*, sing. *āyah*) from the Qur'ān. These *āyāt* demonstrate the obligation of the *ḥijāb* as a concept to be applied in Muslim domestic life, starting with women who need to be protected and valued for their own sake (Al-Murahhem, 2008). The Quran also has several references to *ḥijāb* concerning seclusion and/or screening, but only one reference concerns women's clothing (El-Guindi, 1999). In *sūrat*[1] Al-Ahzāb, it is stated that:

[a]nd when ye ask (his ladies) for anything ye want, ask them from before a screen (hijāb): that makes for your greater purity for your hearts and theirs. (Qur'ān: 33, 53)

A prophet! Tell thy wives and daughters and the believing women that they should cast their outer garments over their persons (when abroad): That is most convenient that they should be known (as such) and not molested, and Allah is Oft-Forgiving, Most Merciful. (Qur'ān: 33, 59)

The first *āyah*, 'his ladies, ' means the Prophet's wives, whereas the second *āyah* involves women believers. The first expresses the *ḥijāb* as a screen and seclusion, and the second illustrates the *ḥijāb* as a garment. The *ḥadīth* clarifies the last issue in greater detail :"When the verse 'That they should cast their outer garments over their persons' was revealed, the women of Ansar came out as if they had crows over their heads by wearing outer garments" (Sunan Abu-Dawud: 33, 4090). This attire is how women dress with their outer garments during the Prophet's time when the *ḥijāb* verses were descended. Nevertheless, metaphorically, *sūrat* Al-Nūr, which means 'the Light', is a real manifesto that explicated rules in Islamic domestic manners. The *sūrah* focuses on personal privacy and domestic etiquette, matters of intimacy, and connecting with spiritual teaching, which Muslims must observe and learn. Moreover, the *sūrah* stresses privacy and other inhabitation issues within the house, whereas Islamic domestic etiquette stresses modesty and good behaviour, as in *āyah* 58–59.

[1] Sūrah or Sūrat means a section or a chapter in the Holy Qur'ān.

O ye who believe! Let those whom your right hands possess, and the (children) among you who have not come of age ask your permission (before they come to your presence) on three occasions: before morning prayer; the while ye doff your clothes for the noonday heat; and after the late-night prayer: These are your three times it is not wrong for you or for them to move about attending to each other: Thus those Allah make clear the signs to you: for Allah is full of knowledge and wisdom ۞ But when the children among you come of age, let them (also) ask for permission, as do those senior to them (in age): thus does Allah make clear his signs to you: for Allah is full of knowledge and wisdom. (Ali, 1991, 884–885)

There is a considerable sense of time and space in the *āyah*, including ways of dealing with gender, classes, and even people with special needs. For instance, the first rule in domestic life starts with respect for the house and the occupiers. The first order is to get permission before entering the house; the manner is to salute those in the house first and to lower the gaze as far as possible. The permission is for the sight, as the *ḥadīth* explained more regarding the *ḥurma* and privacy of the house (Az-Zubadi, 1996). The *sūrah* does not only lay down the rules of decorum within the family and the practice of daily life inside the house, but it also continues underlining regulations inside the house in more detail: children who are not mature, as stated above, slaves (that time) and personal servants included, have more freedom in terms of access, and can come and go at all hours within the family apartments. Although both groups can come and go freely during the daytime, there are certain limitations: during the night and before Fajr (dawn - early morning) Prayer; before Fajr, they must discreetly ask for permission before they enter the family quarters in case people are sleeping or undressed. The same applies to the midday siesta period and again to the time after night prayers when people usually undress and retire to bed (Ali, 1991). The *āyah* demonstrates the role of time within the daily routine and time as a historical period of the Islamic dynasty.

The rules are stricter for adults, as they must always ask permission. Interestingly, the following *āyah* is for older women and their modest *ḥijāb* within the house (Ali, 1991). Moreover, the *sūrah* stresses the privacy of the house, emphasising the rules of domestic manners and public behaviour, and as a part of Muslim spiritual duties. This practice is a crucial aspect of Islam, where the *ḥurma* of the house ought to be respected. The Qur'ān illustrates the privacy circle inside the house and the protocol of inhabitation. Regardless of the size of the house or the economic status, privacy should be respected and considered. This method is how Islamic architecture interprets Quranic rules and applies them regardless of regional differences. The notion of *ḥurma* within the Islamic house is more than a mere private concept; *ḥurma* designates more.

The Qur'ān draws attention to the expected behaviour within the house; the *ḥadīth* describes these traditions and stresses the necessity of asking permission before entering the house. Both sources also draw on the permission protocol, which is enjoined because of the sight and looking at others' houses, and the punishment of committing such an act, as shown in the *ḥadīth* of "Asking permission (before entering)". The permission is enforced because of the role of looking; one should avoid looking at the occupants of the house who may be engaged in a private activity or doing something that might cause shame or embarrassment if exposed to unauthorised public view:

A man peeped through a round hole into the dwelling place of the ProphetProphet ﷺwhile the ProphetProphetﷺ had a *midra* (an iron comb) with which he was scratching his head; the ProphetProphetﷺ said, "Had I known you were looking (through the hole), I would have pierced your eye with it (i.e., the comb)" verily! The order of taking permission to enter has been enjoined because of the sight (that one should not look unlawfully at the state of others). (Az-Zubadi 1996, 968)[2]

In Muslim societies, houses are the most respected places and have their *ḥurma*. These places include the houses of Allah (masjid), the Prophet'sProphet's house in Madinah, and ordinary houses. Sacredness is the common factor, indicating ownership and privacy, restricted access, and the observance of rules. Rules govern the houses of Allah, especially in Makkah and Madinah. However, the Prophet's house has its own access rules, which are discussed in detail in the Qur'ān. Similarly, ordinary houses are respected as territories belonging to their occupants, who also have the right to set their own rules within the boundaries of Islam. Islam imposes an absolute way of living that affects all aspects of being public, private, and spiritual across the Islamic world. Orders in the Qur'ān are always for the benefit of the people and the community. The *ḥijāb* concept governs Muslim daily life and the women within the house. The veiling of women is just one form of a broader range of implications. Women are the main consideration in the wider concept of the *ḥarīm,* with a focus on both the *ḥijāb* and the *ḥarīm* (as women) where the *ḥijāb* was fully practised, especially in major Muslim cities until the early 1900s.

3.0 THE ARCHITECTURAL INTERPRETATION OF THE ḤIJĀB

The need for the *ḥijāb*, as a garment, a partition, and a means of giving women seclusion from men in Islamic societies, is a phenomenon that is applied according to the circumstances of each region. This method is one of the strengths of Islamic architecture, where flexibility in crafts and materials allows for consideration of the climate and leaves room for creativity and identity. This strength parallels flexibility in applying the *ḥijāb* across the Islamic world. Where the form of the *ḥijāb* varies in application, the shape of the house varies as well (based on the region), but Islamic law is still pertinent. For instance, the application of the *ḥijāb* for women's garments in India is different compared to women in Egypt. Although the shape of the house is in line with Islamic law, it is specific to the region and society. The process of designing buildings is similar to the variety of ways in which women conceal themselves across the Islamic world (Al-Murahhem, 2008). In a study of women and veiling, Fadwa El-Guindi states that the analogy between the Afghani hijab garment and the mashrabiyya (the wooden projected windows) of Cairo is striking (El-Guindi, 1999). That is the analogy of the hijab as wooden screens and the garment. There is a striking similarity between the Afghani women's garment - the head part in particular- and the middle part of the mashrabiyya of Cairo, where both ensure the same notion with remarkable form similarity. At the same time, Lloyd Llewellyn-Jones claims that the noun 'veil' is a generic term for a garment with many names in various languages, especially in the languages of modern veil societies, and a corresponding number of styles and wearers. She also states that: 'the veil', as a concept, is still an emotional and impassioned subject for many people who perceive it as a classical statement for the

[2] Narrated Sahl bin Sa'd in ḥadīth: 2060 (Az-Zubadi, 1996, p. 968). Meanwhile, Umar ibn al-Khattab said, "Anyone who fills his eye with the contents of a house before he has been given permission has gone astray." Book 43, Hadith 1092. (https://sunnah.com/adab/43)

suppression of women, particularly in the Middle East. The veil, as a woman's garment, is associated with the containment of women (Llewellyn-Jones, 2000). Elizabeth Cooper claims that the *ḥijāb* can be seen as one issue of these rules; therefore, the actions of a Muslim woman, whether in India, Egypt, Persia, or Algiers, have been controlled by Islamic laws since the seventh century. Even today, these roles govern each act of domestic life and the world outside the home (Cooper, 1915). Although 'Today' refers to the 19th/early 20th century, the rules are still being practised in some Islamic communities and can be noticed through the design of the houses.

The notion of *ḥurma* of the house is interpreted physically and morally to protect women and households alike. Starting from the bent entrance of the Islamic house, which reflects the importance of asking for permission, to the blind and blank walls of the lower floors to prevent sight. The interpretation of the hijab secures the privacy of the house through the levels of the entrance from within to secure privacy for further protection from intruders. Entrances to the house are usually indirect or constructed purposely to obstruct vision into the courtyard, emphasising the separation of public and private domains. They usually open into a blank wall to obstruct views of the inside from the outside world, preserving the family's privacy, as seen in most of the houses in Cairo (Figure 2, 5b).

Meanwhile, "*otlo"* – the street-side platform – is a traditional feature of Indian architecture and is occupied differently by native inhabitants. It is little used by Muslim householders due to the application of the Islamic rule of *ḥijāb*, where the main entrance leads to a lobby that is isolated from the private courtyard by a wooden screen (Cooper & Dawson, 1998). This is the case of the traditional Bohra house in northwest India that reflects the impact of the *ḥijāb* within the house. It is also a clear instance of applying Islamic rules and adopting traditional architecture that indicates the significance of Islamic rules in shaping Muslims' daily lives everywhere. However, applying this Islamic concept in south India, for instance, reveals a form of urban settlement. Sriram Ganaphathi claims that windows facing the inner courtyards are larger than those facing the street, which are smaller and higher than the eye level (Oliver, 1997). Therefore, the sense of privacy within the Islamic house is important, noticeable even from the façade. Homes have blank walls facing the street or have lattice windows and screens to hide the interiors (Ragette, 2012).

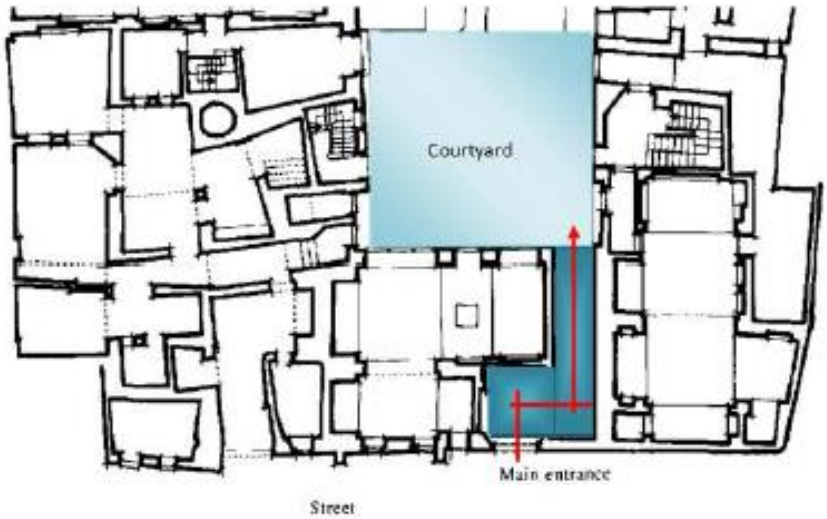


Fig. 2: The bent entrance in Cairo (El-Shorbagy, 2010, p. 16)

Observing the *ḥijāb* as a garment in Islamic architecture indicates that a building's exterior cladding is treated like fabric. This cladding is not just to cover the body of the building, it also to protect it from the outside environment. Fabric, as a material, is the easiest and the most affordable means of fulfilling the need for cover. During the ProphetProphet Mohammed's time, when wearing the *ḥijāb* was obligatory, curtain fabric was used as a simple solution for women's garments[3], and for segregation between male and female spaces. Curtains were used to divide gender zones within spaces to symbolise *ḥijāb* in its full meaning. The aim is to fulfil the Islamic rule of the *ḥijāb*, where the veil is drawn to clad facades, and to create secluded zones to achieve privacy (Al-Murahhem, 2008). The concept of the *ḥijāb* is to protect what is beneath the garment – the building's cladding does the same in Islamic architecture. Screening is applied differently across the Islamic world to veil interiors from being seen. The essence of concealment of the ḥijāb is echoed in the screening of the house from the exterior. Lattice wooden windows and such architectural elements in traditional houses are another form of the *ḥijāb* that fulfils women's needs and aligns with Islamic requirements. Such perforated grilles – made from stone or plaster – like *jali* in India (Figure 3), or rawāshīn and mashrabiyya in the Arab world (Figure 4) – made from timber – have been fitted in buildings whenever privacy is considered important (Al-Murahhem, 2008). Afaf Mahfouz and Ismail Serageldin claim that the definition of privacy has produced the quintessentially Middle Eastern device of the masharabiyya. Popularly regarded as a symbol of segregation and exclusion of women from public life, this lattice window permits women to see simultaneously but not be seen (Mahfouz & Serageldin, 1990).

As the *ḥijāb* may reflect identity, where the outer garment or the cloak that covers a woman from head to toe can be significantly linked to the wearer's identity, the cladding, and the screening work in the same way (Al-Murahhem, 2008). This general formula of application of the *ḥijāb* leaves room for flexibility and local identity in each Islamic region. The richness of the cladding and screening types used across the Islamic world reflect, in local terms, the availability of materials and techniques to apply the role of the *ḥijāb* (Al-Murahhem, 2008). Herbert Baker, the architect of the buildings of the Imperial Secretariat in New Delhi, points out that *jali* is one of the very early features of Indian structural design. He claims, "These screens were familiar to the master-builders of 'Mohammedan's India' (Bunt, 1900s). G. H. R. Tillotson argues that the *jali* was used across windows and as panels in large areas of the wall and appears in women's quarters where the condition of purdah (*ḥijāb*) is dedicated (Tillotson, 1987). Ilay Cooper and Barry Dawson also claimed that examples of these stone *jali* appear in Rajput palaces, especially in the zenana section, for women to peep from behind (Cooper & Dawson, 1998). On the other side of the Islamic world, the same kind of screens are made of wood in a flat or projected form to secure the same concept. Regardless of the richness of techniques, the ornaments' beauty, and even the variation of local terminologies, they all convey the same message in obeying the rule of the *ḥijāb*. Overall, this cladding of such lattice screens is the Islamic house's garment, representing the *ḥijāb* in its simplest form.

[3] Sunan Abu Dawud, book 32, no 4089: Aisha, Ummul Mu'minin "Safiyyah, daughter of Shaybah, said that Aisha mentioned the women of Ansar, praised them, and said good words about them. She then said: When Surat an-Nur came down, they took the curtains, tore them, and made head covers (veils)".

Fig. 3: Projected Sandstone Windows in the Zenana of Johdpur Fort Palace, India. 1640 c. (Tillotson, 1987, 147)

Fig. 4: Projected Wooden Lattice Windows in Makkah. (Al-Hajj Research Centre, Slide Collection).

Both the screening and segregation of genders are fundamental principles in Islam and have been implemented in Muslim countries for centuries. The notion of privacy is a wider Islamic concern where segregated zones within the house, regardless of differences between Islamic regions, fulfil the *ḥijāb* concept. The use of spaces illustrates how religion and ideology have given basic meanings to gender in architecture and society in Muslim communities (Crouch & Johnson, 2001).
Lloyd Llewellyn-Jones also states:

In Muslim ideology, public space and points in time are frequently interwoven. They are usually gender-specific so that, for a limited time, women can inhabit a public world free of men. Men can walk in streets clear of women, nevertheless, the underlying model is so deep-rooted in Muslim thought that the sexes can operate in a public sphere while remaining essentially in a private sex-specific space (Llewellyn-Jones, 2000, p. 297).

Considerable importance is attached to time and space scheduling activities within the house to enable greater freedom and privacy for both genders. Juhani Pallasmaa supports the same notion of home and privacy by stating, "Home is where we hide our secrets and express our private selves. Home is our safe place of resting and dreaming …". There are cultures in which the home is the women's domain. There are ways of life in which the home is a public showcase, and the public gaze penetrates the secrecy of the home. He also thinks that a home is a mediator between the public and private; he puts the two contradicting ideas of privacy alongside each other: "home as women's domain" and "public showcase" (Pallasmaa, 2005). El-Guindi states that Arab privacy concerns two core spheres – women and the family, where privacy is sacred and carefully guarded. For women, it is both a right and an exclusive privilege reflected in dress, space, architecture, and proxemic behaviour (El-Guindi, 1999). Mahfouz and Serageldin claim that the unique position of women in Muslim cultures, with its emphasis on modesty and on limiting the intermixing of the sexes, results in particular patterns of 'private', 'semi-private', and 'public' spaces that are quite distinct (Mahfouz & Serageldin, 1990). As a spatial container, each zone has its functions and users' etiquette to control who has access to private zones. This layout can be seen in the layout of many Islamic houses, whether they are based on horizontal or vertical layouts, where zones are gradually transformed from public to private. Most of the layouts are horizontal and based on the courtyard style.

Horizontal layouts with courtyards can be seen in major Islamic cities; in this layout, reception areas and *majlis* are in the first zone one faces when entering the house. Therefore, guests and visitors cannot go further unless they are close friends or relatives, in which case, they can enter the following section where family and living quarters are located. One cannot proceed further into the restricted areas within the house for the sake of the *ḥurma* of the house. The last zone, at the back of the house, is the private section where family areas and bedrooms – if applicable – are placed. The private zone is not at the back of the house because it is the quietest place; it is designed for privacy, where previous spaces act as insulation barriers. Courtyards in the Middle of the horizontal layouts work perfectly in this sense, where these transition zones absorb sound and retain the family's privacy. Examples across the Islamic world from the East to the West, such as Egypt, Syria, and Morocco (Figure 5).

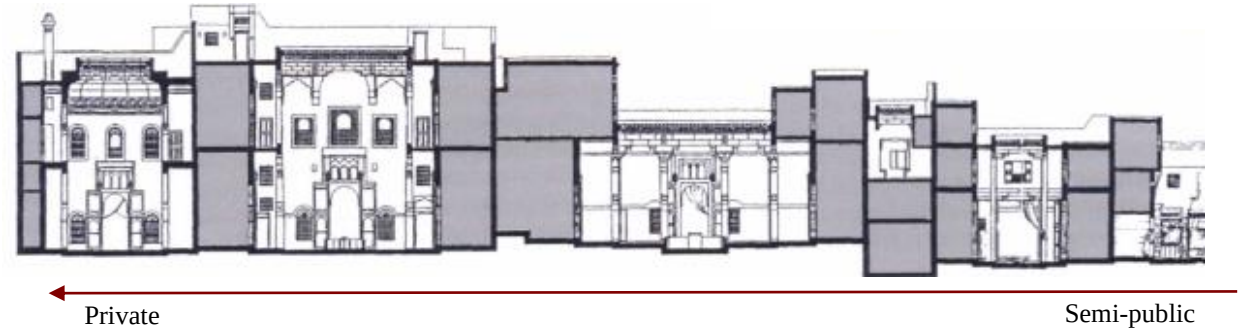


Fig. 5a: Courtyards enhance privacy in horizontal layouts, a house in Morocco (Ragette, 2012, pp. 205–207)

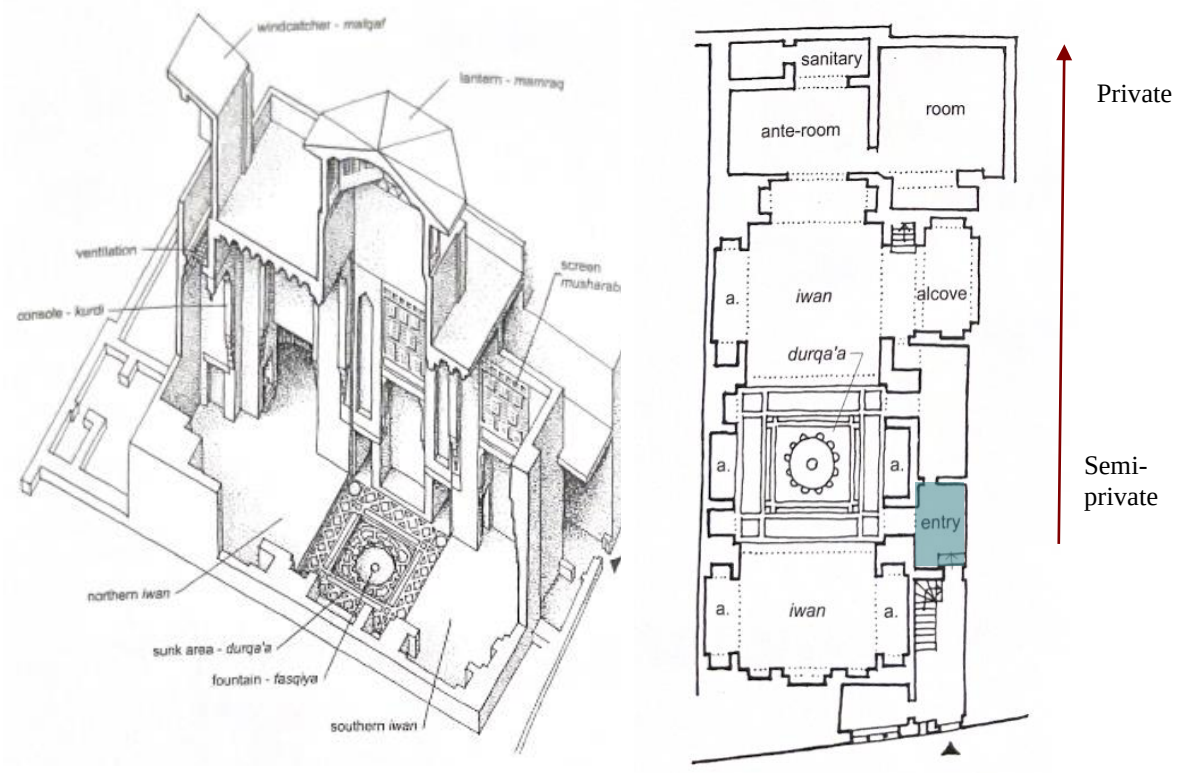


Fig. 5b: Levels of privacy within the horizontal layouts, a house in Cairo-Egypt (Ragette, 2012, pp. 205–207)

In some major cities, where land is expensive or has special status, the layouts vary, and the vertical axis appears. In the vertical layout, courtyards do not exist, but the private zone

is applied similarly on a different axis. The ground and lower floors accommodate reception and *majlis* areas, and the floors above are for family sections and bedrooms. Vertical layouts can be seen in some Islamic cities where spiritually precious areas or courtyards are not effectively applied. If the land is not big enough to accommodate courtyards and horizontal layouts, privacy can be achieved through the alternative vertical layout. Makkah, for instance, is a holy city located in a valley; the land is, therefore, priceless, and buildings have consequently been extended vertically (Figure 6). Some cities in the western and southern regions of Saudi Arabia (Hijaz and Asir) have adopted the vertical layout as an option. Examples of such tower houses can also be seen in Yemen, Hadramout, Morocco, and neighbouring regions. Overall, the deeper into the house, or the higher up, the more private the space becomes, with exceptions based on the layout patterns. In large houses, segregation can be achieved by multiple courtyards or by different floor levels. In these tall buildings, the main stairway is semi-public up to the top (Ragette, 2012).

Fig. 6a: Levels enhance privacy in a vertical layout, a house in Makkah (Al-Hajj Research Centre, 1990, 29)

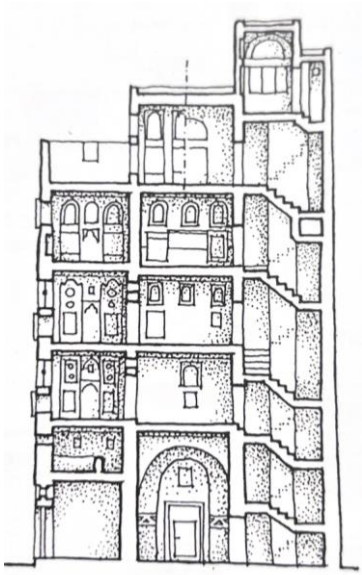


Fig. 6b: Levels enhance privacy in a vertical layout, a house in Yemen (Ragette, 2012, p. 101)

In planning Islamic cities, horizontal layouts are common, with courtyards restricting access and breaking the sight when entering the house. Furthermore, the male and female sections in the Islamic house are commonly known among scholars in architecture. These sections in the Islamic house have local terms, but they all have the same meaning and reflect the same principle of the *ḥijāb*. The *ḥijāb* stands behind the concept of the Islamic house across the Islamic world, and it is applied accordingly. Interestingly, even the horizontal layouts may utilise vertical zones regarding *ḥijāb* and the necessary segregation. In the semi-private zone within the horizontal layout, women can experience some events behind screens overlooking courtyards. Some examples reflect separate zones for women, where lattice screens are added to give women more opportunities to enjoy selected functions dominated by men. Such examples can be seen across the Islamic world from East to West. In Cairo, the *qāʿa* is the main feature in the house, where many of these lattice windows are fitted with built-in benches and cushions, providing comfortable places to sit and enjoy a protected viewpoint

(Vitra Design Museum, 2003). Women cross the courtyard and ascend special stairways to the *qāʿāt* (sig. *qāʿa*) and the chambers on the upper levels of the house (Figure 7). From above, they observe activities in the courtyards and halls below from behind these wooden lattices (Campo, 1991). In the house of Jamāl al-Dīn al-Dhahabī in Cairo, the lattice screens conceal women and allow them to observe the *qāʿa* from above (Figure 7), but the access to them is from another room (Al-Basha, n.d.,). In Baghdad, screened mezzanines flank high majlis for women (Figure 8), from which they can overlook other inner spaces and the street (Ragette, 2012).

Fig. 7: Perspective from above in a house in Cairo

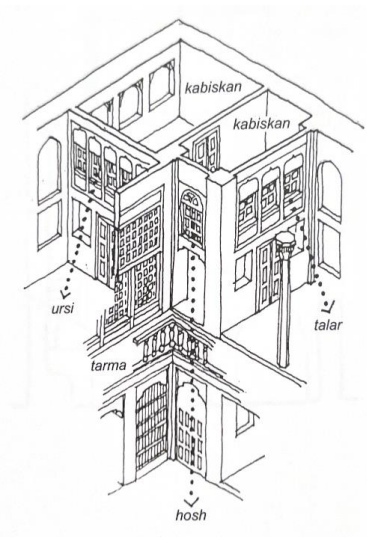


Fig. 8: Women's zone and screening in Baghdad (Ragette, 2012, p. 78)

4.0 THE ḤIJĀB AND ḤARĪM - NARRATIVE AND CASE STUDIES

The *ḥarīm*, as a physical and moral separation of women, has existed throughout history in different parts of the Islamic world. As previously discussed, the *ḥārim* implies women and women's quarters, an area in the house, primarily the domain of women. It is the separate, protected part of a household where women, children, and servants live in maximum seclusion and privacy (Croutier, 1989). Even though *ḥarīm*, as an Arabic term, is a well-known architectural space to define an area used by women and the family of the house, many local terms substitute the old term. However, the notion still exists among Muslim communities worldwide. For example, *Haremlik*, a Turkish term, *enderun* a Persian one, and "*zenane* or *zanana*" used in the Indian subcontinent. Some scholars claim that *Zenana* is used in Persia and Turkey (Cooper, 1915); others argue that *purda/ purdah* is also known as an area for women, which is screened from the sight of men by a curtain (Slesin & Cliff, 1990). All terms reflect the concept of the *ḥarīm* as a secluded space within the house based on the Islamic rule of the hijab (Figure 9 a-b). Regardless of the various terms of the *ḥarīm* within the Islamic house, the notion of gender separation still exists and is fully practised in Islamic communities.

Fig. 9 a: The *ḥarīm* and its equivalent in the Islamic world. World map showing countries with significant Muslim populations (https://mapsontheweb.zoom-maps.com/image/169809641892)

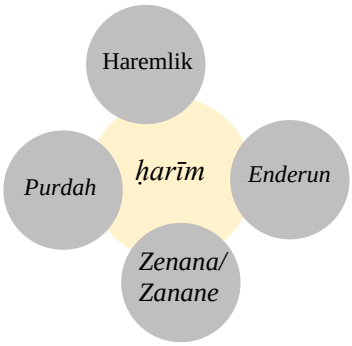


Fig. 9 b: Islamic rule of the hijab

Segregation is one facet of Harim, securing a space designated for women; however, shielding the façade is another significant form, using lattice screens to secure these zones within the house. Screening is also adopted across the Islamic world, considering the region's culture and geographical context. Therefore, narrated case studies focus on the wider Islamic world, where the hijab and harim concepts are applied within the boundaries of different regions and their cultures, away from the Arab world where the terms originated. First, Haremlik, a Turkish term, commonly referred to the same space during the Ottoman period. Regardless of the words used to describe the same space, both ḥarīm and Haremlik were used for corresponding functions (Al-Murahhem, 2008). For instance, this case study in Cairo narrates that the house is partly opened onto the inner courtyard and partly onto the street but is shielded on both sides by projected lattice screens:

To enhance the privacy and security of the family, the Islamic urban house (as indeed was the case with most large rural homes) was frequently divided into two sections, the salamlik and the haramlik. The former served as the public part of the house where male visitors and friends were received, while the latter was a private and secluded sanctuary reserved for the family…When window openings were placed in the haramlik facing the street or central open space, trellised bay windows or mushrabiyyahs protected them. These trellised apertures enabled the occupants of the haramlik to satisfy their curiosity about the outside world without being seen. (Schoenauer, 1981, 37)

In Persia, *modern* or Zenana reflects the concept of a secluded space within the house. It is the inner quarter reserved for close family members and female visitors. The physical form of the hijab constructs the Islamic house layout that focuses on gender segregation (Croutier, 1989; Scarce, 1987). Some modern dictionaries define *modern* as a Turkish term for

the place where the harem is located in the palace or the interior of the great palaces[4]. This analysis of the terminology may need an in-depth study, which may also reflect the concept of the hijab in its comprehensive essence. *Zenana*, as used in Hindi, is the current term for the women of the family and their apartments. It is used in English literature during the 1700s to describe women's sections in palaces (Yule & Burnell, 1903). From Farsi, *zanana* is derived from *zan*, which means 'women'; it designates the apartments of a house in which the women of the family are secluded. This Islamic rule of female seclusion has been largely adopted by the Hindus of Bengal and the Mahrattas. *Zanana* is a Mughal term used to describe women's quarters in a palace or house (Al-Murahhem, 2008). Considering the Persian cultural impact on the Islamic Mughal, *Zenana* is used to describe segregation which is evident in whichever language is used among Muslims. Interestingly, both *ḥarīm* and *zanana* mean women and describe women's quarters. *Zenane* is commonly used in the Sind (southern Pakistan) and in the Indian subcontinent, where the strict rule of purdah (*ḥijāb*) is applied and thus develops gender segregation (Cooper & Dawson, 1998).

Towards the Arabian Sea, in regions like Gujarat in India, many Muslim houses are stricter regarding purdah (*ḥijāb*) than Hindus. *Purdah* is a term that means the seclusion of women within the house. Muslims hide the *Zenana*, or women's section of the house, from visitors (Cooper & Dawson, 1998). Intriguingly, *purda*h "بُردة" in Arabic means a striped garment to wrap the body with – another form of hijab. Karl Wutt claims that some 'tribes' – Pashtun and their Warlords – who inhabit the valleys of eastern Afghanistan or the northwest frontier province of Pakistan have strict codes of privacy and live in formidable fortress houses that ensure security and gender segregation (Oliver, 1997). In Hindi, purdah or pardā is a term from the Persian word 'parda', meaning a 'curtain', especially a curtain used to screen women from being seen by men. A woman of higher status who observes such rules of seclusion is termed parda-nishīn or 'one who sits behind a curtain.' (Yule & Burnell, 1903). The term in Hindi and Farsi has an interwoven and metaphorical meaning: a curtain, hanging, screen, partition, or blind. It also means veil, seclusion (especially for a Muslim woman), and privacy (McGregor, 1997). In a study of Women in Islamic Societies of South Asia, Tasneem Chowdury claims that *purdah*, which means curtain – literally – refers to the physical segregation of living spaces and the covering of body and face. It also refers to the beliefs and values surrounding women's behaviour, the restrictions on their movements, and the requirements for their respectful manners. These include a set of norms that govern women's behaviour in the presence of males within the home and outside in public areas. Thus, the "*purdah* zone" is where women veil and seclude themselves from men. This zone within the Islamic house comprises a large part of South Asia, where Muslims use this practice to safeguard their women from men outside the family and to keep them in their separate feminine world (Chowdury, 1993). It is also argued that, in India, the notion of being secluded and behind a screen can be expressed by saying: 'She is purdah-nashim, or simply purdah.' The purdah is the screen that shuts the woman away from the outside world. A similar expression with a similar meaning is used in Egypt: 'Yes, my daughters go to school', to which a mother might say, 'but they are kept harim' (Cooper, 1915).

Apart from the various terms used from the East to the West of the Islamic world, the residents' experience illustrates another dimension. Women themselves have described this

[4] https://educalingo.com/en/dic-tr/enderun

tradition of securing privacy and safeguarding women in a variety of different ways. Such experience can be seen from a woman's point of view. For example, Alev Lytle Croutier, who lived in a *ḥarīm* quarter in Turkey at the end of the 1900s, has described the residence:

The windows of the women's apartments either opened onto an inner courtyard or were closely barred with latticework, concealing them from the outside world. These artfully designed, intricately woven lattices are some of the most beautiful elements of Islamic architecture, but what made them most compelling were the silhouettes of the shadows behind them, intimating a thousand and one mysteries and intrigues. Enclosed balconies with latticed windows allowed women to observe what was happening outside without being seen. Courtyards, roof gazebos, and gardens allow them a breath of fresh air, though these places were still considered haram. Roof terraces were the favourite places to watch the boats go by, take a siesta, and enjoy refreshments. They also allowed women to go unnoticed from one house to another. (Croutier, 1989, 162)

Another scene from Hyderabad, India, in 1915 describes women entering a female section of *ḥijāb*:

We arrived at the home, which was surrounded by a great wall. A woman-servant raised a curtain, disclosing a short stone stairway, ascending, and we found ourselves in the women's quarters. It was a courtyard, with rooms opening upon it from the four sides. These rooms were like large alcoves, separated from the court only by arches. (Cooper, 1915, 172)

These experiences of being within the *ḥijāb* reflect all previous issues discussed in terms of securing veiled women inside the house and finding solutions to reflect the *ḥijāb* in domestic interiors. More importantly, the first scene demonstrates the architectural means used in the Islamic houses, specially designed to conceal women, which fulfil the *ḥijāb* as a concept and achieve privacy. On the other hand, the second case depicts the layers of the *ḥijāb* being experienced within the zones of space from the outside zone into the interior. The *ḥijāb,* in its different forms, is an Islamic principle applied in a Muslim's daily life. The hijab is a key factor that reflects the essence of Islamic architecture around the globe, a character that unifies such architecture, regardless of the Islamic region. Even in parts of Indonesia where Arab Muslims were living, the implementation of the hijab system is symbolised by a rule adhered to by non-family guests. This rule is a behaviour that prohibits physical contact when visiting families. The circulation pattern within the house ensures that guests pass through a public space (patio) where non-physical contact occurs between the guest and the occupant (from behind the living room door). One vital Islamic rule is getting permission from the house owner. However, in small houses, public and private spaces are separated by a door or curtain (Azizah & Putri, 2013). The discussion went back to the starting point of the hijab as a concept, as a vital principle that could be seen, felt, and experienced physically and non-physically. That is, physically in a material form or application such as garments, screens, and secluded zones and non-physically or morally as attitude, behaviour, or living manners. The layout of the Islamic house reflects the implementation of the hijab as the main religious principle to protect the essence of the family within the house.

5.0 CONCLUSION

This study reflects the metaphorical concept of the *ḥijāb* as it is written and defined in the Qur'ān. It clarifies the terminology of the *ḥijāb* and its idioms, the flexibility of the Arabic term, and its broadened and hidden meanings. The physical form of the *ḥijāb* concept can be seen in the construction of the Islamic house with layouts that focus on gender segregation. As a term, *ḥijāb* is known in the Arab and the Islamic world; however, in some regions, local terminology substitutes the Arabic term while the concept remains the same. The dual meaning of the term *ḥarīm* encompasses both a space and its occupants and is parallel to the connection existing between women and the *ḥijāb* as a concept. Homes in most Islamic cities have blank walls facing the street or have lattice windows and screens from which the inhabitants can look out into the street without being seen. At the same time, segregation is a form of privacy that is applied differently across the Islamic world to veil interiors from being seen.

The practice of Muslim daily life is interwoven within religion; Islam is absorbed and administrated as part of the daily routine. Observing and studying aspects of Muslim daily life, including architecture and inhabitation, cannot be excluded from Islam as the dominating factor, especially within domestic life, where the *ḥarīm* plays an important role within the house. The woman's experience sums up the meaning of Islamic architecture: to fulfil the notion of the *ḥijāb* within the house. It also reflects the main feature of Islamic architecture: the concealment of women regardless of the local terminology. The experience of the *ḥijāb* and being within the secluded section of the *ḥarīm* gives a view of time and space in the context of the Islamic house. Such an experience may not be conserved, as globalisation is moving swiftly. Consequently, the documentation of layers of inhabitation is essential. Historically, it seems that *ḥarīm* is the old term commonly spread during the Islamic empire until the Ottoman period in November 1922. The term, with its Arabic origin, was used because it is the official language. The term may have changed when the Islamic territory was divided into regions. Or it could be due to the use of the equivalent non-Arab term for *ḥarīm*, which non-Arab communities rely on. This practice is evident through history and literature studies, especially among non-Muslim scholars who based their research on local terms about the community's understanding. The studies of this inner space that reflect the *ḥijāb* in its utmost notion were not looked at through Islam as the main source, which leaves room for wide-open speculation.

Case studies throughout the Islamic world were illustrated to show the constant necessity for women's privacy inside the house. The mere narrative of the case studies and experienced stories demonstrate such practice among the Muslim communities. That is the hijab implementation within the Islamic house from when the ProphetProphet was around until recent years. The discussion demonstrates that even with modernity and the globalisation wave, the need for privacy in the home is fundamental and indisputable. The discussed case studies before the 19th century depicted the harmonious manners of such implementation in most major Islamic cities. These cases prove that the hijab concept is applied and adaptable to different Islamic societies accordingly. Such flexibility was narrated in various cultures via terminology and the implementation method within the house zones. The wider perspective of the concept of the hijab application exemplifies a great lesson to learn. A lesson to design a house for the sake of the privacy (*ḥurma*) of the family members, the house occupants, and society in general, since the need for privacy and the hijab is vital within the Islamic house,

even in recent years as discussed in the cases previously. The demonstrated case studies detail how obeying the Quran's rules reflects the house's Islamic etiquette. History proves the necessity of the hijab within the Islamic house and shows the lessons to heed across Islamic communities around the world. These lessons ought to be applied practically for the family's sake as the house's main factor.

ACKNOWLEDGMENTS

The authors would like to express their gratitude and appreciation to all who contributed to this study, directly or indirectly.

REFERENCES

Abū Dāwūd Sulaymān ibn al-Ash`ath as-Sijistānī. (n.d.). *Sunan Abu Dawud: Kitab 34*. Retrieved from https://sunnah.com/abudawud/34

Al-Basha, H. (n.d.). *Madkhal ilā al-āthār al-islāmiyya*. Al-Qahira: Dar Al-Nahda Al-Arabiya.

Al-Hajj Research Centre. (1990). *Namāzij min mabānī Makkah al-taqlīdiya*. Makkah: Umm Al-Qura University.

Al-Hajj Research Centre. (n.d.). *Slides collection*. Umm Al-Qura University, Makkah.

Ali, A. Y. (1991). *The meaning of the Holy Qur'an* (Arab/English ed.). Maryland, USA: Amana Publications.

Al-Murahhem, F. M. (2008). *Behind the Roshan: Visualising the Roshan as an architectural experience in traditional domestic interiors* (Unpublished doctoral dissertation). School of Architecture, University of Brighton, Brighton, UK.

Al-Murahhem, F. M. (2011). The nineteenth-century Western travellers' conception of the harim: Restoring the cultural complexity of the hijab in architecture. *Journal of Islamic Architecture, 1*(4), 167–180.

Az-Zubadi, A. Z. A. (1996). *Summarised Sahīh Al-Bukhāri (Arabic–English)* (M. M. Khan, Trans.). Al-Riyadh: Dārussalam.

Bunt, C. G. E. (1927, December/January). A note on Jali windows. *Monument Magazine, 52*, 13–15.

Campo, J. E. (1991). *The other sides of paradise: Explorations into the religious meanings of domestic space in Islam*. Columbia, SC: University of South Carolina Press.

Chowdhury, T. (1993). *Segregation of women in Islamic societies of South Asia and its reflection in rural housing – A case study in Bangladesh* (Unpublished master's thesis). School of Architecture, McGill University, Montreal, Canada. Retrieved from https://www.mcgill.ca/mchg/student/segregation

Cooper, E. (1915). *The harim, and the purdah: Studies of Asian women*. London: T. Fisher Unwin, Ltd.

Cooper, I., & Dawson, B. (1998). *Traditional buildings of India*. London: Thames & Hudson Ltd.

Crouch, D. P., & Johnson, J. G. (2001). *Traditions in architecture: Africa, America, Asia, and Oceania*. New York: Oxford University Press.

Croutier, A. L. (1989). *Harem – The world behind the veil*. New York: Abbeville Publisher.

El-Guindi, F. (1999). *Veil: Modesty, privacy, and resistance*. Oxford: Berg.

El-Rafey, M. (1992). Housing and women's needs: Emerging trends in the Middle East. *Architecture and Behaviour, 8*(2), 181–196.

El-Shorbagy, A. (2010). Traditional Islamic-Arab house: Vocabulary and syntax. *International Journal of Basic & Applied Science, 10*(2), 29–35.

Hazrina H. B., et al. (2021, April). An architectural review of privacy value in traditional Indonesian housings: Framework of locality-based on Islamic architecture design. *Journal of Design and Built Environment, 21*(1), 21–28.

Hwaish, A. (2015, November). Concept of the "Islamic house": An early Muslim house case study. *Proceedings of 4th IASTEM International Conference, Amsterdam, Netherlands*, 86–93.

Llewellyn-Jones, L. (2000). *Women and veiling in the ancient Greek world* (Unpublished doctoral dissertation). Cardiff University, Cardiff, UK.

Mahfouz, A., & Serageldin, I. (1990). Women and space in Muslim societies. In R. Powell (Ed.), *Expressions of Islam in buildings* (pp. 84–86). Singapore: Aga Khan Trust – Concept Media.

McGregor, R. S. (1997). (Ed.). *Oxford-Hindi-English dictionary* (2nd ed., p. 603). Oxford: Oxford University Press.

Mohammad, A. H. (2008). *Mafhum alkhososiya fi amarat almudon almasriya almu'asira*. Saudi Arabia: King Abdulaziz University. Retrieved from https://www.kau.edu.sa/Files/0053569/Researches/24736_الخصوصية%20بالاشكال.doc (Accessed August 06 August 06, 2021).

Oliver, P. (Ed.). (1997). *Encyclopaedia of vernacular architecture of the world* (Vols. 1–3). Cambridge: Cambridge University Press.
Pallasmaa, J. (2005). *Encounters: Architectural essays* (P. MacKeith, Ed.). Helsinki: Rakennustieto, Building Information Ltd.
Ragette, F. (2012). *Traditional domestic architecture of the Arab region* (3rd ed.). Edition Axel Menges.
Azizah, R., & Putri, R. H. (2013, June). Implementation of hijab concept in Arab house Pasar Kliwon Surakarta. *Journal of Islamic Architecture, 2*(3), 106–113. https://doi.org/10.18860/jia.v2i3.2465
Scarce, J. (1987). *Women's costume of the Near and Middle East*. London: Unwin Hyman.
Schoenauer, N. (1981). *The oriental urban house*. *6000 Years of Housing Series 2*. London: Garland STPM Press.
Slesin, S., & Cliff, S. (1990). *Indian style*. London: Thames & Hudson Ltd.
Tillotson, G. H. R. (1987). *The Rajput palaces: The development of an architectural style 1450–1750*. London: Yale University Press.
Vitra Design Museum. (2003). *Living under the crescent moon – Domestic culture in the Arab world*. Germany: IVAM.
Yule, H., & Burnell, A. C. (1903). *Hobson-Jobson: A glossary of colloquial Anglo-Indian words and phrases* (2nd ed.). Kent: Linguasia.

JOURNAL OF ARCHITECTURE, PLANNING & CONSTRUCTION MANAGEMENT
Volume 15 Issue 1, 2025 E-ISSN: 2462-2222 ISSN: 2231-9514

BUILDING CONTROL AND ENFORCEMENT OF LAND-USE REGULATIONS: PREVALENCE AND CHARACTERISTICS OF ASSULTS TARGETING DEVELOPMENT CONTROL OFFICERS IN OGUN STATE, NIGERIA

Received: 23rd August 2024 | Accepted: 7th February 2025 | Available Online: 30th June 2025

DOI: 10.31436/japcm.v15i1.912

Adewumi Badiora[1*], Adeniyi Adeyemi[2], Akintade Afolayan[3] Henry Afolabi[4], Olukayode Fayomi[5]

[1] Department of Urban and Regional Planning, Olabisi Onabanjo University, Nigeria, adewumi.badiora@oouagoiwoye.edu.ng*
[2] Department of Urban and Regional Planning, University of Lagos, Nigeria, seadeyemi@unilag.edu.ng
[3] Department of Estate Management, University of Lagos, Nigeria, aafolayan@unilag.edu.ng
[4]Department of Urban and Regional Planning, Obafemi Awolowo University, Nigeria, hafolabi@oauife.edu.ng
[5]Department of Building, Olabisi Onabanjo University, Nigeria, fayomi.olukayode@oouagoiwoye.edu.ng

Corresponding author: **Adewumi Badiora*
Corresponding author's email: adewumi.badiora@oouagoiwoye.edu.ng

ABSTRACT
Violence against Development Control Officers (DCOs) and injuries sustained from assaults are frequent occurrences but have been hidden from empirical research. Other than the police, there is a shortage of studies on violence against regulation enforcement officers. This study analyzes the results of a survey to examine the occurrence and characteristics of assaults experienced by DCOs in Nigeria. Using Ogun State as a case study, the 20 zonal Physical Planning and Building Control Areas represent clusters from which at least a respondent was randomly selected. The study used a mixed-method approach to analyze the data. Although more severe assaults resulting in wounds are relatively rare compared to less serious ones, findings show that assault is a regular occurrence against persons employed as DCOs. Results link the frequency of direct personal contact with people to the increasing vulnerability of DCOs to assaults. The logistic regression results show that assaults are more common to female than male DCOs, and may be common for those with less skill on the job. In conclusion, there is a prevalence of violence against DCOs in Nigeria. Collaborative efforts by the State and non-State stakeholders are therefore needed to ensure the safety of DCOs and improve the quality of land use and the built environment.

Keywords: Assaults, Building control agency, Construction management, Development control officers, Land-use regulation,

1.0 INTRODUCTION

Law enforcement is considered one of the riskiest professions (Biere, 2017), and it remains so. It is considered to be a dangerous career, not only while undertaking enforcement duties but also from the possibility of being assaulted by encounters with people (Tuttle, 2019). Oftentimes, law enforcement is synonymous with the police department. However, there are other agencies of the state that perform law enforcement roles. One such is the physical planning and building control agency. This state department consists of several professionals in the built environment, such as builders, town planners, architects, surveyors, and civil engineers, among others.

It has the task of regulating and maintaining law and order regarding building and the use of land. Its functions range from enforcing building codes and urban planning policies of the federal government to administering state and local land use plans. (Badiora & Bako, 2020). Its officers (DCOs) act as executors of building codes, land use regulations and planning laws, ensuring that construction approvals are allowed only when developers fulfill relevant

regulations guiding the area. Besides, they perform routine on-site compliance checks during building construction. This is done to ensure the construction is in tandem with the circumstances under which the construction approval was ratified, and any applicable rules that apply (Badiora & Bako, 2020). These functions come with many risks, as civilians may think such an agency lacks the legitimacy to enforce specific laws. Hence, they put up violent resistance.

While previous studies (e.g. Dawson *et al.*, 2017; Zhou et al., 2018; Maguire 2018; Lawrence *et al.,* 2018; Siegel et al., 2020; Elvegård & Almvik, 2024) reported that the threat of assault by police, social services, and health personnel is two times for employees in other professions. Personnel of development control agencies are also subjected to higher levels of risk as a result of their daily encounter with the public. However, most everyday encounters do not usually end in a DCO being attacked. Still, some happenings can put DCOs in a condition where they are to react to a person or group of persons who may become ferocious and, as a result, expose DCOs to the risk of being assaulted and injured. In March 2023, for instance, DCOs from the Lagos State Physical Planning Permit Authority and the Lagos State Building Control Agency were attacked by hooligans while on development control and enforcement actions. The officials were attacked with dangerous weapons and sustained various degrees of injuries, including head injuries (Idowu, 2023). It is the prospect of being assaulted and the volatility of such attacks that distinguishes the working environment of a DCO from that of other professions.

Despite much evidence, violence against the staff of physical planning and building control agencies remains less researched compared to that of the police, social service workers, and health care personnel. Indeed, there is a shortage of studies on violence against enforcement officers other than the police. To date, no study has assessed violent assaults on DCOs or analyzed the possible linkages between socioeconomic and demographic factors, the levels of violence inflicted on DCOs in various geographical settings, and how they impact assault incidence. Compared to other aspects of civil and public services, such as the police, health, and social work, not much is known about the occurrence and characteristics of assaults against DCOs, as fewer studies exist on this subject matter.

Most literature on development control tended to focus on physical development processes and urban planning practices (Vivan, Kyom, & Balasom, 2013; Adeyemi, 2016; Avogo, 2016; Adeyemi *et al.,* 2023) and probably, DCOs corruption (Chiodelli & Moroni, 2015; Chiodelli, 2018; Badiora, 2020; Badiora & Bako, 2023). However, the increasing rate of assaults on DCOs raises several concerns and represents a fundamental form of violence for the built environment practitioners, researchers, and policymakers to understand. This study was therefore undertaken to understand the incidence and characteristics of assaults experienced by DCOs in Nigeria, how this might be prevented, and how DCOs may be best supported. Among others, the research questions that formed the basis of the research were: What are the experiences of assaults among DCOs in the study area? Where, when and under what circumstances do these assaults happen? What are the socio-economic and demographic factors influencing assaults on DCOs?

The impact of assaults on DCOs, as well as the physical planning and building control agency, should not be disregarded. Violence against DCOs can result in essential costs for agencies and, thus, citizens and public funds. These include the cost incurred for medical treatment of

injuries, emotional and physical well-being, and disrupted resources when staff are on leave. Costs also include possible losses in agency-community and agency-staff relations, including a decline in connection to the agency, lack of an aspiration to continue on the job, and a decline in professional performance.

Apart from the social and financial impacts of assaults on DCOs, the town planning goals of protecting the environment and safeguarding the water, air, land, forest, and wildlife, as enshrined in Section 20 of the 1999 Constitution of Nigeria, will not be realized. Besides, this form of violence is important to understand because it reflects, to some extent, an attack on the rule of law and disobedience of the justice system. For these reasons, physical planning and building control agencies, police, policymakers, and the general public would benefit from this study by understanding the prevalence and characteristics of indecent assaults being experienced by DCOs.

To develop this article further, the next segment summarizes the literature review, and the following segment clarifies the methodology adopted to collect the data used in this study. The third segment discusses the survey results, while section four is the conclusion.

2.0 LITERATURE REVIEW

Around the world, public officials are regularly targeted for violent attacks. Building and development control officers, police, nurses, caregivers, doctors, and local civil servants, among others, come under violence by a wide range of means. While there is a lack of studies that analyze the evidence around assaults on DCOs, there are several studies that examine issues on other civil public servants. Thus, the purpose of this section is to provide an appraisal of previous studies on the prevalence and characteristics of assaults experienced by workers generally.

On the types and seriousness of violence, previous findings show that attacks with no injury were more common among workers compared to attacks causing wounds. For instance, most police victims of assaults received only slight wounds that did not require being hospitalized (Den Heyer, 2023). Also, two-thirds of assaults against physicians in England are pushed with no severe wounds (Elston *et al.,* 2002). Also, a study of nurses' assault involvement showed that attacks usually involved being punched, bitten, pushed, and kicked (Hopkins *et al.*, 2014). In their work on assault cases against health workers, Cashmore et al. (2012) stated that 52% of the attacks were low severity and 46% were of medium severity. Nonetheless, some 2% resulted in severe bodily wounds, while none resulted in death. In 1993, Leadbetter's study of welfare workers in England testified to the experiences of kicks, blows, and moderate physical hostility, including thieving, beating, and hair-pulling. Likewise, the work of Wilkins (2014) on child welfare workers showed that these workers commonly experienced kicking, slapping, and being physically held captive by clienteles. Regarding the public transport sub-sector, a survey of cab drivers in Canada found that being spat on and, or punched were common experiences of Canadian public transport drivers (Zhou *et al.,* 2018).

More severe assaults resulting in wounds are relatively rare compared to less severe ones. Nonetheless, there are some accounts of grave assaults across a variety of private and public services. Craig (2016) found that 52% of nurses, at some point in their career had witnessed assaults occasioning minor injuries, while 13% reported an experience resulting in serious

injuries. Using paramedic data in Australia, Maguire (2018) stated that severe injuries caused by assault increased from 2001 to 2014 in multiple of three. Furthermore, a survey by Elston *et al.* (2002) on physicians showed that eight (of 697 respondents) experienced assaults that involved small arms and light weapons (e.g., guns, knives, axes). Likewise, Magin *et al.* (2009) affirmed that general administrative assistants had experienced threats with handguns, though this type of assault was largely infrequent. A study of student nurses by Hopkins et al. (2014) likewise showed a few incidences of having chancy objects thrown at them and attempts to stab them.

Although uncommon, the study of Boyd (1995) established that gunfire and stabbings were the most severe acts of violence against Canadian workers. In Australia, Hine *et al*. (2018) stated that 9% of wounds in their sample respondents were from being stabbed, or hit with a big stick, iron or gun. In England, Brown (1994) established that some 17% of constables' assaults led to severe injuries, while the bulk of wounds (about 65%) were slight cuts and bruises. In the study by Wilkins (2014), 4% of surveyed child welfare workers in England testified to suffering from physical assault involving small arms and light weapons. Furthermore, Lincoln and Stockill (2015), reported the perception of stakeholders in Australia that the severity of assaults against cab and public bus drivers is on the increase. Similarly, the study by Zhou *et al.* (2018), revealed that a significant number of Canadian cab and public bus drivers had been threatened at gunpoint.

On the personal characteristics of perpetrators of assaults, Dollard et al. (2022), showed that 25% of the respondent sample reported having been physically threatened in the workplace, usually by a client or their family, or both. In Canada, the impact of drugs or alcohol or both was a significant predictor of attacks against workers in the healthcare sector (Brophy *et al.,* 2018). Likewise, in England, the work of Rao *et al.* (2007) found alcohol and drug abuse to be more common among those who were aggressive against healthcare workers. Similarly, the work of Elston *et al.* (2002) discovered that the majority (78%) of medics who have been assaulted testified that drug addiction or alcohol or both problems motivated their assailants. A similar case was found recently in New Zealand as police officer assaulters were habitually under the influence of alcohol or drugs, or both (Den Heyer, 2023).

On the contrary, Dawson *et al.* (2017), in their study on assaults against Australian public bus drivers, discovered that only 17% of the incidents involved passengers under the influence of alcohol and, or drugs. Hence, they concluded that substance use was not a significant reason. In their study, Hine *et al.* (2018) revealed that encounters with female suspects were predictive of constable injuries. In the same way, data from the Office of Inspector of Custodial Services (2014) showed that female inmates are highly involved in correctional workers' assaults. Age was also indicated as a factor in correctional workers' assaults. For instance, findings showed that almost 70% of assaults against correctional staff were carried out by youth inmates under the age of 35 years.

Previous findings regarding the characteristics of workers who experience violence show that physical assaults are more common in males compared to females among medics (Elston & Gabe, 2016), nursing care (Hegney *et al.,* 2006; Shea *et al.,* 2017), child welfare workers (Briggs *et al.,* 2004), and social welfare workers (Balloch *et al.,* 1998). Similarly, male officers were excessive in injury incidents involving police constables (Larsen *et al.,* 2016). Whereas, in the officially recorded incidents, Cashmore *et al.* (2012b) found males to be more often the

prey of assaults than females among correctional health workers, the self-reported experiences conducted with the workers of the same agency showed no statistically significant difference. Thus, the methodology can impact findings. Concerning age, a study by Hegney *et al.* (2006) discovered that younger caregivers were more likely to report experiences of assaults. Similar findings have been reported by Cashmore et al. (2012) for correctional healthcare workers and by Soares *et al.* (2000) for psychiatric medics and nurses.

Research has found violent attacks to be more common to less experienced workers among police (Sundaresan & Sharma, 2022), nurses (Hegney *et al.,* 2006; 2010; Ibrahim 2023), child welfare workers (Briggs *et al.,* 2004), and correctional officers (Inspector of Custodial Services, 2014). Ibrahim (2023) found that a caregiver's year of experience is inversely related to the probability of experiencing workplace violence. That is, caregivers who have been working for many years are less likely to encounter any form of violence compared to those who have fewer years of experience.

The work of Balloch *et al.* (1998) also revealed that, whereas 21% of certified social welfare workers testified to being physically assaulted, 30% of social welfare supporters testified to being physically attacked. This is because the social welfare supporters were less experienced and more likely to do routine work, including visiting clients (Balloch *et al.*, 1998). Conversely, a study by Winstanley and Hales (2008) showed no significant difference in assaults between qualified as against unqualified or experienced as against less experienced social welfare workers. Likewise, a study (Craig 2016) established no significant difference in the physical attack between caregivers who were trained in aggression management and those without such skills.

Some situational factors are linked to violent attacks on workers. These include, among others, contact and field environment factors. Intuitively, contact creates the physical opportunity for violence, and studies have cited the regularity of direct personal interaction as increasing exposure to, or chance of, assaults. A higher prevalence of aggressiveness has been reported in jobs involving personal interaction with persons who have a propensity for emotional violence (Sundaresan & Sharma, 2022). For instance, Al-Khatib et al. (2023) found that the assaulted healthcare service providers were likely to have been posted to the Emergency Departments of Public Hospitals.

A study by Koritsas et al. (2008), showed that social welfare workers who reported experience of physical mistreatment had more direct interaction with clientele compared to those who did not report offensive experiences. Schneider (2002) depicted a related conclusion from a study of social welfare workers in Canada. Some professions require personnel to have direct contact with customers, either through visitations to the community or where customers live on-site, which has also been noted to generate risks for assaults on workers. In surveys of child welfare workers (Briggs et al., 2004) and caregiver workers (Balloch et al., 1998), it was found that the likelihood of assault is high for workers who visit customers' sites. Specifically, Balloch et al. (1998) reported that 62% of residential caregiver respondents interviewed had been physically abused. In law enforcement, attending to domestic fighting has also been mentioned as particularly risky (Ellis *et al.*, 1993), and more recently, Den Heyer (2023) cited the regularity of direct contact as increasing susceptibility to assaults against the police.

Several previous studies (e.g., Moon *et al*., 2019; Farrell *et al.,* 2006) have documented the impacts of assaults on workers while on official duties, including adverse costs for emotional and physical well-being, declined connection to the workplace, lack of an aspiration to remain in the occupation; and decline in job performance such as increased blunders. In addition, research by Moon *et al.* (2019) and Farrell *et al.* (2006) have identified costs for the workplace as a whole, such as lowered output and difficulties in retaining workers for long. Using accepted employees' compensation claims made by personnel of police departments, Ferguson *et al*. (2011) discovered that not less than 587 productive hours per claim were lost due to injuries caused by job-related assaults. Besides, a study of approved caregivers compensation claims over two years showed 2500 productive days were wasted to assault-related wounds (Liss & McCaskell, 1992), while in a sample of caregivers, Mahoney (1991) found that 19% of participants identified someone who had resigned from the job after being attacked. A recent study by Al-Khatib et al. (2023) established the lowered productivity and increased difficulties in retaining health workers in Jordan due to workplace violence against healthcare providers.

Overall, the literature evidence over the years suggests that incidences of assaults vary among workers and across professions and organizational settings. Besides, literature also suggests the sources and causes of aggressive behaviors, as well as the importance of workplace safety and security measures. The current study, therefore, examines the prevalence and characteristics of indecent assaults on DCOs. It explores some of these factors of physical attacks on Physical Planning and Building Development Control areas in a Nigerian setting.

3.0 METHODOLOGY

The study adopted a geographical case study and mixed-method approach to study the prevalence and characteristics of attacks experienced by DCOs.

3.1 The Study Area

The geographical case is Ogun - one of the 36 states of the Federal Republic of Nigeria. Ogun is situated in the southwestern zone of Nigeria (See Figure 1). For physical planning and building control matters, Ogun is organized into 20 Local Government Areas (LGAs) or Zonal Planning Authorities (ZPAs). The ZPAs are responsible for preparing development plans, granting planning approvals, controlling and monitoring various physical development activities. It also ensures that growth and development take place in the local government according to the approved development plan.

Each ZPA has divisions such as Architecture Unit, Surveying Units, Estate Management Unit, Development and Building Control Unit and each unit has a head. Nevertheless, a ZPA is headed by a director who is assisted by a Deputy and other Zonal Planning Officers/DCOs. The team is responsible for implementing the Ogun state town planning, building, and development control plans and coordinating building construction and physical development in their respective jurisdictions.

3.2 Data Collection

The mixed method approach in this study is made up of in-depth interviews and a questionnaire survey (Creswell, 2018). This allows the data to be analyzed qualitatively and quantitatively (Flynn, 2021). Logistic regression models (Olive, 2017) were used to examine

the influence of independent variables (e.g., types of assaults, defense mechanism, location of assaults, socioeconomic groups, and demographics of respondents, among others) on DCOs' experience of assaults while in the line of duty.

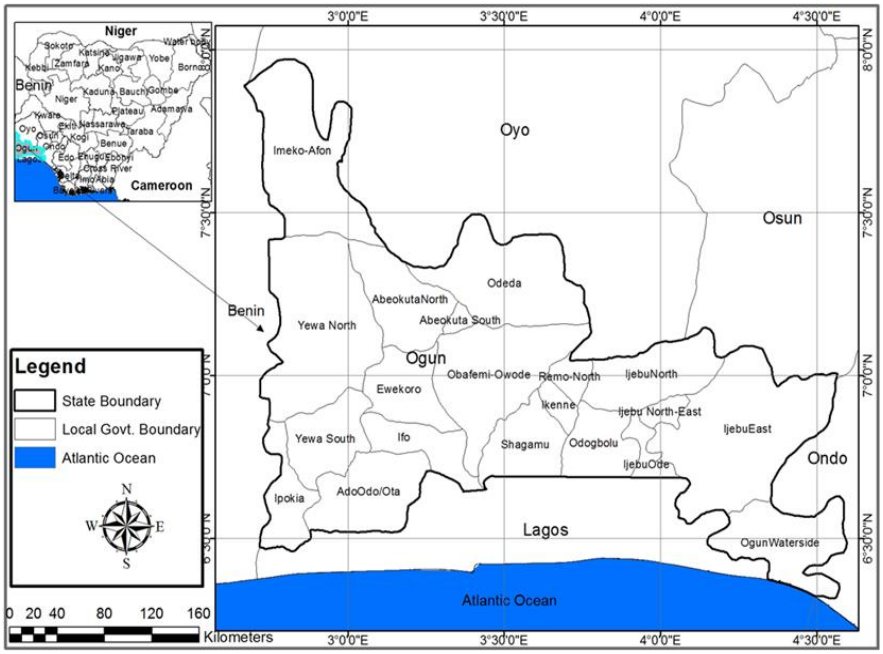


Fig. 1: *Geographical Map of Ogun indicating the LGAs-ZDCOs*
Source: Badiora, & Bako, (2023).

Each of the 20 LGA-ZPOs (See Fig. 1) constitutes clusters from which at least a Development Control Officer (DCO) was randomly selected as participants. Using this sampling method, 76 participants were sampled. Due to the busy schedule of DCOs' activities, data were collected between July 2021 and November 2022 through questionnaires (in pen and paper) and in-depth interviews. Prior to questionnaire administration and the in-depth interview, an experimental study was conducted on 12 potential respondents to test the survey instrument. The golden rule is to try on 12 to 50 people before the actual administration (In, 2017; Tavakol & Dennick, 2011). Feedback was obtained about the length of the interview questions, instrument validity, and interview question clarity. The survey instrument was then reviewed and further tried on more than 12 potential respondents. For the internal reliability of the questionnaire, Cronbach's alpha values were with a cut-off value of .79 (Tavakol & Dennick, 2011). The reliability test showed that the questionnaire used was acceptable (α = .81), exceeding the recommended satisfactory level of .71 (Tavakol & Dennick, 2011).

For the questionnaire administration, participants were provided with a multiple-choice option to develop categorical data (Teddlie & Tashakkori, 2003). This was followed-up with in-depth interview sessions where the respondents were given the chance to discuss their specific responses in the questionnaire and also share personal experiences. The questionnaire was in English. The interview sessions were mixed - in English and Yoruba (*the main local language in the study area*). This study sustains avoidance of injury and privacy of respondents' personalities and experiences. Besides, the study exercised informed consent during data collection by ensuring that respondents were conversant with the intention of the study. They were also given equal chance to participate and withdraw their participation at any time. Among others, the survey questions asked participants how often they had been

attacked in their job as a DCO, the severity of the assault and wound received as a result of the assault, as well as the location where the assaults took place, and if there was any form of defense mechanism employed by them.

The 76 respondents included 51 senior DCOs. The majority (72%) of the respondents were male. Furthermore, the profiles showed that 30% of the participants had more than 15 years' experience, indicating that the respondents had adequate experience on the job to provide ample evidence for making valid deductions on the dynamics of indecent assaults on DCOs in the study area.

3.3 Variables and measurements

Two groups of variables were considered in this study - dependent and independent. For the dependent category, the variable was the experience of assaults as DCO. Regarding this, it was asked: "Since you joined this agency, have you had direct experience of assaults in the line of duty?" with a response as a binary categorization from 1 to 2, where 1 = Yes and 2 = No. The response categorization was re-coded into two to make a clear distinction between those who had been assaulted and those who had not. A detailed description of this variable is included in Table 1.

For the independent variables, four groups were determined: defense mechanism, location of the assault, residents' socio-economic and demographic grouping, and sections within the agency. Regarding the defense mechanism, we asked: "Do you employ any defense mechanism in the line of duty?" with a response as a dichotomous categorization from 1 to 2, where 1 = Yes and 2 = No, with "2=No" as the reference variable. The response categorization was re-coded into two to make a clear distinction between those who use defense mechanisms and those who do not. In this study, we are also interested in the type of defense mechanism employed. Thus, the next question asked respondents about it and was coded into self-defense, police and military personnel accomplices, and group visitation of sites, with self-defense as the reference variable. Regarding the location of the assault, we asked: "Where do the assaults take place?" This was coded into five, including office/workplace, on the developer's site, private/personal residence, on the street to and from work, and in a public place/occasion, with office or workplace as a reference variable.

The respondents' demographic and socioeconomic status were indicated by gender, age, position, and number of years in service. Gender was coded into male and female, with female as the reference variable. The categories for age were 21 – 40, 41 – 50, and 50 – 60 years, with 21 – 40 years as the reference category. For the position in the agency, options included DCO, senior/chief DCO, and the director cadre, with DCO as the reference category. The categories for years of experience in the agency were coded as less than five years; 5-10 years, 10-15 years, and more than 15 years, with less than five years as the reference category. Regarding the respondents' service section in the agency, they were asked: "Which section of the agency are you attached to?" This was coded into three, including site inspections and development control, office and general administration, as well as estate management and survey, with office and general administration as the reference variables.

3.4 Data Analysis

Data analysis was completed using the statistical package of SPSS 16.0. Descriptive analysis was used to summarize the units of analysis. Logistic regression (LR) was used to explore the

variables. The independent variables (such as defense mechanism, location of the assault, residents' socio-economic grouping, and sections within the agency) were used in LR models to predict the dependent variable: experience of assaults while in the line of duty. LR was employed because it is favored over others as an appropriate method for analyzing dichotomized variables. The results of the LR models were reported using Average Marginal Effects (AME) and Standard Errors (SE) estimates. Mainly, AME provides statistics that are simpler to interpret and make honest inferences. As harmonized with more conventional odds ratios, AMEs are more suitable for matching models, and thus, using AME measurements allows this study to link the effects of independent variables across models.

Responses from the follow-up in-depth interview were documented using a combination of voice recording transcription and note-taking. Sessions discussed in the Yoruba language were transcribed into English. This process implied the risk of altering and, or losing details of the discussion. Admitting this, we tried to lessen the occurrence by clarifying all questions emerging from the questionnaire and referring back to the original records when required. We then developed a framework for coding, using NVivo 9 for data management. The study conducted a thematic analysis using the six-phase method (Cichoń, 2020). As part of this procedure, descriptive codes demonstrating features of the discussions were generated and then collated to form overall discussion subjects. Following this, excerpts were extracted from each theme from the discussion transcripts. The final stage involved telling the story in writing from the research problem. Our analysis thus followed a reiterative method, starting with a general issue on the prevalence of violence against DCOs and identifying emerging themes on the characteristics and influencing factors based on the empirical data instead of describing these themes a priori.

4.0 RESULTS

Findings are presented under various sub-headings as follows. If not otherwise indicated, the tables used to summarize results are from the survey carried out between July 2021 and November 2022.

4.1 Descriptive analyses of the variables

The first question asked respondents if they had direct experience of assaults in their roles as DCOs. Findings (*see Table 1*) show that approximately 92% of sample respondents have experienced assaults in the line of duty as DCOs. This vast percentage shows how important this issue is among developers and DCOs in the study area. Some 8% of the respondents who confirmed not to have had direct experience of assaults were also fresh in the agency's activities. Therefore, by implication, it is not unlikely that the more the years in their roles as DCOs, the more likelihood of direct experience with assaults in the line of duty.

Some respondents discussed their experiences further. Two significant issues emanating from this discussion were the severity of the assault and the weapons involved. Although the majority (61.0%) of the respondents testified that their assault was not severe, the proportion (39.0%) of respondents who stated that it was serious is noteworthy not to be discounted. Some weapons mentioned by the respondents include kitchen knives, broken bottles, steel pipes, firearms, cutlasses, and traditional weapons like "Olonde" a Nigerian black magic twine capable of causing death and serious/permanent injuries when smashed on the human body.

Table 1: Descriptive summary of variables

Unit of Analysis	Variables	Freq. (No.)	Per cent (%)
Direct experience of assaults	Yes	70	92.0
	No	06	08.0
Type of assaults experienced**	Verbal assault	70	45.8
	Physical assaults	55	35.9
	Threat to one life	10	06.5
	Threat to the life of a family member	18	11.8
Severity of assaults	Serious assaults	27	39.0
	Not serious assaults	43	61.0
Occasions assaulted	1 - 4	11	15.0
	5 - 9	35	51.0
	Ten and above	24	34.0
Injury received from the assault	No, injury was not received	19	25.0
	Yes, injury received	57	75.0
Types of Injury received**	Fear and psychological trauma	57	41.6
	Cut and bruises	38	27.7
	Fractures and Stitches	30	21.9
	Firearm injuries	12	08.8
Location of the assaults occurred**	On the developer's site	56	40.0
	Office/Workplace	10	07.1
	Private/personal residential house	15	10.7
	On the street to and from work	34	24.3
	In a public place/occasions	25	17.9
Use of defense mechanism	Yes	70	92.0
	No	06	08.0
Type of defense mechanism**	Self-defense	70	42.9
	Police/military accomplice	23	14.2
	Group visitation of sites	70	42.9

***NB:** ** Multiple responses allowed*

A respondent narrated that: *"…my first experience was a highly aggravated assault with some "Omo-Onile" boys. I was naïve in this work then. It was a very serious incident. The intention of the boys that day was to cause severe bodily injury to me. They had come to the site with deadly weapons such as a cutlass and firearms. I was about to be beaten, punched, kicked, and head-butted. Then one of their leaders intervened. I had assisted him with some petty cash before that incident. He recognized me and pleaded with the gangs. He managed to help me escape on his Okada…" (Male/45 yrs. old).*

The questions on the types of assaults experienced in their roles as DCOs were allowed for multiple responses/options. Thus, findings show that respondents who had direct assault experience have had one or more assault types. The most common of them all was verbal assaults (45.8%). Next to this was physical assaults (35.9%). Most of the respondents

confirmed that most of the time, the assaulters made verbal threats prior to the physical assault. Findings show that threats to one's life and the life of family members accounted for 6.5% and 11.8% of all assaults experienced by DCOs in the line of duty, respectively.

Beyond these, some respondents discussed "spiritual attack" and the use of black magic on them in their roles as DCOs. A respondent narrated: *"…on this job, what have we not experienced? How many are we going to count? Is it that of bullies on the streets, or that of physical intimidation of our immediate family members? A developer reported me to my husband and threatened to frustrate his life. I could remember a day, sometimes in 2010. We were on inspection at a site and I had a serious confrontation with the site developer's uncle who is also one of the influential people in the town. He vowed that he would teach me a lesson. That same night, I almost died in my sleep. I saw the same confrontation that happened during the day, but in my sleep, someone shot a gun at me on my left chest, and that was the beginning of my chest pain. I could not do my work effectively. We tried all hospitals in town until one of the doctors privately advised us to explore traditional means…" (Female/55 years old).*

A follow-up discussion with respondents helped us to understand some characteristics of the critical actors and assaulters. Respondents confirmed that most of the assaulters were male, although there were very few females as well. Furthermore, respondents affirmed that many of the assaulters are usually members of a cult group and, or criminal gang. Hence, they are always in a group and, or accompanied at the time of the assault. Besides, they are ardent abusers of alcohol and drugs. Furthermore, assaulters were mostly youths, with the most prevalent age being between 18 and 40 years old. Findings show that multiple actors were responsible for assaults on DCOs in the study area. Among the actors (drivers of assaults) mentioned are landowners, family members (*popularly called - Omo-Onile*), developers, egoistic political and economic elites, as well as some egocentric community leaders. Respondents discussed that many of the direct attacks are not necessarily carried out by these actors. Nonetheless, they (assaulters) mainly act on their instructions.

Most of the assaulters are usually area boys/unemployed youths. As explained by a respondent: *"...In my experience, I can boldly say that many of the assaulters used by developers, egocentric political leaders, and 'Omo-Onile' to cause violence on sites are idle youths. They are frustrated youths who, I think, are unable to secure employment and now take to the underground economy and engage in illicit activities, including land crime and violent conflicts. I was once engaged in a discussion with one of my attackers after he was arrested. He supposedly worked for land grabbers and 'Omo-Onile' in my jurisdiction and had a history of assaulting people in the community. He made me realize that for some of them who follow 'Omo-Oniles', it is the pressure of surviving and the necessity that compels them. By working on this path, their financial needs are met, and it ensures there will be food on the table, thus giving them a degree, although limited, of ownership over or control of resources. This has helped many of them from sinking further into poverty, and enables them and their family to escape the vicious cycle of poverty..." (Male/57-years-old).*

Another question probed respondents on how repeatedly they had been attacked as DCOs. Findings show that only 15% had only been assaulted 1 to 4 times, with just 34% stating that they had been assaulted on 5 to 9 occasions. Findings show that a majority (51%) of the respondents had been assaulted on ten or more occasions (See Table 1). On injury received

during the assault, findings show that a significant proportion (25%) of respondents received no injury at all. In comparison, 75% confirmed receiving various injuries from the assaults, of which fear and psychological injuries were common to all the 57 respondents who specified that they received injuries during the assaults. For instance, some respondents testified that the attacks affected the level of confidence they had in their ability, while some discussed experiencing a feeling of overactive vigilance on duty. Other respondents attested to a general feeling of increased awareness of their environments, both when they are on construction site inspection and when they are not. A respondent described specific ways that her behavior has changed due to this overactive vigilance: *"…my previous experience of violence has made me more suspicious of people getting too close to me, particularly while on site inspections. I now will not let people be out of my sight; I, depending on the situation on the site, position myself so I can see who is around me…" (Female/51-years-old).*

There were also altered moods towards work as respondents testified about how being attacked transformed the way they felt about being an officer in the Physical Planning and Building Control Department. Some respondents testified generally about how, on some days, they would not want to go on construction site inspection. Other respondents said that since being attacked, they have doubted whether they want to progress with their career as DCO in the Physical Planning and Building Control Department. Besides, a respondent spoke about becoming "*nervous*" more effortlessly and how this has impacted her, even beyond the workspace. For instance, she said she has become less confrontational, and this has changed the way she works because she tries and prioritizes works and sites that are not likely to be hostile.

While more severe injuries are relatively rare, the study accounts for a few. For instance, cuts/bruises and fractures/stitches were the few severe injuries received by DCOs, having respectively accounted for 27.7% and 21.9% of all types of injury received as a result of physical attack experience. Furthermore, findings show that DCOs also receive firearm injuries (8%) intermittently. Narrating his experience, one of the respondents said: *"...this healed wound on my neck, I was not born with it. It was an injury I received while visiting a site in 2013. There was a serious conflict on the land. It was a boundary issue. We had gone to the site with the original/approved plan of the area to settle the matter. Both parties came to the site with some thugs. In the process, a fight broke out between the parties' thugs. Everybody was running for their lives. Other officers with me at the time of the assault had "Japa". I did not have the opportunity to talk with the assaulter to identify myself and de-escalate the situation. I became one of the victims of a cutlass-cut. At that moment, I became unconscious and did not know how I found myself in the hospital..." (Male/56-years-old).*

A follow-up discussion with respondents helped us to understand some effects of assaults on the well-being and statutory duties of these officers, as well as whether the assaulters were arrested and charged with the assaults. While some said the attacks caused them to require hospital treatments, some said they needed to take time off their duty to the extent of weeks and months to recover from various injuries suffered. The discussion with respondents steered to issues about reporting the assault. Although the site visitation incident reports do not include compulsory capture of assaults, several respondents confirmed reporting incidents of assaults. However, either formally and, or informally, they did report to one or more family members, friends, colleagues, their bosses at work and the police agency. While some respondents felt comfortable reporting assaults, others did not. For respondents who

feel comfortable, it is because reportage is required for every on-site visit ("*We must write official reports for every site visitation, although there is no provision for assault, you can mention it if such happened nonetheless*"). It aids staff recovery, it is nothing to be feeling guilty of, and it helps improve staff safety, and security in the future.

On the contrary, for those who feel uncomfortable, it is primarily because of inadequate support (i.e. from the agency, family and friends, colleagues, bosses/supervisors and the state police); Site visitation reports do not include compulsory capture of assaults, even when you mention this, reportage would not change anything ("*it is just business as usual." It is our agency's ritual, and makes no significant difference*") and, most times, assaulters do escape penalties. Some of these issues raised were further confirmed when the participants mentioned that some of their assaulters were arrested and charged accordingly. Nevertheless, there were mixed feelings on the process of arrest and charges. While some were partially satisfied with the process, others were not. These respondents confirmed that assaulters and, or actors escape justice because they have benefactors among the political elites in the study area. The respondents stressed that impunity in the Nigerian criminal justice system allows many of these assault crimes and criminal actors to flourish.

Another survey question involved reviewing the occurrence of the assault. The survey started by asking the respondents about the location where the assaults occurred. Findings show that assaults on DCOs mostly happen while on site (40%) on official inspection duty. Next, the survey discovered that several assaults (24.3%) had been committed against DCOs on the street to and from workplaces. Furthermore, a significant number of assaults have been suffered by DCOs while in public places and on occasions (17.9%) such as bars, restaurants, market places, and social functions. Findings also revealed that assaults do occur in DCO offices and private residential houses, with the least place of occurrence being the office. Perhaps this is because of security personnel at government offices in the study area. Hence, assaults against physical planning and DCOs could occur in official and unofficial places and locations. A respondent illustrated how she was stopped in a famous market in the study area by a woman whose property was marked for demolition: *"... We had gone to red-mark this particular block of shops for demolition on Wednesday of that week. I was in the market on Saturday to get groceries for the family. This woman just appeared from nowhere and started raining abusive words on me, shouting at the top of her voice. This attracted many people in the market. It was quite embarrassing. There was no physical fight though, only verbal, but it was very aggressive and abusive..." (Female/45-years-old).*

While the survey questionnaire did not ask a direct question on the time of occurrence, respondents did refer to time while discussing many of their responses. For many, most of the assaulters had attacked them during the day, especially during the official working hours of 8:00am – 4:00p.m (WAT), mostly on weekdays and, or working days. Nonetheless, respondents also said that some assaulters attacked on non-official days/times such as weekends and hours in the late evening between 6:00p.m and 10:00p.m (WAT). This is particularly common to those DCOs who have been attacked in unofficial places like personal residences, on the streets to and from work, and in public places and occasions such as markets, bars, restaurants, and social functions.

Furthermore, respondents were asked about their coping and defense mechanisms. About 92% of the respondents confirmed the use of defense mechanisms. Findings revealed that

DCOs have devised various strategies as defensive mechanisms. Police and military personnel accomplices are one of the defense mechanisms explored by DCOs. This is common when visiting highly volatile areas. A respondent said, "*We have learned from the past.*" Thus, it is now common to visit "problematic sites" with personnel of the security agencies as a means of defense against assaults. Furthermore, two strategies were prominent. These are the use of self-defense and visiting sites in groups. Each of these accounted for 42.9% of the strategies devised by the participants. Participants reiterated that the Bureau standard practice is that a Supervisor must visit a site in his/ her jurisdiction with as many officers under him/her as possible, including those on internship and, or industrial training from various Town Planning Schools. This is to ensure the safety and security of personnel as well as learning and exposure. As DCOs are not expected to carry any weapons whatsoever, the issue of self-defense was clarified by one of the participants as stated: *"...All jobs have risks, but I think our job has more. We are like the police – physical development and land police. Land in this part of the world is life. It is a serious matter. Our people can go to any length, even if it is to kill. So, you cannot afford to be careless. For me, I have faith in God to protect me. Those who can use Juju (Black Magic) are using it. Those who can make do with private securities are also doing so. In my personal opinion, nobody is "alone" in this job..." (Female/45-years-old).*

Following her comments, a further discussion emerged on whether the participants thought that being assaulted was part of their profession. There were mixed feelings. While some of the respondents indicated that they understood being attacked or enduring an assault was just a share of their job and an inevitable hazard of physical development monitoring, others thought that it was not. For the latter, a respondent commented thus: *"…No one should consider that being attacked is part of this profession. DCOs should be able to work safely. I agree it is a work-related risk, but that does not mean I should be beaten while doing my official duties. I have the right to go home safe like everyone else. I did not join this profession to be assaulted but to help in the development of sustainable cities and safe living. Violent physical assault on DCOs should not be normal in a sane clime…" (Female/55-years-old).*

For those respondents who thought that being assaulted was part of their profession, they held this opinion because their professions always make them to be in contact with people, and Nigerians (people) are unpredictable and often become violent when it comes to issues of land. Just as policing, there are risks involved in physical development monitoring; people often do not like being told what to do with their land, and there is a general lack of respect for town planners and DCOs, at least in Nigeria. Furthermore, participants believe that if their system of operation can be done in such a way that it reduces contact with people/developers, then assaults would be reduced drastically. Thus, some reasons emerged from this analysis regarding the remote and immediate causes of assault on DCOs. The most significant is the contact between the DCO officer and the people (i.e., assaulters).

4.2 Multivariate analyses of the variables

The results of the LR model (see Table 2) indicate that respondents who have fashioned out defense mechanisms were less likely to experience assaults in the line of duty compared with those who do not use any defense mechanism. That is, respondents who use defense mechanisms were 69.1% more likely not to experience assaults compared to those who are not using any defense mechanism. Findings further show that, of all defense mechanism options listed in this study, the use of police and military personnel accomplices has the highest odds compared to others. That is, respondents who use police and military personnel

accomplices while discharging their duties were 54.2% less likely to experience assaults compared to those who do not use this type of mechanism.

Table 2: *Logistic regression models of experience of assaults*

Unit of Analysis	Independent variables	Experience of Assaults	
		name	s.e
Use of defense mechanism	No		
	Yes	-.691**	.912
Type of defense mechanism	Self-defense		
	Police/military personnel accomplices	-.542**	.634
	Group visitation of sites	-.319**	.467
Location of the assault	Office/Workplace		
	On the developer's site	.442**	.494
	Private/personal residential house	.009	.827
	On the street to and from work	.217**	.744
	In a public place/occasions	.299	.917
Gender	Male		
	Female	.354**	.677
Age distribution	21 – 40 years		.
	41 – 50 years	.459**	.774
	50 - 60 years	- .188**	.333
Cadre/Position	DCO		
	Senior/Chief DCO	.597**	.288
	Director Cadre	- .348**	.442
Experience (years)	Less than five years		
	5-10 years	- .393**	.147
	10-15 years	- .256**	.098
	more than 15 years	- .157**	.099
Section	Office and general administration		
	Site inspections and development control	.696**	.591
	Estate Management and Survey	.348**	.818

NB: *p ≤ .05; **p ≤ .01; ***p ≤ .001; s.e = standard error; ame = average marginal effect

Furthermore, findings show that it is better to visit sites with a group of colleagues than to depend on self-defense since results show that respondents who visit sites in groups were 31.9% less likely to experience assaults compared to those relying on self-defense. Regarding location, two places were significant – on the site and on the street to and from work. However, developers' sites have the highest significant odds. That is, respondents were 44.2% more likely to be attacked by assailants while on site than other locations. The odds of assaults occurring on the street to and from work are less (21.7%) compared to while on site.

Regarding socio-economic and demographic characteristics, female officers were 35.4% more likely to be assaulted than male officers. In terms of age distribution of respondents, findings show that respondents within the age bracket of 41 – 50 years were 45.9% more likely, while

respondents within the age bracket of 50-60 years were 18.8% less likely to experience assaults in the line of duty compared to other age groups. In terms of position in the agency, respondents who are senior or chief town planning and DCOs were 59.7% more likely to experience assaults, and those who are in the cadre of directors were 34.8% less likely to experience assaults in the line of duty.

Interestingly, for years of experience, findings show that the more years respondents spend in the service, the lower the likelihood of being assaulted in the line of duty, as findings show that respondents who had spent five to ten years, eleven to fifteen years, and more than fifteen years were respectively 39.3%, 25.6% and 15.7% less possible to experience assaults compared to those who had only spent less years. In terms of sections within the agency, respondents in site inspections and development control, and those in estate management and surveying, were 69.6% and 34.8% more likely to experience assaults, respectively, compared to those in the office and general administration units. This is perhaps because the officers in the latter do not necessarily visit sites and ongoing developments and, thus, have no direct contact with people or assailants.

5.0 DISCUSSION

This study examined the occurrence and characteristics of assaults experienced by DCOs in Nigeria. While findings showed that the bulk of respondents had been attacked, only a few of the attacks were severe. These findings are similar to those of Hopkins *et al.* (2014), who found that nurses' experience of assault in clinical settings mainly involved being punched, but there were also a few cases of having a harmful item thrown at them and attempted stabbing. Confirming the works of Elston *et al.* (2002) and Magin *et al.* (2009), who acknowledged that public servants (e.g., physicians and receptionists) do experience threats involving the use of dangerous weapons such as guns, the current study noted that more severe assaults involving weapons are relatively rare for DCOs assaulters too.

Furthermore, assaults where minor injuries occurred were more common, confirming the conclusions of Elston *et al.* (2002), Cashmore *et al.* (2012), Wilkins (2014), Zhou *et al.* (2018), and Den Heyer (2023a), who argue that assaults occasioning in serious wounds are fairly rare compared to less severe assaults among public servants and police. Nonetheless, agreeing with Craig (2016), who found that fewer workers (e.g., nurses), at some point in their profession, had experienced violence resulting in severe gun injuries, the current study also accounts for a few severe and cutlass injuries among DCOs requiring medical care, hospitalization and taking time off their duty.

While most of the assaulters were male, supporting the work of Den Heyer (2023a), who found that an assault attack on a police constable was likely to involve a young male assailant, there were very few females as well, opposing the work of Hine *et al.* (2018) who found that meetings with female suspects were more extrapolative of police attack compared to male suspects. The current study shows that assaulters were ardent abusers of alcohol or drugs, or both. This is also in agreement with previous research (e.g., Elston *et al.*, 2002; Rao *et al.*, 2007; Brophy et al., 2018; Den Heyer, 2023a), which have found the influence of drugs and/or alcohol on assaults against personnel in the healthcare sector.

In contrast, however, the current study is not in agreement with Dawson *et al.* (2017), who found that substance use was not a significant reason for passengers' assaults on public bus

drivers. Furthermore, the current study shows that assaulters were mostly youths who were less than 40 years old. In the same way, previous research conducted by the Inspector of Custodial Services (2014) reported that most of the attacks against correctional workers were performed by assailants under thirty-five years of age.

Findings show that assaults have impacts on both the staff and the agency. On the staff, it is that of health and physical well-being, endorsing previous studies (Moon et al., 2019; Farrell et al., 2006) which have shown emotional and physical well-being as detrimental impacts of assaults on public servants while on official duties. For the agency, it is productivity and loss of working days, supporting the work of Ferguson et al. (2011), who found that not less than five hundred and eighty work hours were lost due to injuries occasioned by job-related aggressiveness. In line with previous studies (e.g., Balloch *et al.,* 1998; Schneider, 2002; Briggs et al., 2004; Koritsas *et al.,* 2008; Den Heyer, 2023), findings in the current study show that the possibility of assault is increased for personnel of development control agency because it is required for the officers of this agency to always be in contact with people, mainly through inspections and visitations to construction sites.

Contrary to previous findings (e.g., Briggs *et al.,* 2004; Hegney *et al.,* 2006; Elston & Gabe, 2016; Shea *et al.,* 2017; Balloch *et al.,* 1998), which reported that physical assaults are more common among males compared to females, findings of the current study show that DCOs who were females were more likely to be attacked compared to male DCOs. Furthermore, findings show that newer workers are generally more likely to experience assaults confirming the works of Hegney *et al.* (2006), Cashmore et al. (2012b), Soares et al. (2000), and Ibrahim (2023), who found that workers who have been employed for many years are less likely to encounter any form of attack compared to those with fewer years of practice.

In terms of position in the agency, senior or chief DCOs are more likely to experience assaults than those in the cadre of directors. This may be because the senior DCOs are more likely to do routine work, which includes leading on-site visits. These routine works gradually decline as one moves into the upper/director cadre. Findings show that physical assaults may be recurrent for employees with less knowledge of the work, confirming previous studies (e.g., Hegney *et al.,* 2006; Hegney *et al.,* 2010; Briggs *et al.,* 2004; Inspector of Custodial Services, 2014; Sundaresan & Sharma, 2022) which established that assaults are more common to those who are new in the trade. Nonetheless, Winstanley and Hales (2008), and Craig (2016), contradicted this finding, having reported no significant difference in assaults between experienced and less experienced social workers and nurses.

6.0 CONCLUSION

As evidenced in this study, there is prevalence of assaults against DCOs, at least in Nigeria, and some situational dynamics to this include visitation to construction sites, and frequent contact between DCOs and the people (i.e., assaulters), especially when the assaulters are drug abusers. For DCOs, assaults are more common to female than male officers, and may be common for those with less skill in the trade.

Findings suggest that being subjected to assaults can hurt many areas of DCOs' welfare, including psycho-physical well-being and perceived confidence and motivation to do their work. Thus, violence against DCOs should never be normalized. Assaults on DCOs are actually

not work-related hazards but serious criminal acts that should be addressed as such. DCOs' working conditions should not include accepting violence as a part of their duty. There is, therefore, the need to assure DCOs of their safety and security. This study, therefore, suggests that the agency should reinforce its partnership with the police department to beef up security around vulnerable sites while DCOs are on official duties.

The security response could be carried out by a joint-agency task force consisting of state and non-state security forces. Also, there is a need to reduce DCOs' contact with people. Hence, development control agencies in Nigeria need to become fully digital. This kind of system eases the monitoring of land and development, and reduces the risks that emanate from contact with people.

There is also a need to establish good support, welfare networks and better management support for DCOs, such as the provision of a modest hazard allowance and other forms of compensation granted to victims of assaults. Also, site visitation incident reports should be amended to include compulsory capture of assault and violence cases. There is also the need for improved follow-through on assault cases to ensure that assailants and their sponsors face the law. Moreover, there should be an immediate setting-up of continuous and mandatory safeguarding training programs and aggression management workshops for DCOs to handle different emergency circumstances while on the job.

This study has some limitations that could be explored in future analysis. More studies are needed to empirically identify and support interventions that will be most fruitful in abating attacks on DCOs, as well as an investment in robust appraisals to evaluate the circumstances of success of these interventions. Perhaps the best operational interventions may differ by geographical location. It is vital to note that understanding an assault against a DCO is multifaceted and not as straightforward as concentrating exclusively on socio-economic and situational factors that may provoke an assault event on a DCO.

To comprehensively apprehend the reasons for assaults, there is a need to comprehend the function of the Building Control and Physical Planning Agency, the official and unofficial culture of their workers, their attitudinal responses to assaults as a result of discharging their duties, as well as the role of DCOs in this modern society and how DCOs contribute to violence against themselves. Furthermore, the current study focuses on a case study. The findings might be different in other settings. Hence, another novel area to further this study is considering more case studies. This single case study limits a comparative analysis of the issues. The comparison of issues emanating from this study at different geographical scales will provide a better understanding of this subject matter. Another area of future study is the extent and valuation of the individual workers and agency costs of these assaults. This aspect was largely understudied in this current research.

Despite these shortcomings, the findings from the current study provide a unique perspective on building control and town planning officers' experiences of assaults, which can inform national policies and help shape effective support services within the Physical Planning and Building Control Agency.

ACKNOWLEDGMENTS

The authors would like to express their gratitude and appreciation to all who contributed to this study, directly or indirectly.

REFERENCES

Adeyemi, S. A. (2016). Development Control Practice in Southwestern Nigeria, an Unpublished Ph.D. thesis Submitted to the Department of Urban and Regional Planning, Obafemi Awolowo University, Ile-Ife, Nigeria.

Adeyemi, S. A., Onifade, V. A., Jimoh, H. O., & Akindeju, F. (2023). Development Control as a Tool for Urban Sustainability in South-Western Nigeria. *Urban and Regional Planning Review*, *9*(1), 10-24.

Al-Khatib O, Taha H, Al Omari L, Al-Sabbagh MQ, Al-Ani A, Massad F, Berggren V. (2023). Workplace Violence against Health Care Providers in Emergency Departments of Public Hospitals in Jordan: A Cross-Sectional Study. International Journal of Environmental Research and Public Health, 20(4), 3675.

Avogo, F. A. (2015). Assessing the Effectiveness of Physical Development Planning and Control Mechanisms in Ghana: The Experience of Wa Municipality. A Thesis submitted to the Planning Department of Planning College of Art and Built Environment, School of Graduate Studies Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

Badiora A.I and Bako, A.I (2020). "The Illicit and Illegal Sides of the Nigerian Public Administration: Corruption in Town Planning and Land Services," In Aransi, I.O *et al.,* (Eds), *Contemporary issues in Nigerian Public Administration: A festschrift in honor of Prof. (Bar.) I. I. Omoleke (pp. 299-.326),* Department of Public Administration, Obafemi Awolowo University, Ile-Ife, Nigeria.

Badiora, A. I. (2020). Perceptions on corruption and compliance in the administration of town planning laws: The experience from Lagos Metropolitan Area, Nigeria, *Town and Regional Planning*, 76, 1-13.

Badiora, A.I and Bako, A. I, (2023). Predictors of corruption among town planners: A Nigerian case study, *Acta Structilia*, 30(1), 90–121.

Balloch, S., Pahl, J., & McLean, J. (1998). Working in social services: Job satisfaction, stress, and violence. *The British Journal of Social Work*, 28(3), 329-350.

Biere, D. (2017). Assault of police. *Crime & Delinquency* 63(8), 899-925.

Boyd, N. (1995). Violence in the workplace in British Columbia: A preliminary investigation. *Canadian Journal of Criminology* 37(4), 491-519.

Briggs, F., Broadhurst, D., and Hawkins, R. (2004). Violence, threats and intimidation in the lives of professionals whose work involves children. Trends and Issues in Crime and Criminal Justice 273. Canberra: Australian Institute of Criminology.

Brophy, J.T., Keith, M.M., & Hurley, M. (2018). Assaulted and unheard: Violence against healthcare staff. New Solutions: *A Journal of Environmental and Occupational Health Policy*, 27(4), 581-606.

Brown, B. (1994). Assaults on Police Officers: An Examination of the Circumstances in which Such Incidents Occur. Police Research Group, Home Office Police Department.

Cashmore, A., Indig, D., Hampton, S., Hegney, D., and Jalaludin, B. (2012). Workplace violence in a large correctional health service in New South Wales, Australia: A retrospective review of incident management records. BMC health services research, 12, 245.

Chiodelli, F. & Moroni, S. (2015). Corruption in land-use issues: A crucial challenge for planning theory and practice, *Town Planning Research*, 86(4), 437-455.

Chiodelli, F. (2018). The illicit side of urban development: Corruption and organized crime in urban planning, *Urban Studies,* 56(8), 1611-1627.

Craig, A. (2016). Registered Nurses' Attitudes Towards, and Experiences of, Aggression and Violence in the Acute Hospital Setting. Eastern Institute of Technology.

Creswell, J.W. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches*. Fifth edition. Los Angeles, USA: Sage.

Dawson, S., Serafim, P., & Lowe, C. (2017). An Investigation into Abuse and Assault of Route Bus Drivers: Statistics, Triggers, Risk Reduction, Training, and Opportunities. Bus Association Victoria, Inc.

Den Heyer, G. (2023). Assaults on police officers: A comparison between England, Wales and New Zealand from 2015 to 2022. *International Journal of Police Science & Management*, *On-line first*.

Den Heyer, G. (2023a). Factors Influencing Assaults on New Zealand Police Officers. In: Albrecht, J.F., Den Heyer, G. (Eds) Police Use of Force. Springer, Cham.

Dollard, M F; Winefield, A H; Taylor, A W; LaMontagne, A D; Bakker, A; Smith, P C; Dormann, C; Bailey, T S; Hall, G, (2022). Australian Workplace Barometer Survey 2014-15, ADA Dataverse, V1

Ellis, D., Choi, A., & Blaus, C. (1993). Injuries to police officers attending domestic disturbances: An empirical study. *Canadian Journal of Criminology*, 35, 149-168.

Elston, M., & Gabe, J. (2016). Violence in general practice: A gendered risk? *Sociology of Health & Illness*, 38(3), 426-441.

Elston, M., Gabe, J., Denney, D., Lee, R., & O'Beirne, M. (2002). Violence against doctors: A medical(ised) problem? The case of National Health Service general practitioners. *Sociology of Health & Illness*, 24(5), 575- 598.

Elvegård, K & Almvik, R. (2024). Organizational Factors in the Prevention and Management of Violence against Employees, *Human Service Organizations: Management, Leadership & Governance*, 48:2, 196-212

Farrell, G., Bobrowski, C., & Bobrowski, P. (2006). Scoping workplace aggression in nursing: Findings from an Australian study. *Journal of Advanced Nursing*, 55(6), 778-787.

Ferguson, P., Prenzler, T., Sarre, R., & de Caires, B. (2011). Police and security officers experience of occupational violence and injury in Australia. *International Journal of Police Science and Management*, 13(3), 223-233.

Flynn, S.V. (2021). *Research design for the behavioral sciences: An applied approach*. New York, USA: Springer.

Hegney, D., Eley, R., Plank, A., Buikstra, E., & Parker, V. (2006). Workplace violence in Queensland, Australia: The results of a comparative study. *International Journal of Nursing Practice*, 12(4), 220-231.

Hegney, D., Tuckett, A., Parker, D., & Eley, R. (2010). Workplace violence: Differences in perceptions of nursing work between those exposed and those not exposed: A cross-sector analysis. International Journal of Nursing Practice, 16(2), 188-202.

Hine, K., Porter, L., Westera, N., & Alpert, G. (2018). The understated ugly side of police-citizen encounters: Situation, suspect, officer, decision-making, and force predictors of officer injuries. *Policing and Society*, 28(6), 665-683.

Hopkins, M., Fetherston, C., & Morrison, P. (2014). Prevalence and characteristics of aggression and violence experienced by Western Australian nursing students during clinical practice. *Contemporary Nurse*, 49(1), 113- 121.

Ibrahim A. (2023). The factors that affect violence against nurses in emergency departments, *Heliyon,* 9 (3), e14306.

Idowu, A. (2023). Lagos Government kicks as thugs brutalize built agencies' officials. Avail at: https://punchng.com/lagos-govt-kicks-as-thugs-brutalise-built-agencies-officials/ Accessed: 15 December, 2023.

In, J. (2017). Introduction of a pilot study. *Korean Journal of Anesthesiology*, 70(6), 601-605.

Koritsas, S., Coles, J., & Boyle, M. (2008). Workplace violence towards social workers: The Australian experience. *British Journal of Social Work*, 40(1) 257-271.

Lawrence, D., Kyron, M., Rikkers, W., Bartlett, J., Hafekost, K., Goodsell, B., & Cunneen, R. (2018). Answering the Call: National Survey of the Mental Health and Wellbeing of Police and Emergency Services. Perth: University of Western Australia.

Leadbetter, D. (1993). Trends in assaults on social work staff: The experience of one Scottish department. *The British Journal of Social Work*, 23(6), 613-628.

Lincoln, R., & Stockill, S. (2015). An integrated response to risks of violence against bus drivers: When on-board assaults affect safety on our roads. The Australasian College of Road Safety Conference.

Liss, G., & McCaskell, L. (1992). Injuries due to violence: Workers' compensation claims among nurses in Ontario. *AAOHN Journal*, 42, 384-390.

Magin, P., Joyce, T., Adams, J., Goode, S., & Cotter, G. (2009). Receptionists' experiences of occupational violence in general practice: a qualitative study. British Journal of General Practice, 59(565), 578-583.

Maguire, B. (2018). Violence against ambulance personnel: A retrospective cohort study of national data from Safe Work Australia. *Public Health Research & Practice*, 28(1), 1-8.

Mahoney, B. (1991). The extent, nature, and response to victimization of emergency nurses in Pennsylvania. *Journal of Emergency Nursing*, 17, 282-294.

Moon, B., Morash, M., & McCluskey, J. (2019). Student violence directed against teachers: Victimized teachers' reports to school officials and satisfaction with school responses. *Journal of Interpersonal Violence*, 31, 1340- 1361.

Office of the Inspector of Custodial Services (2014). Assaults on Staff in Western Australian Prisons. Government of Western Australia.

Olive, D. 2017. *Linear Regression*. Springer International Publishing.

Rao, H., Luty, J., & Trathen, B. (2007). Characteristics of patients who are violent to staff and towards other people from a community mental health service in South East England. *Journal of Psychiatric and Mental Health Nursing*, 14(8), 753-757.

Schneider, S. (2002). Addressing staff safety at high-risk social assistance offices. *Security Journal*, 15(1), 63-81.

Soares, J., Lawoko, S., & Nolan, P. (2000). The nature, extent and determinants of violence against psychiatric personnel. Work & Stress, 14(2), 105-120.

Sundaresan, J. P., & Sharma, C. B. (2022). A review of work done with the police force and the need for change. *International Journal of Health Science* 6, 4895–4903.

Tavakol, M. & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53-55.

Teddlie, C. & Tashakkori, A. (2003). *Handbook of mixed methods in social and behavioral research*. London: Sage Publications.

Tuttle, J. (2019). *Dangerous politics? An analysis of the relationship between political affiliation and assaults on police officers in American counties*. (Unpublished Master's thesis). Colorado State University, Fort Collins, Colorado.

Vivan, E. L., Kyom, B. C. & Balasom, M. K. (2013). The Nature, Scope and Dimensions of Development Control, Tools and Machineries in Urban Planning in Nigeria. *International Journal of Innovative Environmental Studies Research* 1 (1):48-54.

Wilkins, L. (2014). The Impact of Violence and Abuse on Child Protection Workers. Royal Holloway, University of London.

Winstanley, S., & Hales, L. (2008). Prevalence of aggression towards residential social workers: Do qualifications and experience make a difference? *Child & Youth Care Forum*, 37(2), 103-110.

Zhou, B., Boyer, R., & Guay, S. (2018). Dangers on the road: A longitudinal examination of passengers-initiated violence against bus drivers. *Stress and Health*, 34(2), 253-265.

JOURNAL OF ARCHITECTURE, PLANNING & CONSTRUCTION MANAGEMENT
Volume 15 Issue 1, 2025 E-ISSN: 2462-2222 ISSN: 2231-9514

Avoiding vs. Accepting Risk: Evaluating the Risk Management of a Mosque Construction in Kuala Lumpur

Received: 4th August 2024 | Accepted: 20th June 2025 | Available Online: 30th June 2025

DOI: 10.31436/japcm.v15i1.913

Naida Rosli[1,2], Zaidi Mohamad[3*,4]

[1] Unit Teknikal dan Prasarana, Institut Kefahaman Islam Malaysia
[2] Universiti Tun Hussein Onn Malaysia
naida@ikim.gov.my
[3] Jabatan Kerja Raya*
[4] Universiti Putra Malaysia
zaidimd@jkr.gov.my

**Corresponding author:*
Zaidi Mohamad
Corresponding author's email:
zaidimd@jkr.gov.my

ABSTRACT

Risk management is a critical component in ensuring the successful delivery of construction projects, especially in the public sector, where resources, regulations, and stakeholder interests must be carefully balanced. This study examines the practical application of the *Garis Panduan Pengurusan Risiko Bagi Projek Kerajaan* (Guidelines on Risk Management for Government Projects) through a case study of a mosque construction project in Kuala Lumpur, focusing on two fundamental risk response strategies: avoidance and acceptance of risk. This study examines how risk can be identified, classified, and treated effectively during the construction phase. Data was collected through stakeholder workshops and document analysis, leading to the identification of project-specific risks, including design changes, late approvals, and religious considerations such as *qibla* direction alignment. The findings demonstrate that by applying the JKR guideline, certain risks can be proactively avoided through early planning, while lower-impact risks can be strategically accepted with monitoring. The study also highlights how unique characteristics of public religious buildings require tailored risk mitigation approaches. Ultimately, this research affirms the relevance and adaptability of the JKR (2017) guideline in guiding systematic risk management in government-funded construction projects and provides practical insights into future implementation.

Keywords: Mosque Construction, *Garis Panduan Pengurusan Risiko bagi Projek Kerajaan*, Accepting Risk, Avoiding Risk

1.0 INTRODUCTION

This study is grounded by a structured exploration of risk management techniques in construction projects, focusing specifically on differentiating between risk acceptance and risk avoidance. Utilising a mosque project as the case study, this study seeks to provide actionable insights into risk management strategies for similar public infrastructure initiatives. This case study illustrates the applicability of *Garis Panduan Pengurusan Risiko bagi Projek Kerajaan* (Guidelines on Risk Management for Government Projects) (JKR, 2017) to practical situations, emphasising its significance and efficiency for government construction projects where risk management and resource distribution are vital. This study has chosen to examine the construction of a mosque in Kuala Lumpur and apply these guidelines when assessing project risks. The project began in February 2017 and ended in February 2019. The purpose of this study is to provide a detailed analysis of the challenges and risks encountered during the construction of a mosque in Kuala Lumpur, as well as to assess the effectiveness of risk management measures. The analysis will also investigate whether this risk can be eliminated with rigorous project planning. The primary ideas in this

study are organised as follows: (a) Project Background – Introduction, (b) Risk Identification, (c) Risk Analysis, (d) Risk Assessment, (e) Discussion, and (f) Conclusion. Understanding this distinction is essential because it emphasises the challenges of managing large-scale projects and the significance of proper risk management. By analysing the risks encountered during the construction of the mosque in Kuala Lumpur, this study aims to provide important insights into the implementation of the *Garis Panduan Pengurusan Risiko bagi Projek Kerajaan*, offering a comprehensive understanding of how to evaluate and manage risks in construction projects.

2.0 LITERATURE REVIEW

2.1 Case Study Approach for The Mosque Construction Project Background

A case study is a qualitative research approach that allows for an in-depth investigation of a specific real-world phenomenon within its natural context (Yin, 2018). According to Stake (1995), case studies help researchers explore complex processes, interactions, and decision-making dynamics in a way that generalisable methods may not fully capture.

In this study, a mosque construction project is used to examine risk management in public sector construction projects, with a focus on two main risk management strategies: "avoiding risk" and "accepting risk". This case study approach enables an in-depth analysis of how risks are identified, assessed, and managed within a specific context. Using the *Garis Panduan Pengurusan Risiko bagi Projek Kerajaan* (JKR, 2017), this study demonstrates how risk mitigation measures, such as avoiding risks through preventive measures and accepting unavoidable risks, are applied in real projects. The mosque construction project also showcases risk management tailored to the specific needs of the project, providing practical contributions to risk management in future public sector construction projects.

2.2 The Mosque Construction Project Background

This study examines the complexities of risk management in a real-world context, specifically in public-sector construction projects, using a case study methodology. The mosque construction project provides a real-world example of how to use the *Garis Panduan Pengurusan Risiko bagi Projek Kerajaan* to recognise, evaluate, and reduce risks. This approach enables a thorough examination of the procedures and results within a particular setting, offering practical advice for similar initiatives (Choudhry & Iqbal, 2012).

The mosque construction project is located in Kuala Lumpur, near major transportation hubs. It was constructed to replace a smaller *surau*, which had become too small to accommodate the growing number of worshippers, particularly on Fridays and during Islamic festivals. The mosque is strategically located next to a high-density residential area, which includes an affordable housing project. It serves as a vital religious and community hub, catering to the growing population in the surrounding areas.

2.3 Risk Management

Large infrastructure projects hold national significance and are intricate. As a result, effective management of the risks associated with these projects is critical (Liu *et al.,* 2022). Risk means the impact of uncertainty on the objective (JKR, 2017). Risks can be human-caused or natural, and their consequences can be quite severe; therefore, it is necessary to have measures in place to overcome these risks (El Khatib *et al.,* 2022). Project risk management encompasses the risk management planning process, risk identification, analysis, and risk treatment actions, including risk review during the project (Project Management Institute, 2013). When

implementing a project, project personnel must be prepared to handle any risk that may arise. Therefore, to ensure that there are no issues throughout the project's implementation, a decision must be made regarding whether to accept, reject, treat, or share the risk with other parties. Due to the scope limitation, this study focuses specifically on accepting risk and avoiding risk during the construction phase and assesses the ability to eliminate such risks through careful planning.

2.4 Accepting risk

Accepting risk involves making a conscious decision to accept the possibility that an event may occur. Some risks are so significant that it is not feasible to consider transferring or reducing the event (for example, an earthquake) (Gray & Larson, 2021). The project owner is willing to take the risk because the likelihood of this occurring is incredibly minimal.

2.5 Avoiding risk

Avoiding risk involves adjusting the project schedule to eliminate the situation or risk (Grey & Larson, 2021). In all risk mitigation techniques, risk avoidance is typically costly; however, it has the advantage of significantly reducing the cost of recovery and downtime (Snedaker & Rima, 2014).

Table 1: The Key Differences Between Accepting Risk and Avoiding Risk. (Snedaker & Rima, 2014)

Aspect	Risk Acceptance	Risk Avoidance
Definition	Acknowledging a risk without taking immediate action to mitigate it.	Taking proactive steps to eliminate the risk entirely.
Approach	"Do nothing" strategy; accepts the possibility of the risk occurring and manages its impact when it happens.	Preventive strategy: addresses the root cause to ensure the risk cannot occur.
Cost	Least expensive in the short term but can be very costly in the long term if the risk materialises.	Most expensive upfront but reduces long-term costs of recovery or downtime.
Rationale for Use	Used when the cost of mitigation outweighs the potential impact of the risk.	Used when the risk has a high likelihood and/or impact, justifying the cost of elimination.
Business Impact	Low cost initially, but financial and operational impacts can be high if the risk materialises.	Higher upfront investment reduces the likelihood and cost of disruptions if the risk occurs.
Long-Term Implications	Reactive - may lead to significant expenditures if the risk occurs unexpectedly.	Proactive - minimises recovery costs and business downtime in the long term.
Feasibility	Often the default approach, especially for minor risks or resource-constrained organisations.	May not be feasible for all risks or businesses due to high initial costs or logistical challenges.
Decision Factors	Balances cost vs. benefit; suitable when the risk is low probability and low impact.	Balances cost vs. reward; suitable for high-impact or high-probability risks.
Risk Management Role	A legitimate option but requires understanding and acceptance of the potential consequences.	A comprehensive solution that provides certainty against the identified risk.

2.6 Distinction Between Avoiding Risk and Accepting Risk

The successful completion of construction projects depends on effective risk management, which requires a sophisticated understanding of tactics to mitigate potential disruptions. Acceptance risks and avoidance risks are two primary strategies in this area, and each serves distinct functions

in the decision-making process. To provide valuable insights for construction management, this study aims to define these risks and illustrate how they are identified in construction projects. Table 1 presents a comparison summarising the key differences between accepting risk and avoiding risk based on Snedaker and Rima's (2014) study.
The decision to accept or avoid risks is influenced by various factors, such as the project's environment, potential risk consequences, and available resources. Avoidance is crucial for significant threats that could jeopardise project goals, but acceptance might be appropriate for lesser risks if the costs of mitigation are not justified.

2.7 Guidelines for Risk Management Project

In project settings, different sources, such as technical issues, limited resources, rules, and environmental conditions, can lead to risks. Standard guidelines and frameworks are employed to navigate these complexities and manage risks effectively in a structured manner. This section explores three prominent frameworks for risk management in projects as below:

2.7.1 The Project Management Body of Knowledge (PMBOK)

The Project Management Body of Knowledge (PMBOK) is a comprehensive collection of guidelines, best practices, and standardised procedures that provide a foundation for project management across various fields and sectors. The PMBOK is a standard project management approach that is widely utilised in the United States and has acquired an international reputation (Jamali & Oveisi, 2016). Fundamentally, PMBOK is a compilation of project management procedures and subject areas that are widely regarded as best practices in the field of project management (Jamali & Oveisi, 2016). Since its initial publication by the Project Management Institute in 1983, the PMBOK has undergone multiple updates and adjustments to meet the changing demands of the project management industry. The seventh version of the PMBOK, released in 2021, represented a substantial change from its predecessors and was developed in response to the rapid changes in the professional world, including innovative approaches, rapid technological advancements, and shifting market dynamics (Zambrano *et al.,* 2024). Figure 1 shows the PMBOK7® structure adapted from PMI 2021. There are two primary sections in the PMBOK7.

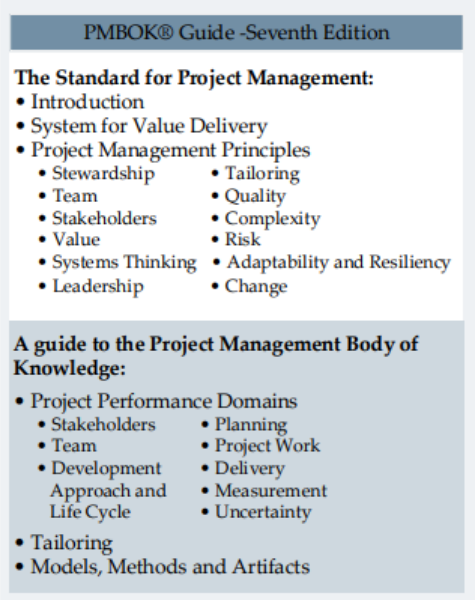


Fig. 1: PMBOK7® structure (Adapted from: PMI 2021; Zambrano *et al.,* 2024)

First Section: The project management standard describes the guidelines that stakeholders and project experts should follow. Project concepts, portfolios, programs, products, and business operations are among the organisational and strategic project elements that comprise the value delivery system (PMI, 2021).

Second Section: The PM Body of Knowledge Handbook outlines key project management tasks that are compatible with various positions. These functions are divided into eight project performance domains, which are customised based on project requirements (PMI, 2021). Every domain outlines a set of anticipated results.

2.7.2 ISO 31000

The international ISO 31000 standard provides guidelines and concepts for risk management (International Organisation for Standardisation, 2018). In 2009, the first edition of ISO 31000 was released. It was later revised and republished in 2018. The understanding that risk, which is defined as the impact of uncertainty on goals, is an essential component of any company operation and needs to be proactively managed lies at the core of this standard (Wirahadi & Pasaribu, 2022). The capacity of ISO 31000 to integrate risk management practices throughout an organisation, allowing for a comprehensive and coordinated approach, is one of its main advantages (Muzaimi et al*.,* 2017). The ISO 31000 standard outlines a systematic approach to risk management that begins with setting the context, identifying risks, assessing and analysing them, and then employing various tactics to address the risks (Stichler, 2013). The methodical application of rules, procedures, and practices to tasks such as consultation and communication, setting the context, and evaluating, treating, monitoring, reviewing, documenting, and reporting risk are all part of the risk management process. Figure 2 illustrates this procedure:

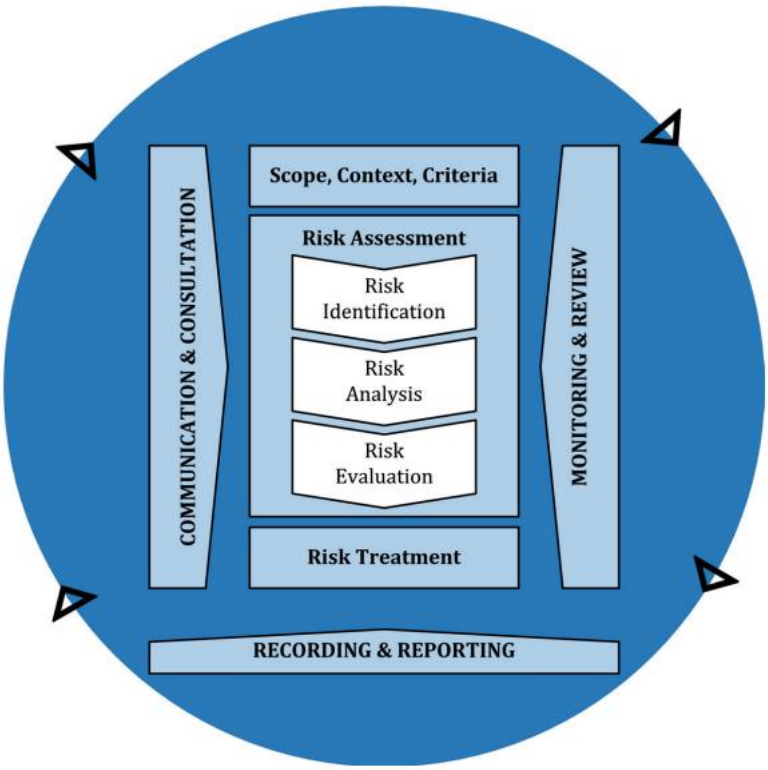


Fig. 2: The process of risk management (ISO, 2018)

2.7.3 *Garis Panduan Pengurusan Risiko Projek Bagi Projek Kerajaaan*

This guideline*, Garis Panduan Pengurusan Risiko Projek Bagi Projek Kerajaan*, produced by Jabatan Kerja Raya, is published as a guide or reference for all government officials in implementing project risk management. Risk management in government projects aims to ensure that the level of risk, uncertainty, and existing opportunities are effectively managed so that the project is completed successfully within the stipulated time, cost, and quality. This guideline was developed to provide a systematic and proactive approach to analysing and assessing project risks that are known with certainty earlier in the project life cycle. This comprehensive risk management guideline was developed by the Unit Penyelarasan Pelaksanaan (ICU) of the Jabatan Perdana Menteri (JPM) in collaboration with the Jabatan Kerja Raya (JKR).

Based on Figure 1, the Ministry (the project sponsor) oversees setting up the project site, determining the primary project scope, and providing a sufficient budget at the outset of the project (Activity 0) before transferring it to the implementing agency. Strategic risks at the program or portfolio level should be identified by the Ministry (or sponsor). During the project handover, both parties agree on the project's location, scope, and project brief during the planning phase (Activity 1). Here, the Project Manager identifies risks in all project phases, logs them in the Risk Register, and creates the Project Risk Management Plan (PRMP) to initiate project risk management operations. From Activity 1 to Activity 5, the Project Manager oversees and manages the implementation of all documented risk treatments until the project is completed. Regular reports on the state of risk management are made, and the Risk Register is updated and evaluated on a regular basis. A final risk report is created to wrap up the project's risk management tasks once it is finished and turned over to the Ministry (or sponsor). This report includes recording lessons learned for potential future improvements.

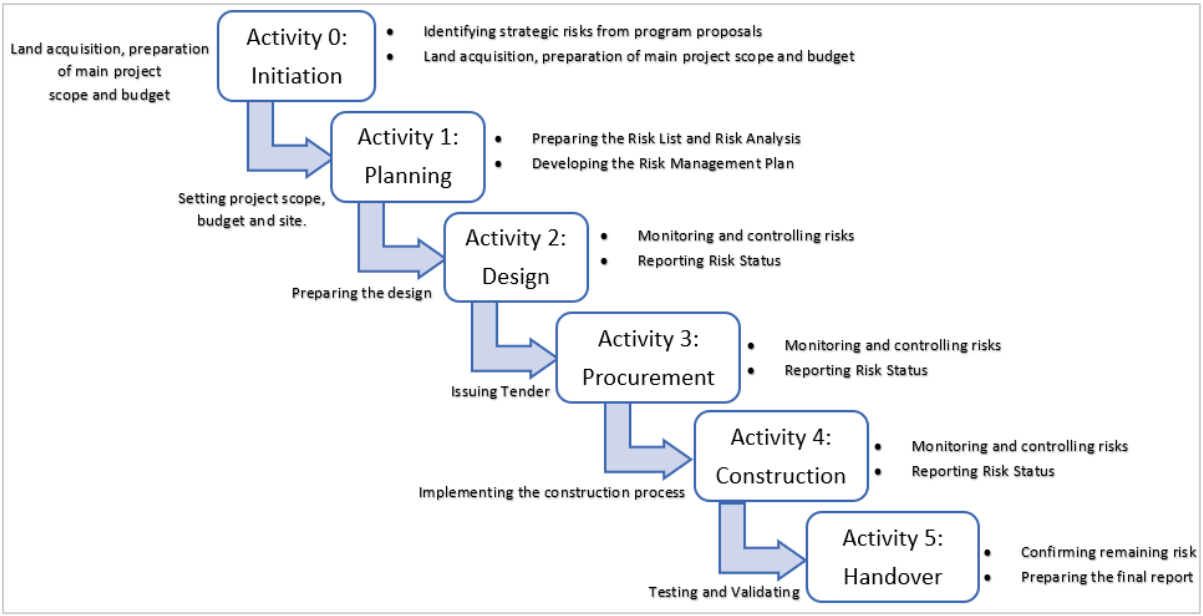


Fig. 3: Risk Management Stages in Project Life Cycles
(Source: Jabatan Kerja Raya, 2017)

2.7.4 Conclusion and Justification

This study concluded that *Garis Panduan Pengurusan Risiko Projek Bagi Projek Kerajaan* is the most effective method for risk management in this construction project, based on the analysis of the three risk management frameworks. The rationale behind this selection is presented in Table 2:

Table 2: The Rationale Behind the Selection of *Garis Panduan Pengurusan Projek Bagi Projek Kerajaan*

Aspect	Details
Guideline Selection	The *Garis Panduan Pengurusan Risiko Projek Bagi Projek Kerajaan* was chosen as the most suitable for government projects in Malaysia.
Guideline Prioritisation	Specifically designed to address unique challenges in Malaysia's public sector.
	Aligned with local laws and policies.
	Provides practical steps for compliance and transparency.
Development by Local Authorities	Developed by JKR and ICU JPM, two key technical bodies in Malaysia.
	Leverages expertise in infrastructure development, construction, and governance.
Strengths of the *Garis Panduan*	A practical framework tailored to local needs.
	Focus on project-specific risks, including environmental and infrastructural factors.
	Enhances accountability through clear risk monitoring and reporting structures.
	The prescriptive approach ensures usability even by less experienced teams.
Benefits of Using the Guideline	Aligns national priorities with best practices.
	Reduces risks of project delays, cost overruns, and non-compliance.
	Contributes to the successful implementation of government initiatives in Malaysia.
Conclusion	The *Garis Panduan Pengurusan Risiko Projek Bagi Projek Kerajaan* is the most relevant and effective framework for Malaysia's public sector.
	Endorsed by JKR and ICU JPM as a strategic tool for ensuring project success.

3.0 METHODOLOGY

This study adopts a case study approach, utilising *Garis Panduan Pengurusan Risiko Projek Bagi Projek Kerajaan* (JKR, 2017) for the mosque construction project to identify risks during the construction phase.

3.1 Data Collection

3.1.1 Brainstorming Workshop with Stakeholder

Data Collection: A risk management workshop for a mosque construction project in Kuala Lumpur was conducted by a government agency among the project owner, consultant and contractors to deliberate on the risk factors and risk management plan to be implemented during the mosque construction stage. Brainstorming activities are employed to generate risk assessments based on project context, problem, and specific issue. This brainstorming session is conducted interactively, allowing all stakeholders to contribute based on their perspectives on the project.
During this workshop, stakeholders identified a range of potential risks specific to the mosque construction project. The unique characteristics of the project, which significantly influenced the identification of these risks, include:

Schedule Risks: Delays in consultant approvals for RFI (Request for Inspection) and materials leading to work schedule changes.

Financial Risks: Increasing construction material prices and payment delays by the client.

Human Resource Risks: Shortage of skilled foreign workers, changes in the workforce by consultants, and challenges in employee replacement.

Technical Risks: Design changes, delays in approvals from local authorities and inaccuracies in *qibla* direction.

Environmental Risks: Limited access to the construction site and pollution (noise and dust) affecting nearby residents.
Several project-specific factors influenced the identification of these risks, including:

Urban Location: The project's setting in a densely populated area of Kuala Lumpur posed site logistics challenges, including traffic congestion, limited access, and community coordination.

Multiple Subcontractors: Coordination among various subcontractors working on different aspects of the construction posed risks related to workflow integration and quality consistency.

Regulatory and Environmental Constraints: Compliance with strict regulatory requirements and environmental protection standards introduced risks of project delays and approval complications. Each identified risk was documented in detail, taking into account the likelihood of occurrence and its potential impact on project objectives. This structured approach ensured that the risk management plan would effectively address the specific challenges of the mosque construction project.

3.2 Data Analysis

3.2.1 Presentation of Risk for Discussion

Risks identified during the workshop were presented for further discussion among stakeholders. The purpose of this discussion is to gain a deeper understanding of each risk, estimate its impact and likelihood, and develop appropriate mitigating measures.

3.2.2 Risk Categorisation

Data gathered from analysis and discussion is used to categorise risks into the relevant categories. This procedure utilises the framework described in JKR (2017), which includes risk analysis to determine the likelihood and impact of a given event.

3.2.3 Risk Assessment

The risk level for each identified risk was determined using a risk matrix, as outlined in the JKR (2017) guidelines (Table 3). This matrix combines the likelihood of a risk occurring with the potential impact of that risk on project objectives (cost, time, and quality).

- **Likelihood**: Measured based on the probability of risk occurring. The likelihood of each risk was assessed based on the probability of its occurrence, using the likelihood scale provided in Table 2.
- **Impact**: The potential impact of each risk was evaluated in terms of its effect on project cost, time, and quality using the impact rating scale in Table 2.
- **Risk Level**: By combining the likelihood and impact ratings, the risk level for each risk was determined using the risk matrix. The risk matrix categorises risks into four levels: Extreme (E), High (H), Medium (M), and Low (L).

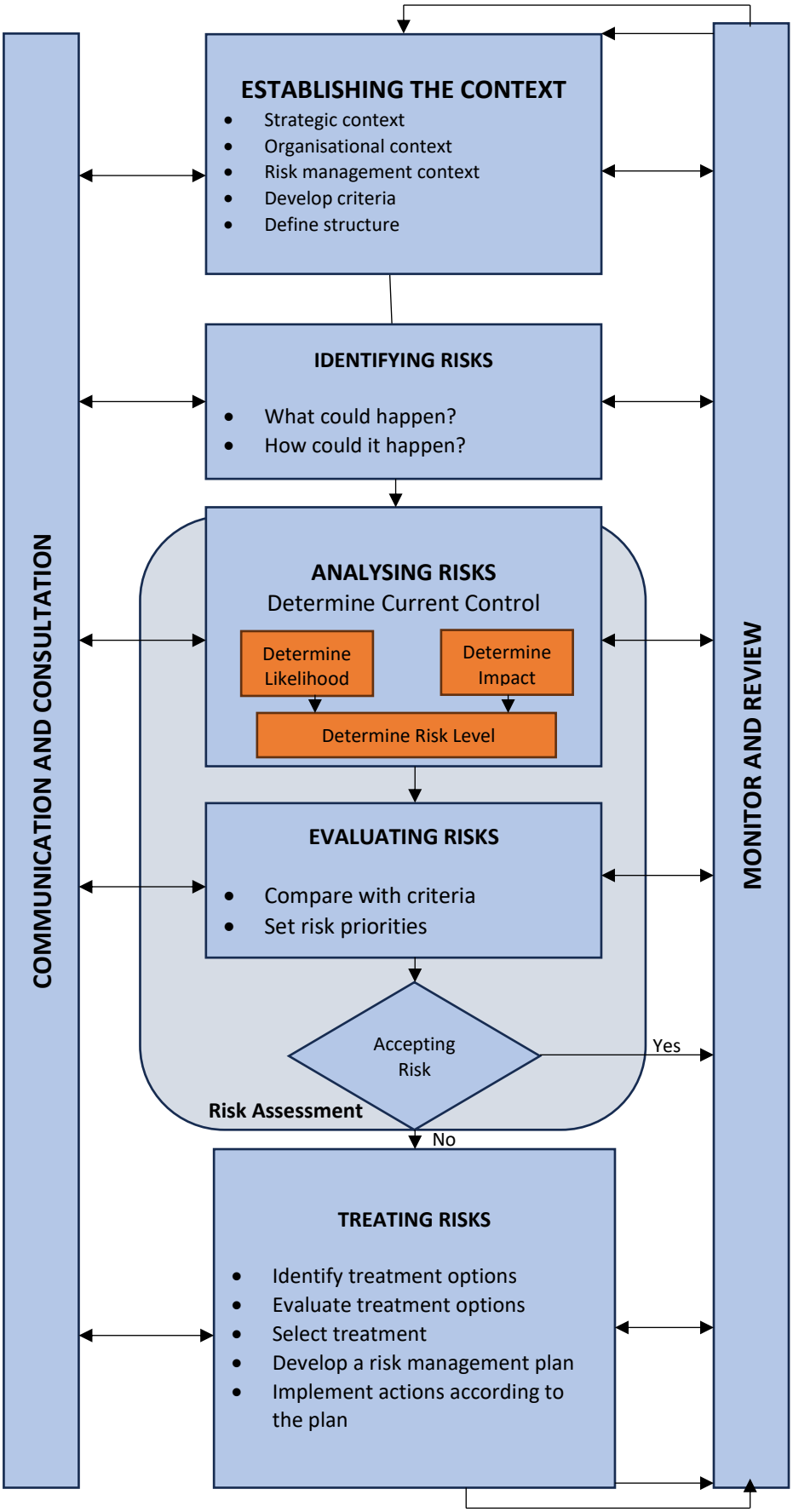


Fig. 4: Process of Risk Management
(Source: Jabatan Kerja Raya, 2017)

3.2.4 Proposed Risk Action Plan

For each risk, a mitigation action plan was developed, such as proactive measures. The results of this risk analysis were used to produce a risk management plan that aligns with the JKR (2017) guidelines. Following the determination of the risk level, risks were classified based on the JKR (2017) guidelines, which outline the appropriate risk response for each level.

- **Accepting Risk**: Risks with a Low or Medium risk level were classified as "Accepting Risk." According to JKR (2017), these risks are accepted without immediate treatment but are monitored and reviewed.
- **Avoiding Risk**: Risks that could be eliminated or significantly reduced through proactive measures were classified as "Avoiding Risk." This classification aligns with the JKR (2017) guideline to avoid risks whenever possible by taking actions to prevent them from occurring.
- **Significant Risk**: Risks with a High or Extreme risk level were classified as "Significant Risk." These risks require prioritised attention and treatment actions, as outlined in the JKR (2017) guidelines.

3.2.5 Monitoring and Continuous Improvement

Data analysis also included recommendations for ongoing risk monitoring throughout the project. This ensured that risks were managed proactively and that the selected strategies could be adjusted if necessary.

3.3 Reference to JKR (2017)

During the development of the risk management plan, the *Garis Panduan Pengurusan Risiko Projek Bagi Projek Kerajaan* was used as the primary reference to ensure that the risk assessment and action planning processes aligned with the established standards. Figure 4 shows the process of risk management by JKR (2017).

4.0 RESULTS

This study adopts a case study approach, utilising the *Garis Panduan Pengurusan Risiko Projek Bagi Projek Kerajaan* (Jabatan Kerja Raya, 2017) framework for the mosque construction project in Kuala Lumpur. This approach involves risk identification, risk analysis and risk assessment.

4.1 Risk Identification

Risk identification is the first step in the assessment process. The basic process involves reviewing the entire mosque construction to identify critical events that could prevent the project from achieving its objectives. All identified risks are documented in the risk register. Risks are identified by the team, including the client and the contractor, which enables the early detection of major issues and critical events that require attention to prevent adverse impacts or effects.

4.1.1 Technique and Tools

The tools and techniques used in the identification and treatment strategies for this project are brainstorming with stakeholders. A risk management workshop for the project was conducted by a government agency among the project owner, consultant and contractors to deliberate on the risk factors and risk management plan to be implemented during the

mosque construction stage. Table 3 listed risk categories to identify risk in this construction project by using guidelines from JKR (2017).

Table 3: Risk category to identify risk in a construction project (Jabatan Kerja Raya, 2017)

No.	Risk Category	No.	Risk Category
1.	Politics	10.	Technical
2.	Scope	11.	Environment
3.	Schedule	12.	Supply
4.	Financial	13.	Agency Relation
5.	Human Resource	14.	Organisation
6.	Quality	15.	Occupational Safety and Health
7.	Communication	16.	Social and Culture
8.	Other Source	17.	Integrity
9.	Law & Contract	18.	Natural Disaster

As a result of brainstorming sessions among project stakeholders and guided by the risk categories (JKR, 2017), risks were systematically listed based on the work breakdown structure (WBS). Figure 5 shows the risks identified for this project.

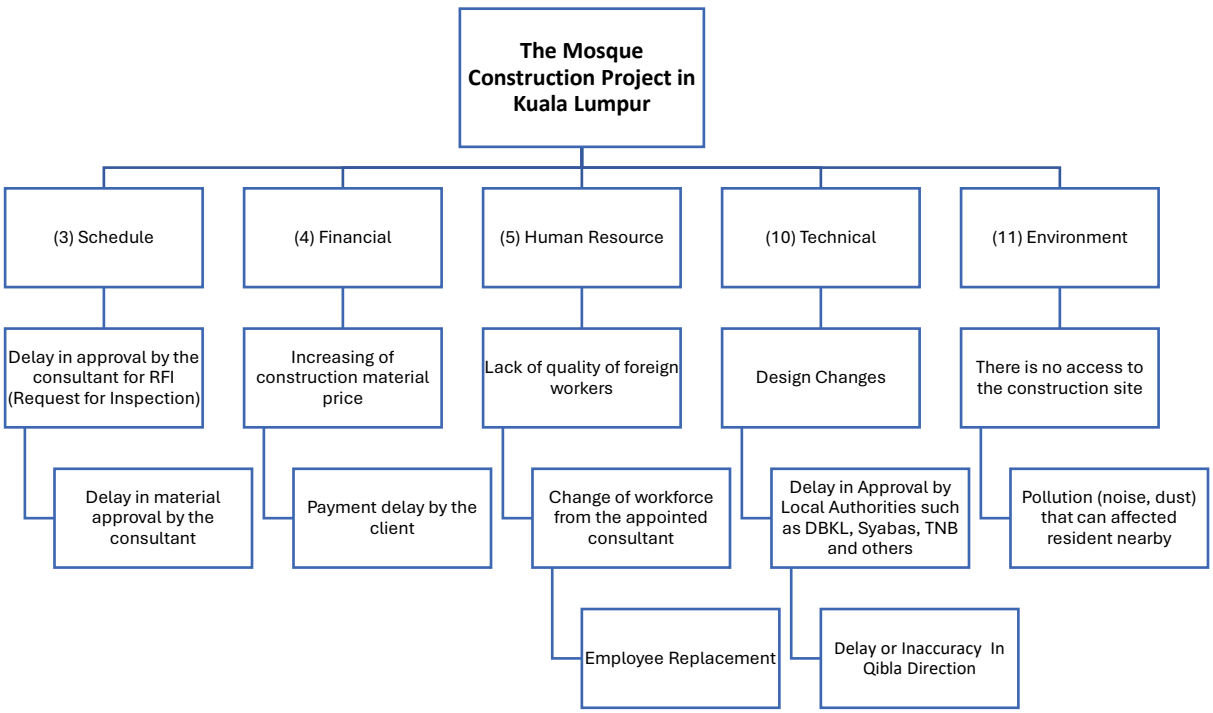


Fig. 5: All risks that were identified for the project

4.2 Risk Analysis

The project risk is analysed to determine the following:

i. The probability of the risk occurring.
ii. The rate of impact by risk on cost, schedule, quality, and other factors affecting the project's objectives, including its products.
iii. The most suitable risk owner.
iv. Potential risk impact on third parties such as projects and organisations.

The determination of the classification of two parameters (likelihood and impact) will determine the risk level for each event evaluated in **Table 4** and **Table 5**:

Table 4: The classification of two parameters to determine the risk level for each event.

Likelihood	Impact Rating
5. VERY HIGH: Almost certain to occur, expected regularly	**V. SEVERE:** Critical impact, severe disruption or cost implications, project viability at risk.
4. HIGH: Likely to occur, occurs frequently**.**	**IV. HIGH:** Significant impact, considerable disruption, or cost implications.
3. MEDIUM: Moderate chance of occurrence, not uncommon.	**III. MEDIUM:** Moderate impact, noticeable disruption, or cost implications.
2. LOW: Unlikely, but possible under rare circumstances.	**II. LOW:** Minor impact, minimal disruption, or cost implications.
1. VERY LOW: Highly improbable, almost negligible chance of occurrence	**I. NEGLIGIBLE:** Insignificant impact, negligible consequences.

The possibility/impact matrix, also known as Matrix Risk, as shown in Table 3 below, is a tool used to determine the frequency of an incident and the consequences that will be accepted. This matrix will be used to determine the risk level, namely Extreme (E), High (H), Medium (M) and Low (L).

Table 5: Matrix Risk (Jabatan Kerja Raya, 2017)

Matrix Risk							Risk Level	
LIKELIHOOD	5	H	H	H	E	E	E	**Extreme Risk:** Urgent action is needed
	4	M	M	H	E	E	H	**High risk:** could impact the project if it is not handled
	3	L	M	M	H	E	M	**Medium Risk:** If not handled, it will have an impact on time, cost, and quality.
	2	L	L	M	H	H	R	**Low risk:** acceptable; monitor only.
	1	L	L	M	M	H		
		I	II	III	IV	V		
	IMPACT RATING							

Therefore, all risks that were listed for this project during the building construction phase (**Figure 2**) were analyzed to determine the risk level for each risk. **Table 6** presents the risk analysis for each risk identified associated with this project. There are seven medium risks, three high risks and two extreme risks.

Table 6: The risk analysis for each risk identified

Ref. No (WBS)	Risk Event	Risk Category	Initial Risk Level		
			Likelihood	Impact Rating	Risk Level
1.1	Delay in approval by the consultant for RFI (Request for Inspection)	3	3	III	**M**
1.2	Delay in material approval by the consultant	3	3	III	**M**
1.3	Increasing construction material price	4	4	IV	**E**
1.4	Payment delay by the client	4	3	IV	**H**
1.5	Lack quality of foreign worker	5	3	III	**M**
1.6	Change of workforce from the appointed consultant	5	3	III	**M**
1.7	Employee Replacement	5	3	III	**M**
1.8	Design Changes	10	3	IV	**H**
1.9	Delay in Approval by Local Authorities	10	3	IV	**H**
1.10	Delay or Inaccuracy in *Qibla* Direction	2	3	V	**E**
1.11	There is no access to the construction site	11	2	III	**M**
1.12	Pollution (noise, dust) that can affect residents nearby	11	4	II	**M**

4.3 Risk Assessment

A review of project risks is being conducted to determine the necessary course of action. The first action is to organize the risks that have been analyzed by classifying the risk as one of:

a. Accepting risk: a risk that is currently accepted and does not require treatment but retained for review. The informed decision to accept the impact and the likelihood of a particular risk. (JKR, 2017); or

b. Avoiding risk: a risk that is considered non-existent after analysis and an informed decision not to become involved in a risky situation. (JKR, 2017); or

Based on **Table 6**, the risks that have been identified and analyzed will be evaluated to determine their classification, as shown in **Table 7**. Based on the risk assessment conducted, there are seven “accepting risks” and five “avoiding risks”.

Table 7: Risk assessment for the project

Ref. No (WBS)	Risk Event	Risk Category	Initial Risk Level			Treatment Action Plan	Risk Classification
			Likelihood	Impact Rating	Risk Level		
1.1	Delay in approval by the consultant for RFI (Request for Inspection)	3	3	III	**M**	-	Accepting Risk
1.2	Delay in material approval by the consultant	3	3	III	**M**	-	Accepting Risk
1.3	Increasing construction material price	4	4	IV	**E**	Monitor fluctuations in pricing, purchase materials before prices increase, engage in early bulk purchasing, consider price-locking contracts, and conduct regular market analyses.	Avoiding Risk
1.4	Payment delay by the client	4	3	IV	**H**	The contractor must ensure that the work progress claim is according to the schedule and follow the government circular.	Avoiding Risk
1.5	Lack of quality of foreign worker	5	3	III	**M**	-	Accepting Risk
1.6	Change of workforce from the appointed consultant	5	3	III	**M**	-	Accepting Risk
1.7	Employee Replacement	5	3	III	**M**	-	Accepting Risk
1.8	Design Changes	10	3	IV	**H**	Check all the drawings to ensure that all drawings are complete with no changes	Avoiding Risk
1.9	Delay in Approval by Local Authorities	10	3	IV	**H**	Early consultation with the local authority before work execution	Avoiding Risk
1.10	Delay or Inaccuracy in *Qibla* Direction	2	3	V	**E**	Submit the design to Pejabat Mufti and ensure they mark the *qibla* direction before starting the foundation work.	Avoiding Risk
1.11	There is no access to the construction site	11	2	III	**M**	-	Accepting Risk
1.12	Pollution (noise, dust) that can affect resident	11	4	II	**M**	-	Accepting Risk

5.0 DISCUSSIONS

In this section, this study will discuss related to the results of the study that will answer the objective of this case study, which are:

- To examine the distinction between avoiding and accepting risk in the context of a government construction project by applying the *Garis Panduan Pengurusan Risiko Bagi Projek Kerajaan* as a structured risk management framework.
- To assess whether identified risks can be effectively eliminated or mitigated through proactive planning and treatment strategies, as outlined in the *Garis Panduan Pengurusan Risiko Bagi Projek Kerajaan*.

5.1 Differentiate Between Avoiding Risk and Accepting Risk

To identify the type of risk associated with this project, a risk assessment process was conducted in Section 2.3. Several types of risk have been identified with the *Garis Panduan Pengurusan Risiko Projek Bagi Projek Kerajaan (*JKR*, 2017)*. **Table 8** shows the accepting risk that was identified for this case study:

Table 8: Accepting risk for the project

Ref. No (WBS)	Risk Event	Risk Category	Initial Risk Level			Treatment Action Plan	Risk Classification
			Likelihood	Impact Rating	Risk Level		
1.1	Delay in approval by the consultant for RFI (Request for Inspection)	3	3	III	**M**	-	Accepting Risk
1.2	Delay in material approval by the consultant	3	3	III	**M**	-	Accepting Risk
1.5	Lack of quality of foreign worker	5	3	III	**M**	-	Accepting Risk
1.6	Change of workforce from the appointed consultant	5	3	III	**M**	-	Accepting Risk
1.7	Employee Replacement	5	3	III	**M**	-	Accepting Risk
1.11	There is no access to the construction site	11	2	III	**M**	-	Accepting Risk
1.12	Pollution (noise, dust) that can affect residents nearby	11	4	II	**M**	-	Accepting Risk

These risks are categorised as accepting risk because, according to JKR (2017) guidelines, they fall within the medium risk level. In the risk management framework, risks are categorised as medium (M) and low (L) rated for monitoring purposes. Accepting risk implies that these risks are currently acknowledged and deemed acceptable without requiring immediate treatment. However, they are retained for ongoing review and assessment throughout the project lifecycle. This approach acknowledges that certain risks, while present, may not warrant immediate mitigation actions but still necessitate regular monitoring to ensure they do not

escalate into significant issues. By categorising these risks as accepting, project managers can allocate resources effectively, focusing treatment efforts on higher-priority risks while maintaining awareness of medium-risk factors to address them if their impact or likelihood changes over time. This proactive monitoring strategy aligns with best practices in risk management, allowing for a balanced approach to risk mitigation and resource allocation.

Table 9: Avoiding risk for the project

Ref. No (WBS)	Risk Event	Risk Category	Initial Risk Level			Treatment Action Plan	Risk Classification
			Likelihood	Impact Rating	Risk Level		
1.3	Increasing construction material price	4	4	IV	**E**	Monitor the fluctuations in pricing, purchase materials before the price increases, engage in early bulk purchasing, consider price-locking contracts, and conduct regular market analysis.	Avoiding Risk
1.4	Payment delay by the client	4	3	IV	**H**	The contractor must ensure that the work progress claim is according to the schedule and follow the government circular.	Avoiding Risk
1.8	Design Changes	10	3	IV	**H**	Review all the drawings to ensure that they are complete and have no changes.	Avoiding Risk
1.9	Delay in Approval by Local Authorities	10	3	IV	**H**	Early consultation with the local authority before work execution	Avoiding Risk
1.10	Delay or Inaccuracy in *Qibla* Direction	2	3	V	**E**	Submit the design to Pejabat Mufti and ensure they mark the *qibla* direction before starting the foundation work.	Avoiding Risk

Table 9 shows the identified risks categorised as "Avoiding Risks" based on the risk assessment process conducted for the mosque construction project. In this project, several risks have been proactively addressed to minimise their potential impact, aligning with Fennelly and Perry's (2017) description of avoiding risk as reducing risk exposure by eliminating or minimising the activities that lead to it. Although certain risks cannot be eliminated, these proactive measures aim to reduce the probability of these risks occurring or lessen their effects on the project.

The project team employed various strategies to avoid or mitigate the impacts of each risk, including early consultations with authorities, price-lock contracts, and rigorous adherence to procedural requirements. Below is an analysis of each risk event classified under "Avoiding Risk" and the rationale behind this classification, reflecting the preventive measures applied to minimise disruptions and enhance project continuity.

5.1.1 Risk 1.3: Increasing Construction Material Price

This risk is a common occurrence in construction projects and cannot be fully mitigated due to external market factors. Nevertheless, this risk can be mitigated by adopting industry-standard practices, such as purchasing construction materials in bulk at the start of the project or utilising price-locking contracts before material prices rise, especially for essential materials that have a history of price volatility. Therefore, the cost of building materials can be preserved until the project is completed.

5.1.2 Risk 1.4: Payment Delay by The Client

Payment delays can hinder cash flow and postpone project schedules. To prevent this, the contractor guarantees that claims for work progress are made in line with the project timeline and comply fully with government regulations and circulars. The risk cannot be eliminated because of potential external factors. However, active adherence to procedural requirements helps reduce the likelihood of payment delays.

5.1.3 Risk 1.8: Design Changes

To manage this risk effectively, the project team employed a proactive strategy focused on preventing unnecessary modifications during construction. This included thorough pre-construction checks of all design documents and implementing a "design freeze" to ensure completeness and accuracy before physical work commenced. This measure reduces the likelihood of disruptive changes during construction, enabling the project to progress efficiently and on schedule, consistent with the classification of "Avoiding Risk."

5.1.4 Risk 1.9: Delay in Approval by Local Authorities

Obtaining approvals from relevant authorities has become a significant concern in the project management process (Kasdi Abd Rahim et al., 2024). This risk is mitigated by engaging in early consultations with local authorities to prevent disruptions to the project timeline. By initiating dialogue well before construction begins, the project team can identify any regulatory requirements or address potential objections in advance, ensuring that all necessary approvals are in place. This proactive approach minimises the risk of last-minute regulatory hurdles and allows the project to proceed smoothly, classifying the risk as “Avoiding Risk.”

5.1.5 Risk 1.10: Delay or Inaccuracy in *Qibla* Direction

This risk arises from the possibility of delay or inaccuracies in verifying the *qibla* alignment before the construction process begins. The *qibla* direction is a fundamental requirement for the validity of prayer (*salah*), and performing prayer without facing the correct *qibla* renders the prayer invalid (Hamdani *et al.,* 2019). Therefore, inaccurate or late marking of the *qibla* direction can lead to structural modification works, causing delays and additional costs. This is a risk that is challenging to fully eliminate due to the involvement of external parties (Pejabat Mufti) and the need for precise on-site verification. However, this risk can be avoided by submitting the design to the Pejabat Mufti for early notification before the foundation work starts. Ensuring that the Pejabat Mufti conducts a site visit to verify and mark the *qibla* direction prior to the commencement of foundation work helps to avoid alignment errors. By implementing this measure, the risk of requiring structural modifications due to misalignment is minimised, ensuring the smooth continuation of the project.

5.2 Risk Elimination with Proper Planning

For the second objective, this study needs to identify whether risk can be eliminated or not. Although the risk analysis performed in this study identifies methods for mitigating certain risks in construction projects, it also indicates that fully eliminating risks is often not a straightforward endeavour. Based on the risk assessment conducted, this study found that eliminating risks is not straightforward. It is essential to address these risks promptly and implement an effective treatment plan as a precaution to prevent future occurrences. This proactive approach involves early identification of potential risks and implementation of mitigation strategies before they develop into significant issues. By taking decisive action and implementing preventative measures, organisations can reduce the likelihood of these risks materialising, improving project outcomes and overall risk management effectiveness.

6.0 CONCLUSION

This study has examined the practical application of the *Garis Panduan Pengurusan Risiko Bagi Projek Kerajaan* through a case study of the mosque construction project in Kuala Lumpur. It focused on two key risk management strategies: "avoiding risk" and "accepting risk," and assessed whether certain risks could be eliminated through proper planning and proactive measures. The findings indicate that structured risk identification, classification, and treatment can enable project managers to handle challenges more efficiently and ensure more effective project delivery.

Every construction project has its unique characteristics, which in turn influence the types of risks encountered. In the case of the mosque construction project in Kuala Lumpur, as a religious building, particular attention was required for faith-based elements, such as aligning the *qibla* direction.

Based on feedback from the project engineer, the project experienced a delay of several months. However, delays are widely recognised as one of the most common, complex, and high-risk issues frequently encountered in construction projects (Ahmad Hisham & Yahya, 2016). Risks, problems and challenges are unavoidable. However, the success or completion of a project depends on the project team's ability to foresee, prepare for, and effectively manage these risks, ensuring the project does not become stalled or fail.

In conclusion, this study affirms that the *Garis Panduan Pengurusan Risiko Bagi Projek Kerajaan* serves as a relevant and adaptable framework for managing risks in real-world public-sector construction projects. It offers practical guidance to project managers in making informed decisions regarding risk strategies, ultimately contributing to more successful and resilient project outcomes.

ACKNOWLEDGMENTS

The authors would like to express their gratitude and appreciation to all who contributed to this study, directly or indirectly.

REFERENCES

Ahmad Hisham, S. N., & Yahya, K. (2016). *Causes and Effects of Delays in the Construction Industry*. Faculty of Civil Engineering, Universiti Teknologi Malaysia. Retrieved from https://civil.utm.my/wp-content/uploads/2016/12/Causes-and-Effects-of-Delays-in-Construction-Industry.pdf.

Choudhry, R. M., & Iqbal, K. (2012). Identification of Risk Management System in Construction Industry in Pakistan. In R. M. Choudhry & K. Iqbal, *Journal of Management in Engineering* (Vol. 29, Issue 1, p. 42). American Society of Civil Engineers. https://doi.org/10.1061/(asce)me.1943-5479.0000122.

El Khatib, M, Alnaqbi, K, Alnaqbi, W, Al Jaziri, A, Al Maazmi, K & Alzoubi, H M (2022). BIM as a tool to optimise and manage project risk management. *International Journal of Mechanical Engineering*, 7 (1). ISSN 0974-5823

Fennelly, L. J., & Perry, M. A. (2017). Assessing Risk and Vulnerabilities. *Physical Security: 150 Things You Should Know*, 79–96. doi:10.1016/b978-0-12-809487-7.00002-4

Gray, C. F., & Larson, E. W. (2021). *Project management: The managerial process* (8th ed.). McGraw-Hill Education.

Hamdani, F. F. S., Abdul Rojak, E., Amalia, R., Hutami, A., & Rosyidah, U. (2019). An accuracy test of qibla direction measurement of mosques and prayer rooms. In *Proceedings of the 2nd Social and Humaniora Research Symposium (SoRes, 2019)*. Atlantis Press.

Jabatan Kerja Raya (2017). *Garis Panduan Pengurusan Risiko Projek Bagi Projek Kerajaan*. Kuala Lumpur: Cawangan Perancangan Aset Bersepadu (CPAB) Jabatan Kerja Raya.

Jamali, G., & Oveisi, M. (2016). A Study on Project Management Based on PMBOK and PRINCE2. In G. Jamali & M. Oveisi, *Modern Applied Science* (Vol. 10, Issue 6, p. 142). Canadian Center of Science and Education. https://doi.org/10.5539/mas.v10n6p142

Kasdi Abd Rahim. S., Zulfakar, M. H., & Ruslan, R. (2024). Determining the root causes of project delay: A case study. *Information Management and Business Review*, 16(3S[a]), 39–45.

Liu, Z., An, L., Kim, D.-J., & Liu, J. (2022). Risk Management of Large Infrastructure Projects: Risk, Uncertainty, and Complexity. *Journal of Architectural Research and Development*, 6(5): 20–24. doi: 10.26689/jard. v6i5.4255.

Muzaimi, H., Chew, B. C., & Hamid, S. R. (2017). Integrated management system: The integration of ISO 9001, ISO 14001, OHSAS 18001, and ISO 31000. In H. Muzaimi, B. C. Chew, & S. R. Hamid, *AIP conference proceedings*. American Institute of Physics. https://doi.org/10.1063/1.4976898

PMI (2021). *A Guide to the Project Management Body of Knowledge - PMBOK 7th edition* (Issue July) 2021.

Project Management Institute. (2013). *A guide to the project management body of knowledge (PMBOK® Guide) (5th ed.).* Project Management Institute.

Project Management Institute. (2016). *Project Management Body of Knowledge (PMBOK®).* Retrieved December 1, 2024, from https://www.projectmanagement.com/wikis/234759/project-management-body-of-knowledge--pmbok--#2.8

Snedaker, S., & Rima, C. (2014). Risk Mitigation Strategy Development. Business Continuity and Disaster Recovery Planning for IT Professionals, 337–367. doi:10.1016/b978-0-12-410526-3.00006-4

Stake, R. E. (1995). *The art of case study research*. Sage Publications.

Stichler, J. F. (2013). Considering Human Factors When Designing for Safety. In J. F. Stichler, *HERD Health Environments Research & Design Journal* (Vol. 6, Issue 3, p. 6). SAGE Publishing. https://doi.org/10.1177/193758671300600302.

Wirahadi, A., & Pasaribu, M. (2022). Business Model Innovation: The Role of Enterprise Risk Management and Strategic Agility. In A. Wirahadi & M. Pasaribu, *Advances in economics, business and management research/Advances in Economics, Business and Management Research*. Atlantis Press. https://doi.org/10.2991/aebmr.k.220304.037

Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). SAGE Publications.

Zambrano, L., Atencio, E., Mariani, C., & Mancini, M. (2024, February). Integration Between PMBOK 7th Concepts: A Network Analysis. In *14th International Conference on Industrial Engineering and Operations Management*, https://doi.org/10.46254/AN14.20240277.

JOURNAL OF ARCHITECTURE, PLANNING & CONSTRUCTION MANAGEMENT
Volume 15 Issue 1, 2025 E-ISSN: 2462-2222 ISSN: 2231-9514

THEMATIC ANALYSIS ON FURNITURE DESIGN FOR WORKING SPACE IN TINY HOUSE

Received: 9th September 2024 | Accepted: 22nd February 2025 | Available Online: 30th June 2025

DOI: 10.31436/japcm.v15i1.930

Izyan Syamimi[1*], Kenta Ono[2]

[1] System Planning Laboratory, Design Department, Graduate School of Science and Engineering, Chiba University.*
izyank.zainol@gmail.com
[2] Design Department, Chiba University
k-ono@faculty.chiba-u.jp

Corresponding author: **Izyan Syamimi*
Corresponding author's email: izyank.zainol@gmail.com

ABSTRACT

There are two future predictions based on current trends: the style of working remotely and the growth of demand for tiny houses. However, the trends are cross-conflict due to the limited space in tiny houses for working activities. One of the most significant influences on working productivity is the suitability of furniture design for working activity. One of the observation results in the furniture design market shows that the available furniture design for working activities is usually not designed for home space. This paper studies the possible types of furniture design for working space in tiny houses. Thematic Analysis extracted from design discussions with 15 Key Informant Interviews (KII) specialises in design (Industrial Design, Entrepreneur, Interior Designer, and Architect) from Malaysia. Results show the attributes of workspace furniture design for tiny houses, such as the consideration ratio of working surface and the longevity time usage for working remotely from the tiny house. These attributes are helpful for future research and development of the furniture design process, specifically in designing furniture design for workspaces in tiny houses. The consistency statement by KII leads to ordering the evaluation of furniture design criteria for workspace in tiny houses. Most of KII is concerned about the technical part, followed by functionality, concept aesthetics, and cost. The perceptual positioning map of workspace furniture shows the working furniture for remote working and their positioning, indicating a space function relationship. The presentation of furniture mapping relates to the estimation for designing furniture for workspaces in tiny houses in the future.

Keywords: Evaluation Criteria, Furniture design, Thematic Analysis, Tiny House, Workspace

1.0 INTRODUCTION

This study explores the potential of furniture design to enhance the functionality and comfort of workspaces in tiny houses. Working remotely is not a new trend; it has been predicted trends since the era of the internet. The workplace's flexibility allows users to work virtually with internet connectivity (Wajcman, J. et al., 2010). This trend shifts the focus of work-life balance in shaping their environments and working behaviour. As remote work grows, it creates opportunities and challenges from many perspectives.

Opportunities from this growing trend are mainly shifting development on technology accessibility and some economic reasons. Some companies found the workers' performance more productive after being given flexibility in managing their space and work time (Ray T. et al., 2021). More companies and employers are taking this trend as an opportunity to minimise

the company's facilities. Therefore, they can save money in preparing the working space for employees (Licite-Kurbe, L. et al.; R., 2021). Many studies show that the remote working style gives a positive response, such as keeping a lot of time and energy in commuting to work, flexibility in choosing a comfortable workspace, and better work-life balance (Hunter, P., 2018).

On the other hand, some companies also need help adapting to the new remote working environment. Some said that workspaces other than the company's office are uncomfortable due to several issues, such as privacy concerns, time control, disturbance of the space's functionality, and lack of social and communication exposure. (Olson, M.,1983). Moreover, health-related issues have been raised since the work remotely has been introduced widely. Excessive spending time in front of the screen results in excessive sitting time, sleep deficiency, and anxiety. (Nakshine, V. et al., 2022). Studies state that working with ergonomic furniture can provide comfort and minimise musculoskeletal disorders. The real question is how to overcome those concerns (Silviana S. et al., 2022).

The remote working style allows workers to work anywhere, including their house. Meanwhile, in addition to employers' desire to reduce the company's costs, individuals also approach the affordable economy to solve problems. Tiny houses are a perfect choice for the young generation who prefer a nonmarriage lifestyle, lower debt percentage, and a simple lifestyle (Shearer, H., 2019). Tiny houses: The community also positively acknowledges the growth of small houses as affordable properties to own.

As it is a response to the economic and social growth of a country like Japan, the rapid increase in the number of tiny houses in the city continues (Hornyak, 2024). Meanwhile, the development of compact housing, such as high-rise apartments in urban areas like Kuala Lumpur, is a response toward rapid urbanisation and significant adaption of culture (K. Seo et al., 2021). According to Global Angel, Malaysia's multiple-family housing was decreasing due to the type of buildings that can occupy a limited space area. The website also mentioned that the high price tag of owning a house in Malaysia is an uptrend and will continue to grow with no cooling-off measures ("Malaysia's Residential Real Estate Information," 2025). The local blogger also mentions that Malaysia's average house size was always above 1500 sqft in previous years; however, in 2018, the average house size was 1,264 sqft. The House and Local Government or KPKT Minister also announced that the average size of the houses in Malaysia will continue to decrease yearly (Tan, 2019).

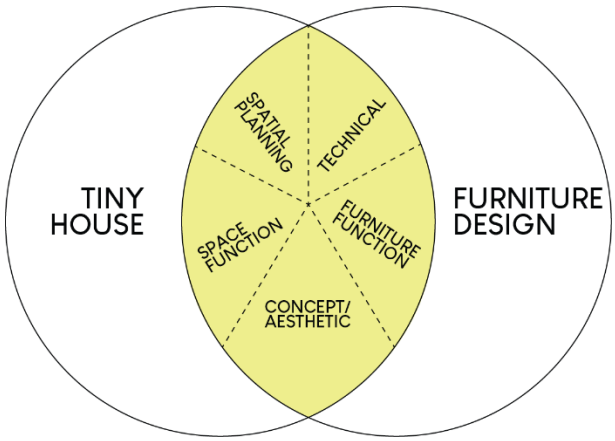


Fig. 1: Research Gap Framework. (Source: author)

A study indicated the need to understand the furniture design process and the relationship between space and furniture design (Kim et al.; J., 2014). The same study also mentioned examples of John Pawson's design that consider the suitability and compatibility of the furniture design to the function and size of the space, which is an essential factor when designing furniture design (Kim et al.; J., 2014). In this study, tiny houses, as the case target area, aim to evaluate the influence of the criterion and design process when designing furniture design.

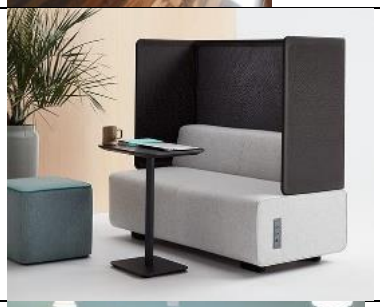
2.0 LITERATURE REVIEW

2.1 Furniture Design for Working Activity

After several months of observation, the authors found that most of the furniture designed for working activities in the current market is generally intended to provide more comfort. Table 1 shows the type of furniture suitable for working activities in general. The furniture listed below is the basic type that authors come across while browsing the internet, with the keyword workspace furniture for remote work.

Table 1: Type of Furniture for Workspace

Type of furniture	Example of the Furniture	Detail & Source
Smart office desk		Herman Miller Smart Desk (Source: https://www.dezeen.com/2017/06/15/herman-miller-yves-behar-live-os-smart-desks-remind-employees-stand-design-technology-neocon-2017/)
Ergonomic Chair		Cosm Chair by Studio 7.5 for Herman Miller (Source: https://alteriors.ca/products/cosm-office-chair?variant=44010009493718)
Multi-function Furniture		Chair PF by Daniel Diermeier (Source: https://www.diermeierdaniel.com/chairpf)

Type of furniture	Example of the Furniture	Detail & Source
Built-in Desk		Built-in desk integrated with shelving (Source: https://ar.pinterest.com/pin/631348441542616184/)
Acoustic and Divider		Allsteel, Recharge Collaborative (Source: https://www.pinterest.com/pin/recharge-lounge--837106649503182833/)
Restaurant/ Café furniture		Image: Working in a Restaurant (Source: https://www.entrepreneur.com/business-news/meet-this-company-that-turns-restaurants-into-coworking/313514)

For example, in Table 1, a smart desk was designed to improve work-life balance (Arlianti et al.; H., 2023) with adjustable features that allowed and reminded users to change positions or stand whenever needed (Kif L., 2017). This active working style can improve user comfort, health, and productivity (Aryal et al.; G., 2019). Ergonomic chairs are always recommended for working activities, mainly because they can promote support to the musculoskeletal system while working at the desk (Silviana et al., D., 2022). Ergonomic chairs also give safety, flexibility, comfort, practicality, stability, and appropriateness while completing remote work (Occhipinti et al.; A., 1993).

Other than ergonomic chairs, multi-position furniture, innovative storage, and multi-function furniture lets the users sit in several working positions, improving their comfort and productivity for extended periods (Workineh et al.; H., 2016). Moreover, some studies mentioned that multi-function furniture effectively simplifies daily activities and tackles the issues in interior design (Shaleh et al.; T., 2022). Multi-function furniture, such as multi-purpose tables, which are single-function furniture items, saves space and improves ergonomic performance, resulting in faster task accomplishment (Cheng et al.; K., 2021).

Another interior solution, including built-in furniture, made the house more stylish, simple, and functional. Some built-in desks with closet doors can help hide the office-related mess instantly (Cori S., 2024). Incorporated interior design with built-in furniture can boost the space outlook and functionality of the house or space (Xiao-zhou, S., 2006). Alternative furniture parts considered necessary for remote working are acoustic and screen dividers that create privacy without completely blocking off the space (Todorova, T., 2023). During the pandemic, desk dividers provided 99% protection from virus transmission (Li et al.; K., 2021). Another study mentioned that a cubicle workspace covered with space or a screen divider indicates privacy zonal, diminished distress and stress, and improved work efficiency by making users feel calmer and happier in that space (Sari, S., 2020).

2.2 Places for Work Remotely

Remote work brings many shifting working places such as restaurants, cafés, and co-working spaces, which are public and social (Shinkawa et al.; Y., 2023). Studies show that situational domestication influenced by free wi-fi in cafes transforms the social space into a workspace (Henriksen et al.; A., 2018). Hence, a co-working space is a business opportunity to create a specific atmosphere, providing appropriate facilities for working activities, especially remote working (Fuzi, A., 2015). Observing all the furniture designs in all these spaces is mostly more casual than the office appearance.

Working from home is another option for remote work. The productivity of working from home differs in geological aspects, culture, and situation. For example, in 2015, studies in China showed an improvement in performance of 13%, which also led to improved work satisfaction (Bloom et al.; Z., 2015). Meanwhile, some studies mentioned that the advancement of technology nowadays also influences working performance (Anakpo et al.; Z., 2023). Additionally, there is a positive impact on short-term staff wellbeing and flexible work design prospects in working remotely (Crawford, J., 2022).

2.3 Evaluation Criteria for Furniture Design

When evaluating furniture design, several studies show critical criteria in several prospects. The difference in the evaluation may be influenced by different methods, such as the ANP Method, which explicitly enhances and focuses on the design's aesthetic value, resulting in form, colour, and ergonomics being important values (Chen et al.; J., 2014). Meanwhile, in a recent study in 2023, Varol A. mentioned that the primary evaluation criteria in evaluating furniture design are functionality, technical, conceptual, and aesthetic, with several other sub-key criteria (Varol, A., 2023). Another study shows different critical criteria specific to green furniture, such that the weightage of the evaluation is more towards the value and pricing criteria, which indicate cost aspects (Yeğin et al.; M., 2022). For sustainable furniture design, it is reviewed that the evaluation criteria were conceptual of the design towards the environment, economy, and social dimensions (Suandi et al.; N., 2022). Xiaojie Xie and others also mentioned the evaluation key for kindergarten furniture differently than in another study, including the material's environmental friendliness, colour, technological structure, size, and interestingness as 11 other criteria (Xie et al.; J., 2023).

Users evaluate furniture differently when making decisions. A study by Zhang and others shows that the key factors influencing the purchasing process were design style, marketing,

and customer experience (Longxiang, Z. et al.; Z., 2020). Another study in Indonesia mentioned that the critical factors were product quality, furniture uniqueness, price perception, and service quality (Widiyanto et al.; Y., 2014). Moreover, different age groups and monthly net income also impact purchase decisions regarding material, price, and service, which are other factors (Oblak et al.; P., 2020). In this digital era, customer trust, product quality, and web atmospheres have been critical factors in purchasing decisions. A study on the second-hand furniture purchasing situation in Japan that uses Facebook and Instagram platforms shows the factors of brand value, aesthetic appeals, convenience, and service quality of the online platform (Chamnankit, C. et al.; S., 2023).

2.4 Furniture for Tiny House

Due to the limited space of tiny houses, there is a lot of consideration and solutions in designing for the space. A study by Norwich University indicates that tiny houses that range from 120 to 400 square feet aim to simplify and minimise the energy requirement (Lutz, M., 2019). Other studies characterised the Indonesian tiny house size as 60–80-meter square (Analisa, F.; S., 2023). More space-saving furniture was introduced to utilise compact house layouts and improve users' quality of life through foldable, elastic materials, flat packaging, and mobile components (Xiang, Y., 2013). Other than space-saving furniture, flexible furniture also shows efficiency in proposing various activities in space to maximise the space commodity while reducing material resources and energy usage (Susanto D. et al.; A., 2018). Flexible furniture design is lightweight and easy to store, which is crucial when utilising limited space (Imam et al.; M., 2018). Spatial furniture planning is also a critical consideration in tiny houses. Space utilisation, function, flexibility in combination, and multiple styles are the factors in designing furniture for small-size houses (Chen, X., 2015).

3.0 METHODOLOGY

Before the online design discussion with KII, a short discussion between laboratory members of the System Planning Laboratory, Design Department, Chiba University, was held to indicate the type of furniture needed for a tiny house. The Miro Platform discussed the suitable type of furniture for a house based on the current project: image assessment for online sources. The method used is the KJ Method when five laboratory members concluded that six types of workspace furniture for tiny houses Sets of Workspace Furniture, Built-in Workspace Furniture, Multi-Function Furniture for Working, Well Setup Furniture Workspace, Simple Furniture for Working, Flexible furniture for Working.

Fifteen key informant interviewers (KII) from Malaysia have been invited to participate in online design discussions as part of the dataset development. Using the Miro Platform, as shown in Fig.2, all the KII with backgrounds in Industrial Design, Architecture, and Interior Design have shared their view on various aspects. In the Miro Platform, an image assessment set of workspace furniture was identified through a collection from multiple online platforms. The professional will indicate one image per furniture keyword based on their perspective and appoint commentary to the furniture design selected based on their viewpoint towards workspaces for tiny houses. Each commentary has been clustered within the same images, coded and iterative, and compared into themes through thematic Analysis. Seven codes, which are material, size, space or placement, time, design, activity, and feeling or behaviour, are highlighted in each commentary. Each coded commentary is then tabled into each type

of furniture keyword, presenting a statement that indicates the furniture design for a working space in a tiny house. Other than that, another result presents the perceptual positioning map of the furniture for the working space.

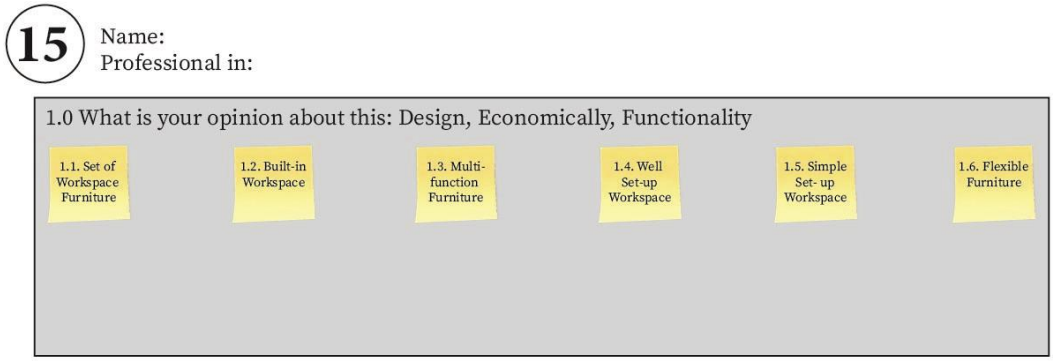


Fig. 2: Design Discussion in Miro Platform. (Source: Illustration by author)

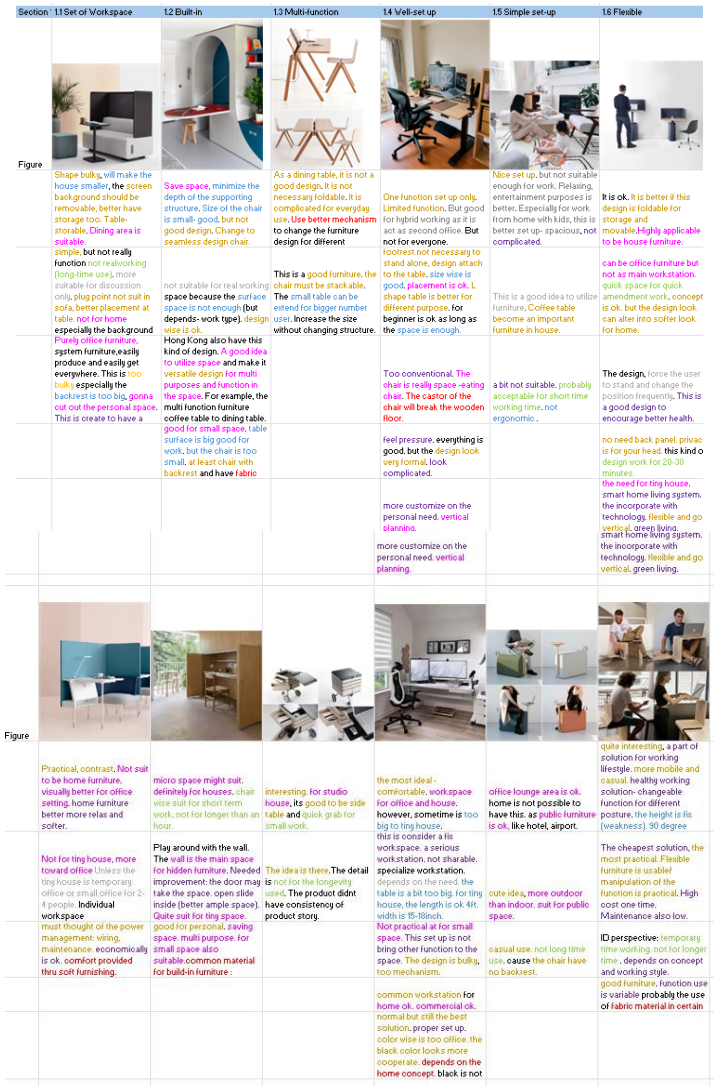


Fig. 3: Screenshots of the data transfer from the Miro platform- photo and viewpoints of KII transferred to Excel and colour-coded according to the title before iterative comparison in Table 2 (Source: author)

As shown in Figure 2, this paper only analysed section 1 (in the green bounding box). As shown in Figure 4 below, the thematic analysis process is a flexible theoretical approach to analysing qualitative data with clear guidelines and potential pitfalls (Braun et al.; V., 2006). However, adapting thematic Analysis for the design discussion dataset leads to a Design map, which helps evaluate existing technologies and notify new technologies (Brown, N., 2018).

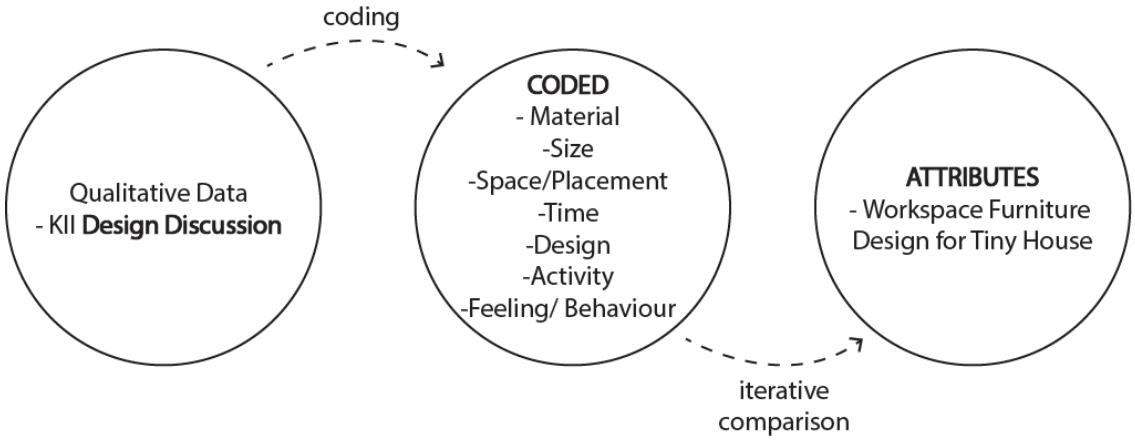


Fig. 4: Thematic Analysis in this study. (Source: author)

4.0 RESULTS

Two analyses are extracted from the online discussion with all KII. First, the thematic Analysis lists the attributes of furniture design for tiny houses. The second Analysis presents the current workspace furniture design's position in perceptual mapping and shows the relationship between furniture design and space. Based on the first activity, five images were selected for sets of workspace furniture; six images were selected for built-in workspace furniture; six images were selected for multi-functional furniture; five images were selected for well-set-up workspace furniture, six images were selected for simple setup workspace and five images selected for flexible workspace furniture which 2 of it was similar images as multi-functional furniture.

4.1 Thematic Analysis

Table 2: Thematic Analysis, Attributes of Furniture Design for Workspace in Tiny House

Workspace's Furniture	Material			Size			Space/Placement		
	Positive	Negative	Neutral	Positive	Negative	Neutral	Positive	Negative	Neutral
Set of Workspace Furniture	Soft furnishing-comfort, outlet port for charging			Small working space, not good			Provide limited working space for commercial use	Not suitable for home, tiny house, small space	Common area
Built-in Workspace Furniture	Netting is a good material	Upholstery is not a good material	For chair - fabric finish, no castor wheel. Wooden finish is a common material that easily matches home concepts.	The size of the working surface is good	Consume space for structure		Saving, utilising, multi-purpose space	Space consuming, no composition to the space function	
Multi-function Furniture for Working	Wood is a good material	The mechanism must be sturdy		Compactness size is good.			Combining the space function	There is no barrier to the space-probability of having disturbance of the space function	
Well-set-up Furniture Workspace	Castor wheel is not good	Recommended: Anti-bacteria surface		Enough surface	Too big for a tiny house	Recommended: 4ft length and 15–18-inch width	Arrange the workspace that accesses natural light. Utilise vertical space.	This setup limits space to one function, and chair design consumes space.	
Simple Setup Furniture for Working				Slightly bigger size for residential.	Size is too small		Suit for public/common area, easy to match any space		
Flexible Furniture for Working	Recommended: fabric material			Ergonomic needs to be considered.			Secondary space to do work. Utilise space for multiple functions.		
Attribute Workspace Furniture Design for Tiny House	Having an outlet port is important for remote work nowadays. Soft furnishings, like fabric, give comfort. Wood is a good material. Wheels are not for home use.			Enough surface/area size is important, but not too big for a tiny house. Recommended: 4 feet in length and 15–18 inches in width.			Most workspace furniture is more suitable for commercial, public, and common areas. Furniture that allows space to be used for multiple functions is good. Choosing the right type of chair is also important so it does not consume too much space.		

Table 2 *(contd.)*: Thematic Analysis, Attributes of Furniture Design for Workspace in Tiny House

Workspace's Furniture	Time			Design			Activity			Feeling/ Behaviour		
	Positive	Negative	Neutral	Positive	Negative	Neutral	Positive	Negative	Neutral	Positive	Negative	Neutral
Set of Workspace Furniture		Not for a long time working space		Compact ability, modularity of the design	Position of the plug point and higher backrest make the design bulky and not practical posture.		For temporary use of activity	More suitable for waiting activity		Depends on the user's working behaviour/style, e. Giving personal space is good	Doesn't have a higher point in ergonomic or comfort	For home must be more relaxed and have storage
Built-in Workspace Furniture		Chair is not suitable for working.		Integrate furniture to provide personal space and storage.	Selection design of the chair is important.		Utilise space for different kinds of activity	Not for working		Being comfortable with space orientation and integrating space with nature is a good		
Multi-function Furniture for Working		Not for long-term use		Multi-function furniture and multi-function space are practical and interesting.	Chair design affects the practicality.							
Well-set-up Furniture Workspace	Applied for longer time workstyle			Ideal working space	Only for working, design looks very formal	Normal look	Second office			Personally custom the workspace.	Conventional, serious setup, not easy to tidy	Depending on the need, a minimal setup is better to ease the cleaning process.
Simple Setup Furniture for Working		Not for long-time use		Utilise the furniture for other functions, more homey setup	Complimentary parts to make it suitable for working activity		Suit for temporary or short-term activity and comfortable people sitting on the floor	Not for working activity		Set up that promotes the user to move	Simple and more relaxing for home	Not suitable for working
Flexible Furniture for Working	Short-time working style			The flexibility of the furniture makes it multi-functional and allows the space to be utilised well.	Foldable, storable, moveable		It makes the user move more, has a suitable posture for healthy working behaviour, and is user-friendly.			Encourage healthy working behaviour.		Depends on user needs and promotes healthy working behaviour
Attribute Workspace Furniture Design for Tiny House	Most furniture is applied for short-term working style except for well-set-up spaces			Utilise the furniture's function and allow space to be utilised well. The plug point position is better on the table than on the chair. Choose a furniture design that is important to the home concept. Recommended designs: foldable, storable, moveable			Most activity suits temporary use, and good furniture should promote healthy working behaviour (e.g., movement, better posture)			It integrates space with nature, is customisable to the user's needs, and encourages healthy working behaviour. Well-set-up furniture is too conventional, giving pressure while using, but it must be more relaxing.		

Refer to Table 2; Table 3 below explains every attribute of workspace furniture for a tiny house.

Table 3: Attributes workspace furniture for tiny house

Codes	Attributes in detail	Example (in picture)	Key of Informant (KII)
Material	Power outlets for charging equipment such as computers and smartphones are must-have features in furniture design for working activity.	 Source: https://www.iconsofdenmark.dk/products/coffee-tables/level/level-side-table/	KII2, KII9 & KII10
	Soft furnishing materials like fabric can comfort the user.		KII8, KII9 & KII11
	Wood is a good choice for sturdy, unique appearances that can easily fit into any interior design concept.	 Source: https://www.jennikayne.com/products/newport-desk-oak?epik=dj0yJnU9THhLY0hVbWVpM0ZHa252R29GckpkaVlQajBiSzlTR0lmcD0wJm49eHdvUTV4UmtFNWxnRFdNaTkyd2lNUSZ0PUFBQUFBR2VPSGJB&view=jkh-home-alt-reviews	KII7, KII12, KII13 & KII15
	A wheel or castor in the chair is not suitable for a home.		KII3 & KII15
Size	Enough surface area or adequate rationing sizing based on the size of the area provided for working activity is essential for working activity in tiny houses.	 Source: https://www.pinterest.com/pin/2744449763021273/	KII2, KII3, KII8, KII10, KII12, KII13 & KII14

Codes	Attributes in detail	Example (in picture)	Key of Informant (KII)
Space/ Placement	Furniture designed for working activities is suitable mainly for commercial spaces, office environments, and public or common areas.	 Source: https://www.pinterest.com/pin/285978645080759352/	KII2, KII3, KII4, KII7, KII8, KII11 & KII12
Time	Most of the furniture design features for tiny houses are predicted to be not for long-term use due to the size and ergonomics of the design visually not convinced.	 Source: https://www.pinterest.com/pin/36521446971786283/	KII2, KII4, KII5, KII6, KII7, KII8, KII10, KII11, KII13 & KII14
Design	- Multi-functional furniture is a good solution - Allowed the space to be utilised more efficiently compared to built-in furniture because some of the built-in furniture has hidden features	 Source: https://www.core77.com/posts/61361/Build-a-Dual-Purpose-Sofa-Create-an-Automatic-Indoor-Garden-3D-Print-Your-Own-Pens-n-More?utm_source=public_sidebar	- KII3, KII5, KII6, KII9, KII10, KII11&KII12 - KII 5, KII6 & KII9

Codes	Attributes in detail	Example (in picture)	Key of Informant (KII)
Activity	Furniture designed for temporary usage promotes a healthy lifestyle while working at home.	 Source: https://www.pinterest.com/pin/436356651386143350/	KII1, KII3, KII5, KII9, KII12, KII14 & KII15
Feeling/ Behavior	The integration of space with nature encourages healthy working behaviour.	 Source: https://workspacebliss.com/office-decor-workplace-ideas/	KII5, KII14 & KII15

As a result of KII design discussions, the author projected that furniture design for working activity is not designed specifically for tiny houses or home environments. Furniture design that allows the space to be utilised for more than one function is a good solution for limited-space houses such as tiny houses, as Chen X. (2015) theorised. In this case, as Cori S. (2024) speculated, the built-in furniture design is the most constructive type. However, the most crucial piece of furniture for working activity is the chair, which most of the KII's commentary focused on, and the selection of chair design is essential. A chair that is manageable in size and has swivel and adjustable features is vital. However, a castor wheel part is not recommended depending on the type of floor house as mentioned in material attributes (KII3&KII15).

In time attributes, even though most of KII thought that the furniture designed for tiny houses is not suitable for long-term use, it is considered not a concerning situation as some of KII mentioned in feeling or behaviour attributes that short-term use of furniture is better for building active physical working behaviour under health reasons (K3, K5 & K14). Between these two attributes, well-set-up workspace furniture shows longer-time use yet possibly will give pressure or stressful feeling during working activity, which contradicts the house's feeling that supposedly is more relaxing.

Even though built-in furniture design is easy to create and adjust to suit the concept design of the house or interior design, theoretically, according to Susanto, D., & Ilmiani, A. (2018), the multi-function furniture design is more economically friendly in terms of production and cost of purchasing since the user gets more than one function in one furniture design. KII recommends foldable, storable, and moveable features as essential for furniture design in limited space, as Xiang, Y. (2013) mentioned.

To support the time and design attributes, the activity attributes show that most of the furniture provides temporary time usage yet still projects an optimistic viewpoint in establishing healthy working behaviour (KII1, KII3, KII5, KII9, KII12, KII14 & KII15). Some KII also mentioned biophilia interior design that integrates the space with nature to improve the working behaviour (KII6, KII14, & KII15). Hence, all the attributes above are compromised by several studies that say smart furniture, integrating environment sensors, and flexible furniture enhance life quality (Medeiros et al.; A., 2018).

4.2 Perceptual Positioning Map

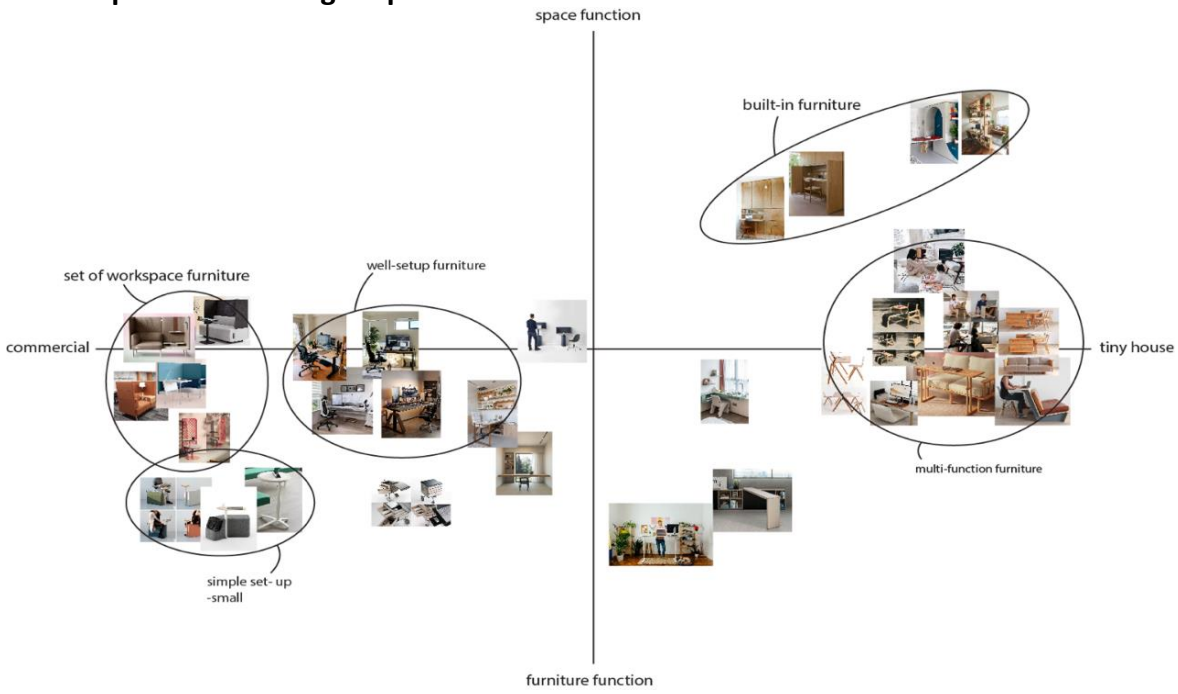


Fig. 5: Perceptual Positioning Map based on furniture design and space relation.
(Source: author)

Figure 5 shows the position of furniture design for working activity selected by KII in design discussions. The positioning of furniture design used discriminant Analysis to see if the type of workspace's furniture design impacted their position in the type of space. As a result, in 4.1, multi-functional furniture shows the highest relation in creating multi-functional space to utilise the limited space in a tiny house. Besides that, built-in furniture is another solution that can successfully create a working activity in tiny houses. However, built-in furniture probably demands higher spending and only serves one type of function. From Figure 5, the usual furniture design for working activity positioning was practically for commercial space, for example, a workspace and well-set-up furniture. In contrast, flexible furniture is distributed all over the space because of the flexibility features.

5.0 DISCUSSIONS

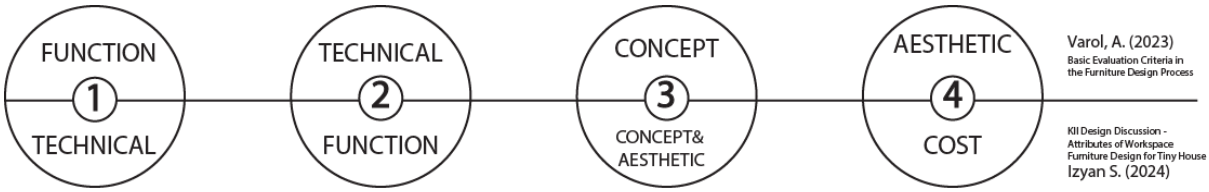


Fig.6: Evaluation criteria of Furniture Design differences between this study and Varol, A. (2023) (Source: author)

Based on the attributes above, we can see a critical criterion that affects the KII commentary, evaluating the existing furniture design to suit it in the space case study as a tiny house. As reviewed in the literature review, furniture design evaluations contrast with each other depending on the context of the design. In this case, KII is affected mainly by technical factors, followed by functionality, concept, and aesthetics, compared with Varol A. studies (2023), as shown in Figure 6. This ordering is based on frequently repeating the number of commentaries highlighted in codes, as shown in Figure 3.

Table 4: Number of commentaries

Criteria- commentary context	Number of commentaries	Key of Informant (KII)
Technical - *Not suitable for long time use (time) due to the size and ergonomics of the furniture design*	21	KII2, KII4, KII5, KII6, KII7, KII8, KII10, KII11, KII13, KII14 & KII15
Technical – *Enough surface area is needed for working activity*	14	KII1, KII2, KII3, KII5, KII8, KII10, KII12, KII13 & KII14
Function - *Multi-functional furniture design and multi-function space is a good solution for tiny house*	18	KII1, KII3, KII5, KII6, KII7, KII8, KII9, KII 10, KII11& KII15
Function – *Integrated furniture for extra or other function*	9	KII2, KII5, KII6, KII10, KII11, KII13, KII14 & KII15
Concept - *The type of furniture impacts the user behaviour*	15	KII3, KII4, KII5, KII6, KII7, KII10, KII13 & KII14
Concept – *Biophilia furniture; embedded design with nature.*	3	KII5, KII14 & KII15
Cost – *Multi-functional furniture design is economically friendly*	4	KII5, KII6, KII9 & KII15

The consistency of every KII in giving their viewpoint is the collection of analysed data in ordering these criteria for furniture design evaluation. Repetitive context often strengthens an opinion (Mubarak, Z., 2019). The evaluation criteria in this study show that the technical aspect is the primary concern when selecting a furniture design, which was impacted by the limited space of the tiny house. Therefore, some KII agree that vertical spatial planning is also crucial (KII6 and KII9). In the context of this study, functionality is the second essential criterion for identifying the critical criteria of furniture design for working activity. However, to fulfil the function of the furniture, technical criteria that indicate the need for enough surface to suit the activity and the solid ergonomic requirement make the technical important to executing a proper workspace and furniture design in a tiny house. Certainly, concept and aesthetics are essential criteria to deliver a suitable furniture design that aggregates the home

concept, which is remarkably designed toward calm and relaxing behaviour. Some of the KII mentioned several contexts regarding economically friendly furniture, related to reviewed studies in 2.3 that show cost concerns criteria like green furniture, sustainable furniture, and buyer's purchasing factor.

6.0 CONCLUSION

In conclusion, this study aims to analyse the first section of the design discussion with KII to gain an in-depth understanding of the topic. By approaching the research using thematic Analysis, furniture design attributes for working activity in tiny houses have been extracted in Table 4. From the same study, the order of evaluation criteria for furniture design in the context of designing for a specific space, such as a tiny house, results in the technical theme as the main criterion. Therefore, based on the design discussion commentary, the positioning map for the workspace's furniture design from the perspective of the space-function relationship shows multi-functional furniture as practically the best option for a tiny house. In comparison, typical furniture design for working activity shows the visual position near commercial space. Based on this Analysis, future research and development of furniture design could benefit the designer and researcher. This study's limitation is that the KII's representative was limited to Malaysian professionals and the number of the KII. A more diverse professional and significant number of KII is recommended for further research. Other than that, in better control of KII commentaries, probably early or expected attributes hinted to the KII.

ACKNOWLEDGMENTS

The authors would like to express their gratitude and appreciation to all who contributed to this study, directly or indirectly.

REFERENCES

Anakpo, G., Nqwayibana, Z., & Mishi, S. (2023). The Impact of Work-from-Home on Employee Performance and Productivity: A Systematic Review. Sustainability. https://doi.org/10.3390/su15054529.

Analisa, F., & Okada, S. (2023). Tiny house characteristics in Indonesia based on millennial user preference. Urban, Planning and Transport Research, 11. https://doi.org/10.1080/21650020.2023.2166095.

Arlianti, I., Sofiah, A., & Susandari, H. (2023). Transformasi analisis konfigurasi desain smart office desk untuk kebutuhan work from home. Productum: Jurnal Desain Produk (Pengetahuan dan Perancangan Produk). https://doi.org/10.24821/productum.v6i1.6206.

Aryal, A., Becerik-Gerber, B., Anselmo, F., Roll, S., & Lucas, G. (2019). Smart Desks to Promote Comfort, Health, and Productivity in Offices: A Vision for Future Workplaces. Frontiers in Built Environment. https://doi.org/10.3389/fbuil.2019.00076.

Bloom, N., Liang, J., Roberts, J., & Ying, Z. (2015). Does Working from Home Work? Evidence from a Chinese Experiment. Quarterly Journal of Economics. https://doi.org/10.3386/W18871.

Braun, V., & Clarke, V. (2006). Using thematic Analysis in psychology. Qualitative Research in Psychology, 3, 101–77. https://doi.org/10.1191/1478088706qp063oa.

Brown, N. (2018). Evaluating the Usefulness of the Adapted Thematic Analysis in the Process of Design. . https://doi.org/10.14236/ewic/hci2018.145.

Chamnankit, C., Ru-Zhue, J., & Aujirapongpan, S. (2023). Buying behaviour of Japanese second-hand furniture: Online channels: Facebook and Instagram. GSC Advanced Research and Reviews. https://doi.org/10.30574/gscarr.2023.16.2.0336.

Chen, M., & Lyu, J. (2014). Aesthetic Evaluation of Furniture Design Based on ANP Method. Applied Mechanics and Materials, 574, 318 - 323. https://doi.org/10.4028/www.scientific.net/AMM.574.318.

Chen, X. (2015). The Furniture Design of Small-size House from the View of Systematization. Packaging

Engineering.
Cheng, H., Ng, P., Nathan, R., Saptari, A., Ng, Y., Yeow, J., & Ng, K. (2021). The Conceptualisation and Development of a Space-Saving Multi-purpose Table for Enhanced Ergonomic Performance. Inventions. https://doi.org/10.3390/inventions6040067.
Cori S., (2024). 22Built-in Desk Ideas for Saving Space and Adding Storage. The Spruce.com. Retrieved at https://www.thespruce.com/built-in-desk-ideas-8599679
Crawford, J. (2022). Working from Home, Telework, and Psychological Wellbeing? A Systematic Review. Sustainability. https://doi.org/10.3390/su141911874.
Fuzi, A. (2015). Co-working spaces for promoting entrepreneurship in sparse regions: the case of South Wales. Regional Studies, Regional Science, pp. 2, 462–469. https://doi.org/10.1080/21681376.2015.1072053.
Henriksen, I., & Tjora, A. (2018). Situational Domestication and the Origin of the Cafe Worker Species. Sociology, 52, 351 - 366. https://doi.org/10.1177/0038038516674663.
Hornyak, T. (2024, Dec 6). *In Japan, Designers Fit Big Ideas Into Tiny Homes*. The New York Times. Retrieved January 10, 2025 at https://www.nytimes.com/2024/12/06/realestate/tiny-homes-japan.html.
Hunter, P. (2018). Remote working in research. EMBO reports, p. 20. https://doi.org/10.15252/embr.201847435.
Imam, M., Kamel, A., & Al-Khatib, M. (2018). Flexibility is a furnishing value in economic housing. International Design Journal. https://doi.org/10.21608/IDJ.2018.85493.
Kif L. (2017). The maker of Silicon Valey's iconic desk chair is building a new kind of smart desk. Tech. Business Insider.Com. Retrieved at https://www.businessinsider.com/herman-miller-live-os-price-features-dashboard-app-2017-6
Kim, N., Park, C., & Lee, J. (2014). A Study on the Characteristics of Furniture Design of John Pawson. Korean Institute of Interior Design Journal, 23, 56-63. https://doi.org/10.14774/JKIID.2014.23.3.056.
Li, W., Chong, A., Lasternas, B., Peck, T., & Tham, K. (2021). Quantifying the effectiveness of desk dividers in reducing droplet and airborne virus transmission. Indoor Air, 32. https://doi.org/10.1111/ina.12950.
Licite-Kurbe, L., & Leonovica, R. (2021). Economic Benefits of Remote Work from the Employer Perspective. 22nd International Scientific Conference. "Economic Science for Rural Development 2021" No 55 Sustainable Bioeconomy, Integrated, and Sustainable Regional Development, Rural Development and Entrepreneurship, Circular Economy: Climate Change, Environmental Aspect, Cooperation, Supply Chains, Efficiencies. https://doi.org/10.22616/esrd.2021.55.034.
Longxiang, Z., Lin, W., & Minghui, Z. (2020). Research on the Factors of Consumers Choosing Furniture Based on AHP. Solid State Technology, pp. 63, 4011–4016.
Lutz, M. (2019). BIG IDEAS IN TINY HOUSE RESEARCH AT NORWICH UNIVERSITY. Journal of Green Building. https://doi.org/10.3992/1943-4618.14.1.149.
Medeiros, A., Fonseca, R., & Rocha, A. (2018). State-of-the-Art on Furniture Design: A Visual Review. , 95-104. https://doi.org/10.1007/978-3-030-55374-6_10.
Mubarak, Z. (2019). THE ANALYSIS OF REPETITION AS PART OF LEXICAL COHESION IN TALK SHOWS. JURNAL BASIS. https://doi.org/10.33884/BASISUPB.V6I1.1040.
Nakshine, V., Thute, P., Khatib, M., & Sarkar, B. (2022). Increased Screen Time as a Cause of Declining Physical, Psychological Health, and Sleep Patterns: A Literary Review. Cureus, p. 14. https://doi.org/10.7759/cureus.30051.
Oblak, L., Glavonjić, B., Barčić, A., Govedič, T., & Grošelj, P. (2020). Preferences of Different Target Groups of Consumers in Case of Furniture Purchase. Drvna industrija. https://doi.org/10.5552/drvind.2020.1932.
Occhipinti, E., Colombini, D., Molteni, G., & Grieco, A. (1993). Criteria for the ergonomic evaluation of work chairs. La Medicina del lavoro, 84 4, 274-85.
Olson, M. (1983). Remote office work: changing work patterns in space and time. Commun. ACM, pp. 26, 182–187. https://doi.org/10.1145/358061.358068.
Overview of Malaysia's Residential Area. (n.d.). Global Angel. Retrieved at https://global-angle.com/blog/malaysia-real-estate-statistics-information/.
Ray, T., & Pana-Cryan, R. (2021). Work Flexibility and Work-Related Wellbeing. International Journal of Environmental Research and Public Health, 18. https://doi.org/10.3390/ijerph18063254.
Sari, S. (2020). Implementation Of Personalization In The Interior Of Cubicle Workspace. . https://doi.org/10.4108/eai.15-11-2019.2296200.
Shaleh, A., Asyifa, N., & Abhistha, T. (2022). The Role of Multi-Function Furniture in the Pandemic Era. International Journal of Design. https://doi.org/10.34010/injudes.v2i0.7339.
Shearer, H. (2019). Tiny Houses. Greening Affordable Housing. https://doi.org/10.1201/b22317-13.
Shinkawa, R., & Tsuchida, Y. (2023). The study of the acoustic environment of remote workspaces:

Characteristics and suitability of work. INTER-NOISE and NOISE-CON Congress and Conference Proceedings. https://doi.org/10.3397/in_2023_0096.

Silviana, S., Hardianto, A., & Hermawan, D. (2022). The implementation of anthropometric measurement in designing the ergonomics work furniture. EUREKA: Physics and Engineering. https://doi.org/10.21303/2461-4262.2022.001967.

Silviana, S., Hardianto, A., & Hermawan, D. (2022). The implementation of anthropometric measurement in designing the ergonomics work furniture. EUREKA: Physics and Engineering. https://doi.org/10.21303/2461-4262.2022.001967.

Seo, K., Ghani, M., & Sarkom, Y. (2021). Relocating home activities: spatial experiments in Malaysian apartment houses to accommodate the vernacular lifestyle. *Journal of Asian Architecture and Building Engineering*, 21, 311 - 325. https://doi.org/10.1080/13467581.2020.1869558.

Suandi, M., Amlus, M., Hemdi, A., Rahim, S., Ghazali, M., & Rahim, N. (2022). A Review on Sustainability Characteristics Development for Wooden Furniture Design. Sustainability. https://doi.org/10.3390/su14148748.

Susanto, D., & Ilmiani, A. (2018). Flexible Furniture: A Design Strategy for Multiuse yet Limited Space in the Urban Kampung. 2018 2nd International Conference on Smart Grid and Smart Cities (ICSGSC), 26-31. https://doi.org/10.1109/ICSGSC.2018.8541315.

Tan C. (2019, February 9). Is your home size above or below average? *kopiandproperty.com.* Retrieved at https://kopiandproperty.com/is-your-home-size-above-or-below-average/.

Todorova, T. (2023). Decorative screens as room dividers: their historical use, modern materials, advantages, and applications. ANNUAL JOURNAL OF TECHNICAL UNIVERSITY OF VARNA, BULGARIA. https://doi.org/10.29114/ajtuv.vol7.iss1.291.

Varol, A. (2023). Determining and Ordering the Basic Evaluation Criteria in the Furniture Design Process. Iconarp International J. of Architecture and Planning. https://doi.org/10.15320/iconarp.2023.252.

Wajcman, J., Rose, E., Brown, J., & Bittman, M. (2010). Enacting virtual connections between work and home. Journal of Sociology, pp. 46, 257–275. https://doi.org/10.1177/1440783310365583.

Widiyanto, I., Sutopo, S., & paraswati, y. (2014). ANALISIS KEPUTUSAN PEMBELIAN MEUBEL DI UD. TUNGGAL JAYA BOJONEGORO. , 13, 211-234. https://doi.org/10.14710/JSPI.V13I2.211.

Workineh, S., & Yamaura, H. (2016). Multi-position ergonomic computer workstation design to increase the comfort of computer work. International Journal of Industrial Ergonomics, 53, 1-9. https://doi.org/10.1016/J.ERGON.2015.10.005.

Xiang, Y. (2013). Analysis of Space-saving Furniture Design. Journal of Jilin Teachers Institute of Engineering and Technology.

Xiao-zhou, S. (2006). Integration Design of Built-in-Furniture for Industrialized Residential-housing. China Wood Industry.

Xie, X., Zhu, J., Ding, S., & Chen, J. (2023). AHP and GCA Combined Approach to Green Design Evaluation of Kindergarten Furniture. Sustainability. https://doi.org/10.3390/su16010001.

Yeğin, T., & Ikram, M. (2022). Performance Evaluation of Green Furniture Brands in the Marketing 4.0 Period: An Integrated MCDM Approach. Sustainability. https://doi.org/10.3390/su141710644.

JOURNAL OF ARCHITECTURE, PLANNING & CONSTRUCTION MANAGEMENT
Volume 15 Issue 1, 2025 E-ISSN: 2462-2222 ISSN: 2231-9514

MAXIMISING THE ECONOMIC BENEFITS OF GREEN RETROFITTING OF EXISTING BUILDINGS IN MALAYSIA

Received: 12th September 2024 | Accepted: 18th December 2024 | Available Online: 30th June 2025

DOI: 10.31436/japcm.v15i1.931

Aini Najwa Mohd Zahari[1], Tan Chin Keng[2*]

[1] Department of Quantity Surveying, Kulliyyah of Architecture and Environmental Design, International Islamic University Malaysia
[2]Department of Quantity Surveying, Kulliyyah of Architecture and Environmental Design, International Islamic University Malaysia*

**Corresponding author:*
Tan Chin Keng
Corresponding author's email: tckeng@iium.edu.my

ABSTRACT

Through implementing sustainable construction, Malaysia has progressively contributed to tackling climate change. However, the focus on new green buildings tends to overlook the environmental impacts of existing buildings. Recognising green retrofitting as a means to achieve sustainability, this research aims to maximise economic benefits such as capital appreciation, higher rental revenue, and improved cost-saving elements from green retrofitting existing buildings, thereby reducing the need for new construction.The objectives are to identify the process of green retrofitting existing buildings, determine the factors influencing economic benefits, and formulate ways to maximise these benefits in the Malaysian context. A qualitative approach was employed for data collection. A literature review was conducted to better understand the topic, and the issues identified formed the basis of the interview questions. Semi-structured interviews with five (5) practitioners involved in green retrofitting projects in Malaysia were carried out to gather insights. Content analysis was used to interpret the data.The study proposes seven (7) stages for green retrofitting: project proposal, project initiation, building assessment, identifying and choosing retrofit options, tendering, site implementation, and validation and verification. Ten (10) factors influencing economic benefits were identified, including market value, building age and lifetime, envelope performance, occupant behaviour, technology, project management, external support, client resources, expectations, and public awareness. Additionally, four (4) key strategies are recommended to guide consultants in maximising economic benefits: adherence to green rating systems, post-retrofitting maintenance, government initiatives, and engagement with building owners.This research supports the effective implementation of green retrofitting in Malaysia, helping consultants deliver retrofit measures that optimise economic outcomes and inform client decision-making.

Keywords: Economic benefits, existing buildings, green retrofitting, sustainability.

1.0 INTRODUCTION

Recognising the importance of environmental sustainability, sustainable construction has gained greater attention in Malaysia. Green buildings are an environmentally friendly construction. It is a significant part of the country's economic development. However,

despite the awareness of reducing construction impacts by adopting sustainability and green concepts, it is concerning that new developments are prioritised, neglecting the presence of existing buildings in Malaysia (Che Husin et al., 2019; Jagaragan et al., 2017). Existing buildings account for 30 percent of total energy use (Leung, 2018). Consequently, total energy consumption is anticipated to rise with the need for new development. While greening initiatives for an existing building are comparatively low in Malaysia (Yu et al., 2011), retrofitting existing buildings is a way to achieve green development goals. Green retrofitting is the process of adapting sustainable solutions, whether wholly or partially, such as integrating appropriate new technologies or green features to existing buildings that were not implemented or installed during the previous construction process to achieve sustainability.

Despite the notable advantages of retrofitting compared to demolition and reconstruction, retrofitting methods and implementation are not extensively employed in Malaysia (Che Husin et al., 2019). While the government encourages greening more existing buildings and has taken various initiatives, not all decision-makers take the extra steps to reap the benefits of green retrofitting. That being the case, green retrofitting existing buildings is only feasible if demanded by tenants, investors, and building owners because, after all, the decision to adopt such practices lies in their hands. Nevertheless, previous research on green retrofitting existing buildings in Malaysia focused primarily on the introduction and implementation, challenges and barriers, factors to retrofit and the study of potential retrofits in selected buildings. Therefore, the retrofit strategy's numerous environmental, social, and economic benefits must be considered to fulfil energy-saving targets and create a high-quality living environment.

Research by Zainul Abidin (2010) found that the economic benefit of green retrofitting existing buildings still needs to be fully understood relative to environmental and social benefits. Besides, because profits drive them and only focus on gaining more investment returns, they are less likely to implement retrofitting (Zainul Abidin, 2010; Gou, Lau & Prasad, 2013; Che Husin et al., 2019). To fill such a gap, this research is intended to gain insight into the dynamics of green retrofitting of existing building investments in Malaysia. This research focuses on maximising the economic benefits of green retrofitting in the Malaysian context to assist green consultants in recommending appropriate retrofit measures and influencing the client's decision-making process to green retrofit. Ultimately, it will provide evidence for obtaining a higher investment return from green retrofitting existing buildings while mitigating the consequences of new building construction and achieving sustainability. The study will also endorse the global agenda to achieve Goal 7 of the Sustainable Development Goals (SDGs) and the government's initiative to focus on environmental sustainability in the Construction Industry Transformation Plan (CITP).

2.0 LITERATURE REVIEW

Malaysia's pace of growth in the built environment is rapid, with environmental, social, and economic implications as it seeks to become a developed country by 2050 (Che Husin et al., 2019). The number of existing building stocks in Malaysia outnumbered the number of green buildings, totalling 41,747,608 (National Property Information Centre, 2017). Also, green buildings are primarily new builds instead of being retrofitted (Hong, Ibrahim & Loo, 2019: Jagaragan et al., 2017). So, even when each new building uses net-zero energy technology, the effect on the overall energy used for the existing building will take decades to be felt (Ab. Azis, Sipan & Sapri, 2013). Che Husin et al. (2019) also argued that green

retrofits are not commonly applied and practised in Malaysia.
Thus, the vast volume of GHG emissions from existing buildings would eventually become catastrophic for the environment. Moreover, even though energy efficiency strategies in Malaysia are continuously improving, construction key players still need to react well to the energy efficiency programs to retrofit the existing buildings because of numerous difficulties that hinder the decision-making process (Jagaragan et al., 2017). Consequently, despite Malaysia's positive involvement in the environmental revolution, few projects employ retrofitting strategies. Be that as it may, the government and construction players must coordinate all options available to achieve energy conservation goals and increase Malaysians' understanding of green retrofitting existing structures in preparation for its adoption.

2.1 The process of green retrofitting existing buildings

Typically, there is a workflow in a standard building project from start to finish, depending on the project's development. However, the workflow for green retrofitting existing buildings remains unclear. According to Che Husin (2017), Malaysia has no standard regulation or code of practice for green retrofitting existing buildings. The execution of green retrofitting projects is solely based on the design reference guide given by GBI, the GreenRE rating standard for existing buildings by the Real Estate and Housing Developers' Association Malaysia (REHDA); Building Sector Energy Efficiency Project (BSEEP) for passive and active design; and Malaysian Standard MS1525:2014 (Che Husin, 2017). Nikman Lee et al. (2020) also agreed that there is still a lack of emphasis on the critical phases for green retrofit.
On the other hand, although the concept of green retrofitting to achieve substantial energy savings is close to constructing a new green building, the processes are entirely different (Nikman Lee et al., 2020). This is because retrofitting is performed on any building, and it is up to the building's owner to decide on its key goal and scope (Yasin et al., 2017). Therefore, before embarking on a retrofitting project, it is crucial to be aware of the measures and processes involved, as specific processes used in one project might not be relevant to other projects. Hence, refined from the studies of Ma et al. (2012), Nikman Lee et al. (2020), Okorafor (2019), and Geldenhuys (2017), the processes can be divided into three stages of green retrofitting an existing building: pre-retrofit, during the retrofit, and post-retrofit. The processes are shown in Figure 1 below.

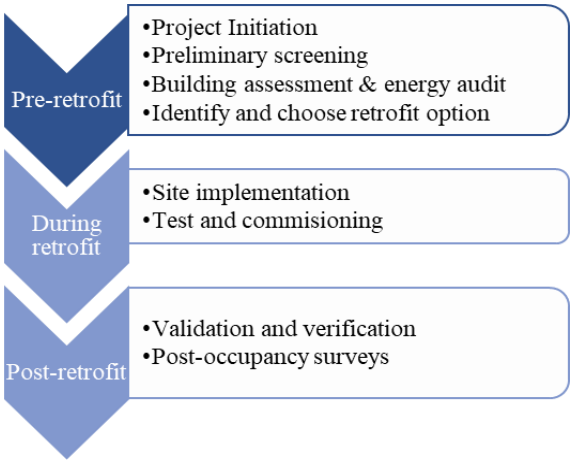


Fig. 1: The process of green retrofitting existing buildings

2.2 Factors influencing the economic benefits of green retrofitting of existing buildings

Green retrofitting measures make the project more economically viable (Al-Kodmany, 2014), so greater payback is advocated in the long term. Even so, the contradictory views on initial costs and payback period and the client's cost restriction to pay for green retrofits inevitably restrict further steps to incorporate green retrofitting (Weerasinghe & Ramachandra, 2020; Che Husin, 2017). Therefore, to increase the potential demand for adapting green retrofits to existing buildings, return on investment (ROI) factors such as capital appreciation, greater rental revenue, and enhanced cost-saving elements are expected (Isa, Abd Rahman, Sipan & Ting, 2013; Zainul Abidin & Mokhtar Azizi; 2016). The costs associated with going green in building projects can be categorised into hard and soft costs. Technically, the final decision to green retrofit would affect these costs, but the effect happens due to certain factors. There are nine factors influencing the economic benefits of green retrofitting of existing buildings found in past literature, as listed in Table 1.

Table 1: Factors influencing the economic benefits of green retrofitting

No	Factors Influencing the Economic Benefits	Authors
1	Building market value	Ayyad & Fekry (2016); IMT (2013)
2	Building age and lifetime	Ayyad & Fekry (2016); Che Husin et al. (2019); Bruce et al. (2015); Ma et al. (2012)
3	Building envelope performance	Ayyad & Fekry (2016); Che Husin et al. (2019); Mohd-Rahim et al. (2017)
4	Occupant behaviour	Ayyad & Fekry (2016); Che Husin et al. (2019); Ma et al. (2012); IMT (2013); Mohd-Rahim et al. (2017)
5	Technology	Mohd-Rahim et al., (2017); Ma et al. (2012); Zainul Abidin & Mokhtar Azizi (2016)
6	Management	Mohd-Rahim et al. (2017); Zainul Abidin & Mokhtar Azizi (2016)
7	External support: Government policies and regulation	Ma et al. (2012); Zainul Abidin & Mokhtar Azizi (2016)
8	Location and accessibility	Bruce et al. (2015); Ma et al. (2012); Oloke et al. (2013)
9	Client resources and expectations	Ma et al. (2012)

2.3 Ways to maximise the economic benefits of green retrofitting of existing buildings

In general, cost benefits and energy savings are the key drivers towards retrofitting an existing building. However, the benefit only accrues to tenants, known as the "split incentive" problem, whereby building owners make energy-saving investments that mainly benefit tenants. However, they may be willing to pay less extra rent than the energy savings implied (Kok, Miller & Morris, 2012). Therefore, the various factors mentioned must be considered to achieve the economic benefits. Most seminal authors from past literature have defined appropriate retrofit options to ensure the effective implementation of green retrofitting of existing buildings. Overall, the most mentioned retrofit options include building fabric insulation, building envelope, windows retrofit, green roof, energy-efficient equipment, low energy technologies, water-efficient fittings, solar photovoltaics (PV) systems, management and maintenance, as well as recycling and waste management practices.

Each of these measures would have a different effect on the performance of retrofit buildings. Furthermore, it can be concluded that applying the whole-retrofit approach that incorporates fabric, system, and renewable measures yields the best-retrofitting outcome by incorporating all the green building features, significant value enhancement in green retrofit projects in the range of 10% to 20% could be realised (Geltner, Moser & Van de Minne, 2017). However, no known study has specifically outlined how to maximise the economic benefits of green retrofitting. Based on previous literature, it can only be deduced that using local materials, following green building rating systems, maintaining after green retrofitting, government initiatives, and discussion with the building owner could be a significant way to accomplish this.

3.0 METHODOLOGY

The study's research strategy is qualitative. Exploratory research is used when more information about the subject is needed. Because green retrofitting has yet to be extensively implemented in Malaysia, qualitative research is deemed appropriate for this research. This is because there is flexibility in how and when the questions are presented and how the interviewee can react (Edwards & Holland, 2013).

A literature review is conducted to understand the research topic and achieve the three main objectives: the process of green retrofitting, the factors influencing its economic benefits, and ways to maximise these benefits. The information and references from the literature review are significant in this research because they will serve as a foundation for preparing primary data collection.

The data collection method chosen for this research is semi-structured interviews, which aligns with this qualitative research. Expert sampling is employed for sample selection, which entails forming a sample group of people who can explain using their experience or those who specialise in a specific area (Etikan & Bala, 2017). In brief, the targeted respondents are professionals from construction firms or companies directly or indirectly involved in green retrofitting projects. This includes green building consultants such as architects, Green Building Index facilitators, mechanical and electrical engineers, and other practitioners involved in green retrofitting projects. Five green retrofitting projects were found for data collection for this study. One respondent from each of the five projects was interviewed to validate the findings, capable of producing reliable and credible data to meet the research's purpose.

For this research, the answers from the semi-structured interview will be evaluated and analysed using content analysis. Qualitative content analysis transforms a large amount of text into a well-coordinated and succinct summary of key findings (Erlingsson & Brysiewics, 2017). The data is transcribed into paragraphs using Microsoft Word 2013 to generate and construct the results and findings.

The limitation of a small sample size of data collection due to adopting semi-structured interviews is acknowledged.

4.0 RESULTS

4.1 The process of green retrofitting of existing buildings in Malaysia

The first objective is to discuss the process of green retrofitting existing buildings in Malaysia, as identified from the semi-structured interview. Respondent 2 was only involved in the green retrofitting proposal stage because the project was not realised and only

progressed for the proposal; as such, only the proposal was briefed in detail. Table 2 shows the summary of the process specified by the interviewees.

Table 2: Process of green retrofitting existing buildings in Malaysia

Category	Process	R1	R2	R3	R4	R5
Pre-retrofit	Project proposal	✓	✓	-	-	-
	Project initiation	✓	-	✓	✓	✓
	Building assessment (structural and energy audit)	✓	-	✓	✓	✓
	Identify and choose retrofit options	✓	-	✓	✓	✓
	Tendering	✓	-	✓	✓	✓
During retrofit	Site implementation	✓	-	✓	✓	✓
Post-retrofit	Validation and verification	✓	-	✓	✓	✓

i. Project proposal: In this stage, the client approaches a green building consultant to green retrofit a building. However, since the project proposal stage is where the client has yet to agree to green retrofit their building, the green consultant would only propose measures based on the GBI rating tool deemed appropriate based on the client's budget.

ii. Project initiation: This stage starts when the client wishes to proceed, and they would inform the consultant about the project's needs and goals. A gap analysis is conducted in which green consultants analyze the current condition of the building by conducting a site visit and certifying the building as it is. During the gap analysis, the consultant will determine what is required for the building to achieve the minimum standard for efficiency according to MS 1525 and what is required to get Certified, Silver, Gold, or Platinum level. A cost-benefit analysis is also provided at each level of ratings for the client to decide.

iii. Building assessment (structural and energy audit): After selecting the level of retrofit to pursue, the building's structural and system plans are obtained from the client. The green consultant is called to conduct two types of audits to assess the building's existing conditions: structural audits and energy audits. These audits are performed manually or using a calibrated model using software. Once completed, the GBI template is utilised to conduct performance evaluations to determine certifiable criteria. If the client decides to pursue green certification, the GBI template will serve as a guideline.

iv. Identify and choose retrofit options: The green consultant will establish a short list of low-, medium-, and high-cost items, categorised according to which measures will give more additional GBI points. The client's priority is also considered because each client has different aims. The consultant will then estimate the project's cost with the contractor. Finally, the payback period can be easily calculated.

v. Tendering: The tendering procedure is similar to conventional construction. Besides, the type of contract used depends on the retrofit level that the project aims for. A contract is usually required for extensive retrofits. Furthermore, a tax incentive claim must be made prior to construction and must be approved and agreed upon.

vi. Site implementation: Once the contractor is chosen, implementation begins. Contractors perform conventional construction work but must adhere to an additional component: the green criteria.

vii. Validation and verification: The green consultant would monitor the project to verify

that whatever retrofit is implemented meets the initial aim. The energy usage and cost of electricity will be recorded during the operation to evaluate the effectiveness of energy-efficiency drives. The report will be assessed by a certifier, who will subsequently arrange site verification. Finally, the post-occupancy survey must be undertaken. Furthermore, the study revealed that the stage of project initiation and identifying and choosing a retrofit option are the most critical stages to the success of a green retrofitting project. This is because gap analysis during project initiation establishes the project's goals. So, it must be based on more than assumptions or any rule of thumb from past projects.

Additionally, the consultant must assist clients in identifying the most appropriate measures to determine the certification level and the amount of money the client must spend on its performance. Choosing the best retrofit options is also crucial for maximising the economic benefits, as adopting the best energy-saving technology lowers energy consumption. This will lower operating costs and electricity bills, as reflected in the client's monthly electricity payment. Funding and maintenance are also crucial because cost constraints limit the client's ability to adopt better technologies that may provide a higher financial return. Maintenance throughout the building's operations helps ensure that the retrofit measures operate as intended to achieve maximum economic benefits.

4.2 Factors influencing the economic benefits of green retrofitting of existing buildings

The second objective of this study is to determine the factors influencing the economic benefits of green retrofitting existing buildings. Table 3 summarises the interviewees' perspectives on the factors.

Table 3: Factors influencing the economic benefits of green retrofitting existing buildings

No	Factors influencing the economic benefits of green retrofitting	R1	R2	R3	R4	R5
1	Building market value	✓	✓	✓	✓	✓
2	Building age and lifetime	✓	✓	✓	✓	✓
3	Building envelope performance	✓	✓	✓	✓	✓
4	Occupant's behaviour	✓	✓	✓	✓	✓
5	Technology used	✓	✓	✓	✓	✓
6	Project Management	✓	✓	✓	✓	✓
7	External support: Government policies and regulation	✓	-	✓	✓	✓
8	Location and accessibility	-	-	-	-	-
9	Client resources	✓	✓	✓	✓	✓
10	Client expectations	✓	✓	✓	✓	✓
11	Other factors	Public awareness	-	-	Public awareness	Public awareness

i. Building market value: All respondents agreed that the property's value would increase when retrofitted green, especially when the building is certified using the GBI rating tool—furthermore, rental and sales value rise, and the occupancy rate increases for retrofitted buildings.
ii. Building age and lifetime: Respondent 1 asserted that if the building is too old to retrofit, the economic benefits will be impacted, as much money must be spent to

keep it standing. On the other hand, Respondents 2 and 3 believed that air-conditioning and lighting systems are the two major energy consumers. So, the economic benefits would only be affected to some extent. Nevertheless, Respondents 4 and 5 believed it relies on how the building has been operated and maintained throughout the years.

iii. Building envelope performance: All respondents agreed that higher building envelope performance would result in more significant economic gains. Although the emphasis is on active design, running the air conditioner at full blast may not be necessary if the structure is appropriately designed because it already has adequate ventilation.

iv. Occupant behaviour: If an occupant leaves a room unattended with the air conditioning or lights on, this human behaviour will eventually affect energy use. Good building performance includes occupants' contributions, so if the occupier wants to reap the most economic benefits, they will lower operational costs following the green retrofit.

v. Technology used: According to the respondents, the air conditioning and lighting systems are the primary energy consumers in a fully air-conditioned building. Therefore, the consultant must assess the many technologies in the simulation to determine the best cost-cutting strategy with the highest payback. Furthermore, while discussing economic benefits, the cost primarily comes from energy efficiency, as minimal capital investment eventually results in a higher return on investment.

vi. Project management: Project management impacts economic gains by ensuring that any features installed during retrofitting are taken care of and not simply disrupted by others. Thus, the project management team must examine all aspects to regulate and verify that everything is on schedule, not over budget, and within the project's requirements.

vii. External support: A considerable amount of government incentive significantly increases the ROI, maximising the economic benefits. Accordingly, the availability of renewable energy programs or tax incentives for energy efficiency will encourage more developers to retrofit their existing buildings. This particularly entices building owners and developers and attracts buyers and renters.

viii. Location and accessibility: All respondents believed that location is not a factor in achieving economic benefits; however, the rationale for the building to be retrofitted is one apparent reason. The location of existing buildings is fixed and does not affect economic gains.

ix. Client resources: The availability of resources influences how far the retrofit can invest in better technology. Suppose the client has adequate resources and is prepared to invest more in building technology or enhance the building's overall efficiency. In that case, there is a greater likelihood of obtaining a better ROI. Nonetheless, Respondent 5 argued that a considerable capital cost or investment is sometimes required to get a high ROI.

x. Client expectations: The consultant must often recommend measures based on the client's goals and requirements. To comply, instead of implementing a complex system, the consultant would recommend technologies that are simple to implement and will be appreciated by the client.

xi. Public awareness: Public awareness is critical, and raising knowledge among the public and the client is beneficial. Therefore, instilling a green mindset to disseminate

knowledge on running and maintaining the property over time is essential. As a result of enhanced knowledge, there will be more demand from the public, boosting the overall worth of the building and providing higher economic benefits.

Overall, in achieving the economic benefits, the study discovered that client expectations, technology used, and external support are the most critical influences. This is because the return on investment (ROI) for some of the systems and devices used has a direct monetary advantage in optimising the economic benefits of green retrofitting. Moreover, the client's expectation and willingness to engage in green retrofitting is critical. Suppose a client expresses an interest in a particular requirement; the consultant will follow through on it because if the client is uninterested in the technologies invested, it would be a waste when they fully use it. So, no economic benefits can be generated if a building with much technology is not used effectively. Besides, the building industry is always looking for possibilities in the government's incentives, as a considerable amount of this incentive also increases the ROI.

4.3 Ways to maximise the economic benefits of green retrofitting of existing buildings

The third section recommends ways to maximise the economic benefits of green retrofitting existing buildings. Table 4 illustrates the research findings from the semi-structured interview. Overall, the respondents agreed upon only four of the five ways derived from the literature.

Table 4: Ways to maximise the economic benefits of green retrofitting of existing buildings

No	Ways to maximize the economic benefits of green retrofitting	R1	R2	R3	R4	R5
1	Use of local materials	-	-	✓	-	-
2	Follow green building rating systems	✓	✓	✓	✓	✓
3	Maintenance after green retrofitting	✓	✓	✓	✓	✓
4	Government's initiative	✓	✓	✓	✓	✓
5	Discussion with the building owner	✓	✓	✓	✓	✓
6	Other factors	-	-	-	-	-
7	Retrofit technologies suggested	Active design	Active design	Active design	Active design	Active design
8	Challenges and solutions	Lack of client's awareness	Client's budget	Client's budget	Lack of client's awareness	Poor operation team

i. Use of local materials: Only Respondent 3 agreed to use local materials, believing that because Malaysia is now producing green technologies at a lower cost, local materials would help achieve economic benefits. Meanwhile, others opined that using local materials is only advantageous from a sustainability standpoint. Hence, using local materials is believed to benefit the country more economically than the client.

ii. Follow green building rating systems: All respondents agreed that the green building rating system is an appropriate guideline for the consultant. Specifically, the Non-

Residential Existing Building (NREB) assessment criteria must be followed for existing buildings. Accordingly, using the green rating tool helps clients save even more money in the long run and achieve economic benefits because the energy bill will be very low.

iii. According to all five respondents, maintenance after green retrofitting is the most efficient strategy for maximising economic gains. If a system installed is misused and not maintained, retrofitting efforts are ineffective, and obtaining a satisfactory-performing building is possible. Hence, maintenance ensures that overall operating costs can be reduced and investments remain profitable.

iv. Government initiative: All respondents agree that government initiatives are a way to obtain economic benefits. Therefore, when the government provides initiatives, the desire for individuals to retrofit their buildings increases.

v. Discussion with the building owner: Finally, all respondents agreed that discussing the retrofitting measures with the building owner is a viable way to achieve economic benefits. Building owners will value them more if they understand the measures implemented. Consulting with the building owner is preferable because it helps the consultant understand their preferences and needs when suggesting retrofit measures. Besides, it allows the consultant to advise them on the level of certification necessary from the outset.

Moreover, all respondents agreed that among all retrofit technologies, heating and cooling reduction through active design is initially promoted and typically based on the building's current state. Because the passive design is easier to implement, the consultant should start with the passive design, if feasible. In addition, the respondents specified several challenges in achieving economic benefits. First, the need for more awareness of clients makes it difficult to persuade them to invest in retrofitting efforts. Hence, case studies illustrating the wide variety of advantages can be developed, and the client must be informed of the benefits early on to increase their budget. Also, the client's budget is a challenge, as an inadequate budget limits the consultants' ability to propose the best retrofit technologies. To address this, the green consultant must show them the potential costs of implementing the proposed measures. A poorly equipped operation team is also a challenge because if the building is adequately maintained, the objective of retrofitting is wholly recovered. Thus, how the building is maintained is critical to reaping the economic benefits. Accordingly, training is required to ensure that the client or operation team properly understands how to operate the facility.

5.0 DISCUSSIONS

The green retrofitting of existing buildings includes the project proposal, initiation, building assessment, identifying and choosing retrofit options, tendering, site implementation, and validation and verification. During project initiation, a cost-benefit analysis is performed at each rating level, which allows the client to choose which degree of certification to pursue and how much they must pay to upgrade to the nearest rating. This is consistent with Summers' (2009) results that developing a budget indicates precisely how far the project will progress in the retrofitting process, whether it is a simple or major retrofit. Then, during the building assessment stage, Okorafor (2019) mentioned in the literature study that energy audits are performed using energy mapping and walk-through surveys. Nevertheless, no mention is made of the guidelines it employs. Thus, the interview discovered that energy audits are generally conducted in Malaysia following the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Guideline standards.

Then, the auditing team will identify, select, and generate recommended measures based on manual logging or calibrated software using IESVE. However, since using the IESVE software depends on the availability of a vast amount of information, it is preferable for the consultant to start with manual logging and build a model based on the data provided. In addition, the interview revealed that recommending retrofit technologies depends on the client because everyone has a unique set of goals. Moreover, a retrofitting project may be difficult and complex depending on the scale of retrofit works and the available resources. Ma et al. (2012) also acknowledged that implementing such retrofit measures could cause significant disruption to the building and occupants' activities. That being the case, it is critical to conduct green retrofitting to adhere to the green standard while also considering various factors that may restrict the project's efficacy.

As for the factors, all respondents agreed on the factors identified from the literature review. However, although there is indeed a value in the location and accessibility of a building, location and accessibility are excluded. This is because the site cannot be chosen, and every measure taken is based on the state of the existing buildings. Thus, location is only considered a factor for the building owner to retrofit, not attaining economic benefits. Moreover, although the age and lifetime of the building are agreed to be a factor, Respondent 1 argued that if the building is too old to retrofit, the client's economic benefits will be limited because a significant amount of money has to be spent merely to keep the building standing. Ayyad and Fekry (2016) also agreed that there is only a limited time to reap the benefits because the building is nearing the end of its useful life. However, Respondents 2 and 3 believe that because lifetime primarily pertains to active components, this aspect has a minor impact on the economic benefit as it may or may not contribute to increasing energy consumption. The consultant must examine various possibilities to discover the best options with the most significant payback.

For ways to maximise the economic benefits of green retrofitting of existing buildings, only Respondent 3 agreed on using local materials, believing that because Malaysia is now producing green technologies at a lower cost, local materials would aid in achieving economic benefits. This is supported by the studies of Prabatha et al. (2020) and Azimi (2013), which show that as more building owners become aware of the potential savings, they will demand new and upgraded green features, allowing for increased production. Nevertheless, because there are few green technology providers in Malaysia, high demand would drive the price to the point where it is no longer affordable. Nonetheless, if the number of providers grows, using local materials would allow the client to reap the economic benefits.

Moreover, according to Azimi (2013), because energy efficiency has the highest score allocation in the NREB Assessment Criteria, it would increase the cost because energy components are expensive. However, from the interview, it was found that going green is less expensive than claimed, as they only need to spend an additional 1.1 per cent on average for the Certified level. In contrast, the average for Silver, Gold, and Platinum is 1.8 per cent, 3.8 per cent, and 6.1 per cent, respectively. Accordingly, using the green rating tool helps clients save even more money in the long run and helps achieve economic benefits due to lower operating costs from energy saving.

6.0 CONCLUSION

In conclusion, this research can fulfil its aim and objectives through primary data collection. It is concluded that green retrofitting existing buildings in Malaysia comprises seven (7) stages: project proposal, project initiation, building assessment, identifying and choosing retrofit options, tendering, site implementation, and validation and verification. This finding is a possible reference source for green building consultants carrying out green retrofitting of an existing building in Malaysia. Furthermore, the study revealed that the stage of project initiation and identifying and choosing a retrofit option are the most critical stages to the success of a green retrofitting project. As for maximising the economic benefits, identifying and choosing the best retrofit options, funding, and maintenance are crucial.

Next, the purpose of investigating the factors is to assist consultants in concentrating more on the factors influencing the economic benefits before beginning to green retrofit an existing building. It demonstrates to clients that there are considerable economic benefits to green retrofitting their existing buildings, which also enhances the future demand for green retrofits. The factors are building market value, age and lifetime, building envelope performance, occupant's behaviour, the technology used, project management, external support, client resources, client expectations, and public awareness. As a result, the consultant must focus more on these factors in optimising the client or building occupant's economic benefits. Furthermore, the study discovered that the factors respondents believe have the most critical influence on the economic benefits are client expectations, technology used, and external support.

Finally, only four of the five approaches described were acknowledged to deliver economic advantages. This includes following green building rating systems, maintenance after green retrofitting, government initiatives, and discussion with the building owner, with maintenance as the most essential. The study also revealed that the best retrofit technologies for economic benefits are active design, passive design, and renewable energy systems. Besides, a lack of client awareness, an insufficient budget, and a poor operation team are challenges in obtaining economic benefits. As a solution, it is advised that more case studies demonstrating the wide range of benefits be developed. Furthermore, the consultant should show them the possible expenses of adopting the recommended solutions so that they can spend their money wisely. Training is also necessary to guarantee that the client or operating team understands how to run the facility effectively.

7.0 FUTURE RESEARCH DIRECTION

Based on the current study's findings, the subject area of green retrofitting implementation in Malaysia can be further expanded, particularly to include ways to enhance the green retrofitting of existing buildings to mitigate the effects of new construction and achieve sustainability.

ACKNOWLEDGMENTS

The authors would like to express their gratitude and appreciation to all who contributed to this study, directly or indirectly.

REFERENCES

Ab. Azis, S. S., Sipan, I., & Sapri, M. (2013). The potential of implementing property tax incentives on green building in Malaysia. *American Journal of Economics*, *3*(2), 63–67. doi:10.5923/j.economics.20130302.01

Al-Kodmany, K. (2014). Green retrofitting skyscrapers: A review. *Buildings*, *4*, 683–710. doi:10.3390/buildings4040683

Ayyad, K. M., & Fekry, A. A. (2016). Green Retrofitability Index (GRI) as an indicator for decision-makers in green retrofitting projects. *Procedia Environmental Sciences*, *34*, 233–244. doi:10.1016/j.proenv.2016.04.022

Azimi, N. A. (2013). *Cost study on a green building: Green Energy Office (GEO) Building* (Degree's thesis, International Islamic University Malaysia).

Bruce, T., Zuo, J., Rameezdeen, R., & Pullen, S. (2015). Factors influencing the retrofitting of existing office buildings using Adelaide, South Australia, as a case study. *Structural Survey*, *33*(2), 150–166. doi:10.1108/SS-05-2014-0019

Che Husin, S. M., Mohd Zaki, N. I., & Abu Husain, M. K. (2019). Implementing sustainability in existing buildings through retrofitting measures. *International Journal of Civil Engineering and Technology, 10*(1), 1450–1471.

Che Husin. S.M. (2017). *Retrofitting existing buildings to reduce energy consumption*. (Degree's thesis, University Teknologi Malaysia).

Edwards, R., & Holland, J. (2013). *What is qualitative interviewing?* In Chow, G (Ed.)*, 'What is' research methods series* (pp.1-125). London, United Kingdom: Bloomsbury Academic.

Erlingsson, C., & Brysiewicz, P. (2017). A hands-on guide to doing content analysis. *African Journal of Emergency Medicine, 7*, 93-99. doi:10.1016/j.afjem.2017.08.001

Etikan I, Bala K. (2017). Sampling and sampling methods. *Biometrics & Biostatics International Journal,* 5(6), 215-217. doi:10.15406/bbij.2017.05.00149

Geldenhuys, H. J. (2017). *The development of an implementation framework for green retrofitting of existing buildings in South Africa.* (Master's thesis, University of Stellenbosch).

Geltner, D., Moser, L., & Van de Minne, A. (2017). The effect of green retrofitting on US office properties: An investment perspective. *SSRN Electronic Journal*. doi:10.2139/ssrn.3028183

Gou, Z., Lau, S. S. Y., & Prasad, D. (2013). Market readiness and policy implications for green buildings: A case study from Hong Kong. *Journal of Green Building*, *8*(2), 162–173. doi:10.3992/jgb.8.2.162

Hong, W. T., Ibrahim, K., & Loo, S. C. (2019). Urging green retrofits of building facades in the tropics: A review and research agenda. *International Journal of Technology*, *10*(6), 1140–1149. doi:10.14716/ijtech.v10i6.3627

IMT. (2013). *Green building and property value.* Retrieved from https://www.appraisalinstitute.org/assets/1/7/Green-Building-and-Property-Value.pdf.

Isa, M., Abd Rahman, M. M. G. M., Sipan, I., & Ting, K. H. (2013). Factors affecting green office building investment in Malaysia. *Procedia- Social and Behavioural Sciences*, *105*, 138–148. doi:10.1016/j.sbspro.2013.11.015

Jagarajan, R., Abdullah Mohd Asmoni, M. N., Mohammed, A. H., Jaafar, M. N., Lee, Y. M. J., Baba, M. (2017). Green retrofitting – A review of current status, implementations and challenges. *Renewable and Sustainable Energy Reviews, 67*, 1360-1368. doi:10.1016/j.rser.2016.09.091

Kok, N., Miller, N., & Morris, P. (2012). The economics of green retrofits. *Journal of Sustainable Real Estate*, *4*(1), 4–22. doi:10.1080/10835547.2012.12091838

Leung, B. C. M. (2018). Greening existing buildings [GEB] strategies. *Energy Reports*, 4, 159–206. doi:10.1016/j.egyr.2018.01.003

Ma, Z., Cooper, P., Daly, D., & Ledo, L. (2012). Existing building retrofits: Methodology and state-of-the-art. *Energy and Buildings, 55,* 889–902. doi:10.1016/j.enbuild.2012.08.018MGTC

Mohd-Rahim, F. A., Pirotti, A., Keshavarzsaleh, A., Zainon, N., & Zakaria, N. (2017). Green construction project: A critical review of retrofitting awarded green buildings in Malaysia. *Journal of Design and Built Environment*, 11–26. https://doi.org/10.22452/jdbe.sp2017no1.2

National Property Information Centre. (2017). *Summary of existing stock for residential, commercial, leisure and industrial property Sub-sector as of Q1 2017.* Retrieved from https://www.jpph.gov.my/v3/en/download/6-summary-of-existing-stock-for-residential-commercial-leisure-and-industrial-property-sub-sector-as-at-q1-2017-2/

Nikman Lee, M. S., Mohamed, S., Nasid Masrom, M. A., Abas, M. A., & Seow, T. W. (2020). Risk in green retrofit

projects: A preliminary study on energy efficiency. *IOP Conference Series: Earth and Environmental Science, 549,* 1-11. doi:10.1088/1755-1315/549/1/012084

Okorafor, C. (2019). *Retrofitting to reduce carbon emissions from existing buildings in Bloemfontein, South Africa*. *(Doctor of Philosophy's thesis, Central University of Technology, Free State).*

Oloke, O. C., Simon, F. R., & Adesulu, A. F. (2013). Examining the factors affecting residential property values in Magodo neighbourhood, Lagos State. *International Journal of Economy, Management and Social Sciences*, *2*(8), 639–643.

Prabatha, T., Hewage, K., Karunathilake, H., & Sadiq, R. (2020). To retrofit or not? Making energy retrofit decisions through life cycle thinking for Canadian residences. *Energy and Buildings*, *226*, 1-25. doi:10.1016/j.enbuild.2020.110393

Summers, B. (2009). Green retrofitting 101. *Strategic Sustainability Consulting*. Retrieved from https://strategic-sustainability.squarespace.com/s/White-Paper_Green-Retrofitting-101_FINAL.pdf

Weerasinghe, A. S., & Ramachandra, T. (2020). Costs and benefits of green retrofits: A case of industrial manufacturing buildings in Sri Lanka. *The 10th International Conference on Engineering, Project, and Production Management, Lecture Notes in Mechanical Engineering*, 227–237. doi:10.1007/978-981-15-1910-9_19

Yasin, M. N., Abdullah, A. H., Abdul Hamid, H., & Wahab, N. S. N. (2017). Potential retrofit of existing Sultan Ismail Parliament Building, Johor, to a green building. *MATEC Web of Conferences, 103*, 1-7. doi:10.1051/matecconf/201710305008

Yu, S. M., Tu, Y. & Luo, C. (2011). Green retrofitting costs and benefits: New research agenda. *Working Paper Series, Institute of Real Estate Studies, National University of Singapore,* 1–15.

Zainul Abidin, N.& Mokhtar Azizi, N. Z. (2016). Identification of factors influencing costs in green projects. *World Academy of Science, Engineering and Technology International Journal of Civil and Environmental Engineering, 10*(9), 1160-1165. doi:10.5281/zenodo.1126421

Zainul Abidin, N. (2010). Investigating the awareness and application of sustainable construction concept by Malaysian developers. *Habitat International*, *34*(4), 421–426. doi:10.1016/j.habitatint.2009.11.011

JOURNAL OF ARCHITECTURE, PLANNING & CONSTRUCTION MANAGEMENT
Volume XX Issue X, 202X E-ISSN: 2462-2222 ISSN: 2231-9514

FRAMING NATIONAL IDENTITY AND UNITY THROUGH VISUAL DESIGN PRINCIPLES IN MALAYSIA'S POST-INDEPENDENCE ARCHITECTURE

Received: 30th September 2024 | Accepted: 25th March 2025 | Available Online: 30th June 2025

DOI: 10.31436/japcm.v15i1.936

Amir Sheriff Mohd Sheriff[*], Bashira Mohd Bahar[2]

[1] Studies of Architecture, School of Architecture and Interior Architecture, College of Build Environment, Universiti Teknologi Mara, Cawangan Selangor Kampus Puncak Alam, amirsheriff@uitm.edu.my*
[2] School of Architecture and Built Environment, Taylor's University, Bashira.MohdBahar@taylors.edu.my

Corresponding author: **Amir Sheriff Mohd Sheriff*
Corresponding author's email: amirsheriff@uitm.edu.my

ABSTRACT

Malaysia's Declaration of Independence in 1957, the architecture of the era adopted an international modern style for many government buildings and mosques, heavily influenced by British architecture. This transition aligns with Edward Said's critique in *Orientalism*, which argues that colonial architecture imposed foreign identities onto built environments, reinforcing Western dominance. In response, Malaysia actively reclaimed its architectural narrative by integrating local cultural elements into national structures. However, as Homi Bhabha (2012) suggests, the formation of national identity is an ongoing process, particularly for post-colonial nations still negotiating their place between historical influences and contemporary aspirations. This study investigates how the facades of Stadium Merdeka, the Parliament Building, and the National Mosque articulate national unity and reflect Malaysia's evolving architectural identity. Employing a two-phase visual analysis methodology, the research evaluates nine Visual Design Principles (VDPs)—harmony, unity, balance, rhythm, emphasis, proportion, contrast, repetition, and movement. A Visibility Scoring System is used to assess the prominence of these principles, while comparative case studies from other post-colonial nations provide contextual grounding. The findings identify the Parliament Building as the most cohesive in terms of visual unity and harmony, whereas the other structures exhibit challenges in rhythm and emphasis. The study highlights the symbolic importance of architectural facades in shaping national identity and nation-building, providing critical insights for developing future design strategies in multicultural contexts.

Keywords: National buildings, Post-colonial architecture, Visual Design Principle, facade design, Stadium Merdeka, Parliament Building, National Mosque.

1.0 INTRODUCTION

Post-independence reconstruction in Malaya during the 1960s was aimed at promoting unity and national identity through infrastructure development. According to Hussain (2017), architecture is perceived as a means of establishing a collective national identity. This concept is widely acknowledged as a key element in nation-building in Malaysia (Koivunen, 2016). Currently, national buildings in Malaysia are often regarded as symbols of progress and economic prosperity.

During the period of post-colonialism, after Malaysia gained independence on 31st August 1957, the architecture stylistic selections reflected the effort to establish a national identity

that is distinct from its colonial past. During this time, the Modern Movement in architecture in the West was at its tail end. However, it remained influential in developing nations, including Malaysia. Due to the limited number of universities in Malaya at the time, wealthier families sent their children to Britain or India for higher education (Subramani & Kempner, 2002). The graduates who returned brought with them skills and knowledge heavily influenced by the modernist style (Hussain, 2017). This influx of modernist ideas shaped the design aspirations for government and public buildings, which came to symbolise progress and unity.

The way architecture looks and feels plays a crucial role in shaping national unity as it reflects shared cultural values and aspirations. In Malaysia, the pursuit of a national architectural identity has played a crucial role in promoting racial harmony and unity. Ismail et al. (2020) emphasise the need for a framework that defines this national architectural identity, highlighting its significance as a symbol of unity in a multi-racial society. By incorporating design elements that reflect the country's diverse cultural heritage, architecture can serve as a powerful unifying force, fostering a collective national identity.

For a building to embody the nation's aspirations, its first impression should evoke a sense of progress and unity, reinforcing national identity. Obaleye et al. (2021) assert that building image is a central element in the experience of the built environment. As the first encounter with a building, the façade plays a crucial role in shaping public perception and connection, with unique architectural features that influence its reception (Ghomeshi & Jusan, 2013). Facades, typically encompassing the front, sides, and rear of a building, serve as its outer covering (Moghtadernejad et al., 2019). Given that the façade provides the initial impression of a building's purpose, it should be considered a means of fostering national unity, particularly in the context of nation-building in Malaysia.

Designers have long utilized Visual Design Principles (VDP) to analyse public perception of media. However, in architecture, the Architectural Design Principle (ADP) usually takes precedence. ADP is a comprehensive method for developing buildings that balances social context, aesthetics, practicality, and environmental factors (Lawson, 2012). While ADP addresses a broad range of considerations, VDP focuses specifically on how two-dimensional elements are perceived (Lidwell et al., 2010). In the context of façade design and its visual impact, VDP is a more suitable tool for analyzing how design elements contribute to national identity and unity.

Therefore, this paper aims to identify the significance of the visual elements of national building facades, focusing on how they contribute to fostering national unity. It aims to identify and categorize the Visual Design Principles (VDPs) present in the façade designs of selected national buildings in Malaysia, with a focus on how these principles contribute to promoting unity within the nation.

2.0 LITERATURE REVIEW

Architecture plays a vital role in shaping national identity by reflecting cultural heritage, socio-political aspirations, and collective memories. Smith (1991) listed six foundation elements of national identity: (i) a collective proper name, (ii) a sense of solidarity for significant sectors of the population, (iii) one or more differentiating elements of a common culture, (iv) an association with a specific 'homeland', (v) a myth of common ancestry, (vi) and a shared historical memory. These aspects are translated through myths, traditions, and symbols that shape a society's identity. Architecture acts as a tangible vessel to preserve these memories and narratives (Jackson, 2006). These elements are notably relevant in multi-ethnic countries

like Malaysia, where architecture is intended to transcend ethnic divisions and represent national unity.

Visual design serves as a tangible manifestation of a product's objectives, focusing on the aesthetic, methodological, and stylistic presentation of information. Artists, designers, and architects creatively employ the language of visual design to convey messages effectively (Kress & Van Leeuwen, 1996). However, visual design is not universally understood, as it depends on various design elements and principles to convey meaning effectively. This includes disciplines within environmental design such as architecture, interior design, and landscape design (Demir et. al, 2021).

Architecture shapes cities and national identity, whether by standing out as a landmark or blending into its surroundings (Quici, 2017). A building's first impression should reflect progress and unity, reinforcing the nation's aspirations. The facade, as the most visible element, plays a key role in shaping how people perceive and connect with a building (Obaleye et al. 2021). Its design influences public experience, making it more than just an exterior, as it becomes a symbol of identity and shared belonging (Ghomeshi & Jusan 2013).

2.1 Visual Design Principle (VDP)

Visual Design Principles (VDP) provide a foundation for organizing design elements in a way that is both visually appealing and functional. While often associated with graphic design, these principles are just as crucial in architecture, especially in façade design. According to Peterson (1996), VDP serves as guiding rules in visual disciplines, shaping how elements like harmony, balance, rhythm, and emphasis come together to create a cohesive design. In architecture, they influence how buildings communicate meaning and connect with their surroundings.

Facades, being the most visible part of a building, play a key role in defining architectural character. The way design elements are arranged—through structure, ornamentation, or materials—creates a sense of rhythm, unity, and identity (Demir et al., 2021). A well-designed façade can evoke a sense of belonging and reinforce cultural significance. For example, repetition in decorative patterns can establish rhythm, while emphasis on certain motifs can highlight cultural heritage. Harmony ties everything together, ensuring that proportions and materials feel balanced and intentional.

Each VDP contributes to how a building is perceived. Harmony brings cohesion, while unity ensures different elements feel connected (Yilmaz, 1999). Balance creates a sense of stability, achieved through symmetrical or asymmetrical arrangements (Watzman, 2003). Rhythm is seen in repeating patterns or structural sequences (Thapa, 2017), and emphasis draws attention to key architectural details. Proportion keeps elements in scale, preventing visual discord (Gangwar, 2017), while contrast adds visual interest by juxtaposing different textures, colours, or forms (Yilmaz, 1999). Repetition reinforces consistency across a design (Kappraff, 1999), and movement guides the viewer's eye, making the design feel dynamic and engaging (Demir et al., 2021).

When applied thoughtfully, these principles help shape a strong architectural identity. In the context of Malaysian national buildings, VDP contribute to a sense of unity, ensuring that designs reflect both modern aspirations and the country's rich cultural diversity.

2.2 Design Language Relevance in Malaysian National Buildings

In the early years of independence, the government focused on creating a master plan for the capital that was both practical and symbolic of a united Malaysia. Modernist architecture became the dominant style, not just as a design choice but as a reflection of a young, multi-ethnic nation striving for progress (Heynen, 2013). By steering clear of elements tied to any single ethnic group, these buildings fostered a shared sense of belonging (Goh & Liauw, 2009). This vision was reflected in landmark buildings like Parliament House (1963) and Stadium Merdeka (1957), where modernist architecture was subtly infused with local influences.

Post-independence, Malaysia also sought to reclaim its architectural narrative by countering the legacy of colonial-era structures. Edward Said's *Orientalism* (1978), as later interpreted by McAlister (2002), critiques how Western architecture historically imposed colonial identity on built forms. In response, Malaysia initiated efforts to move away from colonial façades, favouring indigenous and Islamic-inspired designs that better reflected its cultural heritage. However, for a nation that has been independent for less than a century, the process of defining a national architectural identity remains ongoing (Bhabha, 2012).

To showcase Malaysia's success in self-governance, landmark structures like Stadium Merdeka, the National Museum, and the Parliament Building were built by the Public Works Department to represent unity and modernization (Mohidin & Ismail, 2014; Rahman & Tunku, 1977). This approach, seen in these buildings reflected a time when leaders prioritized national identity over personal or ethnic affiliations (Rasdi, 2015). Over the years, Malaysia's architectural identity has continued to evolve, ensuring that no single ethnic or cultural group dominates its visual representation. Various policies, conferences, and urban projects have played a role in shaping a built environment that represents the nation's collective identity.

Key initiatives have helped refine this architectural direction. The "Toward National Architectural Identity" conference in 1981 laid the groundwork for incorporating Malaysia's multicultural heritage into design (Ismail, 2018). This idea was later brought to life in projects like Putrajaya, a new administrative capital developed in 1995 to reflect the country's pluralistic values (King, 2008). In 2016, the National Architectural Identity Policy (DASIK) further emphasized blending cultural, religious, and traditional elements with the modernist principles introduced post-independence (Ismail, 2018). A strong architectural identity helps strengthen national unity by making buildings feel connected to the people they serve (Ismail, 2020). The façade, as the most visible part of a building, plays a key role in shaping this identity, acting as a bridge between cultural heritage, urban design, and the nation's shared aspirations (Ismail & Abd Elkader, 2023; Baper, 2024).

2.3 Malaysia and Other British-Colonized Nations

Malaysia's approach to nation-building through architecture shares common themes with other former British colonies in South and Southeast Asia, yet each country shaped its post-independence identity in its own way. Comparing Malaysia's architectural response with India and Sri Lanka reveals both shared strategies and distinct interpretations.

Fig. 1: Capitol Complex in Candigarh, India
(Source: Florian, 2023)

India gained independence from British in 1947. Since then, it has moved away from colonial influences by embracing modernist principles, as seen in the Capitol Complex in Chandigarh (1950's) (See Fig. 1). These structures use raw concrete and geometric forms, relying on material consistency rather than ornamental repetition (Vikramaditya, 2002). This is seen as an effort to integrate local material with modernist style, whilst also incorporating Indian Culture influence such as brise-soleil screens, and sun-shading elements to suit the local climate.

Fig. 2: Parliament Complex in Sri Lanka
(Source: Robson & Bawa, 2002)

Sri Lanka took a slightly different approach, blending modernist design with a strong celebration of its heritage. After gaining independence from the British in 1948, Sri Lanka still ensured a strong connection with its heritage. The Parliament Complex in Sri Lanka was completed in 1982. Its tiered hipped roofs (Fig. 2) reminiscent of Kandyan-era palaces, establish a strong connection to Sri Lanka's architectural past, reinforcing a national identity tied to its historical roots (Robson & Bawa, 2002).

Malaysia, focused on practicality and efficiency in its post-independence architecture. Government buildings reflected modernist ideals, emphasizing the country's goal of becoming a global city. While cultural influences were present, they were subtly incorporated into functional designs (Hee, 2017). In Malaysia, government buildings became key symbols of national identity, balancing modernist aesthetics with cultural influences. Unlike some neighboring nations, Malaysia took a more neutral approach, ensuring inclusivity in its

architectural expression. Federal buildings, especially administrative and civic institutions, offer the clearest reflection of how Malaysia shaped its unique post-independence identity. As Ashworth, Graham, and Tunbridge (2007) argue, architecture is a tool for shaping national identity, particularly in post-colonial states. Malaysia's government buildings, like those of its regional counterparts, reflect not just progress but also the ongoing negotiation of identity, power, and historical memory in the post-colonial landscape (Frampton, 2016; Vale, 2014).

2.5 Stadium Merdeka, Parliament Building and National Mosque, Malaysia

For this study, three buildings were chosen, namely, Stadium Merdeka (Independence Stadium), Parliament Building, and the National Mosque. The three buildings completed its construction within the first 10 years of Malaysia's independence and were under the Public Work Department (now known as Ministry of Works). These structures reflect the country's early aspirations for modernity, unity, and national identity.

Fig. 3: Stadium Merdeka (Independence Stadium), Jalan Stadium, Kuala Lumpur
(Source: Bernama, 2024)

In the late 1950s, Stadium Merdeka (Fig. 3) was the biggest stadium in Southeast Asia, was built to host Malaya's Declaration of Independence on 31 August 1957 and later, the formation of Malaysia in 1963. With its reinforced concrete framework, arched grandstand, and towering floodlights, the stadium was designed to accommodate grand national celebrations (Hussain, 2017).

Fig. 4: Parliament Building, Jalan Parlimen, Kuala Lumpur
(Source: Kanagaraju, 2022)

The Parliament Building (Fig. 4) was a crucial step in establishing Malaysia's self-governance. Constructed using advanced technology at the time, it consists of two connected blocks: a podium for legislative debates and an 18-story office tower, symbolizing the country's growing administrative framework (Mohidin & Ismail, 2014).

Fig. 5: National Mosque, Lake Perdana, Kuala Lumpur
(Source: Zekrgoo, 2017)

The National Mosque (Fig. 5) reflects Malaysia's cultural and religious heritage, blending Islamic elements with traditional Malay architectural influences. Designed to represent the nation's dominant ethnic identity, it stands as both a spiritual and national landmark (Ismail & Rasdi, 2010).
Together, these buildings capture Malaysia's early efforts to shape its post-independence identity, balancing modern design with cultural significance.

3.0 METHODOLOGY

Post-independence buildings in Malaysia were designed with an absence of race-specific references, instead reflecting a modern national identity aimed at fostering unity among citizens. The façade serves as the first impression of any building, making it a crucial element in conveying national identity. This study employs a mixed-method approach, integrating quantitative visual scoring with qualitative architectural analysis to systematically evaluate the application of Visual Design Principles (VDP) in national building façades.
For this study, three buildings were selected: Stadium Merdeka (Fig. 3), the Parliament Building (Fig. 4), and the National Mosque (Fig. 5). These structures were completed within the first decade following Malaysia's independence and were developed under the Public Works Department (now the Ministry of Works). The selection of these buildings is based on their status as government-funded projects, which suggests a strong alignment with nation-building objectives. Given their historical and symbolic significance, these buildings serve as architectural representations of Malaysia's aspirations for unity and harmony in its formative years.
This study follows a two-phase Visual Analysis Methodology, integrating empirical façade evaluation and comparative case studies from post-colonized countries to strengthen the research findings. Each building's primary façade will be analysed through a combination of on-site photography and supplementary online images. On-site photographs will serve as the primary visual dataset, while online sources will be used to address any gaps, particularly in areas where access is restricted due to privacy concerns. To ensure a comprehensive

architectural analysis, observations will not be limited to a single elevation but will consider façade orientation and proportions, repetition and modularity of design elements, and symbolism and cultural motifs.

While the Parliament Building has a prominent main facade, as seen from Lebuhraya Sultan Iskandar (Fig. 7), Stadium Merdeka and National Mosque have a horizontal form that can be discerned from a few viewpoints. Stadium Merdeka has a continuous facade that goes through the whole stadium, while the National Mosque is made of a few connecting blocks. For this study, the facade perimeter of each building is limited to one side of the selected building (Fig. 6, Fig. 7, Fig. 8). However, to further examine the building, this study is not limited to only these figures. Observation will be carried out through photographs taken on-site and selected journals and articles.

Fig. 6: View of Stadium Merdeka's facade from the entrance at Jalan Stadium
(Source: Site observation on 3rd September 2024)

Fig. 7: View of Parliament Building's facade from Lebuhraya Sultan Iskandar
(Source: Site observation on 3rd September 2024)

Fig. 8: View of National Mosque's facade from Jalan Perdana
(Source: Site observation on 3rd September 2024)

Phase 1: Visibility Assessment through Visual Scoring System

Each selected building's façade will be systematically analyzed for the presence of nine Visual Design Principles (VDP): Harmony, Unity, Balance, Rhythm, Emphasis, Proportion, Contrast, Repetition, and Movement. To quantify their application, a scoring system (Table 1) will be employed based on photographic observations. Each VDP will be assigned points based on its visibility in the architectural façade. The scoring approach ensures objective measurement of VDP prevalence across the selected buildings.

Table 1: VDP Evaluation Framework

VDP	**Phase 1 - Visibility** **1** = Not visible **2** = Low visibility **3** = Moderate visibility **4** = High visibility **5** = Extreme visibility	**Phase 2 - Significance** **1** = No significance **2** = Low significance **3** = Moderate significance **4** = High significance **5** = Extreme significance	
Harmony		Evidently presence of elements creates a clear visual flow.	
Unity		Visible elements that complement one another, creating a unified appearance.	
Balance		Symmetry or asymmetry arrangements of elements create a sense of balance.	
Rhythm		Strength of repetitive elements that support the harmonious rhythm.	
Emphasis		Strength of the focal point is achieved by carefully arranging the elements.	
Proportion		Well-defined element sizes that create a harmonious facade.	
Contrast		Visible elements that clearly differentiated and engaged through colour, texture, and shape differences.	
Repetition		Evident repetitive patterns and motifs that create an aesthetically pleasing and well-coordinated design.	
Movement		Clear directional, overlapping, or dynamic elements that effectively lead the viewer's eye.	

Phase 2: Significance Analysis of VDP

The identified VDPs will undergo qualitative analysis to determine their architectural and symbolic significance in fostering national unity. This phase includes photographic documentation of building façades from multiple perspectives, and a comparative review of scholarly works and archival materials to contextualize VDP significance. This phase aims to decipher underlying patterns and extract meanings from the VDP application within Malaysia's early national architectural identity.

The findings of the research supposedly offer a substantial basis for modern urban planning and building design. The study should provide insightful information that can improve design methods, while preserving historical continuity in current architecture.

There are a few limitations to this study on the application of VDP to architectural facades that should be acknowledged. The study on visual elements of building facades may obscure other important design elements such as interior spaces and landscape integration. Furthermore, analysing VDPs in isolation might not fully represent a building's sensory experience, including how it interacts with its surroundings and feels to users.

4.0 RESULTS

To yield an outcome through this structured evaluation, this study compiled a database of 30 photographs for observation and analysis. 13 of the photographs were taken from site visits, while the remaining were sourced from selected journals and articles. The assessment was conducted in two phases, using a visual scoring system to quantify the presence and significance of Visual Design Principles (VDPs) in the façades of Stadium Merdeka, the Parliament Building, and the National Mosque.

Phase 1: Visibility Assessment
Table 2 presents the visibility of each VDP across the three buildings, measured on a scale from 1 (Not visible) to 5 (Extreme visibility).

Table 2: Phase 1: Visibility Assessment through Visual Scoring System

VDP	Stadium Merdeka	Parliament Building	National Mosque
Harmony	4	5	4
Unity	4	5	4
Balance	5	3	2
Rhythm	4	4	3
Emphasis	5	2	5
Proportion	3	5	4
Contrast	5	3	4
Repetition	4	5	1
Movement	4	2	4

Phase 2: Significance Analysis
Table 3 evaluates the significance of each VDP in contributing to the architectural and symbolic meaning of national unity, measured on a scale from 1 (No significance) to 5 (Extreme significance).

Table 3: Phase 2: Significance Analysis

VDP	Criteria	Stadium Merdeka	Parliament Building	National Mosque
Harmony	Evidently presence of elements creates a clear visual flow.	3	4	3
Unity	Visible elements that complement one another, creating a unified appearance.	4	3	4
Balance	Symmetry or asymmetry arrangements of elements that create a sense of balance.	5	2	3
Rhythm	Strength of repetitive elements that support the harmonious rhythm.	4	4	3
Emphasis	Strength of the focal point is achieved by carefully arranging the elements.	5	2	4

VDP	Criteria	Stadium Merdeka	Parliament Building	National Mosque
Proportion	Well-defined element sizes that create a harmonious facade.	5	5	5
Contrast	Visible elements that clearly differentiated and engaged through colour, texture, and shape differences.	5	5	5
Repetition	Evident repetitive patterns and motifs that create an aesthetically pleasing and well-coordinated design.	4	5	2
Movement	Clear directional, overlapping, or dynamic elements that effectively lead the viewer's eye.	4	3	4

Final Score: Visual Analysis with Scoring System
Table 4 summarizes the overall VDP application in each building.

Table 4: Final Score: Visual Analysis with Scoring System

VDP	Stadium Merdeka	Parliament Building	National Mosque
Harmony	7	9	7
Unity	8	8	8
Balance	10	5	5
Rhythm	8	8	6
Emphasis	10	4	9
Proportion	8	10	9
Contrast	10	8	9
Repetition	8	10	3
Movement	8	5	8

Given Stadium Merdeka's significance as the site of independence, it justified that the facade design successfully embodies all nine Visual Design Principles (VDPs). This contributes to reinforce its role in fostering national unity and pride. Its well-balanced design and strategic emphasis on key visual elements highlight its historical significance.
As a government building serving a nation with diverse races and ethnicities, the Parliament Building generally achieves moderate to high scores across all nine VDPs. However, its prominent singular block, which overshadows the series of pinnacles on its sides, prevents it from scoring highly in the 'Emphasis' category. The uniformity of its façade panels also restricts a sense of movement, resulting in a lower 'Movement' score.
The National Mosque, built to serve the predominant religion in Malaysia, must adhere to specific religious design principles, which can limit its ability to fully meet all nine VDPs. Nevertheless, the building excels in 'Emphasis,' 'Proportion,' and 'Contrast,' reflecting the key architectural principles of mosque design.
The discussion section will further explore how each VDP is applied to these buildings and their role in promoting national unity through architectural design.

5.0 DISCUSSIONS

Visual Design Principles (VDP)

Harmony

Among the three buildings, The Parliament Building scores the highest for 'harmony' due to its consistent repetition of the iconic 'pineapple' façade element. The transition of the 'pineapple face' to the triangular pinnacle element establishes a clear visual flow between the tower and the podium. It unifies the two masses despite their size (Fig. 9). The relationship between the tower and podium maintains a unified architectural language, contributing to the building's overall formal and spatial harmony.

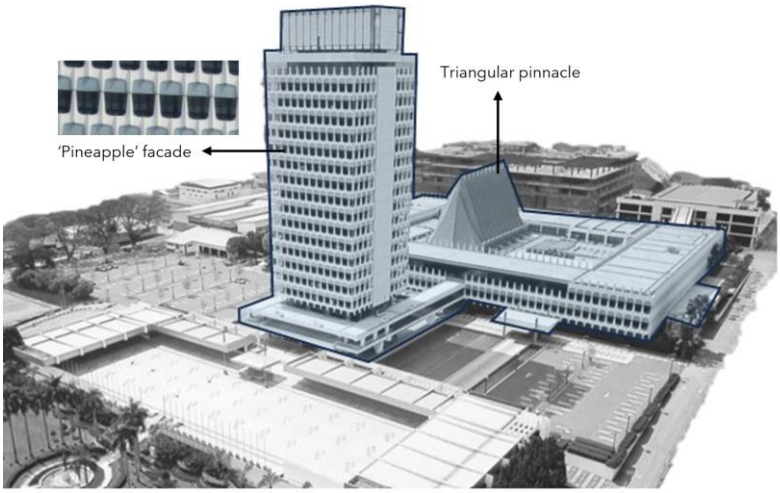


Fig. 9: 'Pineapple' facade elements of Parliament Building

In contrast, both Stadium Merdeka (Fig. 10) and the National Mosque (Fig. 11) rely on a consistent material palette to create visual harmony. Their uniform color palettes help create a cohesive look, though they lack the striking visual impact seen in the Parliament Building. While the Parliament Building uses harmony to balance contrasting forms, Stadium Merdeka and the National Mosque emphasize function over variation, leading to a more understated but effective sense of unity.

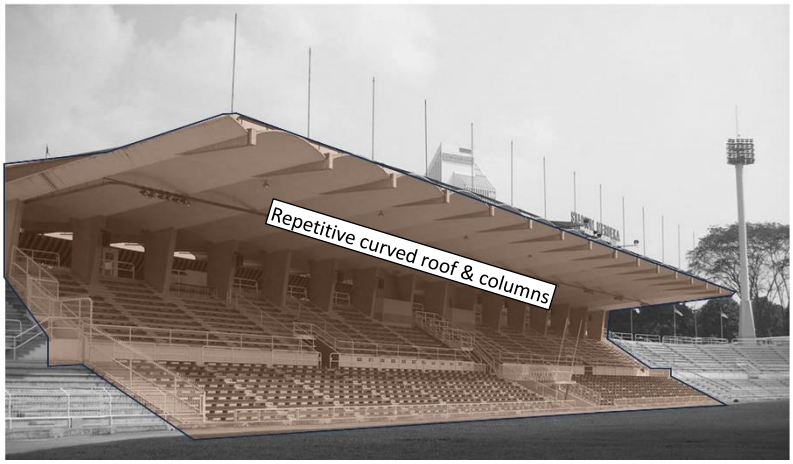


Fig. 10: Cohesive facade elements of Stadium Merdeka (Independence Stadium)

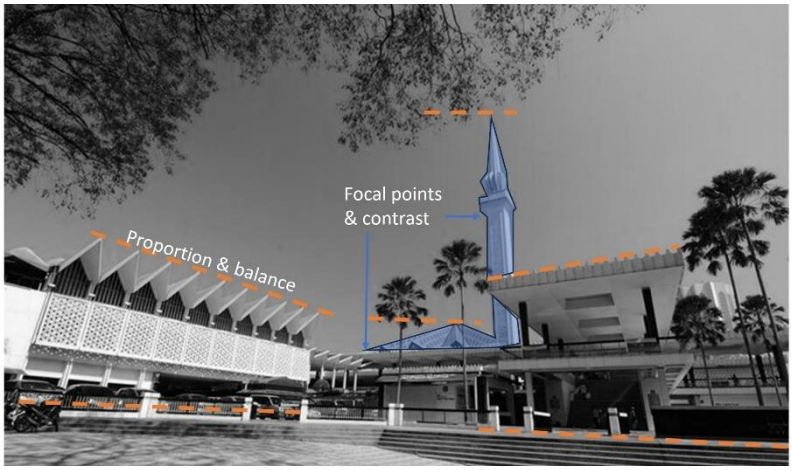


Fig. 11: Cohesive facade elements of National Mosque, Lake Perdana

Unity

All three national buildings display a strong VDP of 'unity' on their facades, despite their distinct styles and purposes. Each building maintains consistency through a simplified architectural style, characterised by the minimization of decorative elements in favour of clean, repetitive patterns.

Stadium Merdeka exemplifies unity through its use of simplified geometry at the long curved roof and its horizontal surroundings (Fig. 6). These repeated elements create a visual rhythm, ensuring that no single feature stands alone or appears disconnected from the overall façade. The Parliament Building follows a similar approach to unity through its recurring 'pineapple' facade, visually tying together its tower and podium (Fig. 9). The National Mosque, while incorporating a wider variety of shapes and forms, achieves unity through its geometric Islamic patterns (Fig. 12). These patterns provide a unifying theme, helping to integrate the various architectural elements and create a cohesive visual identity. Across all three buildings, repetition in either pattern, material, or form, enhances their visual and functional coherence.

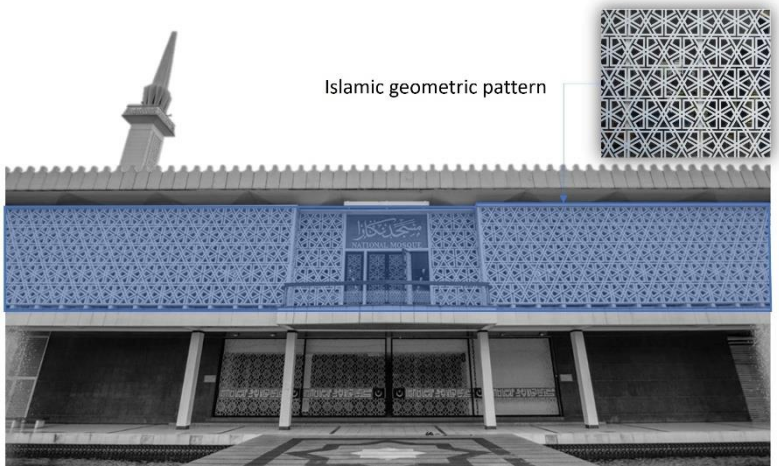


Fig. 12: Islamic geometry pattern on facade of National Mosque

Balance

Both Parliament Building and National Mosque attained a moderate score for 'balance, with emphasis placed on their dominant architectural features. However, the overall look of the façades suggests that the visual weight is concentrated on their main architectural features. Parliament Building's façade draws most of its visual weight from the iconic 'pineapple'

façade, while the lower pinnacles remain more understated (Fig. 9). Similarly, the National Mosque, pulls its visual weight from the blue pleated dome and minaret area to create focal points that define its identity (Fig. 11). In both cases, the heavier visual weight is placed on the most occupied and symbolically significant areas of the buildings. This asymmetric balance serves a functional purpose. By intentionally sacrificing perfect visual equilibrium, these designs help guide viewers toward the main focal areas, assisting in navigation.

Rhythm

Stadium Merdeka and the Parliament Building scored highly in 'Rhythm,' primarily due to the presence of strong, repetitive elements in their façades. These elements contribute to a clear and cohesive visual flow (Fig. 13). The repetition, combined with effective variations, enhances rhythm while preserving unity and visual interest.

Fig. 13: Stadium Merdeka (Independence Stadium), Jalan Stadium, Kuala Lumpur

The Parliament Building's 'pineapple' facade establishes a steady visual pattern (Fig. 9), while Stadium Merdeka's structural design reinforces its purpose with a consistent, rhythmic arrangement (Fig. 13). In contrast, the National Mosque demonstrates less consistent rhythm. Although elements such as triangular roof structures and geometric motifs are repeated, they do not create the same continuous flow observed in the other two buildings, resulting in a more varied aesthetic.

Emphasis

Each building employs emphasis differently. The Parliament Building scored lower for 'Emphasis', as compared to the other two buildings. This can be seen as an extension of the earlier discussion on 'balance' in VDP. The Parliament Building's façade, while visually striking, lacks a single dominant focal point due to its repetitive facade. Although its overall form is distinctive, its repetitive arrangement undermines the creation of a clear visual emphasis. In contrast, the National Mosque gains visual prominence through its distinct design choices, particularly by deviating from symmetry or asymmetry. The main folded roof and towering minaret serve as focal points, symbolising the building's spiritual importance and drawing attention to its religious function (Fig. 11). Stadium Merdeka similarly draws focus with its iconic shell roof, a defining element of its structure (Fig. 6). Deducing from that, for public buildings, strong emphasis aids navigation and identity, while administrative buildings like the Parliament Building may adopt a more restrained approach.

Proportion

All three buildings achieved relatively high scores for 'proportion' in VDP. This is because their designs have effectively used proportions to create balanced compositions. The Parliament Building, despite the size contrast between its tower and podium, maintains proportional harmony through the arrangement of its triangular pinnacles (Fig. 9). Similarly, Stadium Merdeka's shell roof enhances its sense of scale, reinforcing the grandeur of its design. The National Mosque, following the same footprint, balances its minaret, folded roof, and interior spaces to maintain proportional integrity (Fig.11). Across all three, careful attention to proportion ensures that their elements integrate both visually and functionally.

Contrast

The Parliament Building, Stadium Merdeka, and National Mosque all scored relatively high for 'Contrast'. The Parliament Building juxtaposes its vertical tower against the horizontal podium, emphasizing their difference in shape and function (Fig. 9). The National Mosque made use of its vivid blue roof to create a striking difference against the lush greenery of its surroundings (Fig. 11). In contrast, Stadium Merdeka focuses more on functionality, yet subtle contrast is visible in the interplay between the curved grandstand and the straight lines of its supporting columns (Fig. 14).

Fig. 14: Stadium Merdeka (Independence Stadium), Jalan Stadium, Kuala Lumpur

All three buildings employ contrast in different ways, through their form, material, or their interaction with the environment. This creates visually dynamic and engaging architectural compositions.

Repetition

The Parliament Building and Stadium Merdeka scored high for 'Repetition' while the National Mosque scored lower. Stadium Merdeka's combination of concrete shell roof, the grandstand, and the seating areas reinforce a rhythmic, repetitive structure. The Parliament Building's iconic 'pineapple' façade creates consistent and angular forms throughout, ensuring visual consistency (Fig. 15).

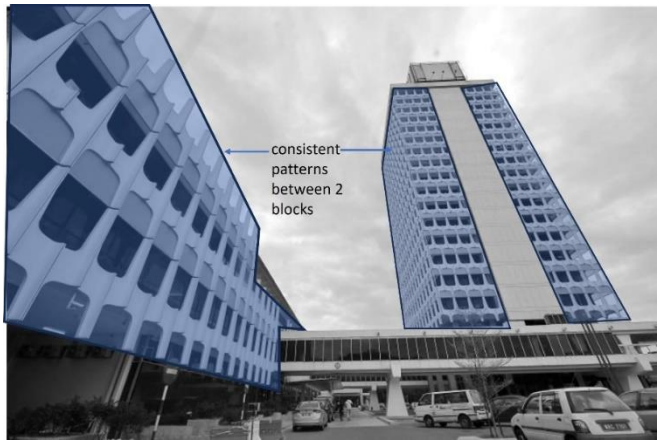


Fig. 15: 'Pineapple' facade elements of Parliament Building

On the other hand, the National Mosque exhibits subtle repetition, primarily seen in the geometric lattice panels on its façade (Fig. 11). This repetition on the National Mosque's facade suggests the sense of tranquillity and spirituality inherent in Islamic architectural traditions. In short, repetition plays a significant role in the visual appeal of all three buildings, but its prominence varies.

Movement

Stadium Merdeka and National Mosque scored the highest for 'Movement'. The curved roof of Stadium Merdeka seen as a focal point that naturally guides eyes upward, generating a dynamic flow (Fig. 6). The absence of contrasting colours on National Mosque's overall facade allows the focus to shift directly toward the vivid blue pleated dome. This creates a fluid visual journey toward the dome, which houses the main prayer hall. (Fig. 11). However, the repetitive "pineapple" façade elements on Parliament Building did not provide a clear sense of movement or direction. While the pinnacle hints at an important focal area, the overall design lacks the same dynamic progression seen in the other two buildings. This repetition could, perhaps, be seen as a more static composition, limiting the perception of movement.

Comparative perspective between national buildings in Malaysia, Sri Lanka and India

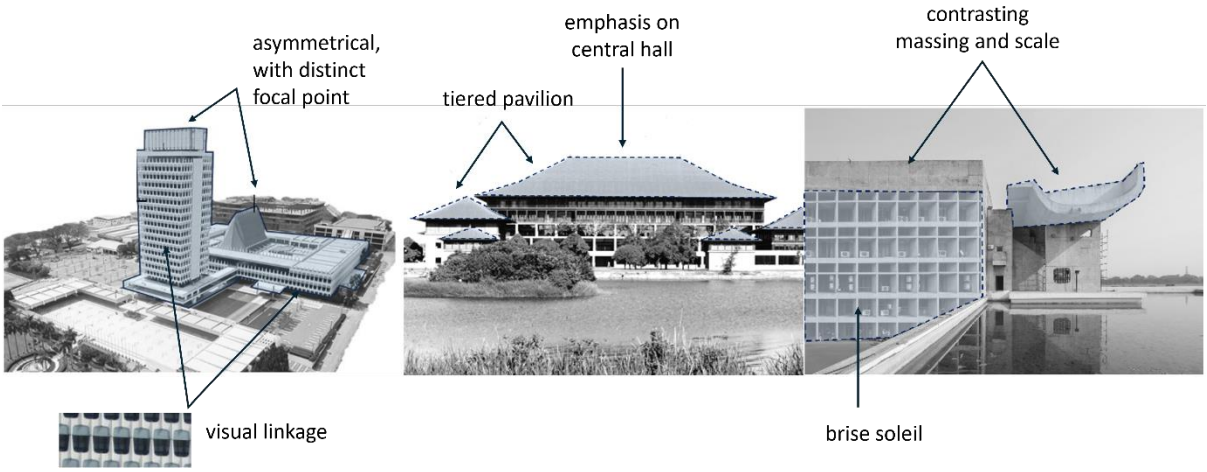


Fig. 16: (From left to right) Parliament Building in Malaysia, Parliament Complex in Sri Lanka, and Capitol Complex in India

Comparing the facades of the Malaysian Parliament Building, Sri Lanka's Parliament Complex, and India's Capitol Complex, each structure applies Visual Design Principles (VDPs) to establish a unique architectural identity.

The Malaysian Parliament Building emphasizes harmony and unity through its repetitive 'pineapple' façade, visually linking the vertical tower with the horizontal podium (Fig. 16). Sri Lanka's Parliament Complex achieves harmony through a tiered pavilion layout, blending modernist and Kandyan architectural elements with a consistent material palette. While both use repetition to create rhythm, the Capitol Complex in India achieves this through modular brise soleil elements, reinforcing its sculptural aesthetic.

Balance is approached differently. Malaysia's Parliament relies on asymmetry, with visual weight concentrated in its patterned façade, while Sri Lanka's Parliament maintains proportional balance through evenly spaced pavilions. India's Capitol Complex, in contrast, establishes equilibrium through contrasting massing and scale.

In emphasis and contrast, Malaysia's Parliament lacks a distinct focal point due to its uniform façade, whereas Sri Lanka's design highlights its central hall with an elevated roof. India's Capitol Complex stands out with its bold interplay of solid concrete volumes, open voids, and water features, creating a striking hierarchy of spaces.

Movement is most pronounced in Sri Lanka's Parliament, where cascading roofs naturally guide the eye upward, unlike the more static, repetitive façade of Malaysia's Parliament. The Capitol Complex, with sculptural elements like its hyperbolic paraboloid assembly roof, creates a dynamic visual flow across the structure.

While all three buildings reflect national identity through VDPs, they do so in distinct ways. Malaysia expresses it through geometric repetition and unity, Sri Lanka through a balance of tradition and modernity, and India through bold contrasts and dynamic sculptural forms. Together, they illustrate how design principles shape not just a building's aesthetics but also their cultural and symbolic significance.

Conceptual Model of Visual Design Principles (VDP) on national buildings in Malaysia

In the context of Malaysia's national buildings, the findings suggest that Visual Design Principles (VDP) are interconnected in the pursuit of achieving 'Harmony' and 'Unity' in façade design (Fig. 17). 'Harmony' helps to reinforce 'Unity' by incorporating complementary elements that work together to create a cohesive appearance. This is especially clear in the Malaysian Parliament Building, where a high score in 'Harmony' aligns with a high score in 'Unity' too. Both the Stadium Merdeka and the National Mosque scored lower in 'Harmony', which led to a low score in 'Unity' in VDP too.

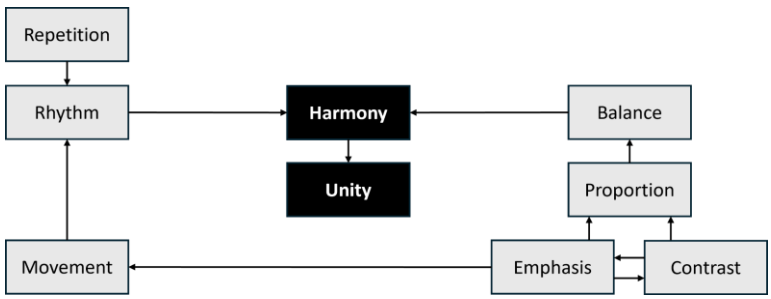


Fig. 17: Conceptual Model of Visual Design Principles (VDP) on National Buildings in Malaysia

As shown in Fig. 17, the findings conclude that two key aspects of the VDP—'Balance' and 'Rhythm'—are most prominent. These two VDPs are influential in understanding how visual elements of a façade can suggest a nation's unity, though they focus on different areas of design. 'Rhythm' is achieved through the careful use of 'Repetition,' which can also suggest a sense of 'Movement' when thoughtfully arranged. 'Balance,' on the other hand, is achieved by organising elements in symmetrical or asymmetrical arrangements. This can be achieved by establishing proportion and visual stability. 'Proportion' is often enhanced using 'Contrast,' which not only improves the visual hierarchy but also contributes to 'Emphasis' within the overall design. Through the scoring system, it also suggests that the prominence of 'Emphasis' on building facade influences 'Movement' in VDP. Scores of 'Emphasis' on all three buildings are similar to the score of 'Movement' on each respective building.

Similar principles can be observed in Sri Lanka's Parliament Complex and India's Capitol Complex facades, though each interprets 'Harmony', 'Rhythm', and 'Balance' differently. Sri Lanka's Parliament achieves 'Harmony' by blending modernist and traditional Kandyan architecture through tiered pavilions and cascading roofs, reinforcing 'Unity' through material consistency and 'Repetition'. India's Capitol Complex, on the other hand, relies on the 'Harmony' of its modular brise soleil façade to balance with its modern selection of façade overall treatment.

Despite their differences, these three national buildings demonstrate that harmony and unity are fundamental VDP principles in shaping the architectural identity of a nation through its façade.

6.0 CONCLUSION

This research explored the architectural identity of post-independence Malaysia, focusing on how national buildings balanced modernity, heritage, and multicultural influences in a period shaped by global architectural trends and local traditions. The establishment of these buildings aims not to represent any specific race, but to celebrate the concept of unity. While international modernism played a role in the formal language of these buildings, it has been assimilated to address local needs and climate. Therefore, this paper examines how the intention was achieved through the lens of Visual Design Principles (VDP), specifically harmony, unity, balance, rhythm, emphasis, proportion, contrast, repetition, and movement. Each of the three iconic Malaysian buildings selected namely, Stadium Merdeka, the National Mosque, and the Parliament Building, exemplifies unique architectural principles across the dimensions VDPs. The findings indicate that harmony and unity were among the dominant principles, reinforcing the nation's aspiration for inclusivity and modernity. However, rhythm and emphasis were inconsistently applied, suggesting differing architectural approaches in administrative versus public spaces.

A comparative perspective with Sri Lanka's Parliament Complex and India's Capitol Complex to situate Malaysia's approach within a broader post-colonial architectural discourse. Sri Lanka's Parliament integrates modernist and Kandyan elements through tiered pavilions and cascading roofs, while India's Capitol Complex achieves harmony through a modular brise-soleil façade. Though each country responded differently to its post-colonial context, all three buildings demonstrate how architecture can serve as a powerful tool in shaping national narratives.

Whilst this study highlights harmony and unity as recurring themes in Malaysian post-independence architecture, it does not claim that these should be fixed criteria for defining a national architectural identity. Nor does it suggest that these findings should be followed

uncritically as a blueprint for nation-building. Instead, the study aims to contribute to the broader conversation on how architecture, particularly in newly independent nations, navigates the balance between tradition and modernity, local identity, and global influences. It also acknowledges that architecture carries meanings beyond form and function, embodying both explicit and implicit cultural, religious, and aesthetic values that evolve over time.

By adopting both quantitative and qualitative approaches and utilising VDP to evaluate each facade design, this research sheds light on the nuanced ways in which architectural elements communicate cultural values, historical narratives, and national aspirations. Through the examination of these iconic buildings, it became evident that as an overall design aesthetic, there are no prominent styles or symbols that represent any race or ethnicity. Nonetheless, all three national buildings exhibit a prominent symbol of national unity.

However, Malaysian architectural identity is not static, nor can it be distilled into a single aesthetic or set of principles. The future of Malaysia's built environment depends on architects, policymakers, and urban planners who continue to interpret and redefine national identity in response to changing social and cultural landscapes. Rather than imposing a rigid framework, this study underscores the importance of context, inclusivity, and critical engagement in shaping Malaysia's architectural future.

ACKNOWLEDGMENTS

The authors would like to express their gratitude and appreciation to all who contributed to this study, directly or indirectly.

REFERENCES

Ashworth, G., Graham, B., & Tunbridge, J. (2007). *Pluralising pasts: Heritage, identity and place in multicultural societies*. Pluto Press.

Baper, S. Y. (2024). Can architectural identity be measured? *Buildings, 14*(5), 1379.

Bhabha, H. K. (2012). *The location of culture*. Routledge.

BERNAMA. (2024, March 30). Stadium Merdeka hangatkan saingan Piala Sultan Selangor 2024. *myMetro*. https://www.hmetro.com.my/arena/bola-sepak/2024/03/1075467/stadium-merdeka-hangatkan-saingan-piala-sultan-selangor-202

Demir, G., Çekmiş, A., Yeşilkaynak, V. B., & Unal, G. (2021). Detecting visual design principles in art and architecture through deep convolutional neural networks. *Automation in Construction, 130*, 103826.

Florian, M.-C. (2023, June 1). The modernist laboratory of the future: Exploring Le Corbusier and Louis Kahn's architecture in India. *ArchDaily*. Retrieved October 10, 2024, from https://www.archdaily.com/1001873/the-modernist-laboratory-of-the-future-exploring-le-corbusier-and-louis-kahns-architecture-in-india

Frampton, K. (2016). Toward a critical regionalism: Six points for an architecture of resistance. In *Postmodernism* (pp. 268–280). Routledge.

Gangwar, G. (2017). Principles and applications of geometric proportions in architectural design. *Journal of Civil Engineering and Environmental Technology, 4*(3), 171–176.

Ghomeshi, M., & Jusan, M. M. (2013). Investigating different aesthetic preferences between architects and non-architects in residential façade designs. *Indoor and Built Environment, 22*(6), 952–964.

Goad, P. (2007). Culture at the crossroads: Recent Malaysian architecture. *Pertubuhan Akitek Malaysia*, 8–25.

Goh, B. L., & Liauw, D. (2009). Post-colonial projects of a national culture: Kuala Lumpur and Putrajaya. *City, 13*(1), 71–79.

Hee, L. (Ed.). (2017). *Future Asian space: Projecting the urban space of new East Asia.* NUS Press. https://d1wqtxts1xzle7.cloudfront.net/51293515/Hee_and_Trivic_Introduction_Future_Asian_Space_2012-libre.pdf?1484107475=&response-content-disposition=inline%3B+filename%3DIntroduction_Future_Asian_Space.pdf&Expires=1742619850&Signature=SNdWXZN5zaqgCEjSz3qq

Heynen, H. (2013). The intertwinement of modernism and colonialism: A theoretical perspective. *Docomomo Journal, 48*, 10–19. https://doi.org/10.52200/48.A.1KTV3PAE

Hussain, N. H. (2017). Nation-building and modern architecture in Malaysia. *Docomomo Journal, 57*, 30-37.

Ismail, A. S. (2018). Representation of national identity in Malaysian state mosque built form as a socio-cultural product. *International Journal of the Malay World and Civilisation, 6*(1), 49–58.

Ismail, A. S., & Rasdi, M. T. M. (2010). Mosque architecture and political agenda in twentieth-century Malaysia. *The Journal of Architecture, 15*(2), 137-152.

Ismail, A. S., Zharani, E. N., & Rashid, A. M. (2020). The construction of national identity in influencing the facade of Malaysian public universities. *Journal of Architecture, Planning and Construction Management, 10*(2).

Ismail, M. A., & Abd Elkader, W. A. (2023). The interrelationship between the design of house facades and the architectural identity of the city: Amman City as a model. *Dirasat: Human and Social Sciences, 50*(6), 275-300.

Jackson, I. (2016). The architecture of the British Mandate in Iraq: Nation-building and state creation. *The Journal of Architecture, 21*(3), 375-417.

Kanagaraju, S. (2022, June 25). Multiplicity of unions causes double jeopardy to workers and unions, says coalition. *The Edge Malaysia.* https://theedgemalaysia.com/article/multiplicity-unions-causes-double-jeopardy-workers-and-unions-says-coalition

Kappraff, J. (1999, July). Systems of proportion in design and architecture and their relationship to dynamical systems theory. In *Bridges: Mathematical Connections in Art, Music, and Science* (pp. 27-40).

King, R. (2008). Post-colonial projects of a national culture: Architecture and identity in Malaysia. *ResearchGate.*

Koivunen, A. (2016). Affective historiography: Archival aesthetics and the temporalities of televisual nation-building. *International Journal of Communication, 10*, 5270-5283.

Koutamanis, A. (1993). The future of visual design representations in architecture. *Automation in Construction, 2*(1), 47-56.

Kress, G. R., & Van Leeuwen, T. (1996). *Reading images: The grammar of visual design.* Psychology Press.

Lawson, B. (2012). *What designers know.* Routledge.

Lidwell, W., Holden, K., & Butler, J. (2010). *Universal principles of design, revised and updated: 125 ways to enhance usability, influence perception, increase appeal, make better design decisions, and teach through design.* Rockport.

McAlister, M. (2002). Edward Said, *Orientalism* (1978). *A Companion to Post-1945 America*, 550.

Moghtadernejad, S., Mirza, M. S., & Chouinard, L. E. (2019). Façade design stages: Issues and considerations. *Journal of Architectural Engineering, 25*(1), 04018033.

Mohidin, H. H. B., & Ismail, A. S. (2014). Sustainable responsive design approach in modern Malaysian administrative buildings – Perdana Putra and Parliament.

Obaleye, O. J., Ezema, I. C., & Adeboye, A. B. (2021, April). The role of height perception in administrative building façade visual sustainability. *IOP Conference Series: Materials Science and Engineering, 1107*(1), 012047.

Peterson, B. (1996). *Using design basics to get creative results.* Adams Media.

Quici, F. (2017, December). Architecture and visual narrative. In *Proceedings, 1*(9), 1082. MDPI.

Rahman, A., & Tunku, P. A. H. (1977). *Looking back: Monday musings and memories.*

Rasdi, M. T. M. (2015). *Architecture and nation-building: Multiculturalism and democracy.* Partridge Publishing Singapore.

Robson, D. G., & Bawa, G. (2002). *Geoffrey Bawa: The complete works.* Thames & Hudson.

Smith, A. D. (1991). *National identity.* University of Nevada Press.

Subramani, S., & Kempner, K. (2002). Malaysian higher education: Captive or post-western? *Australian Journal of Education, 46*(3), 231-254.

Thapa, R. (2017). Rhythm in architecture: An aesthetic appeal. *Journal of the Institute of Engineering, 13*(1).

Vale, L. (2014). *Architecture, power and national identity.* Routledge.

JOURNAL OF ARCHITECTURE, PLANNING & CONSTRUCTION MANAGEMENT
Volume 15 Issue 1, 2025 E-ISSN: 2462-2222 ISSN: 2231-9514

UNDERSTANDING THE MALAYSIAN NATIONAL ARCHITECTURAL IDENTITY: CASE STUDIES ANALYSIS

Received: 30th November 2024 | Accepted: 14th April 2025 | Available Online: 30th June 2025

DOI: 10.31436/japcm.v15i1.939

Muhamad Hanafi Rahmat[1*], Alice Sabrina Ismail[2]

[1] Department of Architecture, Faculty of Civil Engineering and Built Environment, Universiti Tun Hussein Onn Malaysia, mdhanafi@uthm.edu.my*
[2] Department of Architecture, Faculty of Built Environment and Surveying, Universiti Teknologi Malaysia, b-alice@utm.my

Corresponding author: **Muhamad Hanafi Rahmat*
Corresponding author's email: mdhanafi@uthm.edu.my

ABSTRACT

The crisis of Malaysian architectural identity is often the subject of discussion among local scholars in their writings and discourses. The highlighted architectural identities usually lack local authenticity and fail to represent Malaysia architecturally. Therefore, it is important to understand the ideology of the national identity of architecture and how to implement it in the local architectural scenario. This study compiles the ideologies and perspectives of scholars by conducting a literature review and direct observation of the roles, typologies, and themes associated with national architectural identity. It is then discussed further using a case study of local Malaysian architecture to see its clear relationship from the context of the national identity of architecture. An interpretive approach was employed to analyze various architectural elements linked to national identity, with a narrative method applied to convey the findings. Using local case studies enriches the understanding of Malaysia's architectural identity, further exploring the country's architectural heritage. This paper investigates national architectural identity from community and governmental viewpoints, focusing on project identity, sub-national, supra-national, and personal identities. It also explores typologies such as natural, artificial (manufactured), and forced identity, as well as themes like typology, memory (memorial), and geopolitics. The analysis reveals that the roles of architecture clarify its purpose, typologies categorise its forms, and the themes help uncover the deeper meanings embedded in architectural designs. The Malaysian architectural scenario is full of amazing ideas, and this paper helps develop some guidelines for understanding the national identity of Malaysia for reference not only for architects but also for all Malaysians.

Keywords: National identity, national architectural identity, roles, themes, typologies, Malaysian architecture

1.0 INTRODUCTION

Malaysia's national identity is profoundly shaped by its geographical features. Most urban growth is centred in the western part of the Malay Peninsula, influenced by ancient maritime trade pathways and flat topography. At the same time, rugged mountains characterise the central region, and the eastern coastline features long stretches of sandy beaches (Yendra et al., 2017). Similarly, Sabah and Sarawak are known for their diverse terrain, including mountains and winding rivers that flow into the South China Sea dotted with islands. Besides the influence of natural landscapes, the nation's historical, political, and cultural developments have significantly contributed to its sense of place. Malaysia is home to diverse

ethnic groups, such as Malays, Chinese, Indians, Kadazans, and Dusuns, each contributing to the nation's rich cultural diversity. Ensuring sustained peace and harmony among these groups requires significant effort and compromise. The key challenge in building a cohesive Malaysian nation lies in integrating its varied socio-cultural communities—each with a strong sense of its unique identity—into a unified modern nation-state that embraces a collective Malaysian identity. This challenge is also reflected in Malaysia's built environment, where the quest for a distinct national architectural identity continues to evolve, with no definitive conclusion yet reached.

Local scholars often discuss the Malaysian national architectural identity crisis in their writing and discourse (Hussain, 2015; Ismail, 2018; Kosman & Nik Ibrahim, 2007; Mohamad Rasdi & Mursib, 2004; Mursib, 2008; Surat, 2012b, 2012a, 2020). They have listed out a few crises that evolved in the Malaysian national architectural identity, which are:

1. Crisis in determining the direction of the purpose of Malaysian architecture.
2. Crisis in the appearance of progressive Malaysian architecture.
3. Crisis in the cultural development of Malaysian architecture.
4. Crisis in the balance of nature with Malaysian architecture.
5. Crisis in humanitarian and community development by the Malaysian architecture.

The 1960s to the 1970s marked a significant shift in Malaysia towards establishing a national architectural identity. During this time, many developments began integrating elements symbolising a distinct national character, reflecting the country's effort to build a unified cultural and architectural presence. However, as time passed and no real implementation was forced, it returned to the ‘mixed-up’ architecture. There were no fixed guidelines on Malaysian national architectural identity for reference. At that time, many professional architects who had their education overseas returned to serve the country (Mohamad Rasdi & Mursib, 2004; Mursib, 2008). However, most of them were influenced by Western ideology and were carried away to produce the design by neglecting its suitability with the Malaysian context. They often glorify architecture from the outside and continue to be inspired to create such architectural value. Without realizing it, they ignored the importance of understanding regionalism in architecture, which carries important values to the national architectural identity of Malaysia.

The announcement of the Dasar Senibina Identiti Kebangsaan (DASIK) Draft in 2017 was a positive step forward (DASIK, 2017). It was an early framework to guide architects and local built environment industry players in embracing and promoting local architectural identity. However, to this day, the draft has not progressed beyond its initial stage, resulting in a lack of participation from stakeholders. Despite the passing of nearly a decade, DASIK has remained merely a "draft" when it should have already been implemented as a formal reference within the local architectural industry.

2.0 DEFINING NATIONAL ARCHITECTURAL IDENTITY

National identity is often defined as a deep connection or attachment to a particular country or nation (Canizaro, 2007; Ismail & Mohd. Rasdi, 2009b; Pipan, 2008; Vale, 2008). This connection includes recognising common traditions, cultural practices, language, and shared political ideologies within a nation (Vale, 2008). Therefore, national identity can be understood as individuals' collective sentiment toward their nation-state, cutting across various social statuses and backgrounds (Adam, 2012; Dittmer & Kim, 1993). Such a concept

emerges only within groups with mutual affiliations and a unified sense of belonging. Notably, the bonds underpinning national identity are not rooted in blood relations but are socially constructed, requiring ongoing nurturing to ensure continuity across generations (Adam, 2012; Kowert & Legro, 1996; Sokol, 2009; Vale, 2008).

The development of national identity involves a nuanced process that depends on two core aspects: the first is 'identifying with one's nation,' which refers to recognizing a community's existence and its role in shaping the state system; the second is 'commonalities,' which highlights the shared attributes among community members, such as ethnicity, cultural heritage, and shared objectives (Koening, 2006; Pipan, 2008; Vale, 2008). Furthermore, instilling a strong 'sense of belonging' or emotional attachment among community members is essential for sustaining a collective national identity (Fladmark, 2000; Rashidah, 2014).

Most discussions on national identity focus on its acceptance and appreciation within communities, emphasising the relationship between citizens and the state and exploring how patriotic sentiments can be cultivated between them (Liu & Turner, 2018). A strong appreciation of national identity enhances loyalty and unity between individuals and their country. Architecture, in particular, holds the potential to serve as a medium for reinforcing national identity. However, its significance as a symbol of national identity remains largely underrecognised by the general populace and is typically discussed only among architects and policymakers (Surat, 2016). This lack of awareness is unfortunate, given that architecture is a vital part of everyday life and can contribute to instilling a sense of national identity. By leveraging architectural design, a society can foster a deeper awareness of its cultural roots, cultivating a heightened sense of patriotism.

This study delves into the conceptual framework of national identity within architecture, focusing on its functions, underlying ideologies, and thematic elements. These aspects are the most commonly explored concepts surrounding national architectural identity.

2.1 Roles

National architectural identity can be understood through two primary levels: the first focuses on fulfilling societal needs, while the second addresses the demands of those in power (Zharani, 2019). For the community, there is a single category called 'project identity.' On the other hand, at the governmental level, architectural identity is categorised into three distinct types: 'sub-national identity architecture,' 'supra-national identity architecture,' and 'private identity architecture'(Adam, 2012; Levine, 2018; Pipan, 2008; Shear, 2018). These four classifications are based on architecture's specific role with the general public and the authorities (Vale, 1988).

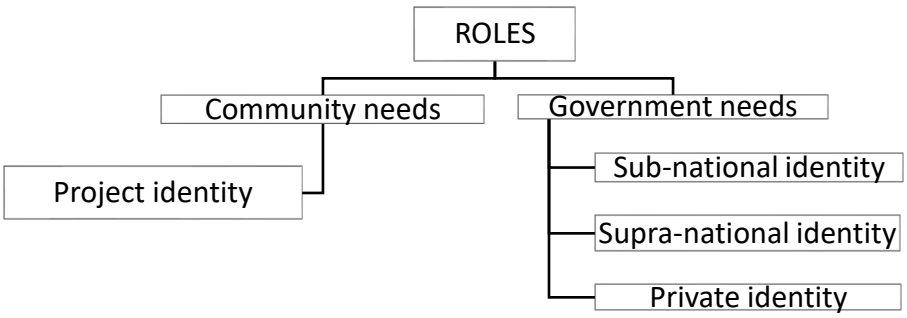


Fig. 1: The roles of architecture in national architectural identity

'Project identity' involves influential members of society using cultural, linguistic, and architectural resources to create a shared identity that can be embraced by diverse social groups, promoting acceptance and unity (Levine, 2018). In this framework, architecture symbolises inclusiveness and democratic principles, helping to bring together various segments of society (Hussain, 2015).

'Sub-national identity' showcases a nation's economic, political, and social development (Bloom, 1993; Levine, 2018)achievements. Newly independent or developing nations, particularly those in the Global South, often utilize architectural expression to communicate their national aspirations and philosophies (Vale, 2008). This approach involves designing structures sensitive to the local context and community needs.

'Supranational identity' is similar to subnational identity but with an expanded scope, aiming for recognition beyond national borders. Unlike subnational identity, which is focused internally, supranational identity seeks to project influence and status on an international level (Adam, 2012; Levine, 2018; Shear, 2018). Achieving global recognition is often a goal for governments, as it enhances the nation's prestige and aligns it with more developed countries, reflecting power and progress.

'Private identity' is characterized by individuals or powerful patrons who dictate architectural styles based on their tastes or personal agendas rather than promoting a collective sense of national pride (Canizaro, 2007; Levine, 2018; Mohamad Rasdi, 2005; Vale, 2008).

2.2. Typologies

National architectural identity can be classified into three typologies: (a) natural identity, (b) artificial (manufactured) identity, and (c) forced identity (Surat, 2012a, 2020).

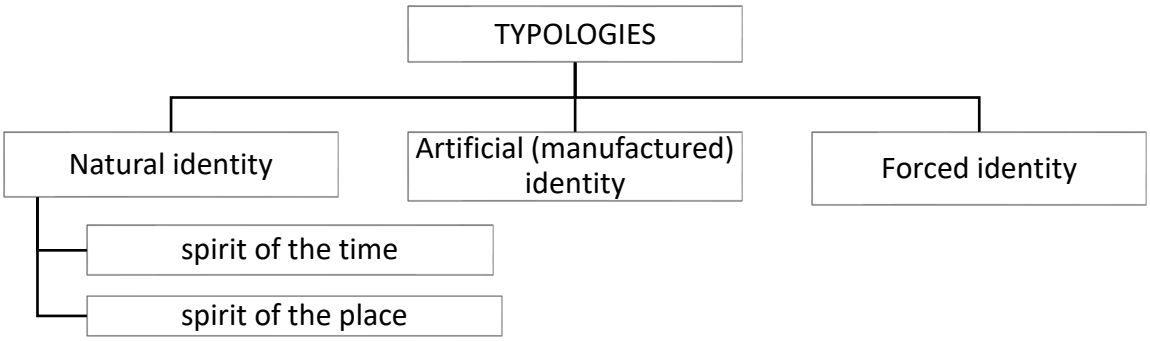


Fig. 2: The typologies of architecture in national architectural identity

Natural identity is grounded in the principles of the ‘spirit of the time’ and the ‘spirit of the place’ (Surat, 2012a, 2020). The ‘spirit of the time’ emphasises the importance of aligning architectural design with modern technological advancements and construction methods, ensuring its relevance while leveraging local expertise. Architects such as Frank Lloyd Wright, Le Corbusier, Charles Correa, and Geoffrey Bawa have consistently incorporated these principles in their work. Meanwhile, the ‘spirit of the place’ involves designing buildings that harmonise with their local environment, considering factors such as climate, traditions, the surrounding landscape, and the natural context, ensuring the architecture fits naturally within its site. Architects like Charles Jencks and Michael Graves have popularized this approach. In

Malaysia, Ken Yeang has been a key advocate for integrating environmental and climatic considerations into his designs. Scholars like Mohamad Tajuddin, Nangkula Utaberta, and Mastor Surat have emphasized integrating these concepts with Islamic values and a culturally human-centred perspective.

Artificial identity (or manufactured identity) arises in times of political instability and economic challenges when the need to address society's demands and aspirations leads to creating an architectural identity that strives for universal appeal and acceptance (Ismail & Mohd. Rasdi, 2009; Kosman & Nik Ibrahim, 2007; Vale, 1988). As noted by William J. Curtis, artificial identity seeks to create easily understandable and widely accepted architecture while still expressing the right values. Architectural styles such as functionalism, machine aesthetics, primitive regionalism, and revivalism are examples of this identity type (Surat, 2012a, 2020).

Forced identity is the result of architecture being created to fulfil a particular purpose, often driven by the interests of a specific group or entity. This type of identity may prioritize economic or political goals over the needs or desires of the actual users. It typically adheres to government regulations and focuses on fulfilling basic requirements. Financial considerations, political structures, and government policies often influence forced identity creation (Kosman & Nik Ibrahim, 2007; Mohamad Rasdi & Kosman, 2005). Developers and governmental authorities are the main actors in shaping this identity. Developers are primarily motivated by financial interests, while governments aim to advance national aspirations, economic progress, and political stability through iconic architectural projects. Although not inherently negative, this approach may weaken national architectural identity if it disregards deeper architectural values, potentially resulting in a crisis in the country's architectural heritage (Mastor Surat, 2012a, 2020).

2.3. Themes

In his recent literature review on national architectural identity, published in the *Journal National Identities: Critical Inquiry into Nationhood, Politics & Culture*, Samir Pandya identifies three key themes in the development of national identity in architecture: typology, remembrance (memorial), and geopolitics (Pandya, 2020).

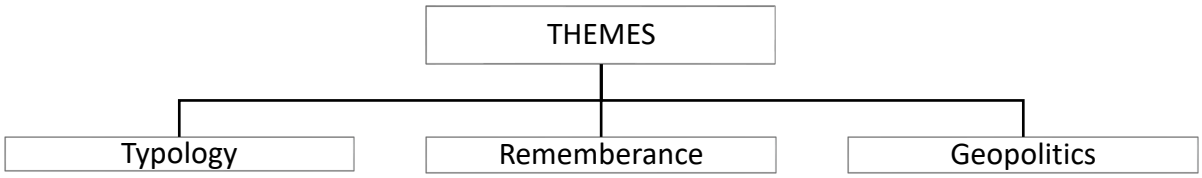


Fig. 3: The themes of architecture in national architectural identity

The typology theme in architecture goes beyond the typical analysis of form, function, and structure, particularly when applied to national identity. Here, it incorporates two essential aspects: the focus on local cultural context and the political environment, which play a pivotal role in shaping architectural design. This approach moves beyond traditional typologies, integrating them with local cultural values and political realities (Pandya, 2020). For example, Singapore's National Theatre (*Panggong Negara*) is a prime example of how architecture can reflect the nation's multiracial identity, promoting "identity as recognition rather than as suppression of difference" (Quek, 2012; Stoicheva, 2009). In addition, typologies related to

historic architecture, cultural significance, and political considerations provide vital guidance in the design process (Huang, 2012). Another significant aspect of typology in national architecture is its ability to adapt to modernity by combining traditional design elements with international and cross-national styles, resulting in an eclectic design approach that merges historical influences with contemporary architectural trends (Pandya, 2020).

Remembrance, the second theme, focuses on the role of architecture in commemorating significant historical events, figures, or movements that are integral to a nation's identity (Pandya, 2020). Buildings such as national monuments, government structures, and museums often symbolise the country's historical and socio-political milestones. These structures go beyond mere architectural form by conveying deeper national pride and unity meanings. For example, the National Monument (Tugu Negara) in Kuala Lumpur honours the sacrifices made by Malaysian soldiers during the Malayan Emergency and World War II, reflecting the nation's struggle for independence and the patriotism that binds its people (N. Ismail et al., 2017). Similarly, the Sultan Abdul Samad Building and Merdeka Square (Dataran Merdeka) stand as iconic representations of Malaysia's journey from colonisation to independence, with the square marking the moment when the country declared its sovereignty in 1957 (Mat Radzuan et al., 2020). These architectural landmarks, tied to remembrance, highlight the importance of historical narratives and post-colonial studies in shaping Malaysia's national identity, ensuring that architecture is functional and a source of cultural pride and unity. Such structures serve as tools for preserving history, fostering patriotism, and attracting local and international tourists eager to engage with these pivotal moments in Malaysia's past.

Finally, the theme of geopolitics examines the interaction between political power and geographical space, highlighting how political and strategic factors influence the development of national architecture (Huzen, 2019). Geopolitical considerations involve understanding the nation's relationships with neighboring countries and its internal political and social dynamics. Pandya (2020) argues that national architecture must account for the local and international geopolitical context to stay relevant and reflect the current political climate. A notable example in Malaysia is the Istana Negara (National Palace) in Kuala Lumpur, reflecting Malaysia's monarchy system and political structure. As the official residence of the King (Yang di-Pertuan Agong), the palace symbolises the nation's unique constitutional monarchy. It represents Malaysia's commitment to maintaining its cultural heritage and political stability (Ahamad et al., 2018). Similarly, the KLCC Towers (Petronas Twin Towers) embody Malaysia's economic rise and technological prowess, with the towers symbolising the nation's ambition to be recognised as a global economic player(Ismaeel Otuoze Audu, 2012). The connection between geopolitics and architecture in Malaysia reinforces national identity. It influences domestic loyalty and international recognition, positioning the country as a prominent force in Southeast Asia and the wider world.

3.0 METHODOLOGY

This study adopts a qualitative research approach to investigate the complexities of national architectural identity in Malaysia. It addresses the ongoing scholarly discourse concerning the perceived lack of local authenticity and representativeness in the nation's architecture. The methodology synthesises scholarly perspectives through a literature review and direct observation of relevant architectural examples. The literature review facilitated the compilation of ideologies and viewpoints about the roles, typologies, and themes of national architectural identity. Subsequently, case studies of Malaysian architecture were analyzed to examine the practical application of these theoretical constructs and their relationship to the

broader context of national architectural identity. An interpretive approach was employed throughout the analysis to explore the various architectural elements that contribute to national identity, and the findings are presented in a narrative format (Moen, 2006; Mohidin & Ismail, 2018). This methodological framework enables a nuanced investigation of how architectural roles, typologies, and themes shape and define Malaysia's architectural identity.

4.0 CASE ANALYSIS AND DISCUSSIONS OF ARCHITECTURAL BUILDINGS IN MALAYSIA

Table 1: An analysis of case studies focusing on the roles, typologies, and themes of national identity in Malaysian architecture

Elements	Types	Local case studies	Analyses & discussions
ROLES (Zharani, 2019) **To meet the needs of the community:** **1. Project identity** **To meet the needs of the government's:** **1. Sub-national identity** **2. Supra-national identity** **3. Private identity**	**Project Identity** - Creating a shared identity that everyone can embrace, fostering acceptance and unity across different communities. - Utilizing architecture as a symbol of community solidarity and democratic ideals, bridging the diverse fabric of society.	 **Fig. 4**: Malaysian Parliament Building (Teh, 2018)	• The Malaysian Parliament Building exemplifies project identity (Ismail & Mohd Rasdi, 2008). Its design emphasizes a representative approach, deliberately avoiding any association with a specific ethnicity or the dominant ethnic group. Additionally, it features a modern and forward-looking style, influenced by local climate factors and regional traditions, while integrating contemporary materials and the latest technological advancements. • The Parliament building was designed with the purpose of serving as a symbol of national unity for all Malaysians (Kosman & Nik Ibrahim, 2007). Tunku Abdul Rahman commissioned Sir Ivor Shipley, who was working with the Public Works Department (JKR) at the time, to create a design that would embody the national image. The final design successfully achieved this goal, becoming a powerful national symbol for the country.
	Sub-national identity - Architecture functions as a means of representing the values and principles behind a nation's emblem. In this sense, buildings are designed to benefit the public while also reflecting the local community's context. Moreover, they	 **Fig. 5:** Melaka City Council building – 'Graha Makmur' (Sharif, 2010)	• The Melaka City Council building, known as 'Graha Makmur', serves as an example of sub-national identity architecture. Its design incorporates aspects of Malay architectural revival, most notably reflected in the style of its roof (Mohd Nor, 2018; Mursib, 2008). • The primary function of Graha Makmur is to serve as the local city council for Melaka. As a central landmark for the community, the

Elements	Types	Local case studies	Analyses & discussions
	symbolize the nation's achievements in economic, political, and social progress.		building stands as a testament to the region's Malay architectural heritage, recalling Malacca's historical prominence as an internationally renowned trading hub. Constructed in the modern era, Graha Makmur reflects the success of the Melaka government in advancing the state economically, socially, and politically.
	Supra-national identity - Closely aligns with sub-national identity. - Architecture acts as a powerful symbol at both national and international levels, with global recognition enhancing the nation's standing and elevating its dignity on the world stage.	 **Fig. 6:** Petronas Twin Tour which is popularly known as KLCC (Robins, 2019)	• The Petronas Twin Towers, commonly known as KLCC (Kuala Lumpur City Centre), were constructed to attract global attention and position Malaysia as a developed region. In addition to serving as a shopping mall, performance venue, and office space during the day, the towers also stand as a symbol of the country's modernity and progress (Ismaeel Otouze Audu, 2012). • KLCC was a key component of Vision 2020, an ambitious plan introduced by former Prime Minister Tun Dr. Mahathir Mohamad, aiming to transform Malaysia from a developing nation into a fully developed one. The construction industry was chosen as a focal point to showcase Malaysia's economic potential, positioning it to rival established global powers. More than just a national icon and a symbol of pride, KLCC represents a modern regional identity. It serves as a prime example of how cultural symbols can thrive in a globalized world, influencing not only local but also global urban landscapes. Through the development of KLCC, Malaysia was able to craft a contemporary regional identity that both embraced globalization and reflected its unique cultural values.
	Private identity - The design of the architecture is influenced by a person or a key figure within		• Perdana Putra in Putrajaya reflects this identity, as the overall development of the area was primarily influenced by the vision of the nation's leadership during

Elements	Types	Local case studies	Analyses & discussions
	the community, reflecting their own tastes and goals.	 **Fig. 7:** Perdana Putra in Putrajaya (Rudolphson, 2018)	that period (A. S. Ismail & Rasdi, 2010). • Putrajaya is one of several large-scale projects designed to draw foreign investment and showcase Malaysia as a stable, prosperous, progressive, and technologically advanced Muslim nation. It aims to highlight the country's strong cultural and religious traditions while positioning Malaysia on the global stage (Moser, 2010). These ambitious initiatives, led by former Prime Minister Tun Dr. Mahathir Mohamad, have been successfully realized and continue to stand as a testament to his vision.
TYPOLOGIES **(Mastor Surat, 2020)** **1. Natural identity** **2. Artificial (manufactured) identity** **3. Force identity**	**Natural identity** - Influenced by the 'spirit of the time' and the 'spirit of the place' - 'Spirit of the time': The architecture developed aligns with contemporary technological progress, ensuring it remains forward-thinking and not constrained by outdated methods. - 'Spirit of the place': New designs must be tailored to the specific characteristics of the location, blending seamlessly with its environment while taking into account factors like climate, context, and cultural traditions.	 **Fig. 8:** Malay Traditional House (Ghazali, 2020)	• The Malay Traditional House exemplifies Natural Identity, with its architecture carefully shaped by the local environment, climate, and topography. This design not only shows how buildings can blend with their surroundings but also promotes sustainable architectural practices(M Surat et al., 2010). • The design of the Malay traditional house was shaped by cultural, religious, and social principles, as well as the region's climate(Hosseini et al., 2012; Utaberta et al., 2015). The house was oriented towards the Qiblah (the direction of Mecca), and the interior spaces were arranged to maintain separation between men and women. Elevated on pillars, the house was built above the ground to protect against dampness, flooding, and wild animal threats. The raised structure also allowed for the area underneath to be utilized for farming and growing crops, contributing to its sustainability.
	Artificial (manufactured) identity - An identity developed during a time of political turbulence and	 **Fig. 9:** Putra World	• An example of artificial identity can be observed in the Putra World Trade Centre (PWTC) in Kuala Lumpur (Mastor Surat, 2020). The design incorporates a large-scale interpretation of the roof from the Malay Traditional House, which

Elements	Types	Local case studies	Analyses & discussions
	economic challenges. - Create architecture that is universally relatable, simple to grasp, and effectively communicates the intended message. - Combining functionalism, regionalist roots, and architectural revivalism in design concepts.	Trade Centre (PWTC) (Govindarajoo, 2020)	has been adapted and placed on the structure. However, the sustainable architectural features present in the original Malay Traditional House, such as climate-responsive design elements, are not reflected in this modern adaptation. The roof was merely an oversized version of the traditional Malay house roof, primarily for aesthetic purposes. It symbolized the Malay community, as the building serves as the headquarters for UMNO, the largest Malay political party in the country.
	Forced identity - An identity established with the primary goal of fulfilling a specific need. - It may seem to benefit one group over others, though this doesn't automatically mean there are negative implications or bad intentions. - Often, the preferences and needs of the people using the space are disregarded, with the focus being strictly on the orders of those in charge. - The factors driving the formation of these identities often include economic considerations, political systems, and the strategies of those in power.	 **Fig. 10:** Kelantan State Education Department building (JPN Kelantan - State Education Department of Kelantan, 2014)	• The Kelantan State Education Department is one of the examples of forced identity (Surat, 2020). The façade which was incorporated with domes that have become the main image of the building did not able to speak on the relationship with the local context. As much as its purpose is to support the local educational system, its translation into the architecture of the building is totally out of context. From the looks itself, the building is more like a castle which is very dominant and powerful. Even though this might become a strong landmark to the locals, the language portrayed by the building is still like it is being forced as there is no assimilation between the context and the purpose of the building.
THEMES **(Pandya, 2020)** **1. Typology** **2. Remembrance**	**Typology** - This is linked to the emphasis on the relationship between local cultural elements and the political context.	 **Fig. 11:** Sarawak	• The Sarawak State Legislative Assembly (Dewan Undangan Negeri Sarawak) building in Kuching exemplifies the fusion of local cultural elements and political significance in its architectural design (Zaini et al.,

Elements	Types	Local case studies	Analyses & discussions
(memorial) **3. Geopolitics**		State Legislative Assembly Building (Aranas, 2017)	2018). The structure features a nine-pointed star floor plan, symbolizing the unity of Sarawak's nine divisions, and incorporates a traditional *'Payung'* (umbrella) roof, which draws inspiration from indigenous Sarawakian symbols. The design reflects a blend of modern materials such as glass and steel with traditional motifs, representing both Sarawak's heritage and its aspirations for a contemporary future. • In addition to its symbolic design, the building's central atrium with clear glass walls allows natural light to flood the space, symbolizing transparency in governance (Aki Media, 2025). These architectural elements not only highlight the cultural identity of Sarawak but also emphasize the building's role as a significant political landmark. The Sarawak State Legislative Assembly building serves as a visual representation of the state's unity, governance, and cultural pride.
	Remembrance (memorial) - The focus is on identifying the individuals or events that should be commemorated. - This often involves the design of palaces, national theatres, museums, parliaments, and government buildings, where the architectural process is shaped by historical context or socio-political influences that reflect the country's national identity. - The design of such structures also conveys a sense of patriotism, either subtly or explicitly, through the architectural form and	 **Fig. 12:** Istana Budaya (Istana Budaya, 2021a)	• The architectural design of Istana Budaya embodies the theme of remembrance, drawing inspiration from Malay cultural traditions (Istana Budaya, 2021b). The structure blends the spatial configurations of the Malay Traditional House and Royal Palace, alongside symbolic motifs like the 'sireh' leaves, which hold significance in Malay customs, especially during the proposal and wedding ceremonies. The interior layout of the building reflects influences from these traditional spaces, while the roof design takes cues from the arrangement of 'sireh' leaves in a 'Sireh Junjung,' a customary Malay offering.

Elements	Types	Local case studies	Analyses & discussions
	symbolism.		
	Geopolitics - Geopolitics illustrates the connection between political authority and geographical space. It typically includes interactions between regions and nations at both the domestic and international levels. This involves identifying guiding principles that shape a country's growth and development. A comprehensive understanding of geopolitics can provide valuable insights into a nation's strategic planning for development and defense.	 **Fig. 13:** National Mosque, Kuala Lumpur (National Mosque, Kuala Lumpur, 2021)  **Fig. 14:** Putra Mosque, Putrajaya (Erin, 2019)	• The influence of geopolitics on architectural design can be observed in several state mosques in Malaysia, such as the National Mosque in Kuala Lumpur and the Putra Mosque in Putrajaya (A. S. Ismail & Mohd Rasdi, 2010). The National Mosque, built during the era of Tunku Abdul Rahman (1957-1970), was designed to combine elements of national identity, traditional Malay house architecture, and Islamic design principles.This design reflected Tunku's vision of Islam as a unifying force among the people. A key feature of the mosque is its unique roof, redesigned to resemble the traditional parasol, a symbol of Malay royalty, making it a significant architectural element that represents national pride. • The Putra Mosque, constructed under Tun Mahathir Mohamad's tenure (1981-2003), reflects the era's growing influence of Islam in Malaysia. The mosque's design symbolizes the modernization and expansion of Islamic practice during Tun Mahathir's leadership, aligning with his broader vision of national development and the role of Islam in contemporary Malaysia. • Consequently, his vision for Islam not only redefined the country's social framework and reorganized the political system but also solidified the link between UMNO, Islam, and the majority ethnic group. His political agenda aimed to position Malaysia as the heart of Islamic civilization, highlighting progress in various developmental sectors while maintaining a balance between religious and worldly concerns. Additionally, he sought to portray Malay Muslim society, under UMNO's leadership, as a progressive and competitive community capable of standing alongside other ethnic groups.

5.0 RECOMMENDATIONS

The examination of selected Malaysian architectural case studies provides valuable insights for shaping future architectural practices and policymaking. These insights are categorized based on the roles, typologies, and themes of national architectural identity, and are translated into the following key recommendations:

a) Clarifying the Roles of National Architectural Identity

Designers should begin by clearly understanding the purpose behind each architectural project, whether it serves a national, sub-national, supra-national, or private role. This understanding informs the selection of appropriate design elements and determinants, allowing for a more focused conceptual approach. When the architectural intent is aligned with the identity it represents, the outcome is more meaningful and contextually relevant.

b) Applying Typological Awareness in Design Strategy

Recognizing the typologies of national identity—natural, artificial (manufactured), and forced—provides designers with a framework for categorizing and strategizing their design approach. For instance, the Malay Traditional House exemplifies a "natural identity" rooted in cultural and environmental context. Understanding the typological origins help architects plan not only the visual language (such as form and façade) but also the incorporation of sustainable design principles that align with the identity's essence.

c) Interpreting Themes to Enrich Design Narratives

Themes of national architectural identity—such as typology, remembrance, and geopolitics—often carry abstract or symbolic meanings tied to culture, history, and political ideology. These themes should be carefully analyzed and interpreted, as they enrich the architectural narrative and invite deeper engagement. A critical and reflective design process that draws from these themes can produce architecture that resonates emotionally and intellectually with its users.

d) Avoiding the Pitfalls of Superficial Representation

Case studies like the Kelantan State Education Department building highlight the risks of applying identity superficially or inappropriately. Forced identities that are disconnected from cultural or functional contexts tend to lack authenticity and user resonance. Designers must therefore avoid tokenistic approaches and instead prioritize authenticity, relevance, and contextual fit in representing identity.

e) Embracing Geopolitical and Cultural Dynamics

Architecture, as seen in projects like the Putra Mosque, can serve as a statement of national and geopolitical positioning. Understanding how cultural diplomacy and political narratives influence design can guide architects in aligning their work with national aspirations. This geopolitical awareness enables architecture to act not only as a functional space but also as a strategic cultural and political instrument.

By incorporating these recommendations, future architectural endeavors in Malaysia can better address community needs, respect cultural narratives, and contribute to the construction of a progressive and inclusive national architectural identity.

6.0 CONCLUSION

This study has systematically examined the key elements that define Malaysia's national architectural identity, specifically focusing on its roles, typologies, and themes. Through a synthesis of literature review and case study analysis, the research demonstrates that these elements are instrumental in shaping the evolution of architecture within Malaysia. The findings underscore that the roles of architecture, encompassing project, sub-national, supra-national, and private identities, are fundamentally driven by the objectives and intentions behind architectural projects, whether to serve community needs or governmental ambitions. These roles provide a conceptual framework that guides the incorporation of appropriate elements and determinants into architectural design to effectively convey national architectural identity.Furthermore, the typological analysis, which includes natural, artificial (manufactured), and forced identities, elucidates the origins and characteristics of different architectural forms. This classification aids architects and related professionals in the design and construction processes, ensuring a clearer understanding of how architectural typologies contribute to Malaysia's national architectural identity. Finally, the study reveals that the themes of national architectural identity—typology, remembrance, and geopolitics—are intrinsically linked to the underlying narratives and contexts that inform architectural design. These themes, encompassing cultural, historical, political, and geographical considerations, necessitate rigorous analysis and interpretation to produce architecture that effectively articulates a meaningful national architectural identity. In conclusion, while the conceptual understanding of national architectural identity is crucial, its successful realization requires sustained effort and investment. Overcoming the challenges posed by the economic imperatives of the architectural industry necessitates a collective commitment from architects, developers, and the broader Malaysian society to prioritize and cultivate a distinct and authentic national architectural identity.

ACKNOWLEDGMENTS

The authors would like to express their gratitude and appreciation to all who contributed to this study, directly or indirectly.

REFERENCES

Adam, R. (2012). *Identity and Identification: The Role of Architectural Identity in a Globalised World*. 176–193.

Ahamad, N. A., Zubir, Z., Isip, P. F., & Hussain, N. H. (2018). The Establishment of the Former National Palace and its Architectural Identity. *Prosiding Persidangan Senibina Dan Alam Bina Serantau 2018 (SeniBINA2018) 'Tema: Senibina Identiti Kebangsaan', Proceedings of Conference on Regional Architecture and Built Environment 2018 (SeniBINA2018) 'Theme: National Architectural Identity,'* 76.

Aki Media. (2025). *(DUN) Sarawak State Legislative Assembly*. akimedia.com.my. https://akimedia.com.my/portfolio/sarawak-state-legislative-assembly/

Aranas, U. (2017). *New Sarawak State Legislative Assembly Building*. structurae.net. https://structurae.net/en/media/290807-new-sarawak-state-legislative-assembly-building

Audu, Ismaeel Otouze. (2012). The Petronas Twin Tour and The Kuala Lumpur City Centre From The Perspective of Critical Regionalism. In *Universiti Teknologi Malaysia* (Issue June). Universiti Teknologi Malaysia.

Audu, Ismaeel Otuoze. (2012). *THE PETRONAS TWIN TOWERS AND THE KUALA LUMPUR CITY CENTRE FROM THE PERSPECTIVE OF CRITICAL REGIONALISM*. Universiti Teknologi Malaysia.

Bloom, W. (1993). Personal identity, national identity and international relations (Vol. 9). In *Cambridge University Press*. Cambridge University Press. https://doi.org/DOI: 10.1017/CBO9780511558955

Canizaro, V. (2007). *Architectural Regionalism: Collected Writings on Place, Identity, Modernity and Tradition*.

DASIK. (2017). *Deraf Akhir Dasar Senibina Identiti Kebangsaan (DASIK)*.

http://www.lam.gov.my/downloads/Forms/Uncategorized/derafdasik_15sep2017.pdf
Dittmer, L., & Kim, S. S. (1993). In Search of a Theory of National Identity. In L. Dittmer & S. S. Kim (Eds.), *China's Quest for National Identity* (pp. 1–31). Cornell University Press. http://www.jstor.org/stable/10.7591/j.ctv2n7fzc.5
Erin. (2019). *Putra Mosque, Putrajaya*. https://i1.wp.com/www.travelingthruhistory.com/wp-content/uploads/2019/06/IMG_0354t2.jpg?resize=1024%2C842
Fladmark, J. M. (2000). *Heritage and Museums Shaping National Identity* (First Edit). Routledge.
Ghazali, A. (2020). *Rumah Tok Su*. https://espoletta.com/2020/10/05/architecture-conservation-protecting-our-past-part-1-of-2/
Govindarajoo, R. (2020). *Bringing PWTC Back To Its Glory*. https://www.businesstoday.com.my/2020/01/13/bringing-pwtc-back-to-its-glory/
Hosseini, E., Mursib, G., Raja Shahminan, R. N., & Shahedi, B. (2012). Values in Traditional Architecture : Malay House. *6th International Seminar on Vernacular Settlements*, *April*.
Huang, Y.-C. (2012). National Glory and Traumatism: National/cultural identity construction of National Palace Museum in Taiwan. *National Identities*, *14*, 1–15. https://doi.org/10.1080/14608944.2012.702742
Hussain, N. H. (2015). Thoughts on Malaysian Architecture Identity and Design Principles of Malayan Architects Co-Partnership. *PhD*, *33*(3), 1–6. http://dx.doi.org/10.1016/j.ssci.2014.04.012%0Ahttps://doi.org/10.1016/j.ssci.2017.12.026%0Ahttp://dx.doi.org/10.1016/j.ssci.2015.04.023%0Ahttp://dx.doi.org/10.1016/j.ssci.2015.03.003%0Ahttp://dx.doi.org/10.1016/j.sbspro.2014.04.370%0Ahttp://dx.doi.org/10
Huzen, K. (2019). *FRAMEWORK FOR UNDERSTANDING: GEOPOLITICS AND FOREIGN POLICY*.
Ismail, A. S. (2018). Representation of National Identity in Malaysian State Mosque Built Form as a Socio-cultural Product. *International Journal of Built Environment and Sustainability*. https://doi.org/10.11113/ijbes.v5.n1.243
Ismail, A. S., & Mohd. Rasdi, M. T. (2009). Frank Llyod Wright's ideology towards the formation of national architectural identity in Malaysia. *Jurnal Alam Bina*, *15*(1).
Ismail, A. S., & Mohd Rasdi, M. T. (2008). Discourse of Democratic Architecture in Malaysia: An Analysis of Putrajaya Government Building in Comparison to Parliament Building. *The 6 Th International Malaysian Studies Conference (MSC6) Engaging Malaysian Modernity 50 Years and Beyond*, *August*, 1–22.
Ismail, A. S., & Mohd Rasdi, M. T. (2010). *The influence of Islamic political ideology on the design of state mosques in West Malaysia (1957-2003)*.
Ismail, A. S., & Rasdi, M. T. M. (2010). Mosque architecture and political agenda in twentieth-century Malaysia. In *Journal of Architecture*. https://doi.org/10.1080/13602361003791051
Ismail, N., Rashidin, R., & Ahmad, A. (2017). Integrating visual semiotics in interpretation of "Tugu negara." *Pertanika Journal of Social Sciences and Humanities*, *25*(S), 351–360.
Istana Budaya. (2021a). Portal Rasmi Istana Budaya. http://www.istanabudaya.gov.my/
Istana Budaya. (2021b). *Senibina Istana Budaya*. Kementerian Pelancongan, Seni Dan Budaya Malaysia. http://www.istanabudaya.gov.my/?page_id=12827
JPN Kelantan - State Education Department of Kelantan. (2014). wikimapia. http://wikimapia.org/27371569/JPN-Kelantan-State-Education-Department-of-Kelantan#/photo/3226913
Koening, N. (2006). Construction of national identity and national pride of Germans in the intercultural context. *Differences*.
Kosman, K. A., & Nik Ibrahim, N. L. (2007). Identiti seni bina Malaysia: Masalah dan penyelesaiannya. *SARI: Jurnal Alam Dan Tamadun Melayu*, *25*, 279–290.
Kowert, P., & Legro, J. (1996). Norms, Identity, and Their Limits: A Theoretical Reprise. In *The Culture of National Security: Norms and Identity in World Politics* (pp. 451–497). https://provost.richmond.edu/about/pdf/Legro1996b.pdf
Levine, R. (2018). Modern Architecture & Ideology : Modernism as a Political Tool in Sweden and the Soviet Union. *Momentum*, *5*(1). https://repository.upenn.edu/cgi/viewcontent.cgi?article=1045&context=momentum
Liu, Q., & Turner, D. (2018). Identity and national identity. *Educational Philosophy and Theory*, *50*(12), 1080–1088. https://doi.org/10.1080/00131857.2018.1434076
Mat Radzuan, I. S., Isa, M., Abd. Rahman, F., Goh, A. T., Koh, J., Kamal, M., Che Amat, R., Mohd Ali, R., Shahruddin, S. N., & Shahidan, S. I. (2020). *The Kuala Lumpur Heritage Agenda*. ICOMOS Malaysia. https://openarchive.icomos.org/id/eprint/2401/1/The Kuala Lumpur Heritage Agenda.pdf
Moen, T. (2006). Reflections on the Narrative Research Approach. *International Journal of Qualitative*

Methods, *5*(4), 56–69. https://doi.org/10.1177/160940690600500405
Mohamad Rasdi, M. T. (2005). *Malaysian Architecture: Crisis Within*. Utusan Publications.
Mohamad Rasdi, M. T., & Kosman, K. A. (2005). Identiti seni bina Malaysia : pengajaran daripada gerakan art and craft di Britain. *Jurnal Alam Bina*, *7*(1), 31–48.
Mohamad Rasdi, M. T., & Mursib, G. (2004). Sahutan regionalisme dalam identiti senibina di Malaysia: adaptasi awal tradisi modenisme 1950-1980. *Jurnal Alam Bina*, *6*(2), 29–49.
Mohd Nor, O. (2018). *Penerapan Seni Bina Istana Lama Seri Menanti Dalam Reka Bentuk Bangunan Pejabat Daerah Seremban*. Universiti Teknologi Malaysia.
Mohidin, H. H. B., & Ismail, A. S. (2018). Malaysian Administrative Building Responsive Design Approach. *Asian Journal of Environment-Behaviour Studies*, *3*(10), 99–111. https://doi.org/10.21834/aje-bs.v3i10.317
Mursib, G. (2008). *Pemikiran dan sahutan regionalisme dalam wacana senibina Malaysia*. Univerisiti Teknologi Malaysia. http://eprints.utm.my/id/eprint/18733/
National Mosque, Kuala Lumpur. (2021). TripHobo. https://www.triphobo.com/places/kuala-lumpur-malaysia/national-mosque
Pandya, S. (2020). Architecture in National Identities: a critical review. *National Identities*, *22*(4), 381–393. https://doi.org/10.1080/14608944.2020.1812825
Pipan, T. (2008). *Building a Sense of a Nation*. Architectural Association, School of Architecture, Landscape Urbanism, Contemporary Landscapes. http://www.urban.si/wp-content/uploads/2013/05/building_web.pdf
Quek, R. (2012). Dramatic pre-emption in Singapore's National Theatre: constructing national identity before an independent nation. *National Identities*, *14*(3), 287–307. https://doi.org/10.1080/14608944.2012.702740
Rashidah, M. (2014). Sense of belonging to the country: assessing patriotism, loyalty and national allegiance of Malaysian students abroad. *Proceeding of the Social Sciences Research ICSSR*, 561–572.
Robins, A. (2019). *Petronas Twin Tour*.
Rudolphson, F. (2018). *Unique Architecture in Putrajaya! Perdana Putra! - Vlog#18 - Kuala Lumpur, Malaysia*. https://www.youtube.com/watch?v=20E2VfAuXwM
Sharif, F. (2010). *Melaka City Council building – 'Graha Makmur.'* http://1.bp.blogspot.com/_0cbyPDiMXGk/S4ZHsj7KwzI/AAAAAAAAADU/0rwQbb8-nR4/s1600-h/DSC07120+copy.jpg
Shear, A. (2018). *Identity and Meaning in Architecture*. https://www.academia.edu/8376865/Identity_and_Meaning_in_Architecture
Sokol, J. T. (2009). Identity Development Throughout the Lifetime: An Examination of Eriksonian Theory. *Graduate Journal of Counseling Psychology*, *1*(2), 139–148. http://epublications.marquette.edu/cgi/viewcontent.cgi?article=1030&context=gjcp
Stoicheva, T. (2009). 'Giving everyone their due': Religious buildings in Sofia and the conceptualisation of national identity, 1878–1912. *National Identities*, *11*(2), 187–207. https://doi.org/10.1080/14608940902891583
Surat, M, Tahir, M. M., Tawil, N. M., Ismail, R., Usman, I. M. S., Che-Ani, a I., Abdullah, N. a G., & Md. Nor, M. F. I. (2010). Re-evaluating the Idea of a Malaysian Architectural Identity Towards a Sustainable Environment. *EE'10 Proceedings of the 5th IASME/WSEAS International Conference on Energy & Environment*, *December 2013*, 25–30.
Surat, Mastor. (2012a). *Bengkel Garis Panduan Identiti Seni Bina Kebangsaan* (pp. 1–86). Universiti Kebangsaan Malaysia.
Surat, Mastor. (2012b). Identiti Senibina Kebangsaan Melalui Pendekatan Senibina Warisan Alam Melayu. *Bengkel Garis Panduan Identiti Seni Bina Kebangsaan (GASIK)*.
Surat, Mastor. (2020). Penerapan teras dan lunas senibina melayu dalam pembangunan senibina identiti malaysia. In *Seminar dan Pameran Senibina Melayu 2020* (p. 181). Persatuan Pencinta Senibina Melayu. https://senibinamelayu.com.my/wp-content/uploads/2020/01/Teras-dan-Lunas-Senibina-Melayu-.pdf
Surat, Mastor. (2016). Peranan Budaya Bangsa Dalam Pembangunan Senibina Malaysia : Garapan Dari Teras Senibina Warisan Melayu. *Seminar Falsafah Sains Teknologi 2*, 1–27.
Teh, A. L. S. (2018). *Malaysian Parliament Building*. https://assets.nst.com.my/images/articles/alan220418a.jpg_1524377712.jpg
Utaberta, N., Nik, F. E., Mohd Rasdi, M. T., Mohd Yunos, M. Y., Ismail, N. A., & Ismail, S. (2015). Assessing spaces in Malay Traditional House. *Advances in Environmental Biology*, *9*(5), 438–444.
Vale, L. (2008). *Architecture, Power and National Identity* (2nd Editio). Routledge.
Vale, L. J. (1988). Designing National Identity: Recent Capitols in the Post-Colonial World [Massachusetts

Institute of Technology]. In *Architecture, Power, and National Identity: Second Edition*. https://doi.org/10.4324/9781315880921

Yendra, R., Anofrizen, Wan Zin, W. Z., Jemain, A. A., & Fudholi, A. (2017). Spatial analysis of storm behavior in Peninsular Malaysia during monsoon seasons. *International Journal of Applied Engineering Research*, *12*(10), 2559–2566.

Zaini, A. I., Karsono, B., & Awang Sulong, A. H. (2018). From sacred to secular: Baruk architecture on secular buildings in Sarawak. *IOP Conference Series: Earth and Environmental Science*, *213*(1). https://doi.org/10.1088/1755-1315/213/1/012043

Zharani, E. N. (2019). *Reka Bentuk Mukaan Bangunan Awam Ke Arah Pembentukan Seni Bina Bercirikan Identiti Kebangsaan Malaysia*. Universiti Teknologi Malaysia.

JOURNAL OF ARCHITECTURE, PLANNING & CONSTRUCTION MANAGEMENT
Volume 15 Issue 1, 2025 E-ISSN: 2462-2222 ISSN: 2231-9514

UTILISATION OF AUGMENTED REALITY FOR GENERATING ACTIVE LEARNING IN ARCHITECTURAL EDUCATION

Received: 25th February 2025 | Accepted: 22nd April 2025 | Available Online: 30th June 2025
DOI: 10.31436/japcm.v15i1.965

Fadzidah Abdullah[1*], Aliyah Nur Zafirah Sanusi[2], Mohd Raziff Abd. Razak[3], Mhd Hafiz Karami Mhd Zain[4], Zeenat Begam Yusof[5], Nayeem Asif[6], Aida Kesuma Azmin[7], Mohd. Norizhar Ismail[8]

[1,2,4,5,6,7,8]Department of Architecture, Kulliyyah of Architecture and Environmental Design, International Islamic University Malaysia, Kuala Lumpur, Malaysia.
Email address:fadzidah@iium.edu.my

[3] Universiti Kuala Lumpur British Malaysian Institute, Jalan Gombak, Kuala Lumpur, Malaysia.

Corresponding author: **Fadzidah Abdullah*
Corresponding author's email: fadzidah@iium.edu.my

ABSTRACT

The advancement of Augmented Reality (AR) has impacted the world of architecture and has facilitated the construction industry to leap ahead, giving practitioners the ability to virtually visualize and spatialize design works with integration into the physical environment. Nevertheless, the utilization of the available visualization techniques in AR has not been widely used in the teaching and learning of architecture. Hence, this article aims to describe the exploration of utilizing AR in architectural education, as a method for generating active learning among students. This article also depicts case studies of the integration of AR visualization with architectural education by experimenting with techniques of AR application in the teaching and learning of building construction courses. Two (2) experimental projects were conducted with the substance of exploratory action research. The projects were carried out to experiment with the integration techniques and to assess the integration as attributes for successful learning. The two projects used a qualitative approach to have the exploratory inquiry of the experimentation, focusing on exploration of AR utilizations in two (2) building construction courses using steel and timber materials. This research shows that AR had been successfully utilized as the medium to disseminate architectural construction knowledge of both steel and timber construction materials. The experimentations also have inspired students to participate in the learning process actively and improved their cognitive learning capability.

Keywords: Augmented Reality, Architectural Education, Visualization, Immersive Environment, Design Education, Building Construction, Building Materials.

1.0 INTRODUCTION

The current advancement of digital technology has given birth to an enormous improvement in architectural visualization techniques. The techniques include visualization of two-dimensional drawings, three-dimensional digital models, virtual reality (VR), augmented reality (AR), mixed reality (MR) and extended reality (XR). In architectural practice, the advancements of immersive visualization techniques have assisted architects to model their designs with precision and detail (Gattupalli, 2024), so that convincing clients to realize their ideas could be done at ease. This immersive environment delivers a much more accurate representation of scale, depth, and spatial awareness that is incomparable to the conventional methods of rendering drawings and building scale models (Jullia Joson, 2022).

Specifically, augmented reality technologies have facilitated the construction industry to leap ahead, giving practitioners the ability to virtually visualize and spatialize design works with integration into the physical environment. This developing technology of AR has already impacted the world of architecture, design, and construction industry (James Wormald, 2023). The possible impact of AR technology on architectural education is also a matter of soaring pursuit. The last decade has shown increasing intellectual discourses, deliberating on the utilization of AR as one of the visualizing techniques to be adopted in architectural education. The demand keeps on increasing and the construction industry and job market command the necessity of utilizing AR for better equipped architects in the coming years (Jullia Joson, 2022). How architectural education might evolve in the future depends on how it incorporates the utilizations of this immersive technology.

Nevertheless, despite the immersive technological advancement, the utilization of the available visualization techniques has not been widely used in the teaching and learning of architecture. There is a substantial gap in expanding pedagogies and teaching methods that adopt the utilization of immersive technologies in the architecture and construction curricula (Hajirasouli, A. & Banihashemi, S., 2022). Hence, there is a necessity to explore the feasibility of integrating AR technology in tertiary education, especially in the fields that require visualization for their teaching and learning environments.

Hence, this article aims to describe the exploration of utilizing AR in architectural education, as a method for generating active learning among students in architectural education. This article depicts case studies of the integration of AR visualization with architectural education by experimenting with techniques of AR application in the teaching and learning of building construction courses. Two (2) projects were carried out to experiment with the integration techniques and to assess the integration as attributes for successful learning. The two projects used qualitative approaches to have the explorative inquiry of the experimentation, focusing on tentative usages of AR in two (2) building construction courses using steel and timber materials. Meanwhile, the quantitative research approach was also applied to the two projects by having survey questionnaires to obtain students' feedback on their acceptance of the integration.

2.0 LITERATURE REVIEW

2.1 Augmented Reality (AR)

Augmented Reality (AR) has an immense potential to produce spectacular architectural visualization and representation. Augmented reality is defined as the "emerging technology that allows the real-time blending of the digital information processed by a computer with information coming from the real world using suitable computer interfaces" (AR-media). The users could visualize "a composed world," mixing the real world with virtual objects (Redondo et al., 2013). Batchelor et al. (2021) describe the advancement of AR has also been widely used in locative AR games. Computer games become more attractive as AR lets virtual elements overlaid and integrated into the actual physical space. Hence, AR has a high potential to be utilized for the dissemination of Architectural Knowledge. Figures 1 and 2 show how visualization of a virtual object could be interfaced with a situated real world in real time, simply by using a simple tool like mobile telephone that traces a maker on a piece of paper. Meanwhile, figure 2 also shows how AR enables virtual and real objects seemingly co-exist at full scale.

Fig. 1: Overlays of virtual and real objects in AR interface

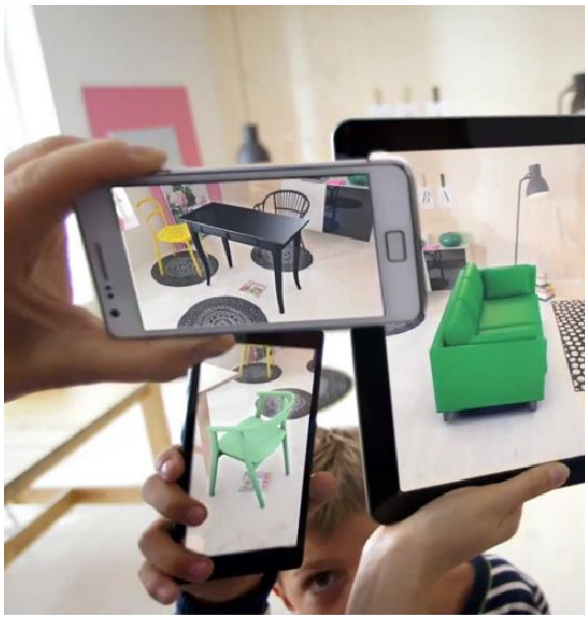


Fig. 2: AR enables the virtual and real objects seemingly co-existent at full scale

2.2 Challenging the Norm of Architectural Education

Architectural Education throughout the globe is dominantly accentuated on design studio. The architecture design studio (ADS) is a diverse environment that integrates theory with practice (Schon, 1987) that reflects experiential learning theory, specifically emphasizes "learning by doing" Kolb's (1984). This scenario of architecture design studio that combines experiential learning and iterative learning (Kolko, 2012), promotes active learning where knowledge is produced rather than disseminated. Furthermore, Jack Mezirow (2018) introduces the educational theory of "Transformative Learning" in architecture design studio, to reduce the hierarchical structure dominated by instructors that limit students' autonomy (A. M. Salama & Wilkinson, 2007). Formerly called student-centered learning, this pedagogical approach demonstrates how design instructors act as facilitators rather than authoritative figures, guiding students through complex design processes and encouraging the generation of new knowledge. Transformative learning involves a profound shift in the learners' perspectives, encouraging reflection, creativity, and critical thinking (Mezirow, 2018). This theory is particularly relevant for architectural design education, where design studios foster problem solving, reflective learning, and identity development.

Nonetheless, advanced pedagogic development with active instructional design implemented in architecture design studio generally has not been implemented in the teaching and learning of other architecture courses, such as building construction and architecture history classes. In non-studio courses, students routinely remain passive in class and have minimum engagement to the lesson learnt, resulting in ineffective learning outcomes. Hence, all architecture course courses should be converted into adaptive learning environments (Al Maani et al., 2021), where students develop resilience by adjusting to dynamic learning contexts. This recent Al Maani's pedagogical approach aligns with Mezirow's theory (2018) which emphasizes the importance of learners challenging their assumptions through problem-based engagement. This progressive shift required students and instructors to navigate uncertainty, reinforcing the transformative potential of learning through exploration and change.

Therefore, transforming the instructional design of non-studio architecture courses is inevitably critical to enhance architecture education in general. Specifically, this research has adaptability to the current learning theories, by exploring how utilization of AR could be a progressive method for generating active learning among students in building construction classes. This exploration of AR intends to make learning experience more enjoyable and effective. The implementation also encourages students' active participation with freedom and flexibility to create their own adaptive learning environment. Benzizoune (2024) ratifies that this learning development positively contributes to the quality of the learning through understanding and remembering the material in a more sophisticated way. Jiali, Ruixue, and Lu (2025) add that adaptive learning dynamically become more important because it caters to the differences in students' learning styles.

2.3 Augmented Reality in Architectural Education

AR technology offers a new way of delivering knowledge. In AR visualization, a virtual object interfaces with a situated real world in real-time (Azmin, et al., 2017). AR interfaces the real and virtual environment as it is a system that overlays, or augments, the real world with digital information that seemingly co-exists at full scale (Abboud, 2014). In architectural education, AR could enable students to virtually visualize design ideas which content information on spatial quality and materials used, while simultaneously experiencing the ideas in the real world (Gattupalli, 2024). The production of design hybrid realms in AR could minimize the gap between virtual and physical environments, giving students the opportunity to represent design ideas in more active and engaging ways.

For building construction and material courses, the usage of AR may offer a unique learning experience of building and construction details visualization. This visualizing tool enables students to envisage three-dimensional architectural design and comprehend construction details better than using traditional two-dimensional drawings. Scholars' works have also shown that the utilization of AR in architectural education contributes to numerous benefits (Bressler, et. al., 2013; Chen, et. al., 2016; Jullia Joson, 2022; Hajirasouli, A. & Banihashemi, S., 2022; James Wormald, 2023). AR stimulates learning by providing engaging, entertaining, cooperative, and interactive learning without jeopardizing learning achievement. AR also offers other key benefits in architectural visualization by increasing engagement among viewers, relishing immersive showcases, providing realism for virtual tours, and delivering alternative for data representation in architecture field.

3.0 METHODOLOGY

This research could be considered action research because the researchers directly involve in students' learning process. Action research has the "transformative power" (Dusty, 2024), to improve pedagogical instruction, to capture the potential of individuals and teams, and to execute meaningful change in educational endeavors. It demonstrates the interconnectedness of inquiry, teaching, and learning (Dusty, 2024) for the improvement of holistic understanding among stakeholders in education.

Adopting mixed-method approach, observation and survey questionnaires were two (2) main techniques used to describe the exploration of utilizing AR in two (2) projects designed for learning constructions and materials, in architectural education. The two projects used qualitative approaches to have the explorative inquiry of the experimentation, focusing on

tentative usages of AR in two (2) building construction courses using steel and timber materials. Meanwhile, the quantitative research approach was also applied to the two projects by having survey questionnaires to obtain students' feedback on their acceptance of the integration.

The two (2) projects were conducted with the substance of exploratory action research. Researchers were involved in the experience of assessing the potential and effectiveness of integrating AR for the dissemination of architectural knowledge, explicitly focusing on steel and timber construction classes. The first project deals with the course of AAR 1195: Building Construction and Materials 2 (timber). The second project deals with the course of AAR 2198: Building Construction and Materials 3 (steel). For each project, there were three (3) similar steps involved. First, a literature review was conducted to examine the issues linked with current AR technology relevant to architectural education. Second, researchers experimented with integrating AR application in architectural education, and third, researchers sought participants' insights on the experimented projects.

3.1 Project 1: AAR 1195 Building Construction and Materials 2

This project investigated how an instructional design that had AR integration could be planned to make learning enjoyable. The learning content consisted of AR building models of 13 traditional Malay timber houses. Since the students who enrolled in the class were freshies, the educators had developed the content before the experiment. Upon completion of the teaching experiment, an online survey was distributed to students to get their feedback. Figure 3 shows how students actively engage in the learning process in a classroom environment, by using a television as a visualized tool. Meanwhile, figure 4 shows how students interactively control the visualization tools, using smaller gadgets such as mobile phones, to view the AR interface in an outdoor learning environment.

3.2 Project 2: AAR 2198 Building Construction and Materials 3

This project explored the teaching and learning of steel architectural construction with the integration of AR. An experiment of explorative learning was conducted to collaboratively construct 3-dimensional models of steel construction details of a building, using computer-aided (CAD) design software. Students then converted CAD virtual models into AR models and uploaded the AR models into an online database. Since the students were sophomores, they independently developed their learning content in AR models . Figure 5 shows a sample of an augmented construction detail, produced by a student for the class assignment. Whilst figure 6 shows a student interactively visualizing an augmented construction detail product by his peer, with the real time interface.

In both projects, students were asked almost the same questions, encompassing the same parameters of learning attributes of AR Integration; Enjoyability, Active learning, Understandability, and Effectiveness. Tables 1 and 2 show the parameters in relation to questions addressed to students. The survey questionnaires were formulated based on 1-5 Likert scale. Number (1) represents strongly disagree, number (2) represents disagree, number (3) represents the neutral opinion, number (4) represents agree, and number (5) represents strongly agree.

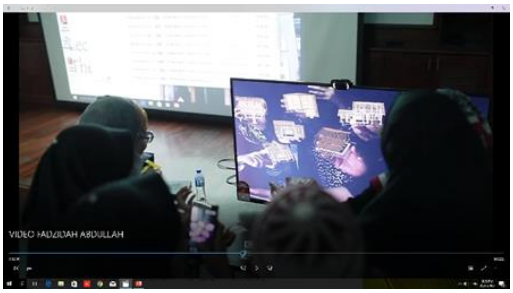


Fig. 3: Experiencing AR overlays in an indoor classroom environment (Project 1)

Fig. 4: Experiencing AR overlays in an outdoor learning environment (Project 1)

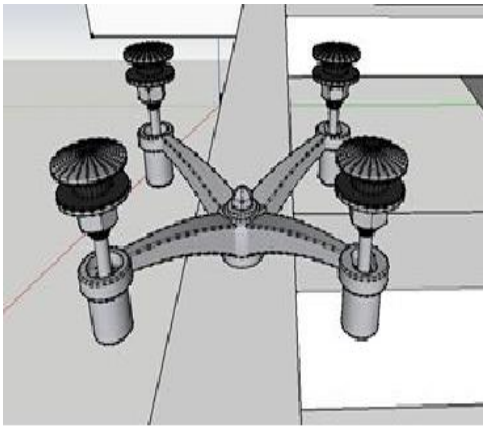


Fig. 5: A sample of an augmented steel construction detail, produced by a student (Project 2)

Fig. 6: A student is visualizing an augmented construction detail with real time interface (Project 2)

Table 1: Questions in Project 1, on the parameters of perceptions

No.	Parameters of Perception	Questions in Project 1
1	Enjoyability	Integration of AR makes learning Timber Construction Subject enjoyable.
2	Active learning	Integration of AR encourages students to ask more questions and actively be involved in classroom
3	Understandability	Integration of AR helps students understand Timber Construction easily
4	Effectiveness of the integration.	Integration of AR creates effective learning method for knowledge attainment on timber construction

Table 2: Questions in Project 2, on the parameters of perceptions

No.	Parameters of Perception	Questions in Project 2
1	Enjoyability	Exploration of AR Steel Structure Model is stimulating, with elements of sharing-meaning through social media interaction
2	Active learning	The project allows Interaction with the AR Steel Structure model to gain information
3	Understandability	Working on AR Steel Structure Model offers better understanding in learning steel construction as compared to listening to lectures
4	Effectiveness of the integration.	The project applies effective learning method to ensure understanding

4.0 RESULTS

This section shows the results of the survey questionnaire for both Project 1 and project 2.

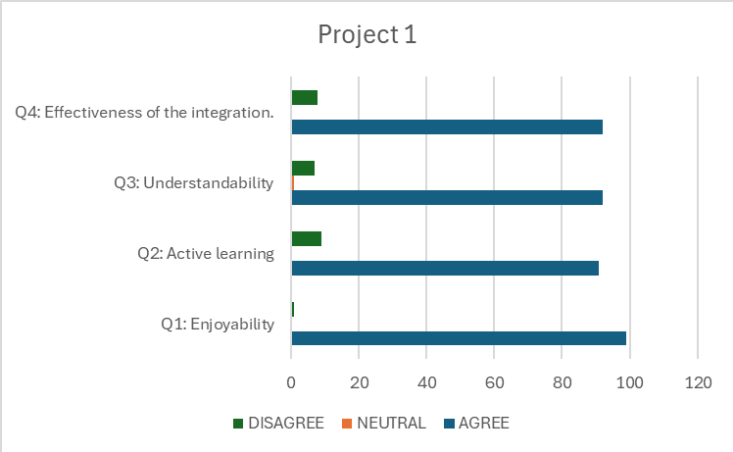


Fig. 7: The result of survey for Project 1

For Project 1, Ninety-two (92) students enrol in the class of AAR 1295: Building Construction and material 2, and 95% of the students participate in the online survey (n =87). The result of the study reveals that in Question Q1, 99% of the respondents agreed that AR makes learning Timber Construction Subject enjoyable. In Question Q2, 91% of the respondents agreed that AR encourages students to ask more questions and actively be involved in the classroom. In Question Q3, 92% of the respondents perceived that AR helps students understand Timber Construction easily, and in Question Q4, 92% of the respondents confirmed that AR creates effective learning method for knowledge. Fig. 7 displays the graphic representation of the survey results.

Most respondents confirmed that with the integration of AR, learning is favoured by very high percentage, due to its capability to make learning enjoyable, encourage active involvement of students, help students to understand subject learned easily and create effective learning for them.

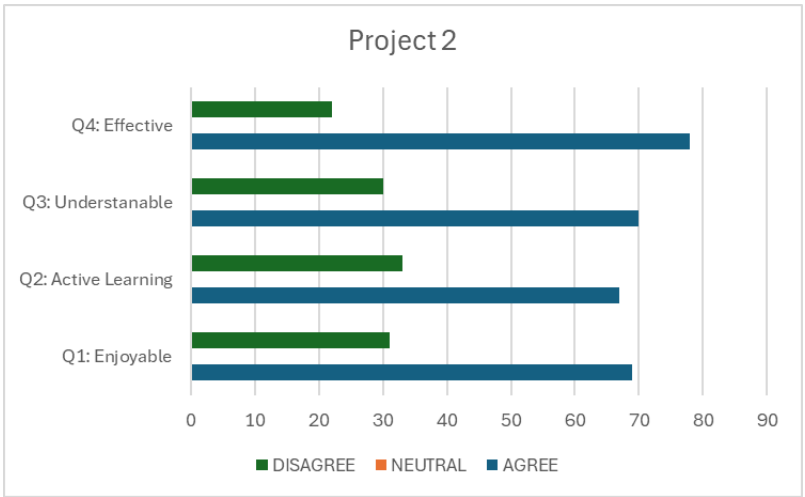


Fig. 8: The result of survey for Project 2

For Project 2, the results show that in Q1, 69% of the participants agreed that exploration of AR Steel Structure Model is stimulating (enjoyable), with elements of sharing-meaning through social media interaction. In Q2, 67% participants agree that project allows active interaction with the AR Steel Structure model to gain information. In Q3, 70% of participants think that working on the reconstruction of AR steel structure model offers better understanding as compared to merely listening to lectures alone. The project applies effective learning method to ensure understanding. The highest percentage of agreement satisfaction befell in Q4, where 78% of the respondents agree that the project applies effective learning method to ensure students understand the subject learned. Fig. 8 portrays the findings of Project 2.

Based on the analysis, it is concluded that most of the respondents agree that implementation of BL with integration of AR visualization has shown the potential to make learning stimulating, allow active interaction, offers better understanding, and initiate effective learning.

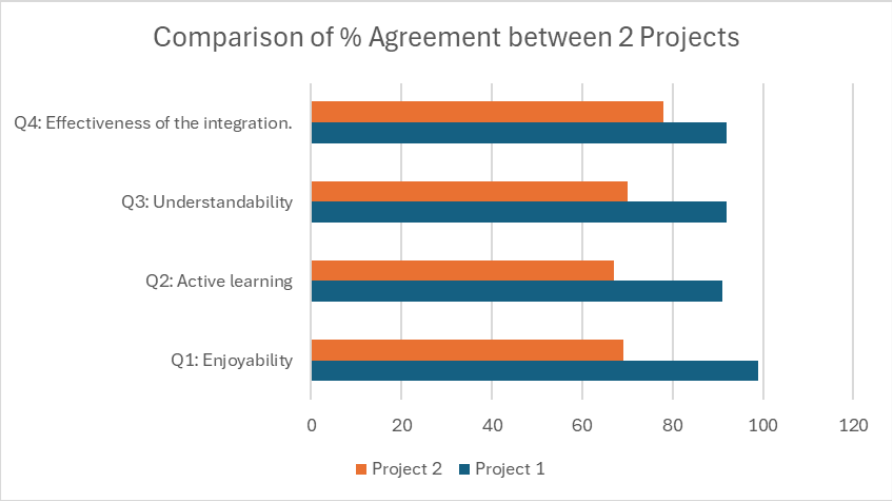


Fig. 9: Comparison of Survey Result for Project 1 and Project 2

Fig. 9 shows a comparison of the results of project 1 and project 2. Both projects had successfully integrated AR visualization in architectural education. The projects had four (4) parameters: enjoyability, active learning, understandability, and effectiveness of integration. In all categories of assessment, Project 1 had shown higher scores as compared to project 2. This scenario reveals that the freshies favored the integration AR visualization better as compared to the sophomores.

The following are possible justifications for the significant findings. Students who undertook Projects 1 experiments were fresh to accept any new method of teaching and learning compared to their second-year counterparts. The sophomores' group have had exposure to various instructional designs throughout their two years of study on campus and introducing them to another new one has fashioned no surprise.

Second, students who participated in Project 1 did not prepare the learning content themselves because educators had meticulous preparation for the experiment. Hence, students did not experience the burden of looking for teaching materials and the problem of

constructing learning content. In Project 2, students had to prepare the learning content by themselves. Hence, the extra workload given to the sophomore group influenced their perception of the experiment. Nevertheless, since the percentage differences are minimal, it is concluded that the integration of AR visualization in architectural education positively impacts students.

In all categories of assessment, Project 1 has shown higher scores as compared to project 2. This scenario reveals that the freshies favor the integration of AR visualization in construction subjects better as compared to the sophomores.

5.0 CONCLUSION

This research has successfully assessed the integration of AR visualization in architectural education, by experimenting with techniques of AR application in the teaching and learning of building construction courses. This research found that AR had been successfully utilized as the medium to disseminate architectural construction knowledge of both steel and timber construction materials. AR could be perceived as an educational tool that encouraged interaction among students during the learning process. The AR 3-dimensional visualizing tool inspired students to participate in the learning process actively and improved their cognitive learning capability.

Based on this research, it could be reflected that architecture students are ready for transformational frameworks of teaching and learning, with the integration of the usage of AR. With the verge of advanced immersive environment and AI advancement, a better learning environment could be empowered for the future students.

ACKNOWLEDGMENTS

This research was not funded by any grant. Nevertheless, the researchers would like to send their gratitude to the Kulliyyah of Architecture and Environmental Design, International Islamic University Malaysia, for allowing researchers to use the faculty's facilities for the research, and to students who had participated in the research.

REFERENCES

Abboud, R., (2014). Architecture in an Age of Augmented Reality: Mobile AR's Opportunities and Obstacles in Design, Construction, and Post-Completion. Research Report on NAWIC International Women's Day Scholarship Recipient 2013.

Al Maani, D., Alnusairat, S., & Al-Jokhadar, A. (2021). Transforming learning for architecture: online design studio as the new norm for crises adaptation under COVID-19. Open House International, 46(3), 348–358. https://doi.org/10.1108/OHI-01-2021-0016

AR-media (2015). Augmented Reality and the Future of Printing and Publishing. A white paper. Inglobe Technologies Srl.

Azmin, A.K., et al. (2017). Architectural Heritage Restoration of Rumah Datuk Setia Via Mobile Augmented Reality Restoration." Planning Malaysia Journal, Vol 15, No.1.

Bressler, D., et al. (2013). A mixed-methods assessment of students' flow experiences during a mobile augmented reality science game. Journal of Computer Assisted Learning 29, no. 6, p. 505-517.

Batchelor, J., (2021). GamesIndustry.biz presents. The Year In Numbers 2019. Assessed on 1st. June 2021 at https://www.gamesindustry.biz/articles/2019-12-17-gamesindustry-biz-presents-the-year-in-numbers-2019.

Chen, C., et al., (2016). "Augmented reality-based video-modelling storybook of nonverbal facial cues for children with autism spectrum disorder to improve their perceptions and judgments of facial expressions

and emotions." Computers in Human Behavior 55, p. 477-485.
Dusty, C. E. (2024). The transformative power of action research. Educational Action Research, 32(2), 165–168. https://doi.org/10.1080/09650792.2024.2321728
Gattupalli, A. (2024). “Transforming Architectural Education with Augmented and Virtual Reality.” ArchDaily. Assessed on 6th. August, 2024, at https://www.archdaily.com/1012936/transforming-architectural-education-with-augmented-and-virtual-reality#
Hajirasouli, A., Banihashemi, S. (2022). Augmented reality in architecture and construction education: state of the field and opportunities. Int J Educ Technol High Educ 19, 39 (2022). https://doi.org/10.1186/s41239-022-00343-9
James Wormald (2023). "Explore the Future of Architecture with Augmented Reality" 26 Jul 2023. ArchDaily. Accessed 6 Aug 2024. https://www.archdaily.com/1004256/explore-the-future-of-architecture-with-augmented-reality> ISSN 0719-8884
Jullia Joson, J. (2022). "How is the Use of Virtual Reality in Architecture Becoming Increasingly More Significant?" ArchDaily. Accessed 6 Aug 2024. https://www.archdaily.com/977882/how-is-the-use-of-virtual-reality-in-architecture-becoming-increasingly-more-significant> ISSN 0719-8884
Jiali, S., Ruixue, D., and Lu, F., (2025). AI-Driven Adaptive Learning in Higher Education: A Systematic Review of Dynamic Learning Pathways. Pakistan Journal of Life and Social Sciences. https://doi.org/10.57239/PJLSS-2025-23.1.00295
Kolb, D. A. (1984). Experiential learning: Experience as the source of learning and development. Prentice Hall.
Kolko, J. (2012). Transformative learning in the design studio. Interactions, 19(6), 82–83. https://doi.org/10.1145/2377783.2377801
Redondo, E., et al. (2013). New Strategies Using Handheld Augmented Reality and Mobile Learning-teaching Methodologies, in Architecture and Building Engineering Degrees. Procedia Computer Science 25 : 52 – 61.
Benzizoune, O. (2024). Enhancing classroom management and student engagement: The role of ClassDojo and gamification in education. Journal of English Language Teaching and Applied Linguistics, 6(3), 106–114. https://doi.org/10.32996/jeltal.2024.6.3.13.
Schon, D. A. (1987). Educating the Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions. The Jossey-Bass Higher Education Series. Jossey-Bass Publishers.
Mezirow, J. (2018). Transformative learning theory. In K. Illeris (Ed.), Contemporary theories of learning: Learning theorists in their own words (2nd ed., pp. 114–128). Routledge.
Salama, A. M., & Wilkinson, N. (2007). Introduction: Legacies for the Future of Design Studio Pedagogy. In A. M. Salama & N. Wilkinson (Eds.), Design Studio Pedagogy: Horizons for the Future (pp. 3–8). Urban International Press: Gateshead.

JOURNAL OF ARCHITECTURE, PLANNING & CONSTRUCTION MANAGEMENT
Volume 15 Issue 1, 2025 E-ISSN: 2462-2222 ISSN: 2231-9514

ADAPTABILITY OF SHOPHOUSES CONFIGURATIONS IN MALAYSIA: A FRAMEWORK FOR ENHANCING SOCIAL COHESION THROUGH END-USER PERCEPTION

Received: 27th February 2025 | Accepted: 14th April 2025 | Available Online: 30th June 2025

DOI: 10.31436/japcm.v15i1.968

Nur Amalina Hanapi[1*], Leng Pau Chung[1]

[1] Faculty of Built Environment and Surveying, Universiti Teknologi Malaysia, 81310 UTM Skudai, Johor, Malaysia.*
amalina91@graduate.utm.my

Corresponding author: **Nur Amalina Hanapi*
Corresponding author's email: amalina91@graduate.utm.my

ABSTRACT

Shophouses are a quintessential part of Malaysia's architectural heritage, serving as historical landmarks and vibrant hubs for social and economic activities. Over time, these structures have been adapted to meet contemporary needs while retaining their cultural significance. However, rapid urbanisation and modernisation become a challenge in preserving the social fabric of communities centered around shophouses. This study examines how end-user perceptions of shophouse adaptability influence social cohesion in urban environments and employs a mixed-methods approach that includes site observations, surveys, and focus group discussions where the research evaluates the functionality, adaptability, and social impact of shophouse readaptation. The findings emphasise the critical role of inclusive design, cultural preservation, and community engagement in fostering social cohesion. The paper concludes by proposing a framework for architects, urban planners, and policymakers to balance modernisation with heritage conservation, ensuring shophouses continue to thrive as dynamic spaces for interaction and economic vitality.

Keywords: Shophouses, Social Cohesion, End-User Perception, Urban Adaptation, Heritage Conservation

1.0 INTRODUCTION

Shophouses in Malaysia are a unique architectural typology that blends residential and commercial functions, reflecting the country's multicultural heritage (Rashid & Heath, 2022). Over time, these structures have undergone significant adaptations to meet the demands of modern urban life (Chen & Mohamed, 2023). However, Phang et al. (2023) revealed that while these physical and functional transformations are well-documented, their unintended consequences on social cohesion particularly the erosion of community ties, displacement of long-term residents, and fragmentation of shared cultural practices, remain critically understudied. Yusoff and Koh (2024) further highlight this gap by critiquing current assessment frameworks for failing to capture longitudinal social impacts, proposing a new metric system to evaluate cohesion in adapted shophouse communities. This oversight is problematic because it prioritises economic and aesthetic outcomes over the lived experiences of communities, risking the loss of the very social capital that defines shophouse neighbourhoods. This paper investigates how end-users, residents, business owners, architects, urban planners and visitors perceive the adaptability of shophouses and how these perceptions influence community dynamics. The study aims to provide a framework for designing shophouses that enhance social cohesion while preserving their cultural and historical value.

2.0 LITERATURE REVIEW

The adaptability of shophouses in Malaysia has garnered significant attention in recent years, particularly in urban development, heritage conservation, and social cohesion (Firzan et al., 2022). Shophouses, a quintessential architectural typology in Southeast Asia, have historically served as residential and commercial spaces, reflecting their time's socio-economic and cultural dynamics (Sanchez et al., 2019). In Malaysia, shophouses are architectural landmarks vital to urban identity, particularly in cities like George Town, Malacca, and Kuala Lumpur. This literature review explores the adaptability of shophouses, focusing on their role in fostering social cohesion through end-user perception, and identifies gaps in existing research.

Historical and Architectural Significance of Shophouses

Shophouses in Malaysia emerged during the colonial era, blending Chinese, Malay, and European architectural influences. Their unique design, characterised by a narrow frontage, elongated floor plan, and a five-foot walkway (kaki lima), reflects a response to tropical climates and urban density (Vardopoulos et al., 2021). Historically, shophouses were multifunctional, housing businesses on the ground floor and residences above, fostering a close-knit community life. According to Chen (2015), shophouses are adaptable because of their flexible spatial configuration, which allows for diverse uses over time. However, rapid urbanisation and modernisation have threatened the preservation of these structures, leading to debates about their relevance in contemporary society.

Adaptability and Urban Sustainability

Adaptability is a key concept in sustainable urban development, emphasising the capacity of buildings to evolve in response to changing social, economic, and environmental conditions. Shophouses, with their inherent flexibility, are often cited as models of adaptive reuse (Sanchez et al., 2020). Studies by Lim (2018) and Tan (2020) highlight how shophouses have been repurposed for cafes, boutique hotels, and creative studios, contributing to urban revitalisation. However, these transformations are not without challenges. Commercialising shophouses, particularly in heritage zones, has raised concerns about gentrification and the displacement of long-standing communities. As Ismail and Said (2019) noted, the economic benefits of adaptive reuse often overshadow the social implications, leading to a loss of cultural continuity and community identity.

Social Cohesion and End-User Perception

Social cohesion, defined as the sense of belonging and connectedness within a community, is increasingly recognised as a critical outcome of urban design (Han et al., 2021). Shophouses, with their mixed-use nature, have the potential to enhance social cohesion by fostering interactions between residents, business owners, and visitors (Dash, 2022). However, the extent to which this potential is realised depends largely on end-user perception. According to Said et al. (2022), end-users—from residents to tourists, perceive shophouses differently based on their cultural background, economic status, and personal experiences. For instance, while tourists may appreciate shophouses' aesthetic and historical value, residents may prioritise functionality and affordability (Foster, 2020).

End-user perception is also influenced by the quality of public spaces surrounding shophouses (Jin & Wang, 2021; Noriza et al., 2013). The five-foot walkway, a defining feature of

shophouses, is a semi-public space facilitating social interactions. However, as Goh (2017) highlighted, the encroachment of commercial activities and poor maintenance often diminish the walkway's role as a social connector. Furthermore, the lack of inclusive design in adaptive reuse projects can alienate certain user groups, particularly the elderly, disabled person and low-income residents, undermining social cohesion (Merciu et al., 2022).

Gaps in Existing Research

While existing studies have explored shophouse adaptability's architectural and economic aspects, there is a notable gap in research focusing on the social dimensions, particularly the role of end-user perception in enhancing social cohesion. Most studies adopt a top-down approach, emphasising policy and design strategies, but fail to incorporate end-users voices (Varady, 2022). Additionally, there is limited research on how cultural diversity in Malaysia influences the perception and use of shophouses. Addressing these gaps is crucial for developing a holistic framework that balances heritage conservation, economic viability, and social inclusivity.

The adaptability of shophouses in Malaysia presents a unique opportunity to enhance social cohesion in urban areas. However, realising this potential requires a deeper understanding of end-user perception and its impact on the social dynamics of shophouse communities. By integrating insights from architecture, urban planning, and social sciences, future research can develop a comprehensive framework that ensures the sustainable and inclusive adaptation of shophouses in Malaysia. This framework should prioritise community engagement, cultural sensitivity, and equitable access to urban spaces, ensuring that shophouses remain vibrant social and economic activity hubs.

3.0 METHODOLOGY

The research employs a mixed-methods approach, combining qualitative and quantitative techniques. Site observations were conducted in key urban areas in recent years of the local municipalities, which are Klang Royal City Council (2024), Seremban City Council (2020) and Kuantan City Council (2021), to document physical adaptations and usage patterns. Surveys were distributed to a diverse end-user group to gather data on their perceptions of shophouse functionality and social interactions, as outlined in Figures 1 and 2 below. The sample size of 286 respondents would be representative of the population. Focus group discussions were held with stakeholders, including architects, urban planners, and local authorities, to gain deeper insights into the challenges and opportunities of shophouse readaptation.

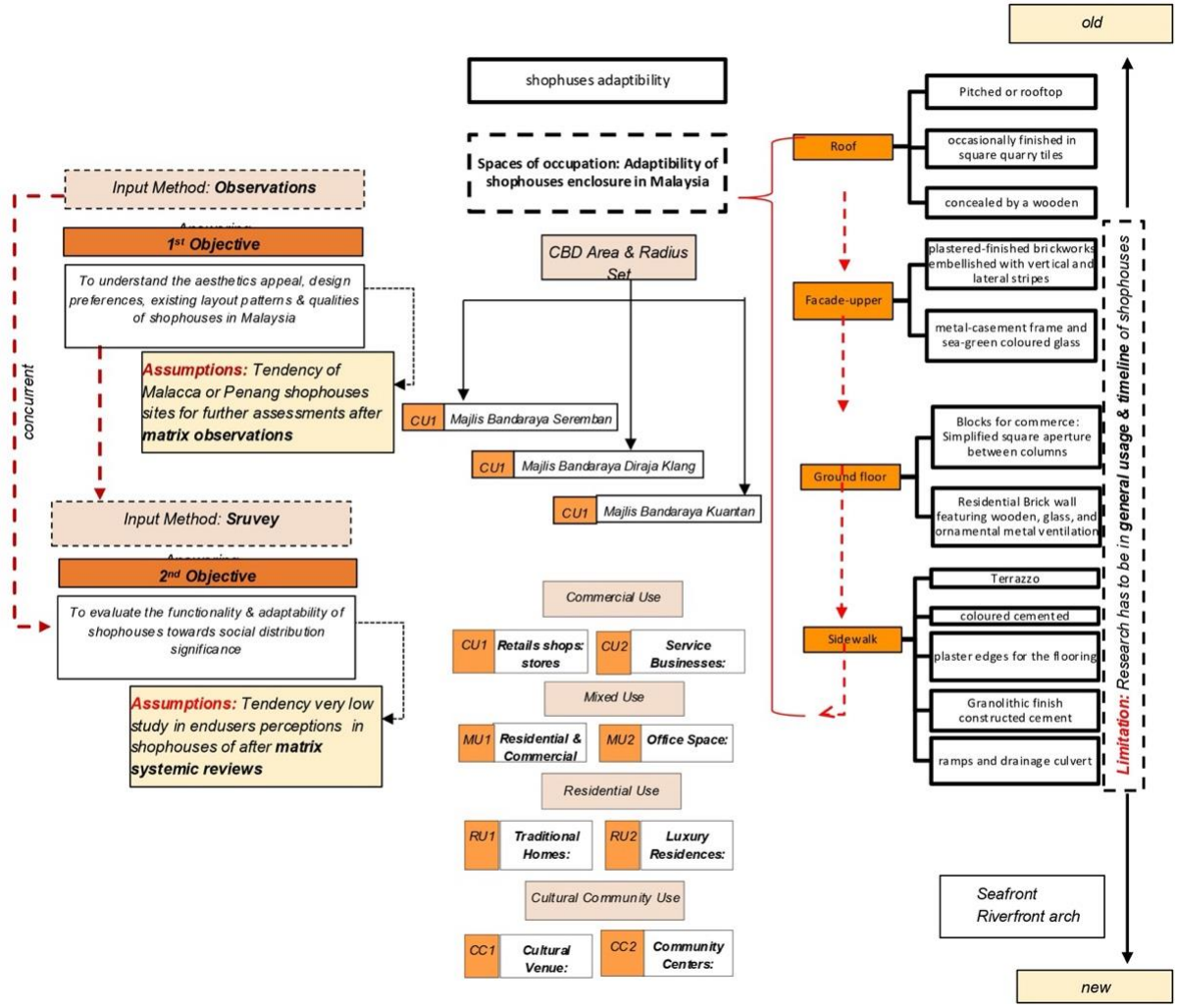


Fig. 1: Subjects or data sources for the methodology.
(Source: Author).

548,014 Kuantan
297,837 Klang
514,000 Seremban

n=N1+N(e)2n = \frac{N}{1 + N(e)^2}
Where:

- ***nn: Sample size***
- ***NN: Population size***
- ***ee: Margin of error (usually set at 0.05 for 95% confidence level)***

- Business owners: 30%
- Residents/Workers: 15%
- Architects: 20%
- Users/Visitor: 25%
- Planners: 10%

For a sample size of 286:

- Business owners: 286×0.5=143286 \times 0.5 = 143
- Residents: 286×0.3=86286 \times 0.3 = 86
- Architects: 286×0.2=57286 \times 0.2 = 57

Final Considerations

- Ensure sample is **random** and **unbiased**.

Fig. 2: Sampling sizing of the end users.
(Source: Slovin's formula is commonly used for determining sample size when the population size is known Mahame et al., 2023)

4.0 RESULTS

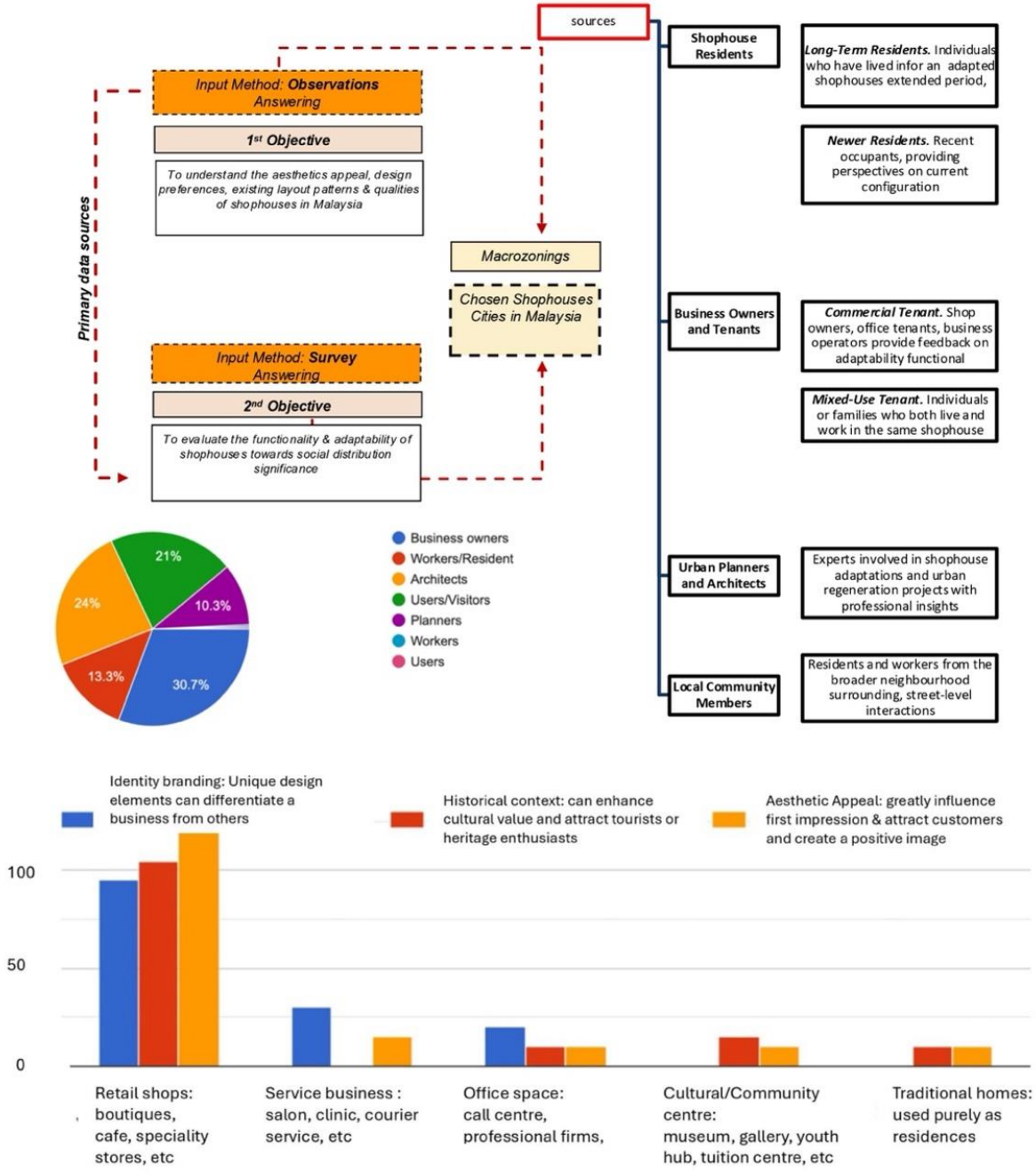


Fig. 3: Preference typology and selection parameter percentage of shophouse end-users.

The study reveals that end-users value shophouses for their historical significance and adaptability to modern needs. However, the lack of inclusive design and community engagement in adaptation projects often leads to social fragmentation, as addressed in Figure 3. The research identifies key factors influencing roughly 80% of the Kuantan, Klang, and Seremban end-users and acknowledges shophouses as retail stores such as boutiques, cafes, restaurants, and speciality stores. In conjunction with that, the percentage will likely be the highest recorded for aesthetic appeal, greatly influencing first impressions and attracting customers. The findings suggest that thoughtful design and stakeholder collaboration are essential for creating shophouse environments that foster social interaction and community well-being.

5.0 DISCUSSIONS

The adaptability of shophouses in Malaysia, particularly in enhancing social cohesion through end-user perception presents a multifaceted discussion that intersects urban development, heritage conservation, and community well-being (Varady, 2022). The findings explore the variations of percentages of preservation of communal spaces, the integration of green areas, and the implications of shophouse adaptability for social cohesion, focusing on end-user perspectives, challenges, and opportunities for inclusive urban design in the three site surveys.

End-User Perception and Social Cohesion

End-user perception plays a pivotal role in determining the success of shophouse adaptability in fostering social cohesion. Figure 4 emphasises that the diverse user groups of shophouses' results, ranging from residents and business owners to tourists, have varying expectations and needs. The most common reason, indicating 91.3% of the primary visits, is due to work-business related, while 41.3% of the respondents indicate social gatherings. Siad et al. (2021) found that residents often prioritise functional aspects such as affordability, accessibility, and maintenance, while tourists and new business owners value aesthetic and historical significance. This dichotomy highlights the need for a balanced approach that accommodates both functional and cultural dimensions of shophouse adaptability.

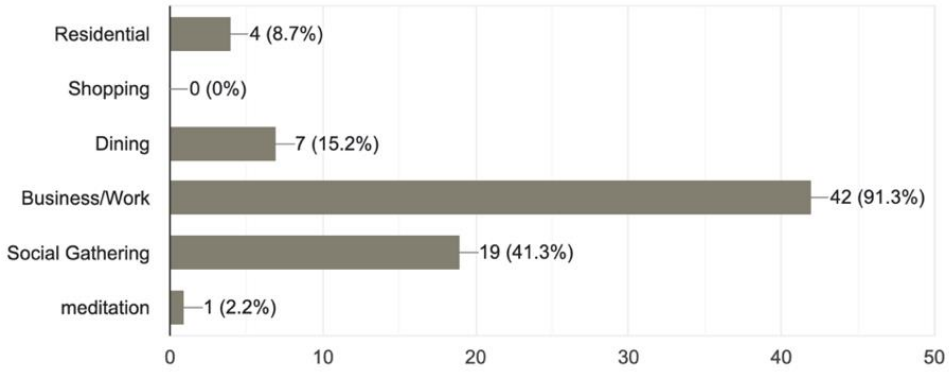


Fig. 4: Purpose and primary visits recorded for the Kuantan, Klang and Seremban shophouses.
(Source: Author)

The five-foot walkway, a defining feature of shophouses, is a critical social space fostering interactions among diverse user groups. However, its potential is often undermined by poor maintenance and encroachment by commercial activities. According to Goh et al. (2022), the

walkway's role as a social connector can be enhanced through inclusive design strategies, such as improved lighting, seating, and signage. The findings in Figure 5 below show that 86.7% of the community acknowledges the awareness engagement among shophouse users. These interventions not only improve usability but also encourage spontaneous social interactions, thereby strengthening community bonds.

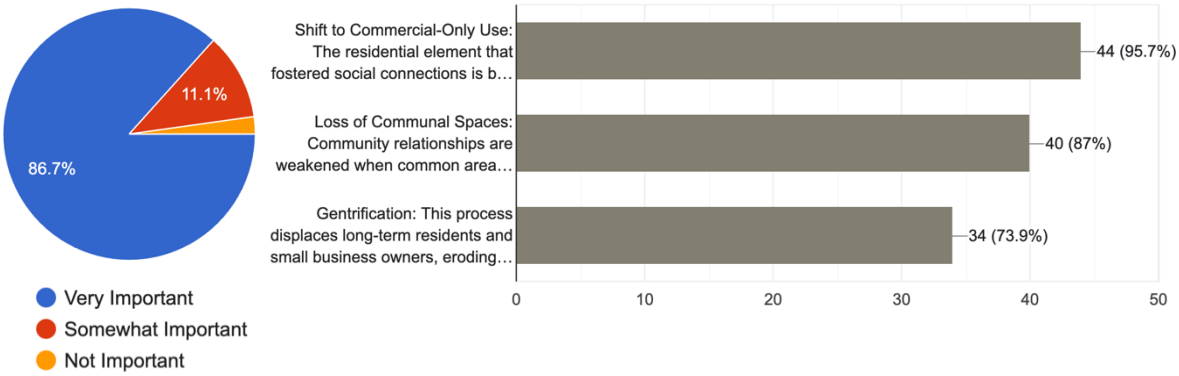


Fig. 5: The awareness and impression of social cohesion and engagement among shophouse users in Kuantan, Klang, and Seremban.
(Source: Author)

Challenges in Adaptive Reuse

Despite their potential, the adaptation of shophouses faces several challenges that hinder their contribution to social cohesion. One significant issue is gentrification, which often accompanies the commercialisation of heritage areas, as addressed in Figure 3 above. Ismail and Tan (2023) argue that transforming shophouses into high-end cafes, boutique hotels, and galleries can lead to the displacement of long-standing communities, particularly low-income residents and small businesses. This statement is, however, proven in the survey conducted, as 73.9% of the respondents addressed this issue. This activity will likely erode the social fabric of neighbourhoods, replacing traditional community networks with transient, consumer-driven interactions in which 95% agree that the economic viability significantly influences the sustainability of the shophouse in Figure 6 below.

97.8% of the respondents stated that the high renovation cost includes unaccountable electrical upgrades, structural reinforcements, and adherence to building requirements. The second factor, profit-driven development, constitutes 82.6%, and this was due to developers putting profit first, frequently at the price of preserving cultural assets, causing a loss of historical value due to profit. Inequitable economic benefits were also recorded as the third factor. Larger corporations or outside investors frequently gain more from commercialising shophouse districts than local communities. Another challenge is the lack of inclusive design in adaptive reuse projects. Many repurposed shophouses fail to accommodate the needs of vulnerable groups, such as the elderly and people with disabilities. A study by Lim and Ng (2021) revealed that the absence of ramps, elevators, and accessible facilities in repurposed shophouses limits their inclusivity, excluding certain user groups from participating in community life. Addressing these barriers is essential for ensuring that shophouses remain vibrant and inclusive spaces for all.

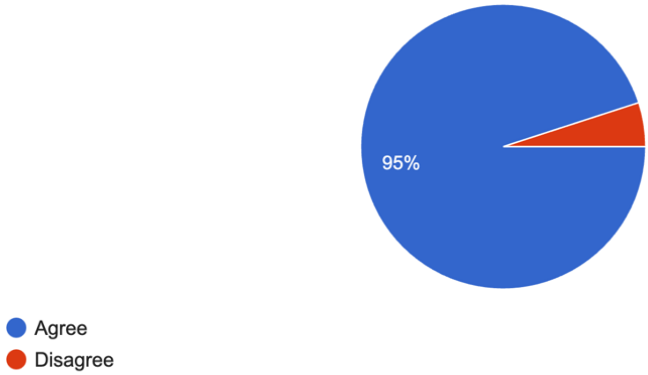


Fig. 6: The economic factor significantly influences shophouses' sustainability.
(Source: Author)

Opportunities for Enhancing Social Cohesion

Despite these challenges, shophouses offer significant opportunities for enhancing social cohesion through thoughtful design and community engagement. One promising approach is participatory design, which involves end-users in the planning and decision-making. According to Lee et al. (2023), participatory design fosters a sense of ownership and belonging among community members, ensuring that adaptive reuse projects align with their needs and aspirations. For instance, involving residents in redesigning public spaces around shophouses can create environments that reflect their cultural values and social practices. The survey conducted as per Figure 7 below represents the three most suggested options addressed by end-users) Flexible Spaces: Design spaces that can accommodate multiple uses, such as pop-up stores, community workshops, or cultural events, allowing for greater community participation; b) Public Spaces: Include pedestrian-friendly areas, shaded walkways, or small plazas where people can gather and interact, and c) Shared Facilities: Offer communal amenities such as gardens, seating areas, or co-working spaces that encourage interaction among a diverse group.

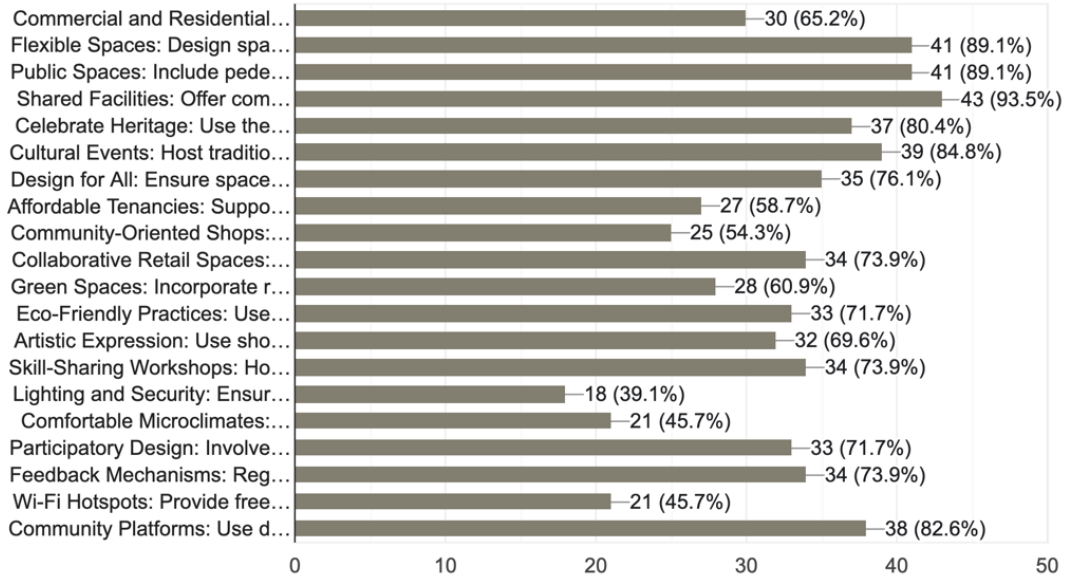


Fig. 7 Shows how end-users think about steps to foster social cohesion.
(Source: Author)

Another opportunity lies in leveraging digital technologies to enhance the functionality and accessibility of shophouses that could be implemented in the precinct backland promenade,

like what we have in Kuantan, as per Figure 8 below. Smart design solutions, such as sensor-based lighting, mobile apps for wayfinding, and virtual tours, can improve the user experience while preserving the historical integrity of shophouses. A study by Wong and Teo (2022) demonstrated that digital interventions can attract younger generations to heritage areas, bridging the gap between tradition and modernity. These technologies also provide opportunities for storytelling and cultural education, fostering a deeper appreciation for the historical significance of shophouses.

Fig. 8: Shophouses-community engagement revitalisation feedback survey observations of Jalan Besar and Jalan Makhota, Kuantan. (Source: Author)

Cultural Diversity and Social Cohesion

Rapid urbanisation and commercialisation have led to the homogenisation of these spaces, diminishing their role as cultural connectors. As per Figure 9 below, 80.4% find difficulties in preserving the cultural legacy of the shophouses. 100% selected neglect and decay as one of the major problems. Shophouses in less noticeable areas or those owned by people without the resources, are frequently allowed to fall into disrepair. Another recorded was the loss of authenticity by 93.3%. Adaptive reuse frequently puts profit and usefulness ahead of historical preservation. Although several shophouses have been converted into cafes, galleries, and boutique hotels, these changes may deprive buildings of their original cultural character. Recent research by Ahmad et al. (2024) highlights the importance of cultural narratives embedded in shophouses to serve multicultural heritage, fostering mutual understanding and respect among diverse communities.

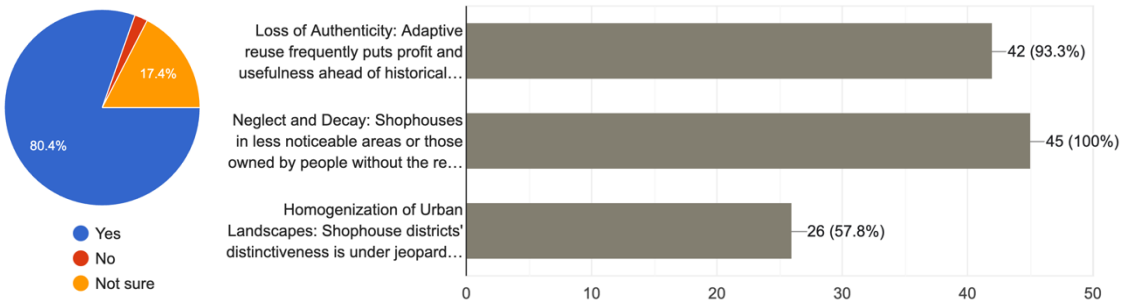


Fig. 9: Manifestations number of difficulties in adapting shophouses.

Policy and Governance

Effective policy and governance are critical for ensuring the sustainable adaptation of shophouses. Current heritage conservation policies in Malaysia often prioritise physical preservation over social sustainability, leading to a disconnect between conservation goals and community needs. According to Cheong and Lim (2023), a more holistic approach is

needed to integrate social, economic, and environmental considerations into heritage management. This initiative includes providing financial incentives for inclusive, adaptive reuse projects, establishing guidelines for participatory design, and enforcing regulations to prevent gentrification, as highlighted in Figure 5 above. Local governments also play a crucial role in facilitating community engagement and ensuring equitable access to shophouse spaces.

Figure 10 below describes the result in the three states, demonstrating that collaborative governance models involving local authorities, community organisations, and private stakeholders can lead to more inclusive and sustainable outcomes, where 85% of the respondents agree with it. It is recorded that 97.8% of respondents agree that limited stakeholder engagement contributes to policy improvements. Local communities, entrepreneurs, and historical specialists are frequently left out of policymakers' decision-making processes. Thus, this research will support the new guidelines for future reference. Secondly, inconsistent guidelines imposed in Kuantan, Klang and Seremban also contributed to the factor. Weak enforcement is frequently insufficient, even in regions where regulations exist. However, there are thorough rules to safeguard shophouses in some places, such as UNESCO World Heritage Sites like Malacca and George Town, which could be absorbed by building units in preservations.

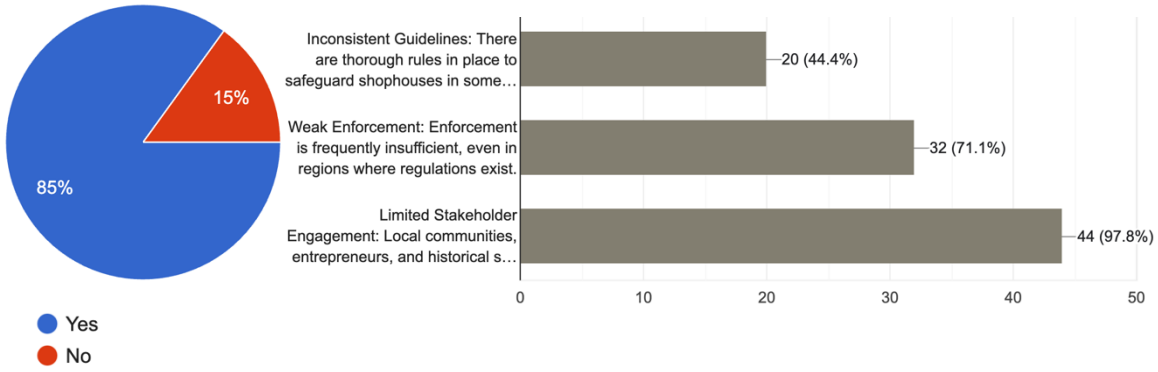


Fig. 10: Balance modernisation and preservation requires effective governance.
(Source: Author)

These models encourage shared responsibility and collective action, ensuring that the benefits of shophouse adaptability are distributed equitably. The adaptability of shophouses in Malaysia offers a unique opportunity to enhance social cohesion in urban areas. However, realising this potential requires a nuanced understanding of end-user perception and its impact on the social dynamics of shophouse communities. By addressing challenges such as gentrification, lack of inclusivity, and cultural homogenisation and leveraging opportunities such as participatory design, digital technologies, and collaborative governance, shophouses can continue to serve as vibrant social and economic activity hubs. Based on the criteria and results achieved, the following framework in Figure 11 above was a reference for future guidelines to help the local authority and community benefit and preserve better shophouse implementation based on their preferred typology.

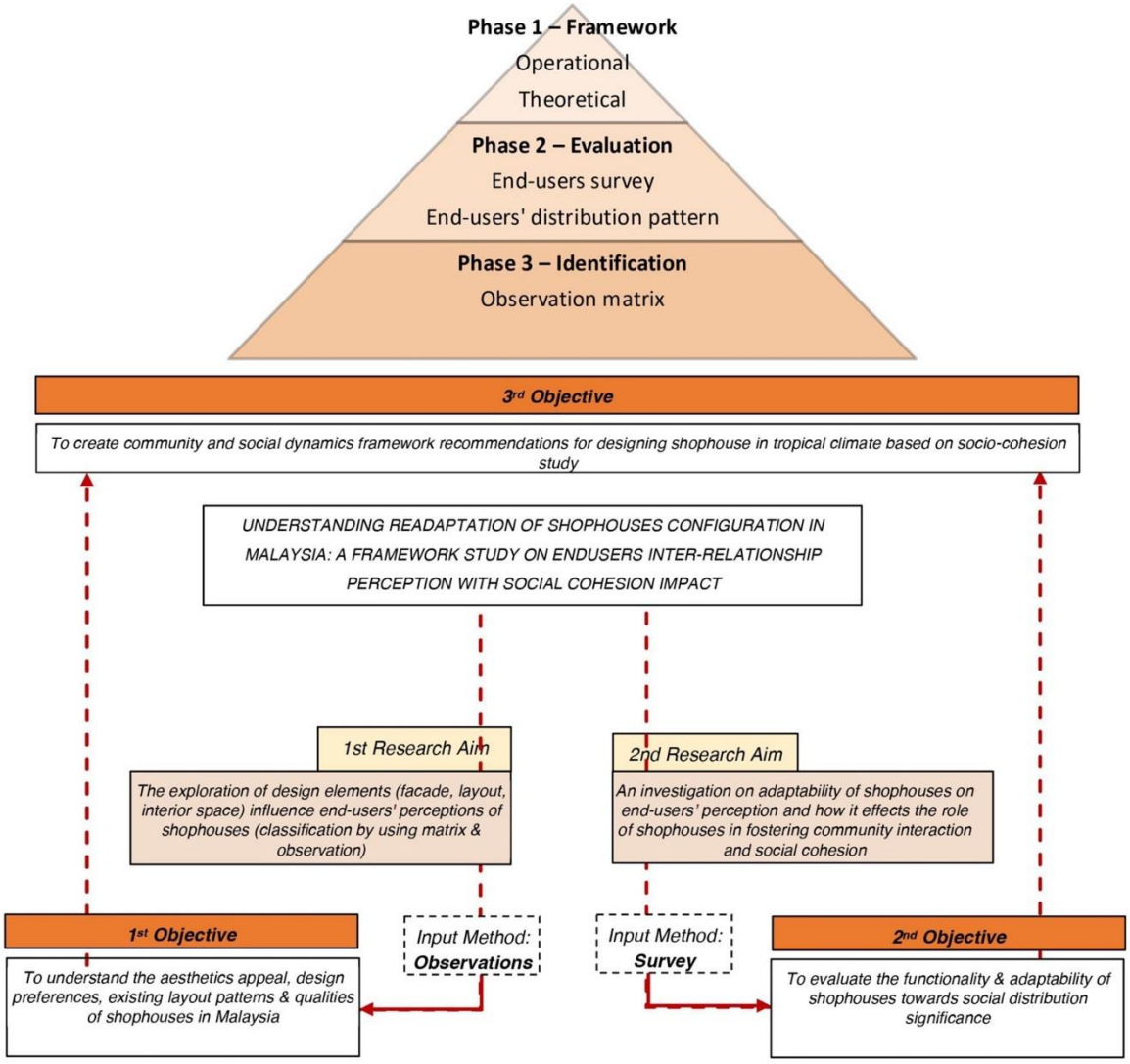


Fig. 11: Operational step to form a framework for fostering better social cohesion.
(Source: Author)

6.0 CONCLUSION

This paper concludes that the adaptability of shophouses in Malaysia offers a unique opportunity to enhance social cohesion in urban areas. Architects and urban planners can create functional and culturally resonant spaces by incorporating end-user perceptions into the design process and forming a framework. The proposed framework provides guidelines for balancing modernisation with heritage conservation, ensuring that shophouses continue to serve as vibrant hubs of social and economic activity that benefit the stakeholders. As shown in Figure 12 below, the detailed proposed performance-based framework has three primary areas of objective with different methods to approach: Each category is measured by relevant criteria. These crucial elements have been discussed previously in assessing the viability of repurposing shophouses' adaptability impact on end-user preference in building resilient and sustainable urban environments.

This framework combines quantitative breadth with qualitative depth, ensuring a comprehensive analysis of shophouse readaptation and its social implications. This framework utilises a matrix observation-based illustration of this shophouse phenomenon between shophouses from different municipalities. This practice aims for future recorded reference studies, which are more structured and easier for end-users to refer to according to locality. These cities 'morphological variations witness the multitude of ethnicities and civilisations that have settled there, that harmonious blending of development of the main central business district (CBD). This approach will demonstrate matrix zonings involving mapping locations, architectural styles, governing-statutory bodies, topography and layout explorations of selected buildings. Future research should focus on developing a comprehensive framework that integrates these elements, ensuring that shophouses remain inclusive, sustainable, and culturally significant for future generations.

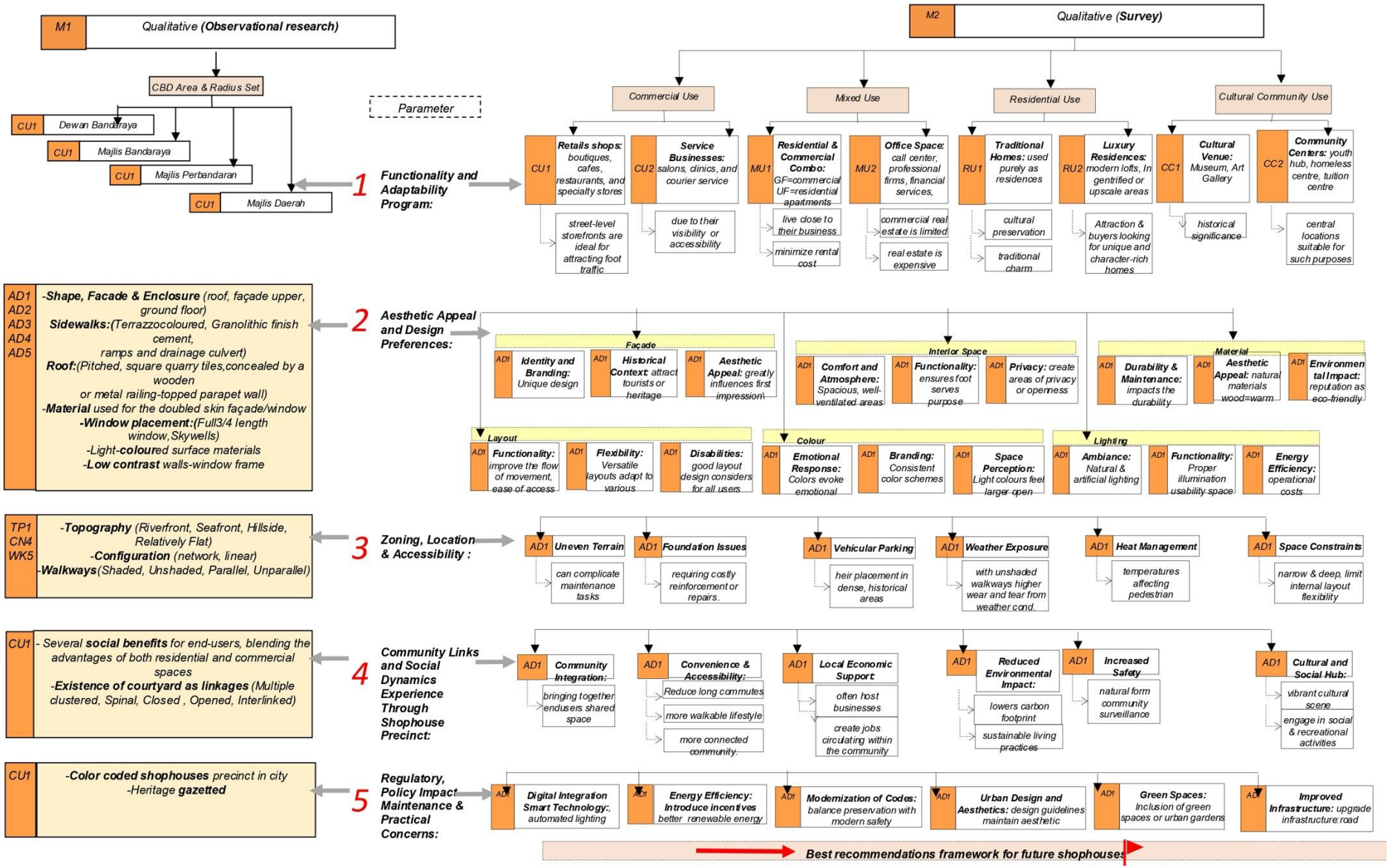


Fig. 11: The insights gained from observation techniques have significant implications for the development of a shophouse

(Source: Author)

REFERENCES

Chen, Y. (2015). "The Evolution of Shophouses in Southeast Asia." Architectural History Review, 58(2), 112–130.

Chen, X., & Mohamed, B. (2023). From residential to hybrid spaces: The adaptive life cycles of Penang shophouses. Habitat International, 131, 102726.

Dash, S. P. (2022). *A Study On Inter- Relationship Of Open Space And Social Cohesion For Well-being Of Elderly: A Systematic Literature Review*. *9*(1), 55–72.

Firzan, M., Prihatmanti, R., Johari, S. F., Ning, T. S., & Ghafar Ahmad, A. (2022). Boutique Hotels Within Heritage Shophouses in George Town: Understanding Adaptive Reuse Through Existing Interior Layouts. *Lecture Notes in Civil Engineering*, *223*. https://doi.org/10.1007/978-981-16-8667-2_36

Foster, G. (2020). Circular economy strategies for adaptive reuse of cultural heritage buildings to reduce environmental impacts. *Resources, Conservation and Recycling*, *152*. https://doi.org/10.1016/j.resconrec.2019.104507

Goh, H. C. (2017). "Public Spaces and Social Cohesion in Urban Heritage Areas." Urban Studies, 54(8), 1800-1818.

Han, D., Song, Y., Wang, E., & Liu, H. (2021). ScienceDirect Multiple dimensions of urban design development from a practice perspective : A case study of an institute in Nanjing. *Frontiers of Architectural Research*, *10*(1), 79–91. https://doi.org/10.1016/j.foar.2020.11.005

Ismail, S., & Said, I. (2019). "Gentrification and Heritage Conservation in Malaysia." Journal of Heritage Tourism, 14(5), 456–470.

Jin, X., & Wang, J. (2021). ScienceDirect Assessing Linear Urban Landscape from Dynamic Visual Perception based on Urban Morphology. *Frontiers of Architectural Research*, *10*(1), 202–219. https://doi.org/10.1016/j.foar.2021.01.001

Lim, C. K. (2018). "Adaptive Reuse of Shophouses in Kuala Lumpur." Journal of Architectural Conservation, 24(1), 23–40.

Mahame, C., d'Amour, O. J., Cardinard, T. S. P., & Sindayiheba, P. (2023). Adoption of sustainable value management (SVM) to building projects in a developing economy. International Journal of Innovative Science and Modern Engineering, 11(4), 1–11.

Merciu, F.-C., Stoican, A. V., Petrişor, A.-I., & Vasiloiu, A.-M. (2022). THE PERCEPTION OF ROMANIAN TOURISTS ON THE ATTRACTIVENESS OF THE INDUSTRIAL HERITAGE. CASE STUDY: MUNICIPALITY OF CLUJ-NAPOCA. *CACTUS*, *2*. https://doi.org/10.24818/cts/3/2021/2.01

Noriza, R., Ariffin, R., & Khairi, R. (2013). Perceptions of the Urban Walking Environments. *Procedia - Social and Behavioral Sciences*, *105*, 589–597. https://doi.org/10.1016/j.sbspro.2013.11.062

Phang, C. W., et al. (2023). "Shophouse adaptations and social cohesion: A Singapore-Malaysia comparative study." Urban Studies, 60(8), 1451-1470. https://doi.org/10.1177/00420980221137921

Rashid, N. S. A., & Heath, T. (2022). Factors of Obsolescence Affecting Adaptively Reused Shophouses in the Core Zone of Melaka, Malaysia. *Lecture Notes in Civil Engineering*, *223*. https://doi.org/10.1007/978-981-16-8667-2_18

Said, S. Y., Abdul Hamid, H. Z., & Wongso, J. (2022). The users' perceptions on adaptive reuse of selected heritage shophouses in Jalan Tun H.S. Lee. Environment-Behaviour Proceedings Journal, 7(19), 249–254. https://doi.org/10.21834/ebpj.v7i19.3238

Sanchez, B., Rausch, C., & Haas, C. (2019). "Deconstruction programming for adaptive reuse of buildings." *Automation in Construction*, *107*(July), 102921. https://doi.org/10.1016/j.autcon.2019.102921

Sanchez, B., Rausch, C., Haas, C., & Saari, R. (2020). A selective disassembly multi-objective optimisation approach for adaptive reuse of building components. *Resources, Conservation and Recycling*, *154*(August 2019), 104605. https://doi.org/10.1016/j.resconrec.2019.104605

Tan, K. G. (2020). "Sustainable Urban Development through Adaptive Reuse." Sustainability, 12(15), 6123.

Varady, D. P. (2022). Cities and affordable housing: Planning, design and policy nexus, edited by Sasha Tsenkova. *Journal of Urban Affairs*, *44*(8). https://doi.org/10.1080/07352166.2022.2044244

Vardopoulos, I., Tsilika, E., Sarantakou, E., Zorpas, A. A., Salvati, L., & Tsartas, P. (2021). An integrated swot-pestle-ahp model assessing sustainability in adaptive reuse projects. *Applied Sciences (Switzerland)*, *11*(15). https://doi.org/10.3390/app11157134

Yusoff, N. A., & Koh, S. L. (2024). "Measuring the intangible: Developing social cohesion indicators for heritage adaptation projects." Journal of Cultural Heritage Management, 14(1), 58-72.

JOURNAL OF ARCHITECTURE, PLANNING & CONSTRUCTION MANAGEMENT
Volume 15 Issue 1, 2025 E-ISSN: 2462-2222 ISSN: 2231-9514

A METHODOLOGY TO INVESTIGATE UNIVERSITY BUILDING CONDITION FOR LIFE CYCLE COST OF MAINTENANCE

Received: 6th March 2025 | Accepted: 24th April 2025 | Available Online: 30th June 2025

DOI: 10.31436/japcm.v15i1.971

Mohd Fairullazi Ayob[1*], Mohd. Yusri Mohamed Yunus[2], Khairusy Syakirin Has-Yun Bin Hashim[3], Abdul Razak Sapian[4], Ahmad Tarmizi Haron[5]

[1,2 &3]Department of Quantity Surveying and [4]Department of Architecture, Kulliyyah of Architecture and Environmental Design, International Islamic University Malaysia.

[5] Faculty of Civil Engineering Technology, University Malaysia Al-Sultan Abdullah, Pahang

Corresponding author: **Mohd Fairullazi Ayob*
Corresponding author's email: fairullazi@iium.edu.my

ABSTRACT

Education buildings are important assets in the universities that are purposely built to provide a conducive and secure environment to the staff and students in facilitating them to execute teaching, learning and academic programmes, research, consultancies, and administrative activities for the development of knowledge, skills, culture, and personality. Nonetheless, in the face of multiple effects of inflation on the economy, the maintenance work for the facilities in university education buildings has become very complex and a thorny issue. There has been a demand to re-examine and improve the practice of university building maintenance methodology by emphasising the optimisation of maintenance life cycle cost to facilitate the university agencies in measuring their long-term financial capability to pay maintenance costs based on the efficient use of capital and resources throughout the service life. This paper is prepared to present the methodology to investigate the university building maintenance condition and operational performance as inputs for developing a life cycle cost of maintenance database prototype. The methods designed for the study are a qualitative research strategy incorporating three fieldwork approaches, i.e., the semi-structured interview, building condition assessment (BCA), and quick response codes (QR) approaches. The methodology is proposed to investigate the operational performance and maintenance condition of teaching and learning facilities in the chosen university building case study to produce outputs for the development of prototype of life cycle cost database requirements of university building, which would add value to the core services of the university and in line with the key drivers of Malaysian Science, Technology, Innovation, and Economy (MySTIE) framework.

Keywords: Methodology, University Building, Maintenance, Life Cycle Cost

1.0 INTRODUCTION

Education buildings are important university assets purposely designed and built to provide facilities for teaching, learning, research, academic and administrative activities. The educational buildings of universities are usually built with suitable teaching and learning facilities to accommodate diverse departments and faculties for offering different specialisations of subjects and educational programme areas. Commentators pointed out that

the operational performance and maintenance condition of the teaching and learning facilities of education buildings is deemed important to be maintained effectively for providing a secure, pleasant and fosters an indoor learning environment and atmosphere to the individuals and communities in the universities (Abiodun & Odemakin, 2019). In the Malaysian context, the education sector has received the highest budget from the national development budget for every 3 years, where a huge amount of money was spent to pay for the maintenance cost in preventing the decay of teaching and learning facilities in the education buildings. For example, in 2004, the Malaysian government had spent RM304 million for the maintenance of teaching and learning facilities of university education buildings, nonetheless the expenditure had been significantly increased to RM600 million in 2008, which is nearly double than the amount spent for university building maintenance in 2004 (Olanrewaju et al., 2010, 2011; Bidi et.al., 2020). The university building maintenance work has become very complex to implement at the optimum cost, as the future ownership costs were normally ignored and calculated separately from design and construction costs. Hence, there has been a demand to relook and improve the practice of university building maintenance methodology by emphasising the optimisation of maintenance cost and long-term financial capability in paying maintenance cost based on the efficient use of capital and resources throughout the service life. Therefore, this paper is prepared to present the methodology to investigate the university building maintenance condition and operational performance as inputs for developing the life cycle cost of maintenance of the university building. The methodology presented in this paper is proposed to investigate the operational performance and maintenance condition of the teaching and learning facilities in the chosen university building case study to produce outputs for the development of prototype of life cycle cost database requirements of university building, which would add value to the core services of the university to be in line with the two (2) key drivers of the Malaysian Science, Technology, Innovation, and Economy (MySTIE) framework, namely augmented analytics, and data discovery (science and technology driver) and education (socio-economy driver) Academy of Sciences Malaysia (2020).

2.0 OVERVIEW OF LIFE CYCLE COST (LCC) APPLICATION IN BUILDING MAINTENANCE

Life Cycle Cost (LCC) is an economic assessment technique that can be applied to estimate all costs related to the ownership of the building, which includes the initial capital costs, financial costs, operation costs, maintenance and replacement costs, and the salvage costs throughout anticipated life (Davis Langdon Management Consulting, 2007; BS ISO 15686-5, 2008; Langdon, 2010). Commentators advocated that the availability, accessibility, currency, and reliability of the cost data used as quality inputs in LCC analysis are of paramount importance that should be emphasised in the initial phase of LCC analysis to ensure the estimation process would be able to produce reliable output (Ayob, 2014; Ayob & Abdul Rashid, 2016a, 2016b).

The LCC has been identified as an ideal economic solution technique that is useful facilitate the university agencies in making wise and feasible decision-making to determine the most optimum building maintenance cost of assets and facilities to be paid for preventing financial adverse effect on paying long-term maintenance cost over the anticipated service life (Bidi & Ayob, 2015; Akomolafe et al., 2018). In addition, the outcome of LCC analysis can be applied as input for the decision makers to compare the most cost-effectiveness between the competing maintenance and repair methods to achieve the best value for money decision-making in attaining feasible facility management practice In addition, the LCC outcome can

assist the building owners to measure financial capability and potential cost saving in maintaining the assets and facilities throughout the long in-use phases (ASTM International, 2010; BS ISO 15686-5, 2008; BSI, 2008 as cited by Ayob, 2014; BSI, 2013).

According to Ayob (2014), the LCC technique has been unsatisfactorily utilised in the Malaysian construction sector due to the challenges faced by the LCC practitioners in obtaining quality data to be used as input for producing a thorough and trustworthy LCC analysis. Ayob (2014) and Bidi et al. (2020) had identified the following as the key reasons that hindered the application of LCC practice in the Malaysian construction industry:

i. The construction industry confronts difficulty in conducting comprehensive LCC analysis due to a lack of reliable cost data for each category of cost components of LCC (Ayob & Abdul Rashid, 2016a; Bidi et al., 2020)
ii. Only a few cost estimation practitioners in the Malaysian construction industry have utilised the LCC technique for building projects (Bidi et al., 2020)
iii. New construction expenses of assets and facilities are included in the construction budget, but the maintenance costs are calculated separately with no connection and interaction with the initial capital cost in the investment decision making (Ayob, 2014; Ayob & Abdul Rashid, 2016a, 2016b; Bidi et al., 2020).

Building maintenance in Malaysia is a major concern due to poor maintenance practices in both the public and private sectors (Hauashdh et al., 2020). Facility management requires a collaborative effort from all agencies involved in the asset and facilities' life cycle phases, including the end users. A specific agency or ministry that overlooks the maintenance of the government and public buildings in Malaysia is the Ministry of Works (KKR) and its federal technical department, i.e., Public Works Department (PWD) that oversees the construction and management of the government and public building and infrastructures such as schools, hospitals, airports, harbours, roads, bridges, soil protection and other related engineering works (PWD/SIRIM, 2020). All maintenance activities in the government and public buildings are under the custody of the PWD. Therefore, approval must be acquired and granted by the PWD before implementing the maintenance works at the site. Maintenance activities in government and public buildings must also be aligned with PWD maintenance guidelines. The PWD, as the established technical agency, operates not only in all states of Peninsular Malaysia but also in Sabah and Sarawak. The Maintenance Order for Government Buildings in Putrajaya that published in the Government General Circular No. 1 for the Year 2003 dated 11 February 2003 (PWD, 2003) has written an important provision for circulation to the facilities management stakeholders that the building maintenance practices in government and public buildings have to be conducted correctly and efficiently to preserve the government's reputation (Zakiyudin et.al., 2014).

2.1 Overview of Methodology Applied in LCC Studies of University Education Building Maintenance

A systematic review was conducted to identify articles that discuss the research methodologies applied in the LCC studies of university education building maintenance. A set of inclusion and exclusion criteria is used to identify related academic publications that have reported the outcome of studies in LCC of university education building maintenance,

covering all years until 15 March 2024 from an established online databases, i.e., Google Scholar, Emerald, SAGE Scopus, ISI Index, MyCite, SpringerLink, ISRA publications, as well as other related databases. The searching strategy implemented in the study is designed with a systematic analysis of literature that evaluates the internal validity of each article following the advice given by the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines (Moher et al., 2015; Page et al., 2020; Bello et al., 2021). The study has identified eleven (11) articles that have discussed or presented the required data of methodologies applied in the LCC of university building maintenance. The data that retrieved from the review outcome of eleven (11) articles is presented according to the following forms, i.e., name of the author(s), the title of the article, date of publication, name of publication journal/conference, and applied methodology, as shown in the Table 1.

Table 1: The summary outcome of the systematic review of methodology applied in LCC of university building maintenance studies

No	Author & Published year	Title	Applied Research Methodology
1	Puvaneswary, T. (2014)	Activity-based life cycle cost process model of facilities maintenance for public universities	Qualitative Research Strategy: *-Semi-structured Interview approach*
2	Bidi and Ayob (2015)	Investigation of Quality of Cost Data for Life Cycle Cost Analysis in University Building Maintenance	Qualitative Research Strategy: *-Semi-structured Interview approach*
3	Ayob and Abdul Rashid (2016)	Protocol of Life Cycle Cost (LCC) data input requirements process	Qualitative Research Strategy: *-Modified the Delphi approach and focus group discussion approaches*
4	Huang, et al. (2018)	Life cycle assessment and life cycle cost of university dormitories in southeast China: Case study of the university town of Fuzhou	Mixed Methods Research Strategy: *-Case study: Literature Review:* *-ISO 14040/44 methodology, ISO, 2006a and 2006b.*
5	Li and Guo (2018)	Life Cycle Cost Analysis of Maintenance Costs and Budgets for University Buildings in Taiwan	Qualitative Research Strategy: *-Case study* *-Review of historical data on maintenance and repair*
6	Husain and Prakash (2018)	Life Cycle Ecological Footprint Assessment of an Academic Building	Qualitative Research Strategy: *-Case study* *-Literature Review*
7	Abuznaid (2018)	Investigation of LCC Analysis Practice of University Mosque Maintenance During the In-Use Phase	Qualitative Research Strategy: *- Semi-structured Interview*
8	Maisham et al. (2019)	Developing a Research Methodology for a Life Cycle Costing Framework for Application in Green Projects	Mixed Methods Research Strategy: - *-Literature review* *-Questionnaire Survey* *-Interview*
9	Bidi et al. (2020)	A study on the quality of cost data in the Life Cycle Cost analysis of maintenance during the in-use phases of a university building	Qualitative Research Strategy: *-Semi-structured Interview approach*
10	Hanak et al. (2024)	Life cycle cost modelling using 6D BIM in construction: A comparative study	Qualitative Research Strategy *-Case study:* *-Literature Review*
11	Adewale et al. (2024)	Application of Artificial Intelligence (AI) in Sustainable Building Lifecycle: A Systematic Literature Review.	Qualitative Research Strategy: *-Literature review*

Paper 1 presents the Activity-Based Life Cycle Cost (AB-LCC) process model for facilities maintenance in public universities that employed a Qualitative Research Strategy supported by semi-structured interviews. Paper 2 presents the study that chose a qualitative research strategy to investigate the quality of cost data relevant to Life Cycle Cost (LCC) analysis in university building maintenance. Its qualitative research strategy is designed with semi-structured interviews for primary data collection to achieve the goals of the study. In addition, Paper 3 outlines the study of the protocol of LCC data input requirements process for building works, which employed a qualitative research strategy and was supported by the Modified Delphi method and focus group discussion approaches. Paper 4 shows that the study used mixed methods research to examine the life cycle assessment and life cycle cost of university dormitories in southeast China, specifically referencing Fuzhou University Town in adhering to ISO 14040/44 standards and ISO 2006a and ISO 2006b methodologies. Paper 5 exhibits a study of Life Cycle Cost Analysis of maintenance expenses and budget allocations for university buildings in Taiwan, which utilised the qualitative research strategy to assess historical maintenance and repair data of the chosen case study. Lastly, Paper 6 presents a Life Cycle Ecological Footprint Assessment study of an academic building, which adopted a qualitative research strategy supported by case study and literature review approaches.

Paper 7 shows the outcome of the investigation of Life Cycle Cost (LCC) analysis for the maintenance of university mosques during their operational phase, which utilised a qualitative research strategy supported by a semi-structured interview approach. Paper 8 delineates the development of a research methodology for a Life Cycle Costing framework specifically designed for green projects, and the study employed a mixed-methods research strategy to attain the study objectives. Paper 9 presents the outcome of the investigation on the quality of cost data in LCC analysis during the operational phases of university building maintenance, and the qualitative research strategy was chosen, supported by a semi-structured interview approach to achieve the study objectives. Paper 10 offers a comparative analysis of Life Cycle Cost modelling by integrating 6D Building Information Modelling (BIM) within the construction sector, and the study adopted a qualitative research strategy supported by a literature review to achieve the study objectives. Lastly, Paper 11 shows that the qualitative research strategy was chosen in the study, and the paper presents the outcome of a systematic literature review of Artificial Intelligence (AI) applications in the sustainable building lifecycles.

Overall, based the outcome of systematised review on the eleven (11) articles as shown in Table 1, it is not misconception to state that the qualitative research strategy (with highest mode: 9 items) is the most chosen research strategy that has been applied in the LCC studies of university building maintenance rather than the mixed methods research (mode: 2 items) and quantitative (mode: 0 item, nil). The methodology for the study is based on the nature, goals, and purpose of the study, as well as the accessibility of the data and information needed for the study. In addition, the exploratory and attitudinal research categories fall under the qualitative research strategy (Naoum, 2013). The utilisation of qualitative methodologies is experiencing a notable increase and gaining widespread acceptance among researchers (Akinyode, 2018).

3.0 PROPOSED RESEARCH METHODOLOGY FOR THE STUDY

A research strategy is used to design a study methodology for data acquisition, followed by data analysis and validation to answer the research questions and objectives (Bidi, 2018). The selection of research strategy is normally based on the nature, goals, and purpose of the study, as well as the accessibility of data and information needed for the study (Naoum, 2013). The qualitative research strategy is proposed as the methodology designed for the study because it is superior to the quantitative and mixed methods research strategies in procuring data of LCC that is subjective, profound and limited in nature, which requires supplementary analysis and interpretation on the meanings, definitions, characteristics, experiences, descriptions, thoughts and emotions from the respondents' feedback (Ayob & Abdul Rashid, 2016; Pawar, 2020). The chosen qualitative research strategy is proposed to incorporate with three fieldwork approaches, i.e., semi-structured interview, building condition assessment (BCA), and quick response (QR) codes (as shown in Figure 1), to investigate the operational performance and maintenance condition of the teaching and learning facilities in the chosen university building case study and to produce results that could be used as inputs for the development of prototype of life cycle cost database requirements, which could add value to the core services of the university of chosen case study to in line with the two (2) key drivers of the Malaysian Science, Technology, Innovation, and Economy (MySTIE) framework, namely augmented analytics, and data discovery (science and technology driver) and education (socio-economy driver).

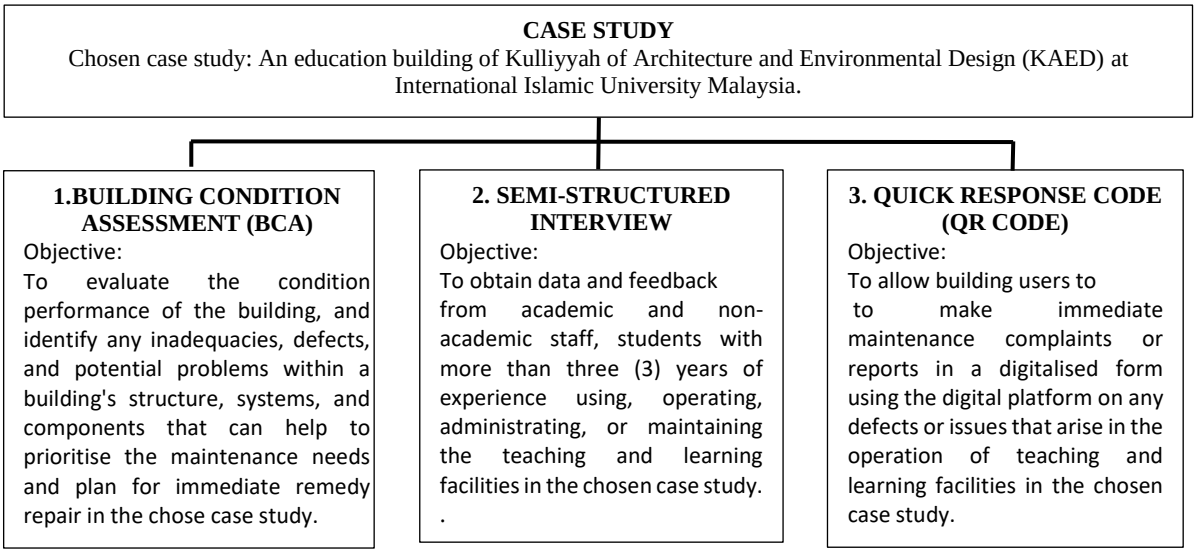


Fig. 1: The proposed research methodology for the study.

3.1 Case Study: KAED Education Building

The objective of choosing a case study is to assess the present phenomena, components and condition of the subject from a real-life context based on firsthand observation through walking to the site, visual inspection, taking photos, drawing, and information provided by the end-user community during the study visit. According to Abu Noh et al. (2017), the primary goal of the case study is to examine phenomena where various components and

interactions are present and where no fundamental rules govern which components and relationships can be observed firsthand. The selected case study is an education building of Kulliyyah of Architecture and Environmental Design (KAED) located at the International Islamic University Malaysia, IIUM Gombak Campus, Selangor, Malaysia. It was chosen as the subject of a case study because the end-user community has reported many issues with the decay of teaching and learning facilities in the KAED education building. The faculty that operated in the building case study is called Kulliyyah of Architecture and Environmental Design (KAED), which was established on 01 June 1996 to provide teaching and learning programmes in Built Environment that offered by five departments, i.e., Architecture (ARCH), Landscape Architecture (LA), Quantity Surveying (QS), Urban and Regional Planning (URP), and Applied Art and Design (AAD). The education building of KAED is equipped with various teaching and learning facilities that include the classrooms, studios, labs and workshops, ICT equipment, Internet cables, Wi-Fi connections, resource centre, restrooms, cafeteria, *musolla* (prayer rooms), lighting and air conditioning, systems in serving for various operations of activities including academic, research and community services. The recent record shows that the total population of registered students 2023 in KAED is 1,039, encompassing undergraduate and postgraduate students who utilised the teaching and learning facilities in the KAED building for learning and study (KAED Academic Office, 2023).

3.1.1 *Maintenance Management of Case Study*

Implementing a maintenance management system in educational buildings is important to preserve assets and facilities from defects and failures and to optimise their functional and operational performance in serving the community satisfactorily (Alaudin et al., 2016). Ramli and Mohd. Zain (2018) claimed that the Ministry of Education's initiatives to support the education sector have resulted in a notable expansion of the higher education market in Malaysia. Thus, a good building maintenance management system will influence the quality of students and staff in their studies and job performance. This maintenance is performed based on the operational condition of an equipment element, instead of simply setting it and forgetting it, as is the schedule. The majority of the universities in Malaysia outsource the maintenance work to facility management contractors because many educational buildings are designed and built on a large scale to house educational programmes (Olanrewaju & Abdul Aziz, 2015). For the case study, the centralised maintenance management approach was chosen by the IIUM central university agency rather than the decentralised maintenance management due to the complexity of maintaining many large educational buildings on campus by a small group of administrative staff or in-house agencies. Besides that, the decentralised facilities management is also not practical and cost-efficient because the in-house agencies may require many workers to supervise, maintain and repair each building in the vast university campus areas. To adapt the centralised maintenance management approach, an agreement known as a Service Level Agreement (SLA) is made on periodically basis between the IIUM Development Division representing the International Islamic University (IIUM) with the maintenance services provider, i.e., Daya Bersih Sdn Bhd (DBSB).

The SLA is a written contract that specifies the standards, obligations, and expected level of services between both parties in the maintenance management of all physical assets installed within the boundary of the facilities, which include but are not limited to buildings, structures,

compounds, landscape and Mechanical and Electrical (M&E) equipment/system. The SLA outlines the obligations of the service provider and the service recipient regarding the policies, processes, sanctions, and incentives. The SLA is also a useful management tool for the service recipient to evaluate the service's effectiveness, value, and quality (Ishak & Mohd Anasir, 2020). According to El-Awadi and Abu-Rizka (2015), the Service Level Agreements (SLAs) should encompass five essential components. These include: a comprehensive delineation of the services provided by cloud service providers; clear and unequivocal terms detailing the specific services offered; a set of Quality of Service (QoS) metrics designed to assess the performance and delivery of services; mechanisms for continuously monitoring these performance metrics; and formalised procedures for resolving disputes that may arise in the event of non-compliance with SLA terms. Usually, the common parameters to define the quality of the services (QoS) are delivery, response time, execution time, service availability, access time, throughput, network bandwidth, service latency, or server uptime or downtime.

For the case study, the SLA is important for the Development Division of IIUM to possess a proper centralised maintenance monitoring supervision based on the specified job scopes and Key Performance Indicators (KPIs) throughout the SLA contract period. As the education building of KAED has approached its twenty-eighth years' service life in 2024, it is imperative to reassess and evaluate the operational performance and maintenance conditions of teaching and learning facilities in the KAED building that is currently maintained by the appointed maintenance service provider under the SLA contract and the achievement of the service provider is based on the Key Performance Indicators (KPIs). To ensure a sustainable, comfortable and conducive educational environment, all facilities must be underpinned by an effective maintenance system. Implementing a robust maintenance management system within the KAED building is vital for protecting the assets from defects and failures. The teaching and learning facilities must be underpinned by an effective maintenance system to ensure the facilities can be complemented with the continuous education development goals in serving the communities to advance the technical and social transformation (Fadhila & Komariah, 2020).

3.2 Semi-Structured Interview Method

For this study, a semi-structured interview question set is designed with a combination of open-ended and closed-ended questions developed from the outcome of a comprehensive literature review. A semi-structured interview methodology was employed to identify the key users of KAED for active participation in assessing the operational performance and maintenance status of the teaching and learning facilities within KAED. This qualitative study is structured around semi-structured interviews, which allow for flexible yet targeted responses, with questions tailored to the specific instruments used in the research, thereby aligning with the overarching objectives of the study. Table 1 briefly presents the two types of questions, i.e., open-ended and closed-ended. The questions are designed based on a specified objective to obtain data and feedback from academic and non-academic staff, and students who have more than three (3) years of experience in using, operating, administrating, or maintaining the teaching and learning facilities in the chosen case study, i.e., the KAED education building. To improve the questionnaire's quality and answerability before the interview, the pilot questionnaire is carried out with a small group of people who

have established knowledge in the subject of study (Bidi & Ayob, 2015; Bidi et al., 2020). The close-ended questions are developed with a Likert-type scale to evaluate the responses provided using a descriptive statistical analysis method, i.e., mean and standard deviation. The mean is calculated to determine respondents' opinions' average or central tendency, and the cut-off mean is 3.75. It is used to identify the critical item response to be included in the answer set of questions. The standard deviation is calculated to determine the variation of the response distribution amongst the respondents, where a small score of less than 1.00 indicates a high consensus achieved from the group of respondents (Ayob, 2014; Mansor et al., 2017).

Table 2: Types of interview questions (Bidi, 2018)

Types of questions	Descriptions
Open-ended question	It comprises exploratory questions that allow the respondent to express their opinion freely without selecting an answer from the list of options.
Close-ended question	It comprises a wide variety of questions that require the respondents to choose from a list of pre-selected options, such as multiple-choice, drop-down, checkboxes, ranking, and more.

3.3 Building Condition Assessment (BCA) Method

Building condition assessment (BCA) is a visualisation assessment technique that is performed to evaluate the condition performance of the building, and to identify any inadequacies, defects, and potential problems within a building's structure, systems, and components. Building Condition Assessment (BCA) entails a comprehensive physical inspection and diagnostic evaluation of a building's structural integrity and overall condition. The primary objective of such an assessment is to ascertain the current state of the structure, including the extent of any deterioration or degradation it may have experienced over time (Faqih & Zayed, 2021). In Malaysia, two BCA rating systems are implemented: the CP BS101 Code of Practice for Building Inspection Report with Building Assessment Rating System (BARIS) (RISM, 2010), and the JKR 21602-0004-13 Building Examination and Evaluation Guideline for BCA (PWD, 2013) using the Building Assessment Rating System (BARS) (Awang et al., 2017). The JKR 21602-0004-13 standard guideline was selected as the foundational framework for this study due to its comprehensive rating system, which encompasses key aspects such as defects, condition, and functionality. The guideline clearly delineates the distinctions between various rating categories, streamlining the rating process and enhancing its interpretability (Mohd & Deraman, 2013). The outcome of the BCA can prioritise the maintenance needs and plan for immediate remedy repair based on the severity of faults or defects found to prevent greater structural difficulties and extend the building's overall durability, functionality, safety and value over time. Hence, maintenance resources can be efficiently directed to vital areas first, which can help reduce the likelihood of costly repairs or safety issues.

Based on the outcome of review of the JKR 21602-0004-13 Building Examination and Evaluation Guideline for BCA using the Building Assessment Rating System (BARS) a new revision form of BCA is prepared as the second approach in the methodology of study to assess physical state of the building portfolio and to identify any defects and faults in the existing building frameworks of

the chosen case study, i.e., KAED education building. In addition, the revised BCA is designed to assess the operational performance and maintenance conditions of the teaching and learning systems, subsystems, and components in the building, civil, mechanical, electrical, and ICT. The outcome of BCA also provides useful input for the remedy planning and strategies that can be prioritised according to the maintenance needs and optimum life cycle cost.

3.4 Quick Response Code (QR Code) Method

A QR code is a two-dimensional barcode that can be scanned with a smartphone or a QR code reader to obtain information or execute numerous actions quickly. The QR code comprises black square dots on a white background and can hold various data, including text, URLs, contact information, and even directions for a particular action. According to Hung et al. (2020), the QR code is a form of matrix barcode (or two-dimensional barcode) invented in 1994 by the Japanese automotive firm, i.e., Denso Wave, to track vehicles during manufacturing. QR codes have been utilised significantly in various consumer industry applications. The basic goal of QR codes is to give a quick and effortless way to transmit information. When scanned, the QR code can trigger operations like opening a website, displaying text or messages, starting a phone call, sending an email, or prompting consumers to download an application. The QR codes serve as a bridge between the physical and digital worlds, enabling users to access information or perform actions by simply scanning the code with a compatible device.

The QR code is chosen as the third approach in the methodology of study to allow building users, i.e., students, staff, and visitors to make immediate maintenance complaint or report in a digitalised form using the digital platform on any defects or issues that arise in the operation of teaching and learning facilities in the chosen case study, i.e., KAED education building. The building users who intend to make defect complaints using the digital platform of QR code will be required to provide basic information like contact info, defect location, dates of the new and previous reports, and photos taken as proof to support the submission of the complaint report.

4.0 CONCLUSION

This paper has presented the methodology proposed for the study to investigate the university building maintenance condition and operational performance as inputs for developing the life cycle cost of maintenance of the university building. The literature study has established that very limited studies have been reported on the methodology to investigate the university building maintenance condition and operational performance with specific reference to maintenance life cycle cost (LCC). Hence, the qualitative research strategy has been proposed as the methodology designed for the study to procure subjective, profound, and limited data of LCC. The qualitative research strategy incorporates three fieldwork approaches, i.e., semi-structured interviews, building condition assessment (BCA), and quick response (QR) codes. The study has recommended the QR code as a useful technique to be integrated with the BCA technique to collect comprehensive firsthand data that can facilitate the facilities management practitioners to produce a thorough and trustworthy LCC analysis of maintenance in achieving cost-effectiveness and value for money maintenance management decision making based on the Key Performance Indicators (KPIs) to protect the assets from defects and failures, and prolong their service life span.

ACKNOWLEDGMENTS

This research was funded by the UMP-IIUM Sustainable Research Collaboration 2022 (IIUM-SRCG), Project Number ID: IUMP-SRCG22-016-0016. This paper follows the other paper that has been presented elsewhere by the authors:

Ayob, Mohd Fairullazi and Yunus, Mohd. Yusri and Hashim, Khairusy Syakirin Has-Yun and Sapian, Abdul Razak and Haron, Ahmad Tarmizi (2025). Life Cycle Cost (LCC) of University Building Maintenance: A Systematised Review. Planning Malaysia: Journal of the Malaysian Institute of Planners, 23 (1 (2025). pp. 501-520. ISSN 1675-6215 E-ISSN 0128-0945.

REFERENCES

Abiodun A. A., Odemakin, M. (2019). Reformation of Slums, *Journal of Contemporary Urban Affairs*. Vol. 3 No. 2.

Abu Noh. S., Mansor. M., & Harun N. Z., (2017). The Benefits of River Indicators to Assess the Ecological Status of IIUM Campus. *Journal of the Malaysian Institute of Planners*, Volume 15, Issue 1 (2017), Pages 221 - 228.

Abuznaid, S. M. A. (2018). Investigation of Life Cycle Cost (LCC) Analysis Practice of University Mosque Maintenance During the In-Use Phases (Unpublished Dissertation for Master of Science (Building Services, Asset and Facilities Management, IIUM)

Academy of Sciences Malaysia (2020). *10-10 Malaysian Science, Technology, Innovation and Economy (MySTIE) Framework.*

Adewale, B. A., Ene. V.O., Ogunbayo B.F., and Aigbavboa. C.O. (2024). Application of Artificial Intelligence (AI) in Sustainable Building Lifecycle: A Systematic Literature Review.

Akinyode, B.F. (2018). Step-by-step approach for qualitative data analysis. *International Journal of Built Environment and Sustainability (IJBES),* Volume 5, Issue 3, 2018, Published in September 2018.

Akomolafe, M., Fagbenle, O., Joshua, O., Afolabi, A., Ojelabi, R., Fagbenle, O., & Fagbenle, A. (2018). Cost Management Practice of Construction Firms and Its Influencing Factors: Lessons from Southwestern Nigeria. *Construction Research Congress 2018*

Alaudin, K., Ishakt. M.F., Isa, H.M., and Sohod, F.M. (2016). The Observation of Defects of School Buildings Over 100 Years Old in Perak. The 4th International Building Control Conference 2016 (IBCC 2016), Volume 66.

ASTM International (2010). E917-05: Standard Practice for Measuring Life-Cycle Costs of Buildings and Building Systems. United States: ASTM International, Georgia Institute of Technology database.

Awang, N. A., Chua, S. J. L., & Ali, A. S. (2017). Building condition assessment focusing on persons with disabilities' facilities at hospital buildings. *Journal of Design and Built Environment, 17*, 73–84. https://doi.org/10.22452/jdbe.sp2017no1.7

Ayob, M. F. (2014). Development of Life Cycle Cost Strategy and Protocol on Cost Data Input in Malaysia. Unpublished doctoral dissertation, International Islamic University Malaysia.

Ayob, M. F., & Abdul Rashid, K. (2016a). Protocol of Life Cycle Cost (LCC) data input requirements process. Protocol of Life Cycle Cost (LCC) data input requirements process. CRLY00002485. *IIUM Repository (IRep)*

Ayob, M. F., & Abdul Rashid, K. (2016b). Review of Methodology Designed to Investigate Quality of Cost Data Input in Life Cycle Cost. *Malaysian Construction Research Journal (MCRJ)*, Volume 18, Issue 1, 2016. ISSN No.: 1985-3807. Publisher: Construction Research Institute of Malaysia.

Bello, H., Ayob, M. F., and Sarkawi, A. (2021). Maintenance Of Waqf Properties in Malaysia: A Systematised Review. *Journal of Architecture, Planning & Construction Management,* Volume 11 Issue 2, 2021.

Bidi, N. K. (2018). Readiness of Life Cycle Cost (LCC) Data Inputs for LCC Analysis of New Flexible Pavement Construction in The Malaysian Construction Industry. Unpublish Dissertation for Master of Science in Asset and Facilities Management, IIUM)

Bidi, N. K., and Ayob, M. F. (2015). Investigation of Quality of Cost Data for Life Cycle Cost Analysis in University Building Maintenance. In: 14th Management in Construction Researchers' Association (MiCRA) Annual Conference and General Meeting (2015), 12th & 13th November 2015, Kulliyyah of Architecture and Environmental Design, International Islamic University Malaysia. (Unpublished).

Bidi, N. K., Ayob, M. F., Aripin, S., and Mat Noor, N. A. (2020). A Study on Quality of Cost Data in Life Cycle Cost Analysis of Maintenance during the In-Use Phases of University Building. *Malaysian Construction Research Journal (MCRJ), 31* (2). ISSN 1985-3807.

British Standards Institution (BSI) (2008). BS ISO 15686-5: 2008, Buildings & Constructed Assets – Service Life Planning – Part 5: Life Cycle Costing, BSI, London.

British Standards Institution (BSI) (2013). BS 8544:2013 (2013). Guide for life cycle costing of maintenance during the in-use phases of buildings, BSI, London.

Davis Langdon Management Consulting. (2007). Final guidance: Life cycle costing (LCC) as a contribution to sustainable construction: Guidance on the use of methodology and its application in public procurement. United Kingdom: Davis Langdon Management Consulting.

El-Awadi, R. & Abu-Rizka, M. (2015). A Framework for Negotiating Service Level Agreement of Cloud-based Services, Int. Conf. Commun. Manag. Inf. Technol., no. 65, pp. 940–949.

Fadhila M. I., and Komariah, A. (2020). Management of Classroom: Utilisation of Learning Facilities and Teacher Performance on Learning Effectiveness.

Faqih, F., Zayed, T. (2021). Defect-based building condition assessment. Building and Environment, 191(September 2020), 107575.

Hanak.T., Mathoi T., Alb. M., Schachner. K., Vyskala. M., Mikulik. M., & Korytarova. J. (2024). Life cycle cost modelling using 6D BIM in construction: A comparative study. *MATEC Web of Conferences 396, 06001*

Hauashdh, A., Jailani, J., Abdul Rahman, I., and AL-fadhali, N. (2020). Building maintenance practices in Malaysia: a systematic review of issues, effects, and the way forward. *International Journal of Building Pathology and Adaptation*, Volume 38, Issue 5. ISSN: 2398-4708

Huang, L., Liu, Y., Krigsvoll, G. & Johansen, F. (2018). Life cycle assessment and life cycle cost of university dormitories in the southeast China: Case study of the university town of Fuzhou. *Journal of Cleaner Production*. Volume 173, 01 February 2018, Pages 151-159.

Hung, S.H., Yao, C.Y., Fang, Y.J., Tan, P., Lee, R., & Sheffer, A. (2010). Micrography QR Codes. *IEEE Transactions on Visualization and Computer Graphics*, Volume: 26, Issue 9, 01 September 2020

Husain, D., and Prakash, R. (2018). Life Cycle Ecological Footprint Assessment of an Academic Building. *Published in Journal of The Institution of Engineers (India):* Series A.

Ishak, M. H., & Mohd Anasir, N. N. (2020). An Assessment of Cleanliness Level from Service Level Agreement and User's Perception in Universiti Tun Hussein Onn Malaysia. *Research in Management of Technology and Business,1*(1),663–676.Retrieved from https://publisher.uthm.edu.my/periodicals/index.php/rmtb/article/view/496

KAED Academic Office (2023). Intakes for the academic year of 2022/2023 (as of Semester 2). Retrieved 24 November 2024, from i-Perform version 2-2022. Kulliyyah of Architecture and Environmental Design, International Islamic University Malaysia (Unpublished).

Langdon, D. (2010). Development of a promotional campaign for Life Cycle Costing in construction. United Kingdom: Davis Langdon.

Li, C.S., & Guo, S.J. (2018). Life Cycle Cost Analysis of Maintenance Costs and Budgets for University Buildings in Taiwan. *Journal of Asian Architecture and Building Engineering*. Volume 11, Issue 1.

Maisham, M., Adnan, H., Ismail, N.A.A., & Mahat, N.A.A. (2019). *Developing a Research Methodology for a Life Cycle Costing Framework for Application in Green Projects*.

Mansor, N. S., Ayob, M. F., Abdul Rashid, K., and Hassan. S.F. (2017). Pros and Cons of Incomplete Contract in Private Finance Initiative (PFI) Project. *4th International Conference on Rebuilding Place.*

Mohamed Yunus, M. F. (2024). Evaluation on the Operational Performance and Maintenance Condition of Teaching and Learning (T&L) Facilities in Kulliyyah of Architecture and Environmental Design (KAED). (Unpublished Dissertation for Master of Science (Building Services, Asset and Facilities Management, IIUM)

Mohd, N. S., and Deraman, R. (2013). Building Condition Assessment at Tun Syed Nasir Residential College, UTHM. *Recent Trends in Civil Engineering and Built Environment,* Vol. 4 No. 1 (2023), Pages 162-172.

Moher, D., Shamseer. L., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Paul, S., & Steward, L. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. Syst Rev 2015; 4:1. doi:10.1186/2046-4053-4-1 pmid:25554246.

Naoum, S.G. (2013). Dissertation Research & Writing for Construction Students. Third edition.

Olanrewaju, A. L., Khamidi, M. F., and Idrus A. (2010). Building Maintenance Management in Malaysian University Campuses: A Case Study. *Australasian Journal of Construction Economics and Building*, Volume: 10, Issue 1/2.

Olanrewaju, A. L., Khamidi, M. F., and Idrus A. (2011). Appraisal of the building maintenance management practices of Malaysian universities. *Journal of Building Appraisal,* Volume 6, pages 261–275.

Olanrewaju, A. & Abdul Aziz, A.R. (2015). Building Maintenance Processes, Principles, Procedures, Practices and Strategies.

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D. (2020). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *Systematic Reviews 2021*,10:89. doi: 10.1186/s13643-021-01626-4

Pawar, N. (2020). Type of Research and Type of Research Design. *Social Research Methodology*. https://www.kdpublications.in

Public Works Department (PWD) (2013), Garis Panduan Pemeriksaan Dan Penilaian Keadaan Bangunan Sedia Ada (JKR 21602 -0004 -13), JKR 21602. Bahagian Senggara Fasiliti Bangunan, Cawangan Kejuruteraan Senggara, JKR Malaysia.

Puvaneswary, T. (2014). Activity-based life cycle cost process model of facilities maintenance for public universities. (Unpublish PhD Thesis)

PWD (2003). Pekeliling Am Kerajaan Bil 1 Tahun 2003 (Government General Circular No 1 Year 2003) Arahan Penyelenggaraan Bangunan Kerajaan di Putrajaya (Maintenance Order for Government Buildings in Putrajaya).

PWD/SIRIM 2:2020. (2020). Penarafan Hijau (pHJKR) bagi Fasiliti Bangunan Kediaman dan Bukan Kediaman. Shah Alam Selangor& Wilayah Persekutuan Kuala Lumpur. JKR Green Product Directory - Site. (n.d.).

Ramli, A. & Mohd Zain. R. (2018). The Impact of Facilities on Students' Academic Achievement, 30(2),299-3112018.

Royal Institution of Surveyors Malaysia (RISM) (2010), the CP BS101 Code of Practice for Building Inspection Report with Building Assessment Rating System (BARIS), RISM, Malaysia.

Zakiyudin M.Z., Fathi, S., Rambat, S., Tobi, Uzairiah & Rejab, N (2014). Building Maintenance Management in Malaysia: An Overview. *The 7th International Real Estate Research Symposium, 2014.*

JOURNAL OF ARCHITECTURE, PLANNING & CONSTRUCTION MANAGEMENT
Volume 15 Issue 1, 2025 E-ISSN: 2462-2222 ISSN: 2231-9514

LEARNING ACROSS BORDERS: STUDENTS' EXPERIENCES IN OUTBOUND MOBILITY PROGRAMME

Received: 22nd March 2025 | Accepted: 13th May 2025 | Available Online: 30th June 2025

DOI: 10.31436/japcm.v15i1.974

Nurul Alia Ahamad[1*], Delliya Mohd Zain[2], Bashira Mohd Bahar[3], Veronica Ng Foong Peng[4]

[1] School of Architecture, Building and Design, Taylor's University, Nurulalia.ahamad@taylors.edu.my*
[2] School of Architecture, Building and Design, Taylor's University, Delliya.MohdZain@taylors.edu.my
[3] School of Architecture, Building and Design, Taylor's University, Bashira.MohdBahar@taylors.edu.my
[4] Department of Architecture, Sunway University, veronican@sunway.edu.my

Corresponding author: **Nurul Alia Ahamad*
Corresponding author's email: Nurulalia.ahamad@taylors.edu.my

ABSTRACT

This study explores the use of a focus group approach to evaluate students' experiences in an outbound mobility programme in Chiang Mai and Bangkok, Thailand. It intends to reveal the various dimensions of their learning encounters, such as their understanding of local culture and architecture, academic and professional growth transformation, application of the experience, and improvement for future outbound mobility programmes. A qualitative method was employed, utilising an asynchronous online focus group with ten (n=10) final-year Bachelor of Science (Honours) in Architecture students who participated in this programme. Through data analysis and coding, four key themes emerged: understanding the impact of local architecture and culture, effective collaboration with industry professionals and peers, motivation to pursue architectural projects in the future, and reflections on the post-mobility experience. This study offers a relatively good overview of students' experiences in outbound mobility programmes and shall contribute to the broader discourse on architectural education, especially for graduating cohorts. However, to assess students' experiences more comprehensively, further evaluation needs to be conducted before, during, and after the outbound mobility programme.

Keywords: Architecture, Experiential Learning, Outbound Mobility Programme, Online Focus Group

1.0 INTRODUCTION

Graduates today need to master not only professional skills of their profession, but also various soft skills, including the ability to communicate, coordinate, work under pressure, and solve problems, which incorporate practical skills, often linked to social competencies such as group work and leadership (Qizi, 2020). While some aspects of learning occur in the classroom, experiential learning outside of the classroom is a crucial part of higher education. Experiential learning supports students in applying their knowledge and conceptual understanding of real-world problems or situations where they are being facilitated in their learning (Tovar & Misischia, 2018). This is commonly achieved through hands-on assignments and internship programmes, which push students beyond their comfort zones and encourage social interaction (Chwialkowska, 2020). However, experiential learning is often confined to local communities or within the country due to time constraints, financial limitations, and scheduling conflicts. When these barriers are addressed, students can gain opportunities to engage with different cultures through outbound mobility programmes with partner universities.

2.0 LITERATURE REVIEW

2.1 Outbound Mobility Programme

An outbound mobility programme can be defined as a programme where students spend a short or a long term abroad at another institution, which aims to positively impact personal growth in the education system or among the students themselves (Ismail et al., 2020). Chwialkowska (2020) identifies six key components of an outbound mobility programme: accommodation, academic context, community engagement, cross-cultural orientation, self-reflection, and mentoring. According to Watson and Wolfel (2015), host universities play a crucial role in assisting social integration and helping students to adapt quickly to new cultural environments.

Through outbound mobility programmes, students develop self-awareness, adaptability, resilience, and intercultural sensitivity (Dall'Alba & Sidhu, 2013). Ismail et al. (2020) and Tovar and Misischia (2018) claim that outbound mobility programmes are critical components of higher education directly entwined with the mission of many universities, which is to provide academic distinction and significantly shape students' perspectives, preparing them for global engagement. However, studies show that students in outbound mobility programmes often face challenges abroad, from adjusting to food, weather, finances, and health to navigating cultural differences and language barriers; these challenges vary based on their language proficiency and adaptability (Prasetyaningrum et al., 2022).

These programmes foster cross-cultural learning by encouraging group collaboration, hands-on experimentation, knowledge sharing, and skill exchange within the education curriculum. This concurs with the industry perspective on attributes of graduate architects in Malaysia, specifically on a positive attitude, teamwork, creativity, independence, problem-solving skills, flexibility, and interpersonal attributes (Ng, Mari, & Chia, 2022). While outbound mobility offers a broad framework for cross-cultural and skill-based learning, its value becomes even more significant when contextualised within the unique pedagogical needs of architecture education.

2.2 Experiential Learning in Architecture Education

Architecture is a multidisciplinary field that integrates the arts, sciences, and social science. Architectural design is the cornerstone of architectural education, with the design studio serving as a space where students integrate knowledge from various disciplines to develop their designs (Charalambous & Christou, 2016; Nicol & Pilling, 2000). The studio culture cultivates a rich, multifaceted learning experience and stimulates students' creativity and engagement, like the office setting experienced during architectural training (Ahamad et al., 2022; Wahid et al., 2023). A key strength of studio-based learning is its emphasis on experiential learning, encouraging students to learn through hands-on practice (Cennamo et al., 2011; Nicol & Pilling, 2000). However, creativity and experiential learning should not be limited to the studio setting. Abdullah et al. (2011) argue that everyday experiences beyond the studio can facilitate architectural learning. Experiential learning theory suggests that knowledge is constructed through experience transformation, requiring internalisation and reinterpretation (Kolb & Kolb, 2005). As a semi-structured approach, experiential learning promotes collaboration and problem-solving, allowing students to build on their existing knowledge to grasp new concepts (Bartle, 2015). To further understand the impact of these learning theories, it is essential to examine students' actual experiences within outbound mobility settings.

2.3 Students' Experiences in Outbound Mobility Programme

Outbound mobility programmes have been regarded as a positive method to impact a student's global learning experience and have continued to gain popularity in higher education (Tovar & Misischia, 2018). Research indicates that students are primarily motivated by the opportunity to study in an international setting, visit foreign countries, and enhance their skills (Ruhi Sipahioğlu et al., 2021). Rajaendram and Jeevita (2025) highlight that tertiary education is a life-changing opportunity for students to broaden their perspectives through international exposure, as it is no longer about the traditional classroom experience. This aligns with architectural education, where students are encouraged to explore new perspectives beyond conventional learning environments. These experiences foster interdisciplinary learning (Olson & Lalley, 2012), innovation and creativity (Mahgoub & Alawad, 2014; Smith & Mrozek, 2016), increase global awareness (Campbell & Gedat, 2021; Grigorescu, 2015; Lim et al., 2021; Stathem, 2015), become more independent (Cubillos & Ilvento, 2012), and promote higher order thinking skills (Foo & Foo, 2022).

Before the COVID-19 pandemic, Taylor's University School of Architecture, Building, and Design (SABD) organised Activity Week, a programme that has since been revitalised and expanded into a two-week Student Mobility Programme. After a 6-year hiatus, SABD launched an Outbound Mobility Programme in Thailand for 18 days, from February 16 to March 4, 2024. Ten (n=10) final-year Bachelor of Science (Honours) in Architecture students, guided by two lecturers, participated in this enriching journey, spending 9 days in Chiang Mai and 9 days in Bangkok. The programme offers a holistic learning experience for the students, combining cultural exposure, architectural diversity, and opportunities for hands-on learning.

During the visit, students participated in workshops addressing regional architectural challenges hosted by the Faculty of Architecture, Chiang Mai University, and the Department of Architectural and Design Intelligence (ADI), King Mongkut's Institute of Technology Ladkrabang (KMITL) in Bangkok. They also had the opportunity to meet with renowned local architects, including Sher Maker and PHTAA in Chiang Mai, as well as Chat Architects and Arsomsilp Community and Environmental Architect in Bangkok. Additionally, students were given a guided visit to the buildings designed by these architects, gaining firsthand insights into contemporary architectural practices in Thailand. According to Tovar and Misischia (2018), literature evaluating study-abroad experiences is prevalent. However, based on the review by Roy et al. (2018), the literature has not thoroughly addressed shorter travel studies (1-2 weeks), especially in architectural education. Therefore, this study aims to address this gap by evaluating students' experiences using a focus group approach to reveal the various dimensions of their learning encounters, such as their understanding of local culture and architecture, academic and professional growth transformation, application of the experience, and improvement for future outbound mobility programmes.

3.0 METHODOLOGY

This study employs a qualitative approach by conducting an online focus group of ten (n=10) final-year Bachelor of Science (Honours) in Architecture students, consisting of four (n=4) males and six (n=6) females who participated in an outbound mobility programme to Thailand. While there is no definite number of participants for a focus group (Manzano, 2023), Abrams and Gaiser (2017) recommend (n=10-30) participants for an asynchronous online focus group with more prominent groups that tend to capture a greater variety of views.

Additionally, research indicates that mixed-gender groups often enhance the quality of discussion and its outcome (Nyumba et al., 2018). Since the participants share common characteristics relevant to this study, the focus group can be categorised as homogeneous. This approach is appropriate for the study as it involves a purposely selected group of individuals to provide rich, contextual data (Marra & McCullagh, 2018) rather than aiming for a statistically representative sample of a broader population (Kitzinger, 1995; Lane et al., 2001; Nyumba et al., 2018). Therefore, purposive sampling was used to access a limited subject pool of architecture students.

3.1 Asynchronous Online Focus Group

The focus group method enables a researcher to assess ideas in a group setting to gather data and additional participant information. Abrams and Gaiser (2017) noted that much of the seminal literature describing the focus group method was developed with face-to-face communication in mind, and it could be employed for many different purposes. Nyumba et al. (2018) emphasise that this method is widely used in qualitative research to understand social issues comprehensively. The focus group format has also favoured those doing pilot testing for curricula, programme improvement, organisational development, and outcome evaluation (Leung & Savithiri, 2009; Marra & McCullagh, 2018). Furthermore, this method is claimed to provide a rich and meaningful dataset in a relatively short period (Gundumogula, 2020).

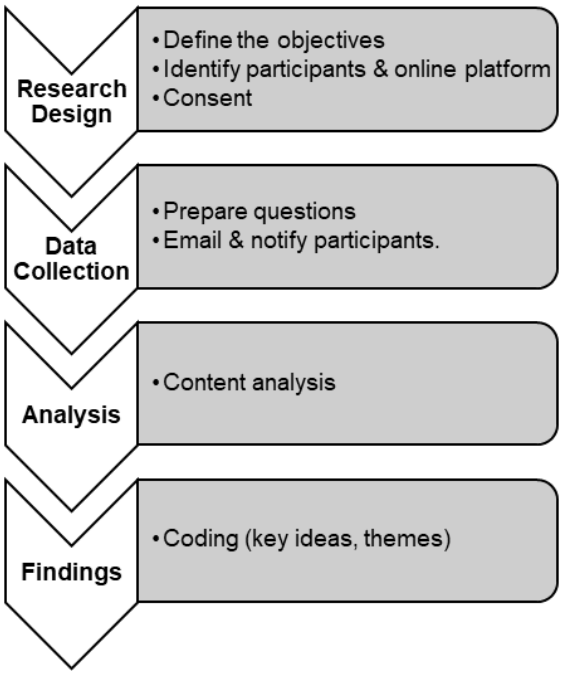


Fig. 1: Flow chart of the steps of the online focus group

Nonetheless, Williams et al. (2012) highlight that the researcher has to carefully consider the suitability of using an online focus group approach with a specific research sample to grapple with a particular research question. This includes considering participants' familiarity and comfort with written and online communication to express their views and experiences. After careful consideration and discussion, everyone agreed to participate in this asynchronous online approach, as all participants had graduated and started working, making face-to-face meetings unfeasible. As supported by Abrams and Gaiser (2017) and Schulze et al. (2022),

there are many benefits to conducting focus groups in an online setting: they are relatively inexpensive, provide greater and easier access to a broad range of research participants, and can take less time to collect data. In addition, written communication, especially in an asynchronous setting, enables respondents to share their experiences with vivid emotional detail, leading to powerful emotional responses from the reader (Ratislavová & Ratislav, 2014; Williams et al., 2012).

Figure 1 shows the flow of the online focus group procedure. The online focus groups took place in March 2025, one year after the outbound mobility programme. This timing allowed students to reflect on how the experience had influenced their academic and professional growth. However, the year-long gap may also have introduced memory recall bias, potentially threatening the accuracy and depth of participants' reflections (Sutherland et al., 2014). To minimise this, participants were provided with guiding prompts to support memory retrieval using standardised data collection protocols and well-structured questions (Hassan, 2005). Research shows that when appropriately scaffolded, reflective practices can yield meaningful insights even after a time-lapse (Mann et al., 2009).

After obtaining participants' consent, a WhatsApp group was created to facilitate communication. Participants were briefed on the research procedure and reminded to respond to the questions thoughtfully and in as much detail as possible. The questions were emailed to each participant, allowing them one week to complete the questionnaire at their own pace. According to Ratislavová and Ratislav (2014), participants have more time to think and consider their answers. They can review and reflect on their responses, which helps them communicate more carefully. This also can safeguard their privacy.

Ratislavová and Ratislav (2014) have also reported in their research that the quality of the data obtained through asynchronous email is similar to that in face-to-face interviews, as participants are generally more focused. However, due to the limitations of asynchronous online focus groups, follow-up private conversations were conducted to assist participants facing difficulties or seeking further clarification (Schulze et al., 2022).

3.2 Data Analysis and Coding

The data was analysed to gain insight into participants' experiences in the outbound mobility programme. Inductive analysis was conducted to identify the patterns and themes from the data. This analysis is commonly used with text-based data and is useful when approaching data without theoretical guardrails. It aims to produce an understanding of the meanings of the content of the data set and to uncover unexpected insights (Vears & Gillam, 2022). The data was examined with few preconceived ideas and read thoroughly. Exploratory remarks were made through the analysis process to assign meaning to them.

The next step after data analysis was the coding procedure, which was to identify patterns of participant responses and categorise them accordingly. This approach involved reading and re-analysing the responses multiple times and extracting and coding information to understand the data in-depth. It is an iterative process and constant comparative method in which researchers code the data, compare data with data and codes with codes, and eventually condense codes into categories, categories into themes, and themes into findings (Charmaz, 2014, as cited in Bingham, 2023). The coded data was then organised into a spreadsheet based on the selected themes of the participants' descriptive, linguistic, and

conceptual comments (Cooper et al., 2012, as cited in Koh & Ahamad, 2023). Although formal data saturation was not the primary aim of this small-scale study, recurring themes were consistently observed across participants' responses. This thematic convergence supports the dataset's adequacy for the research's exploratory nature.

4.0 RESULTS

Four significant themes were identified by analysing and coding the participants' responses. They are the ability to understand the influence of local architecture and culture, positive collaboration with industry players and students, motivation toward applying architectural projects in the future, and reflection on the post-outbound mobility programme. Table 1 summarises the findings and illustrates the correlation of these themes with the dimensions of students' experiences in this outbound mobility programme.

Table 1: Summary of findings

Themes	Students' Experiences	Keywords
The ability to understand the influence of local architecture and culture	Understanding of local culture and architecture	• Contextual • Vernacular • Preservation • Heritage
Positive collaboration with industry players and students	Academic and professional growth transformation	• Lectures • Discussions • Site Visit • Workshops
Motivation toward applying architectural projects in the future	Application of the experience	• Project Management • Site Analysis • Passive Design • Use of local materials
Reflection on the post-outbound mobility programme	Improvement for future mobility programme	• More activities • Journal diary • Integration with curriculum

4.1 The ability to understand the influence of local architecture and culture

This theme demonstrates that most students grasped new cultures and local architecture well during the outbound mobility programme.

> *Realising the importance of incorporating culture within the fabric of urban design, instilling preservation values while aiming for a continued and modern growth of a place. (Student 2)*

> *Thai culture and architectural diversity opened my eyes to many new ways of passive architecture using cultural work in modern architecture, especially during my time in Chiangmai. (Student 5)*

> *Visiting these two cities, each with its distinct character, climate, and history, provided me with valuable insights into how culture and architecture intertwine, shaping the*

built environment in unique ways. One of the key lessons I learned from this trip is how architecture in Thailand bridges the old and the new. Many contemporary Thai architects have embraced globalisation and modern techniques but remain deeply connected to their cultural roots, often seeking to balance innovation with tradition….. (Student 8)

Thai culture's robustness and influence on their architectural style made me understand how the heritage of a place directly shapes its architecture to complement the lifestyle. (Student 9)

Exposure to Thai culture and architecture highlights the balance between tradition and modernity in contemporary design with its form and materiality. The blend of vernacular elements with modern innovations in Thailand's urban landscape demonstrates how heritage and innovation coexist, shaping a more holistic and sustainable approach to contemporary architectural practices. (Student 10)

Most students exhibited a good understanding of local architecture and culture. They could analyse the unique characteristics of vernacular architecture and identify how the architects have embraced traditional techniques with a modern twist in their designs. Student 1 also added the importance of incorporating culture in urban design to give the place a distinct identity. Building on this cultural appreciation, students engaged meaningfully with local professionals and peers, which further deepened their insights and fostered collaborative learning experiences.

4.2 Positive collaboration with industry players and students

This theme refers to the students' attitudes towards collaboration with local architects and students in Thailand. The analysis reveals that the students' positive remarks about the activities planned during the outbound mobility programme are recognised.

I think the collaboration activity between different university students has given me a lot of insights in terms of the design approach, software skills, and team dynamics. The design approach for a historical site has given me a fresh perspective on how we look at the site through history, morphology, and building usage. (Student 1)

The most transformative experience would have been meeting new interesting lecturers and architects, hearing about their practices, and discussing specific topics regarding Thai architectural styles. (Student 5)

I learned a lot from this trip, from lecturers to practising architects to students. Especially during site visits. (Student 6)

Meeting industry players such as PHTAA architects at their firms and getting valuable advice helped me grow. (Student 9)

……Engaging with local architects and communities broadened my perspective on contextual design, adaptability, and material innovation…..(Student 10)

The students have benefited from the activities with local architects and students as they had

the opportunity to ask questions and learn about traditional architecture. They also had the chance to converse with the local community, which deepened their understanding of the cultural norms. Students 1 and 10 noted that the collaborative activities provided new perspectives on analysing the site. Others, such as Students 5, 6 and 7, enjoyed learning about local practices and engaging with local architects. These meaningful interactions enriched their understanding of architectural practices and sparked a sense of purpose and enthusiasm for applying these insights to their future professional journeys.

4.3 Motivation towards applying architectural projects in the future

This theme indicates that the students feel motivated to apply the new knowledge they gained in Thailand to their future projects or work.

> *What I love about Thailand's architecture is that it is very distinct. I could easily tell that I was in Thailand just by looking at a building. They put a lot of thought into designing buildings that reflect their culture. Thailand's architecture reflects a deep connection to nature and culture, which I would strive to incorporate in my future work. (Student 6)*

> *Contextual sensitivity in design, blending tradition with innovation, sustainability, and environmental responsibility, focusing on human experience and spatial organisation, and sensitivity to cultural impact are a few aspects that I will keep in mind when approaching my future architectural experiences. The lessons learned from my time in Thailand will be a constant source of inspiration, also encouraging me to learn from more vernacular and contemporary architecture from Southeast Asia. (Student 8)*

> *I plan to integrate the insights from my experience in Thailand by emphasising sustainability, cultural sensitivity, and climate-responsive design in my future architectural work. (Student 10)*

The students have expressed their confidence by projecting ideas on how to implement their experience in their future endeavours through this outbound mobility programme. Student 6 claimed to incorporate nature and culture, while Students 8 and 9 were inspired to integrate sustainability and environmental approaches in their works.

4.4 Reflection on the post-outbound mobility programme

As students looked ahead to applying their knowledge, they also turned their attention inward, offering thoughtful reflections on the programme and how it could be further enriched for future participants. This theme captures the students' perspectives on improving the learning experience in future outbound mobility programmes. It also provides an opportunity for lecturers to review and enhance the overall planning of the programme.

> *I think the mobility programme should have more seminars and architectural tours. The activity with different university students can be more in-depth. I think one of the reasons was language barriers, which resulted in short and quick discussions. (Student 1)*

> *Something I appreciated from the trip was the arrangement of having scheduled daily*

activities ranging from few-days-long workshops, group work, sharing sessions from architects to site visits, and ample free time for us to explore around. I think it would be better if we could have some pre-trip preparation and contextual learning, as well as immediate post-trip reflection to help us understand and reflect better on our experience of the programme, as it was something remarkable of my architecture uni life. (Student 8)

Participants may record their experiences in a diary to help them remember more clearly and utilize the knowledge from the trip. (Student 9)

…..The activities themselves were a good blend of fun and academic, but could also include some that integrated with their existing curriculum instead of creating one. (Student 10)

Overall, the students expressed satisfaction with the outbound mobility programme as they acquired new knowledge and experiences. That being noted, there is potential for future enhancements to this programme. Student 10 suggested this programme could be integrated with the existing curriculum to make the experience more structured and robust. Student 1 pointed out that the language barrier hindered deeper discussions. However, this issue could be addressed, as Student 8 and 9 suggested incorporating a reflective journey during the trip to aid in understanding and contemplating their experiences within the programme.

5.0 DISCUSSIONS

Based on the findings of this study, the students gained valuable experiences in the outbound mobility programme, which enabled them to understand the influence of local architecture and culture and to collaborate positively with industry players and students. This outcome concurs with a study by Handayani and Wienanda (2020) and a review by Roy et al. (2018), which reports that outbound mobility programmes allow students to develop their ability to understand and adapt to different cultures and differences. Despite language barriers being a significant challenge, as Kasim et al. (2012) claim, it did not hinder students from embracing new experiences as they felt motivated to apply the new knowledge in their future careers. However, one student highlighted the need for a more structured orientation at the programme's outset to integrate within the existing curriculum. According to De Moor and Henderikx (2013), addressing this as an integral part of a curricular framework in future iterations could further increase students' participation in outbound mobility programmes.

The importance of academic mobility and the advantages of conducting the outbound mobility programme for the student cannot be underestimated since it is evident that the majority of the population studied perceives their mobility experience as positive since they acquired competencies, abilities, capacities, and skills necessary for their disciplinary development (Herazo Chamorro et al., 2023; Ismail et al., 2020). This outbound mobility programme has harnessed soft skills such as flexibility and adaptability, which are highly sought-after by the industry (Crossman & Clarke, 2009; Kasim et al., 2012; Handayani & Wienanda, 2020). Through some student reflections, this study also highlights improvements that could be considered in the future outbound mobility programme, such as having personal journals to record their experiences in detail. These journals would inquire about

their mobility experiences, follow up on their learning, and allow them to promote the programme based on their experiences.

Embedding personal journaling aligns with established pedagogical frameworks such as Kolb's Experiential Learning Cycle, which emphasises reflective observation as a key stage in transforming experience into learning (Kolb, 1984). Existing literature on mobility programmes also supports structured reflection to enhance students' cultural awareness, personal growth, and professional development (Mohd Noor et al., 2020). Therefore, integrating reflective journals could provide a scaffolded, pedagogically grounded tool to enrich student outcomes and promote more intentional learning during and after the programme.

6.0 CONCLUSION

This study concludes with a positive overview of students' experiences in outbound mobility programmes, highlighting their transformative impact on architectural education. Key findings suggest that students developed critical competencies such as cross-cultural understanding, industry collaboration, and enhanced adaptability, which are essential in the global architecture profession. The programme also effectively fostered valuable soft skills, including flexibility and communication, aligning with industry expectations.

Drawing from the study presented, it is recommended that the outbound mobility programme be vigorously promoted, particularly for the graduating cohort. This will diversify their learning experience and development, enriching their learning and growth, thus producing a highly sought-after graduating cohort. Continuous assessment before, during, and after the programme is encouraged to support better and refine students' experiences. Ultimately, outbound mobility programmes hold immense potential to broaden students' horizons and reimagine and elevate architectural education globally.

ACKNOWLEDGMENTS

This research did not receive any grant from any funding agency in the public, commercial, or not-for-profit sectors. The authors would like to express their gratitude to all the students and lecturers who were involved in this outbound mobility programme. We would also like to thank the Faculty of Architecture, Chiang Mai University, Department of Architectural and Design Intelligence (ADI), and King Mongkut's Institute of Technology Ladkrabang (KMITL) for hosting this programme and for their warm hospitality.

REFERENCES

Abdullah, N. A. G., Beh, S. C., Tahir, M. M., Ani, A. I. C., & Tawil, N. M. (2011). Architecture design studio culture and learning spaces: A holistic approach to the design and planning of Learning Facilities. *Procedia - Social and Behavioral Sciences*, *15*, 27–32. https://doi.org/10.1016/j.sbspro.2011.03.044

Abrams, K., & Gaiser, T. (2017). Online focus groups. In N. G. Fielding, R. M. Lee, & G. Blank (Eds.), *The SAGE handbook of online research methods* (2nd ed., pp. 435–450). Sage.

Ahamad, N. A., Ibrahim, F. I., Koh, J. H., & Ng, V. F. (2022). First-year experience (FYE) in architectural studio education during the COVID-19 pandemic. In V. F. P. Ng, S. Srirangam, & S. N. Z. Abidin (Eds.), *Handbook of research on issues, challenges, and opportunities in sustainable architecture* (pp. 365–383). IGI Global. https://doi.org/10.4018/978-1-6684-5119-9.ch017

Bartle, E. (2015). *Experiential learning: An overview* (Discussion paper). Institute for Teaching and Learning Innovation, The University of Queensland.

Bingham, A. J. (2023). From data management to actionable findings: A five-phase process of qualitative data

analysis. *International Journal of Qualitative Methods*, *22*. https://doi.org/10.1177/16094069231183620

Campbell, Y. M., & Gedat, R. (2021). Experiential learning through field trips: Effects on educational, social and personal development among linguistics majors. *Journal of Cognitive Sciences and Human Development*, *7*(2), 131–144. https://doi.org/10.33736/jcshd.3430.2021

Cennamo, K., Brandt, C., Scott, B., Douglas, S., McGrath, M., Reimer, Y., & Vernon, M. (2011). Managing the complexity of design problems through studio-based learning. *Interdisciplinary Journal of Problem-Based Learning*, *5*(2). https://doi.org/10.7771/1541-5015.1253

Charalambous, N., & Christou, N. (2016). Re-adjusting the objectives of architectural education. *Procedia - Social and Behavioral Sciences*, *228*, 375–382. https://doi.org/10.1016/j.sbspro.2016.07.056 Charmaz, K. (2006). Constructing grounded theory: A practical guide through qualitative analysis. Sage. https://doi.org/10.7748/nr.13.4.84.s4

Chwialkowska, A. (2020). Maximizing cross-cultural learning from exchange study abroad programs: Transformative learning theory. *Journal of Studies in International Education*, *24*(5), 535-554.

Cooper, R., Fleischer, A., & Cotton, F. A. (2012). Building connections: An interpretative phenomenological analysis of qualitative research students' learning experiences. *The Qualitative Report, 17*, 1–16.

Crossman, J. E., & Clarke, M. (2009). International experience and graduate employability: Stakeholder perceptions on the connection. *Higher Education*, *59*(5), 599–613. https://doi.org/10.1007/s10734-009-9268-z

Cubillos, J. H., & Ilvento, T. (2012). The impact of study abroad on students' self-efficacy perception. *Foreign Language Annals, 45*(4), 494–511. https://doi.org/10.1111/j.1944-9720.2013.12002.x

Dall'Alba, G., & Sidhu, R. (2013). Australian undergraduate students on the move: Experiencing outbound mobility. *Studies in Higher Education*, *40*(4), 721–744. https://doi.org/10.1080/03075079.2013.842212

De Moor, B., & Henderikx, P. (2013). *International openness in higher education* (Advice Paper No. 12). League of European Research Universities (LERU). https://www.leru.org

Foo, S. C., & Foo, K. K. (2022). Purposeful field trip: Impact on experiential learning opportunities and critical thinking skills. *Pertanika Journal of Social Sciences and Humanities*, *30*(1). https://doi.org/10.47836/pjssh.30.1.01

Grigorescu, C. (2015). *Undergraduate students' perceptions of study abroad and their level of achievement of global learning outcomes* (Publication No. 3721483) [Doctoral dissertation, Florida International University]. ProQuest Dissertations & Theses Global.

Gundumogula, M. (2020). Importance of focus groups in qualitative research. *International Journal of Humanities and Social Science, 8*(11), 299–302. https://doi.org/10.24940/theijhss/2020/v8/i11/HS2011-082

Handayani, A., & Wienanda, W. K. (2020). International mobility programs to improve soft skills of vocational college students and alumni. Journal of Education and Learning (EduLearn), 14(3), 377–384. https://doi.org/10.11591/edulearn.v14i3.14538

Hassan, E. (2005). Recall bias can be a threat to retrospective and prospective research designs. *The Internet Journal of Epidemiology, 3*(2).

Herazo Chamorro, M. I., Sánchez, E. G., Ruiz , M. R., Mendivil Hernández , P. M., & Ruiz , L. Á. (2023). Perception about the mobility experience of students in universities: A descriptive study. *Journal of Higher Education Theory and Practice*, *23*(13), 155–165. https://doi.org/10.33423/jhetp.v23i13.6324

Hunter, B., White, G. P., & Godbey, G. C. (2006). What does it mean to be globally competent? *Journal of Studies in International Education*, *10*(3), 267-285.

Ismail, I. R., Saikim, F. H., Yahaya, N. Z., Tan, M. P., & Ibrahim, Y. S. (2020). *AIMS students' mobility programme in Thailand: Empirical evidence on the wider sphere of students' perceptions.* Akademika, 90(Isu Khas 2), 105-115. https://doi.org/10.17576/akad-2020-90IK2-09

Kasim, M. A., Abd Aziz, M. I., Balachandran, D., & Abdullah, D. (2012). *International mobility programme participation in diversifying students' learning experience and strengthening graduate attribute development: A case study.* ICTLHE ● RCEE ● RHED2012.

Kille, K. J., Krain, M., & Lantis, J. S. (2008). Active learning across Borders: Lessons from an interactive workshop in Brazil. *International Studies Perspectives*, *9*(4), 411–429. https://doi.org/10.1111/j.1528-3585.2008.00345.x

Kitzinger, J. (1995). Qualitative research: Introducing focus groups. *BMJ*, *311*(7000), 299–302. https://doi.org/10.1136/bmj.311.7000.299

Koh, J. H., & Ahamad, N. A. (2023). A phenomenological study of learner's virtual place experience. In N. Peng & U. Sonet (Eds.), *Handbook of research on inclusive and innovative architecture and the built*

environment (pp. 368–386). IGI Global. https://doi.org/10.4018/978-1-6684-8253-7.ch020
Kolb, A. Y., & Kolb, D. A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education*, *4*(2), 193–212. https://doi.org/10.5465/amle.2005.17268566
Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.
Lane, P., McKenna, H., Ryan, A. A., & Fleming, P. (2001). Focus Group methodology. *Nurse Researcher*, *8*(3), 45–59. https://doi.org/10.7748/nr2001.04.8.3.45.c6157
Leung, F. H., & Savithiri, R. (2009). Spotlight on focus groups. *Canadian family physician Medecin de famille canadien*, *55*(2), 218–219.
Lim, C. R. R., Barcelona, T. A., Ramos, A. R. M., & Mandigma, E. Jr. (2021). Educational tours: Its impact on the learning experiences of third-year tourism students (S.Y. 2020-2021) in De La Salle University – Dasmariñas. *International Journal of Social Science and Humanities Research, 9*(2), 379–390. Available at: www.researchpublish.com
Mahgoub, Y. M., & Alawad, A. A. (2014). The impact of field trips on students' creative thinking and practices in arts education. *Journal of American Science, 10*(1), 46–50. http://www.jofamericanscience.org
Mann, K., Gordon, J., & MacLeod, A. (2007). Reflection and reflective practice in health professions education: A systematic review. *Advances in Health Sciences Education, 14*(4), 595–621. https://doi.org/10.1007/s10459-007-9090-2
Manzano, A. (2023, July). *Focus groups* (LIEPP Methods Brief No. 37). Sciences Po, Laboratory for Interdisciplinary Evaluation of Public Policies (LIEPP). Available at: https://sciencespo.hal.science/hal-04159342v1/document
Marra, M., & McCullagh, C. (2018). Feeling able to say it like it is: A case for using focus groups in programme evaluation with international cohorts. *The International Journal of Management Education*, *16*(1), 63–79. https://doi.org/10.1016/j.ijme.2017.12.006
Mohd Noor, Z., Abd Razak, A., Gisip, J., & Mustafa, M. (2020). Impact of participating AIMS student mobility programme: A UiTM perspective. *Akademika, 90*(Isu Khas 2), 39–49. https://doi.org/10.17576/akad-2020-90IK2-04
Ng, V., Mari, T. S., & Chia, L. L. (2022). Re-thinking architecture education: Conceptualising curriculum through the lens of 21st century graduate attributes. *Journal of Design and Built Environment*, *22*(2), 85–92. https://doi.org/10.22452/jdbe.vol22no2.6
Nicol, D., & Pilling, S. (Eds.). (2000). *Changing architectural education: Towards a new professionalism* (1st ed.). Taylor & Francis. https://doi.org/10.4324/9780203992340
Nyumba, T. O., Wilson, K., Derrick, C. J., & Mukherjee, N. (2018). The use of focus group discussion methodology: Insights from two decades of application in conservation. *Methods in Ecology and Evolution*, *9*(1), 20–32. https://doi.org/10.1111/2041-210x.12860
Olson, J. E., & Lalley, K. (2012). Evaluating a short-term, first-year study abroad program for business and engineering undergraduates: Understanding the student learning experience. *Journal of Education for Business, 87*(6), 325–332. https://doi.org/10.1080/08832323.2011.633580
Orhan, M. (2017). The role and importance of workshops in the architectural design education; case of "Self made architecture i-ii." *New Trends and Issues Proceedings on Humanities and Social Sciences*, *3*(3), 131–136. https://doi.org/10.18844/gjhss.v3i3.1545
Prasetyaningrum, D. I., Ruminar, H., Ivana, A., & Irwandi, P. (2022). Explorational study of international student mobility program challenges in dealing with global diversity and change. *Erudio Journal of Educational Innovation, 9*(2), 150–167. https://doi.org/10.5281/zenodo.8081328
Qizi, K. N. (2020). Soft skills development in higher education. *Universal Journal of Educational Research*, *8*(5), 1916–1925. https://doi.org/10.13189/ujer.2020.080528
Rajaendram, R., & Jeevita, J. (2025, February 23). Make the world your classroom. *The Star*. Retrieved from https://www.thestar.com.my/news/education/2025/02/23/make-the-world-your-classroom.
Ratislavová, K., & Ratislav, J. (2014). Asynchronous email interview as a qualitative research method in the humanities. *Human Affairs*, *24*(4), 452–460. https://doi.org/10.2478/s13374-014-0240-y
Roy, A., Newman, A., Ellenberger, T., & Pyman, A. (2018). Outcomes of International Student Mobility Programs: A systematic review and Agenda for Future Research. *Studies in Higher Education*, *44*(9), 1630–1644. https://doi.org/10.1080/03075079.2018.1458222
Ruhi Sipahioğlu, I., Abbas, G. M., & Yılmaz, B. (2021). Outside the school: A review of the non-formal short-term architectural workshops. *Journal of Design for Resilience in Architecture and Planning*, *2*(1), 44–63. https://doi.org/10.47818/drarch.2021.v2i1011
Schulze, L., Trenz, M., Cai, Z., & Tan, C.-W. (2022). Conducting online focus groups: Practical advice for

information systems researchers. In T. X. Bui (Ed.), *Proceedings of the 55th Hawaii International Conference on System Sciences* (pp. 3085–3094). Hawaii International Conference on System Sciences (HICSS). https://doi.org/10.10125/79714

Smith, P. J., & Mrozek, L. J. (2016). Evaluating the application of program outcomes to study abroad experiences. *Honors in Practice, 12*, 9–32.

Sutherland, S. L., Cimpian, A., Leslie, S., & Gelman, S. A. (2014). Memory errors reveal a bias to spontaneously generalize to categories. *Cognitive Science*, *39*(5), 1021–1046. https://doi.org/10.1111/cogs.12189

Tovar, L. A., & Misischia, C. (2018). *Experiential learning: Transformation and discovery through travel study programs*. *Research in Higher Education Journal, 35*.

Vears, D. F., & Gillam, L. (2022). Inductive content analysis: A guide for beginning qualitative researchers. *Focus on Health Professional Education, 23*(1), 111–126.

Watson, J. R., & Wolfel, R. (2015). The intersection of language and culture in study abroad: Assessment and analysis of study abroad outcomes. Frontiers: The Interdisciplinary Journal of Study Abroad, 25(1), 57–72

Wahid, J., Abdullah, A., Koesmeri, D., & Hashim, A. (2023). Architecture education in Malaysia: Antecedent or traditional inheritance reprisal along the pace of globalization. *International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies, 1*, Article 12. https://doi.org/10.14456/ITJEMAST.2023.12

Williams, S., Clausen, M. G., Robertson, A., Peacock, S., & McPherson, K. (2012). Methodological reflections on the use of asynchronous online focus groups in Health Research. *International Journal of Qualitative Methods*, *11*(4), 368–383. https://doi.org/10.1177/160940691201100405