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MALAYSIA INSTITUTE OF PLANNERS  
PLANNING MALAYSIA VOLUME 20 ISSUE 3 (2022)  
[ISSN 1675-6215] e-ISSN 0128-0945]  
[www.planningmalaysia.org](http://www.planningmalaysia.org)

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All articles were reviewed by two or three unanimous referees identified by the Institute (MIP).

***Published By***  
**Malaysian Institute of Planners**

*ISSN Number*

1675-6215

*e-ISSN*

0128-0945



*Date Published: 30<sup>th</sup> September 2022*

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**PLANNING MALAYSIA:**  
*Journal of the Malaysian Institute of Planners*  
**VOLUME 20 ISSUE 3 (2022), Page 1 – 13**

## **DESIGNING RESILIENT COASTAL TOURISM FACILITIES BASED ON LANDSCAPE CHARACTERISTICS AND LOCAL WISDOM**

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### **Abstract**

Landscape characteristics in coastal areas greatly influence the resilience of tourism facilities for the economy of local people and government. On the other hand, the coastal areas are the first zone hit if a natural disaster such as a tsunami occurs. It is also vulnerable to abrasion as the impact of climate change. The topography of the coastal landscape is considered a factor in planning tourism facilities. Thus, to what extent does landscape design influence designing resilient coastal tourism facilities? The study area of this research is located in Lampuuk beach, Aceh Besar, Indonesia. The research aims to observe the landscape characteristics in coastal tourism areas as a preparedness strategy to confront natural disasters in resilient coastal areas. This research is conducted using a descriptive quantitative method by collecting data on landscape coastal characteristics and data records of coastal tourism growth. Next, all data are analysed based on the coastal tourism area that has developed tourism facilities. The final step is synthesizing collected data and the analysis result using a modelling approach. The research finds out that the landscape characteristics influence the design of facilities in the coastal tourism area, which requires different structures and materials. The local wisdom of Rumoh Aceh could mitigate and prevent the coastal tourism industry from rebuilding new facilities if the wave range reaches the land.

**Keywords:** resilient, coastal tourism, landscape design

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## **INTRODUCTION**

Tourism facilities in coastal tourism are paramount for captivating visitors to come. Besides attraction, marketing materials for instance physical amenities and facilities are factors that contribute to the success of tourism industry development (Hall & Page, 2014; Makkonen, 2016). Biggs et al. (2015) assert that coastal and marine-orientated nature-based tourism plays an important socio-economic role and provides an incentive for conservation in many coastal regions. In the last decade, coastal tourism has experienced phenomenal growth since 2010, especially in vulnerable areas such as Lampuuk and Lhoknga beaches. This growth has led to the construction of tourism facilities such as gazebos, cottages, and restaurants. However, all of this construction has taken place in vulnerable areas in the wake of the Indian Tsunami in 2004. Therefore, it is threatened by the possibility of tsunami occurrence and the impact of climate change, for instance, rising sea levels causing shoreline movement closer to land and depth of the coastal area where it is forbidden to swim.

No empirical studies in Aceh, however, have been conducted to ascertain the impact of sea-level rise on tourism. Moreover, the local wisdom related to the prevention of natural disasters in the coastal area is hard to discover, so the efforts to provide resilient disaster management have not been reaching sustainability. Moreover, it is a known fact that local wisdom inherited from past generations who survived disasters would serve as precious knowledge with the potential to increase the capability of having a better and safer built environment. Thus, would it be appropriate to incorporate local wisdom into the landscape design concept in coastal tourism facilities?

In order to support tourism facilities, the government has dominant clout in implementing various tourism programs which have been proven complex and ineffective by previous researchers (Zulkefli, Jaafar, and Marzuki, 2021). Generally, programs that have been made by Aceh's government focus on the occurrence of a disaster. Moving the coastal tourism and the settlements to higher land would be improper to offer as the previously equal quality of life, and economic vitality for people and the industry might deteriorate. Therefore, preparedness in responding to disasters is required in order to mitigate the severity of the human and material damages. The study of designing a resilient coastal tourism landscape is critical, thus reinforcing the need to build sustainable disaster-responsive coastal tourism for tourists and the local community.

The research aims to observe the landscape characteristics in coastal tourism areas as a preparedness strategy to confront natural disasters in the resilient coastal area. Investigating the possibility to mitigate the impact of disaster is the main objective of the study. Therefore, the question at the heart of this research is: to what extent does landscape design influence the designing of resilient coastal tourism facilities?

## **LITERATURE REVIEW**

Coastal tourism is considered a significantly growing segment of global tourism (Hall, 2011). As well as being significant in size, coastal tourism is considered to be one of the tourism segments that are most vulnerable to extreme weather events, most of which are driven by climate change. This is because they offer a wide array of activities that can be enjoyed by tourists, which in turn trigger the coastal economic development of many developed and developing countries across the world (Moreno & Becken, 2009; Scott et al., 2012). Coastal areas play a crucial role in the tourism sector as they remain yet renowned for being popular spots for tourism.

Planning for creating a coastal landscape should be renewed and enhanced using adaptation to the risk of climate change and natural disasters to people and the tourism industry. Similarly, the distinctive topography of the landscape along the coast that differs from higher land should also be considered. Landscape planning provides information about the existing qualities of the landscape (i.e., landscape potentials), their value and sensitivity to the current, the objectives, and guidelines for the development of the landscape, upon which proposed measures and development plans can be appraised (E. Ü. Mander, Uuemaa E., 2015). One crucial element that connects human social relations with nature is the environment in which landscape becomes an integral part of both. This study refers to four main scope theories that include coastal landscape characteristics, coastal tourism, resilience in landscape design, and local wisdom.

### **Coastal Landscape Characteristics**

This paper defines a coastal landscape as a strip of soil between the mainland and the sea, thus constantly formed by the actions of waves and tides, winds, and atmospheric agents. Four main characteristics of coast in a coastal landscape are rias coast, high coast featuring cliffs, low coast, and lagoons. Initially, rias coasts are formed when the sea invades old river valleys. Consequently, capes and peninsulas are created. Secondly, rocky and vertical slopes on the sea are featured on high coasts with cliffs. Third, low coasts are shaped because of the weak destructive action of the sea, allowing materials and debris in the river to settle. An outcome of low coasts is sandbanks and beaches. Lastly, an enclosed area is a lagoon leading to several kilometres of expansive, scenic sandy coasts and shallow waters.

### **Coastal Tourism**

Coastal tourism pursues recreational activities as key in coastal areas, for instance, visiting beaches, swimming, surfing, and fishing (Gounden, R., et. Al., 2021). According to Hall (2011), the concept of coastal tourism takes place in the coastal zone embracing the full range of tourism, leisure, and recreationally

oriented activities. Therefore, coastal tourism is defined as tourism capacities in providing amenities such as restaurants, cottages, and shops based on recreational activities that are diverse in activities along with the coastal areas. Recapturing the coastal tourism during the Roman times when the Southern part of the Apennine peninsula was constructed with the first villa. Furthermore, in the mid-18th century, the therapeutic atmosphere of the sea and sun were considered a coastal tourism attraction. Consequently, this leads to the development of the mass coastal tourism industry in this century. The United Nations Environment Program accentuated that coastal tourism is based on a unique resource combination at the interface of land and sea in which it offers amenities such as water, beaches, scenic quality, rich terrestrial and marine biodiversity, diversified cultural and historical heritage, healthy food as well as good infrastructure (UNEP, 2009: 10).

### **Resilience in Landscape Design**

Resilience in landscape design is to be responsive to the site condition in order to recover from the disadvantageous situation. Coping with dangerous events or disturbances along the coastal areas is defined as the adaptation and transformation of the capacity of social, economic, and environmental systems to maintain their function, identity, and structure (Pachauri et al., 2014). A powerful aid to considering landscape visibility is through a map, resulting in analysing development options and anticipating the future for territories facing a variety of challenges (Robert, S., 2018). Reductionist paradigms and mechanistic worldviews are still a foundation of landscape design to prevail in western society, thus attempting to dominate and control both nature and society for human benefit (Fischer, F., 2017).

### **Local Wisdom**

Local wisdom is the identity of a crucial aspect of a society that enables them to survive and settle in a place, including their knowledge of various aspects of their surroundings to support their daily lives. The local community activities present an authentic cultural landscape that is part of the urban design (Rauzi & Dewi, 2017; Rauzi, 2018). Traditional settlement is crucial to be evolved because it shows the social behaviour pattern and local wisdom of an area. The original starting point of traditional settlement development is a traditional market where the space facilitates trading for primary daily needs, such as staple food and household needs (Rauzi, 2021). In particular, architectural heritage is an active agent providing resilience for survivors more than it is merely a passive victim needing to be rescued (Dewi & Rauzi, 2018). Therefore, recovery encompasses a mitigation plan and a preparation strategy to enhance the quality of life in long-term at-risk coastal areas.

In general, local wisdom emerges through internal processes and is passed down over generations over a long period of time, resulting in a significant interaction between humans and their environment. Moreover, it is a known fact that local wisdom inherited from past generations who survived disasters would serve as precious knowledge that potentially increases the aptitude of having a better and safer built environment. Thus, would it be appropriate to incorporate local wisdom into the landscape design concept in coastal tourism areas?

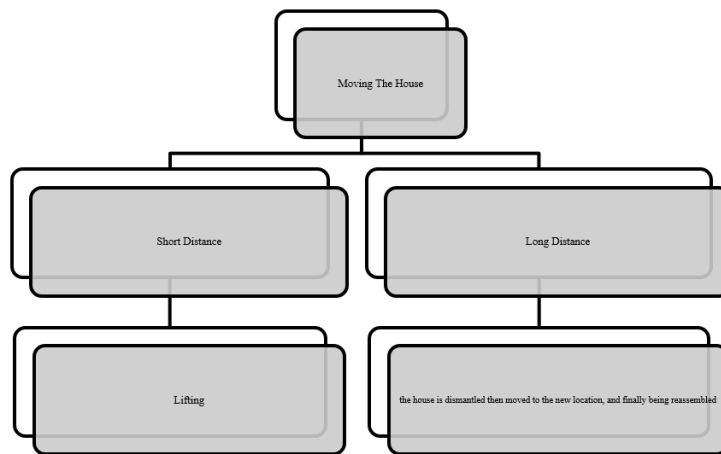


Figure 1: SEQ Figure \\* ARABIC 1 : Diagram of moving house method of Rumoh Aceh.  
Source: Image Copyright, author (2021)

Rumoh Aceh's construction is one of inheritance knowledge known as local wisdom technique in building dwellings. The material of the structure is wood because it was available in their neighbourhood. Moreover, the stilt house construction aimed to keep livestock below and they living upstairs. Therefore, the local wisdom of Acehnese synergizes their daily norm with their traditional house structure. The main principle of Rumoh Aceh is constructed using wood from the bottom to the top of the building. It consists of columns and beams connected by *pasak* (its shape similarly looks like a nail yet is made from wood). Rumoh Aceh has no nails at all; however, it uses straps made in rattan as a replacement. There are two methods for moving Rumoh Aceh based on the distance of moving it (Figure 1). The first method is lifting Rumoh Aceh, which is carried out by the local community working together from the previous site to a new location within the neighbourhood. However, the second method required three steps: dismantling, transporting, and installation. All the processes involved are directed by Utoeh (an expert in building Rumoh Aceh). This method is applied if Rumoh Aceh is moved from its previous location (Meutia, E., et al.

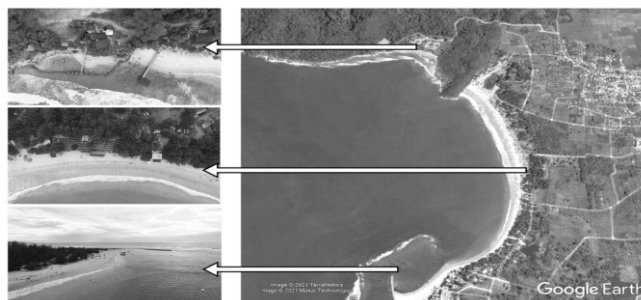
2020). The tradition that follows the moving of the house go along with feast celebration during and after the process on-site (Figure 2).



**Figure 2:** SEQ Figure \\* ARABIC 2 : Illustration of moving house of Rumoh Aceh.  
*Source: Image Copyright, Amri Satria (2021)*

## RESEARCH METHODOLOGY

This research is conducted using a descriptive quantitative method to provide systematic information about spatial data from the study area to collect, analyse, and synthesize data. This study focus on disaster-responsive on Lampuuk beach, Aceh Besar, Indonesia (Figure 3) because it has unique coastal landscape characteristic and tourism facilities. The study begins by collecting data on landscape coastal characteristics and data records of coastal tourism growth using applications Google earth and photographs using a drone. Next, all data are analysed based on the area of coastal tourism that has been grown and developed. The final step is synthesising collected data and the result of analysis using a modelling approach.



**Figure 3:** SEQ Figure \\* ARABIC 3 : Map of Lampuuk beach, Aceh Besar, Indonesia.

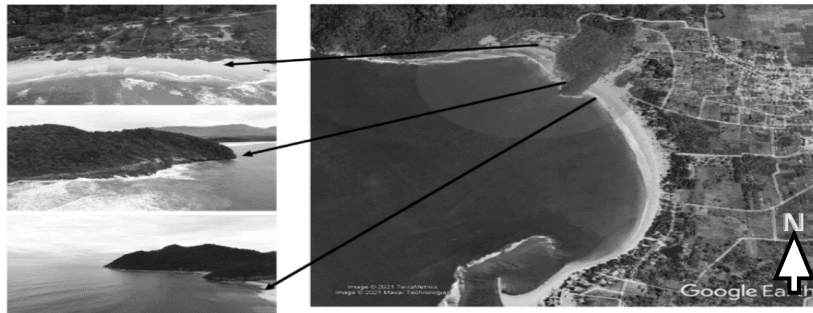
*Source: Image Copyright, Chandra and GoogleMap (2021)*

## RESULT AND DISCUSSION

### Data Collection

The topography of Lampuuk beach is categorised into two coastal landscape characteristics which are the high coast featuring cliffs and low coasts. The high coast with cliffs is located in the northern part, while the low coast is in the southern, as shown in Figure 4. The area is forbidden for swimming because the

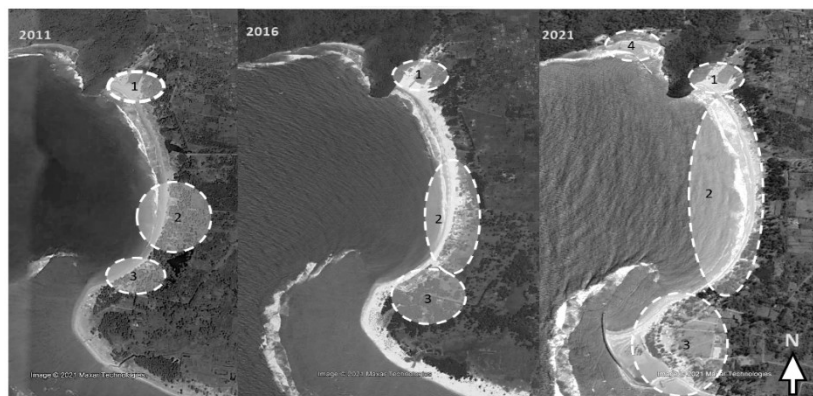
seabed is very deep and has strong deep currents. However, it has tourism facilities such as cottages and restaurants. Visitors are welcome to enjoy food and stay at these cottages for the beautiful scenery across the beach.



**Figure 4: SEQ Figure \\* ARABIC 4 :** Landscape characteristic of Lampuok beach.

*Source: Image Copyright, Chandra and GoogleMap (2021).*

Coastal tourism in Lampuok beach has been growing significantly since 2011 as it is illustrated in Figure 5. Firstly, there are three points of the tourism facilities built after the Tsunami disaster in 2004. Five years later, the area becomes more prominent, particularly at points 2 and 3 in 2016. Currently, the tourism facilities develop new sites at point 4, and both points 2 and 3 have become broader. The tourism facilities have increased along the coastal area and the type of the tourist facilities such as cottages, restaurants, and hut gazebos in the last decade.

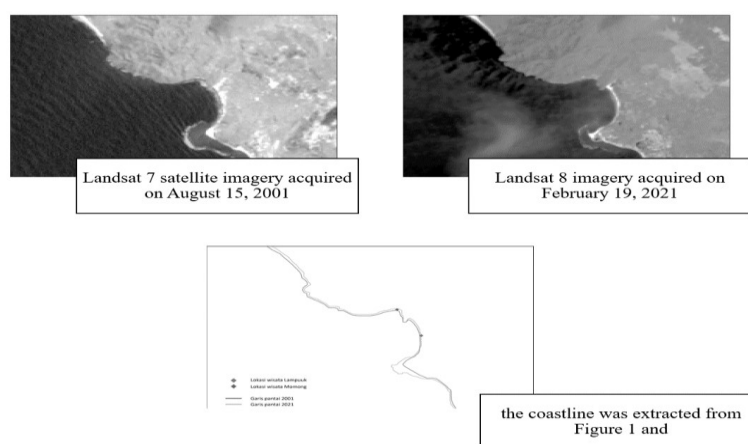


**Figure 5: SEQ Figure \\* ARABIC 5 :** Landscape characteristic of Lampuok beach

*Source: Image Copyright, Google earth (2021)*

### Spatial Analysis

The purpose of spatial analysis is to obtain the shoreline movement from 2001 to 2021 (Figure 6). Shoreline extraction is conducted using Landsat 7 and 8 images on ArcGIS 10.4 software. This method study processes data from Landsat 7 satellite imagery acquired on August 15, 2001, and Landsat 8 on February 19, 2021. In Landsat 7 satellite imagery, data processing is carried out on raster composite bands 4, 5, and 3 to obtain images recognizing land and water bodies (Figure 6. A). Meanwhile, in Landsat 8, composite bands were performed at 5, 6, and 4 (Figure 6. B). After obtaining the images (A and B) seen in Figure 6, the coastline was extracted by digitizing where the visible colour differences formed a contrast to the coastline (Figure 6. C). The data present that the movement of the shoreline is not significant; however, the range of waves on the coastline reaches closer towards the land.



**Figure 6: SEQ Figure \\* ARABIC 6 : Landsat 7 satellite imagery of shoreline of Lampuuk beach, Aceh Besar, Indonesia.**  
*Source: Image Copyright, GIS (2021)*

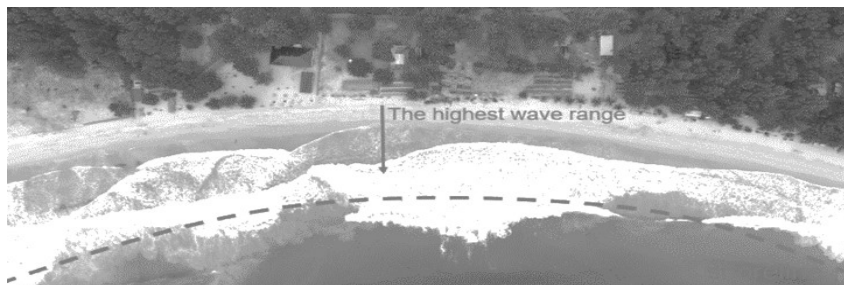
The topography condition of the coastal landscape category is divided into rocky and sandy areas. The rocky area lies around the cliff (Figure 7. at the top and in the below section), while a sandy area is located in the middle of the bay beach (Figure 7. in the middle). The analysis continues by identifying characteristics of some areas that are not allowed to swim (Figure 5, point 1). The site is located on high coasts featuring cliffs where the water depth is unpredictable because the topography of the shoreline is sandy. Even though the area is forbidden to swim, people still prefer to sit and enjoy the view. Moreover, the cliff is the most popular spot for taking pictures. In contrast, the opposite side of the cliffs is safe for swimming. In this area, cottages, and restaurants are available for tourists (Figure 5, point 4).

Tourism facilities located in the sandy area (Figure 7, in the middle) experience a high impact of wave range, although the shoreline lies in the same position for the last two decades. The development of tourism facilities is doubled since 2011 (Figure 5, point 2), thus resulting in it being observed getting closer to the land. This condition endangers tourism facilities because the building should be moved further back to prevent damages essentially for the structure which is constructed by wood. The distance between seawater from waves and gazebo has been getting narrower recently (Figure 8).



**Figure 7: SEQ Figure \\* ARABIC 7 :** Location of a sandy and a rock area in Lampuuk beach, Aceh Besar, Indonesia

*Source: Image Copyright, Chandra and Google earth (2021)*



**Figure 8: SEQ Figure \\* ARABIC 8 :** Illustration of the highest wave range on a sandy area in Lampuuk beach, Aceh Besar, Indonesia.

*Source: Image Copyright, Chandra and Google earth (2021)*




### **Synthesising**

According to collected data and results of spatial analysis, there are four topography conditions that synchronise with the type of tourism facilities. The analysis shows that the topography condition influences the structure and material construction of tourism facilities. The tourism facilities are developed following massive requirements of tourist activities. Consequently, the number of tourism facilities has rapidly increased in the last five years. Therefore, a modelling approach is required to tackle the topography condition as a resilient design of tourism facilities in coastal areas.



Adaptation in the design of tourism facilities refers to the principle of resilient design in which “learns” from its environment. The results present how the existing buildings respond to weaknesses, dangers, hazards, and the impact of the immediate changes on topography conditions. Tourism facilities on shorelines illustrate that wood construction is suitable for abrasion because it is located on the coastline. On the other hand, tourism facilities in the rocky area are constructed using concrete structures in which the foundation of buildings is in the sea. The concrete structure could resist wind load and the wave crash because the column has space in between, so the water can flow easily.

**Table 1:** List of collected data and the result of analysis

Data		Analysis	Result	Images
Topo- graphy	Tourism Facilities			
The Rocky area	The type is Varied (floating hut gazebo; cottages; restaurants)	People fancy to go to the beach because the tourism facilities offer various services, therefore, the number of the facilities increases	The type of facilities are dominated by using a concrete structure	
The Sandy area	The type is similar (hut gazebo and restaurants)	The type of facilities following the topography characteristics	The variety of facilities is dominated by using wood structure	
The shore-line	The position of tourism facilities are located on the coastline	The characteristic of the coastal landscape influences the wave range reaching the land	The hut gazebo is constructed using wood materials that are vulnerable to the effect of waves and seawater such as abrasion	

Source: Author

The local wisdom of the wood structure of Rumoh Aceh is possible to be implemented for constructing tourism facilities in the sandy area which are impacted by the wave range (Figure 8). It is able to apply because the principle of structure is simple and easy to assemble; the material is affordable, and it is possible to move the building if seawater reaches out closer to the land.

The construction of the floating hut gazebo is appropriate for coastal tourism in the rocky area because the foundation is possible to erect on a steady, rocky seafloor. The type of foundation has sufficient stability to survive the wind loads. Therefore, the construction requires specific waterproof material preventing corrosion caused by seawater. Furthermore, the rigid structure should be strong enough to bear wind load as it has space for flawing wind through columns, and space between seawater level and the building's floor. (Figure 9).



**Figure 9: SEQ Figure \\* ARABIC 9 :** Illustration of modeling approach for coastal tourism facilities in Lampuuk beach, Aceh Besar, Indonesia.  
*Source: Image Copyright, Chandra, and Ferian (2021)*

The tourism facilities in the sandy areas could use a similar structure system using rigid frame structures such as the stilt house construction of Rumoh Aceh. The building's foundation is not soaked in seawater. It will be submerged if a high tide occurs. Therefore, wood as the structure material is possible with peculiar treatments such as drying dan covering the wood with waterproof paint.

## CONCLUSION

The landscape characteristics influence the design of facilities in the coastal tourism area. Every topography condition, both rocky and sandy area, require different structure and materials. The local wisdom of Rumoh Aceh could mitigate and prevent the coastal tourism industry from rebuilding new facilities if the wave range reaches their hut gazebo along the coastal area. The stilt house structure model can be implemented for the building structure's system of tourism facilities on Lampuuk beach. The difference is the material of the structure that concrete or reinforced concrete should be used in the rocky area, and wood with certain treatments is possible only in the sandy area. This research suggests the model of tourism facilities based on the local wisdom approach of the Acehnese norm and traditional house knowledge. The study demands further research related to the quality of the space and the element of the coastal landscape area to be resilient.

## ACKNOWLEDGEMENTS

We wish to thank the Architecture and Planning Department of Universitas Syiah Kuala. A special thanks to the Centre for Knowledge & Understanding of Tropical Architecture & Interior (KUTAI) for sponsoring 50% of the PMJ Special Edition 2022 publication fees. May this effort encourage more scholars to publish in Index-Journal in the future.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**  
*Journal of the Malaysian Institute of Planners*  
**VOLUME 20 ISSUE 3 (2022), Page 14 – 24**

## **TYOLOGY OF PADANG TRADITIONAL HOUSE (RANTAU MINANGKABAU) IN PAUH, PADANG**

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### **Abstract**

The Padang is one part of the Minangkabau Region. According to Tambo Minangkabau, the border of Minangkabau consists of two parts, namely Darek and Rantau. Darek is the origin of Minangkabau which consists of three Luhak/Luhak Nan Tigo namely Luhak Nan Tuo/Tanah Datar, Luhak Nan Tengah/Agam, Luhak Nan Mudo/Luhak Limo Puluh Kota. The region is the expansion area of Minangkabau in the form of each of these Luhak colonies. This research was conducted to explore and find out the origin of the formation of traditional Padang (Rantau Minangkabau) houses, characteristics, spatial patterns, physical forms, and house ornaments. This is a descriptive study including qualitative data. The investigation's goal is to describe the state of the research object and its problems by observing and conducting interviews with homeowners as well as parties who fully understand the existence of this traditional house. As a research case study, the traditional Padang house in Pauh Subdistrict. The results of this study are the identification and typology of traditional houses of the Minangkabau Region.

**Keywords:** typology, Rantau Minangkabau, Padang traditional house, Pauh

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## INTRODUCTION

A traditional house is inhabited by a community whose building architecture and spatial arrangement are inherited from previous generations. The architecture of traditional houses arises and develops based on a range of conditions, such as climate, culture, social situation, and material (Setijanti et al. 2012). In the unity of residence (home), the community develops a pattern of adaptation that refers to the applied social and value system inherited from the previous generation. That is, the pattern or formation of a traditional house is determined by the geographical background of the environment in which the people live and the culture of the community concerned.

Likewise, Minangkabau ethnic group inhabiting the mainland of West Sumatera has a traditional house commonly called *Rumah Gadang* (a large house). As one of the identities and pride of the Minangkabau people since a long time ago, *Rumah Gadang* is classified as a stilt house because the floor is high from the ground, so *janjang* (stairs) is used to provide access to it. However, there is a physical difference between *Rumah Gadang* in the Minangkabau *darek* (land) area, which is the origin and cultural center of Minangkabau, and *Rumah Gadang* in the *rantau* (faraway land). *Rumah Gadang* in the *darek* area is characterized by its roof which has a *gonjong* (spired roof), so it is commonly called *Rumah Bagonjong*. Meanwhile, *Rumah Gadang* in the *rantau*, particularly in the west coastal area of West Sumatera, is usually smaller in size and does not have *gonjong*. Nevertheless, in everyday life, the house is still called *Rumah Gadang* by the local community. According to *Kamus Besar Bahasa Indonesia* (KBBI), *gonjong* is the pointed end of the roof, resembling the shape of a buffalo horn.

One of the areas on the west coast of West Sumatera categorized as *rantau* is Padang, which is the old and largest city on the west coast of Sumatera, as well as the capital of West Sumatera Province. Culturally, Padang has its own culture, although its people still have to associate themselves with the *darek* culture (Amir, Zuriati, and Anwar 2006: 129). The physical identity is characterized by a form of *Rumah Gadang* which is different from the one in *darek* area. The people who have inhabited the city for generations commonly call their traditional houses *Kajang Padati* because of the shape of the roof that resembles *pedati* roof. *Pedati* (*padati*), as is known, is a traditional means of transportation in Minangkabau formerly used to transport goods or travel long distances, pulled by one or two buffaloes and controlled by a man called a *padati* man. *Rumah Gadang Kajang Padati* is characterized by its roof that curves (shortens) in the middle (ridge) and rises (high) at both ends of the roof. Rullis (2018) suggests that the roof ridge of *Rumah Gadang Kajang Padati*, which is curved in the middle and high at both ends, seems to show "*gonjong* that does not arrive" (trimmed). The house can still be found in several sub-districts in Padang such as Pauh and Kuranji.

Rumah Gadang Kajang Padati is one of the cultural heritages of Indonesia, and is currently at the brink of extinction since it is less famous compared to Rumah Gadang Bagonjong in the darek area. Today, the people of Padang have rarely built a Rumah Gadang Kajang Padati for residence and are more inclined to more modern-style houses because they are considered to be more practical. Rumah Gadang Kajang Padati in existence today are mostly uninhabited; some have undergone renovations, and others are left out, waiting for tearing down. Consequently, fewer and fewer Rumah Gadang Kajang Padati are discovered, and efforts to preserve them are being made. It is feared that the Rumah Gadang Kajang Padati in Padang will one day be lost.

Hence, this study was conducted to study, identify and describe the typology of Padang traditional houses, which are traditional houses located in the *rantau*. It also aims to determine whether there is an influence of external culture on the shape of houses in *rantau*.

## LITERATURE REVIEW

### Traditional House

Since the end of the 19th century, anthropologists have believed that a house is a manifestation of family and social structure as well as cultural evolution of a traditional society (Morgan, 1877). The longhouses found in many regions in Indonesia illustrate the togetherness of tribal families and the egalitarian principle among them in daily life. In a society that was developed without a written culture, architecture, especially traditional houses and settlement orders, became a 'book' that reflected the culture of indigenous peoples including social order and relations in society, gender, and rituals (Rapoport, 1969, Nordholt, 1971, Forth, 1981).

The construction of traditional houses, starting from the collection of materials, design, and implementation, is carried out by indigenous people guided by applicable norms. In other words, tradition has a legal force everyone respects by mutual consent. A traditional house can be interpreted as a house built in the same way for several generations (Rapoport, 1969). Another criterion in assessing the authenticity of a traditional house is the habits that become an unwritten rule when the house is established or begins to be used (Sumintarja, 1978). Some examples of such habits or rituals include the ceremony of erecting the pole and the determination of the right time to build a house. Generally, traditional houses do not only function as shelters or residences. In *House Form and Culture*, Amos Rapoport argues that, for traditional societies, houses are part of the physical embodiment of the human/occupant relationship with the universe. In other words, they are constructed for a purpose that is more than just a sanctuary.

## **Typology**

Typology is a system for categorizing objects based on their similarity, purpose, trait, trend, size, and hierarchy (Moneo,1978). It is the study of types or the examination of the formal resemblance of a group of items. Hence, typology studies object groupings (as models) based on structural similarities and encompasses classification as well as taxonomy work. Taxonomy is the grouping of hierarchical categories in order to build the rules of the information on the thing. The categorization is also done by examining disparities so that uniformity and variety can be directly observed in typology research (Mentayani, 2007).

## **METHODOLOGY**

This study employed descriptive-qualitative approach. It aimed to explore traditional architecture and the values or norms contained in the formation of traditional architecture by looking at the conditions of reality and phenomena in the field. This means that traditional architecture as a continuous process is viewed from several perspectives, including as a portrait of conditions unearthed from detailed reports from respondents. A traditional Padang house in Pauh District was chosen as the sample for the present study. The data collection methods carried out were interviews and observations. An in-depth interview with or without the use of interview guidelines was conducted, while observations were carried out to gain overview of the conditions of the research site, behaviors, or events. The variables of this research are aspects of form, function, spacem and structure, which were analyzed from the point of view that applies to the traditional architecture of Padang. The data were then analyzed to produce a typology of Padang traditional houses.

## **RESULTS**

Pauh district covers an area of 146.29 km<sup>2</sup> and is bordered on the north by Koto Tangah district, on the south by Lubuk Kilangan and Lubuk Begalung, on the east by Solok, and on the west by East Padang and Kuranji. Field observations showed that 21 traditional Padang houses (Rumah Gadang Kajang Padati) are still occupied and maintained, and their locations are portrayed on Figure 1.



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Typology Of Padang Traditional House (Rantau Minangkabau) In Pauh, Padang



**Figure 1:** Traditional House Distribution Map  
Source: Desy Aryanti, 2021

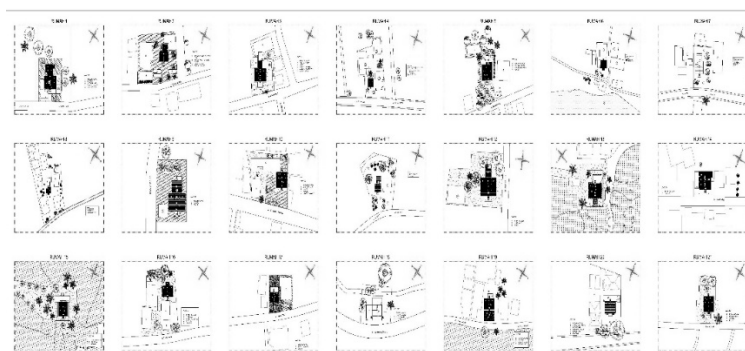
## Elements of Outdoor Space

### Courtyard

Rumah Gadang Kajang Padati has a fairly spacious yard. This yard is overgrown by long-lived plants such as jackfruit, guava, rambutan, mango, banana, and coconut. In addition, it is common to see plants for cooking purposes such as turmeric, ginger, galangal, and lemongrass around the houses, especially on the back and side of the house. The front yard is usually planted with a variety of flowers. Sometimes there are also pool/*tabek* house, stalls and cattle pens around some houses.

### Orientation at Home

The houses front the main road and are oriented from the southeast to the northwest.



**Figure 2:** Orientation at home  
Source: Desy Aryanti, 2021

## Elements of Space in the House

### Plan Pattern

Rumah Gadang Kajang Padati has the same layout as Rumah Gadang in Darek; the only difference is the quantity and size of the rooms. From front to back, Gadang Kajang Padati is made up of three *lanjar*. *Lanjar* was originally referred to as portico or ledge by the Minangkabau people, and it is the place for *kato nan bagurau* (interview with Dt. Rajo Indo Langik, Penghulu Suku Caniago Limau Manih, 2021). This area is used to greet guests and provide a place for guests to rest. Guests are welcome in this room, except relatives, who are allowed in. In other words, this room is a public environment. In addition to the mats presented to receive guests, there is also a seat in the form of *palanta* in this room. There are no walls at the front or side of this room; there is only a 60 cm high fence or lattice made of wood, some of which are carved. Moreover, *bandua* serves as a handrail on the ledge. The back part of the ledge is a wall that borders with space; however, it is actually the main wall of Rumah Gadang Kajang Padati. Some decoration is usually found on this wall. Between *langkan* and the backroom is contacted with a door with a two-door opening. In some houses, there are carvings on the doors. To go up to *langkan*, there is a wood ladder with a carving in the middle. The stairs are made of wood with a little carving. The rungs are odd numbers such as 5, 7, 9. The second *lanjar* is called *Ruang Tapi*, the space for *kato nan bare tong* (interview with Dt. Rajo Indo Langik, Penghulu Suku Caniago Limau Manih, 2021). This room is a free space usually used as a gathering place for large families or people to consult and conduct customary activities such as marriage and coronation. It also serves as a place to shower the corpse of family members before burial. The floor of this room is characterized with small holes that aim to drain the water used for that purpose and to remove dust when sweeping the house.

The third *lanjar* is known as *Ruang Tengah*, described as a space for *kato nan rahasio* (interview with Dt. Rajo Indo Langik, Penghulu Suku Caniago Limau Manih, 2021). This room is used to keep personal items and equipment. For example, harvested rice is stored in a separate area called *kapuk*. There is also a chamber called *biliak* in *Ruang Tengah* that is used as a bed for married women to welcome their *sumando* (husband). If a sister wishes to marry, the *biliak*'s occupant must rent a house or build a new house in the vicinity of Rumah Gadang. Only if they are unable to pay bills will they be allowed to stay in Rumah Gadang, depending on the number of *biliak* available. The number of *biliak* in Rumah Gadang Darek is not as large as that in Rumah Gadang Kajang Padati. The *biliak* does not have a bed for the boys. The child and his companions usually slept in *surau* (mosque). The number of *biliak* found during field observation varies, ranging from one to three. It's the *biliak* squaring off against each other.

Beyond *lanjar*, there is a space called *dapua* (kitchen). The kitchen is in close proximity to the main residence. The kitchen floor is constructed up of boards that have been stretched out.



**Figure 3: Floor Plan**  
 Source: Desy Aryanti, 2021

### Number of Poles

The dimensions of Gadang Kajang Padati House range around 10.5 m × 7 m depending on the homeowner's abilities when building the house. Some come from ordinary people, while others come from the ruler's or grandfather's family. Observations in the field revealed that the number of *tonggak* (pillars) of dwellings varied, with 12, 16, and 20 poles being the most common. However,

the majority of houses has 16 poles. *Tonggak tuo*, *tonggak tapi*, *tonggak tengah*, and *tonggak biliak* are some of the names for poles. For *tonggak tuo*, a straight timber shape is taken from the forest and will be the first milestone when the house is completed.

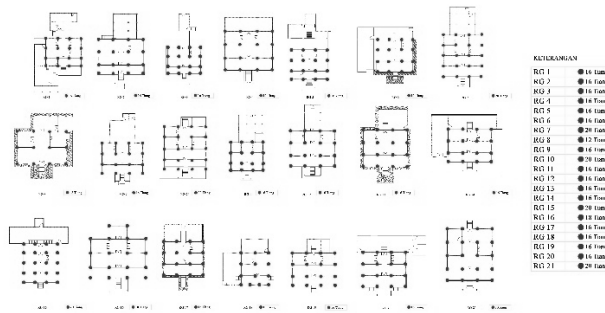


Figure 4. Number of Poles  
Source: Desy Aryanti, 2021

## Physical Elements of the House

### Elements of the Roof

Based on observations in the field, all houses retain their original shape (flat roof), which is the metaphoric manifestation of the *pedati* cart being hauled by a buffalo/cow. A zinc roof is the most commonly used roofing material nowadays, while all dwellings in the past had *ijuk/rumbio* roof. In some homes (for example, homes 1 and 6), the roofs have a new shape as a result of the installation of a new function.



Figure 5. Elements of the Roof  
Source: Desy Aryanti, 2021

### Elements of the Wall

The walls of the house are made of wood plank material arranged vertically and horizontally. The walls have a slope of about 4°-5° expanding to the top. The

front wall material of the house is wood with a plank arrangement, while the back wall is made of woven bamboo. Some carvings are found on the inner wall in several houses. There are also openings for doors and windows on the walls. The shape of the doors and windows retains its original form and thus the characteristics of the house. On the doors and windows, there are also carvings.



**Figure 6:** Elements of the Wall

Source: Desy Aryanti, 2021

### Elements of the Floor

Boards are stacked transversely on the floor to form the floor material. There are minor holes in the house's floor. When the inhabitants are sweeping, these little holes are used to remove dust waste. The holes also serve to drain the water used to shower the corpse of family members before burial.



**Figure 7:** Elements of the Floor

Source: Desy Aryanti, 2021

### Elements of the Ladder

Rumah Gadang Kajang Padati is a house in the shape of a stage, similar to a house in the *darek* area. Consequently, it requires a ladder to climb the house. The house's main stairwell runs parallel to the entryway, which is located in the center. The number of rungs is odd, with 5,7,9 being the greatest odd numbers. A small carving may be found on the stair grip and the stair cover. The average height of the stairs from ground level is roughly 1.5 meters.



Figure 8: Elements of the Ladder  
Source: Desy Aryanti, 2021

### Elements of the Foundation

All houses use *umpak* foundation stone. The pattern of the shape of the column varies; some are in the form of circles, others are rectangular and octagonal.



Figure 9: Elements of the Foundation  
Source: Desy Aryanti, 2021

## CONCLUSION

Padang traditional house, also known as Rumah Gadang Kajang Padati, is a Minangkabau traditional house. The house in *rantau* does not have the same shape as that in the *darek* area. The most noticeable distinction between the two can be seen from the roof's form. The roof of the house in *darek* area resembles buffalo horns (the roof of *gonjong*), while the roof of Padang's house is shaped like a *pedati* cart. Furthermore, the observable distinction is the pattern of space arrangement. There are four *lanjar* in the house in *darek* as opposed to three *lanjar* in the house in *rantau*. As a result, the size of a *rantau* house is smaller than the one in *darek*. From a physical standpoint, however, both houses share various characteristics, particularly the use of materials (mainly wood and bamboo components as well as *rumbio/ijuk* roofs). Following the discovery of zinc, the house's roof was replaced with a zinc roof. Further research in other regions is recommended, but the focus shall remain on the Minangkabau indigenous migration journey from Luhak Nan Tuo. Future studies are expected to determine the difference in shape between the original house in *darek* and the house in *rantau* (architecture modifications), and the difference in the pattern of the original building.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**  
*Journal of the Malaysian Institute of Planners*  
**VOLUME 20 ISSUE 3 (2022), Page 25 – 36**

## **HIGHLIGHTING THE POTENTIAL OF KAMPUNG KUCHAI, IPOH, PERAK THROUGH A HERITAGE TRAIL**

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### **Abstract**

Kampung Kuchai was founded in 1900 by Toh Puan Saripah Rodziah and her husband; Seri Adika Raja Wan Mohammad Salleh. It is claimed that the Kampung Kuchai settlement was the starting point of the City of Ipoh. During its glorious time, Kampung Kuchai comprises a house of worship (mosque), Malay mansions, rows of shophouses, schools, and a government clinic. Hence, to restore the identity of Kampung Kuchai, this project applied a cultural heritage-based trails approach to identifying elements left in this kampong by using site observation and questionnaire survey. The site observation shows that some buildings and spaces are still worth conserving. The survey conducted among the local visitors of the Old Town of Ipoh helps to identify the visitors' favourable needs in establishing a successful heritage trail of Kampung Kuchai. Through appropriate actions taken from all parties involved and considering findings gained by the surveys, the heritage assets of Kampung Kuchai will consistently be recognized and appreciated. Introducing a new heritage trail of Kampung Kuchai could help promote the culture and uniqueness of this place.

**Keywords:** Heritage trail, Cultural heritage route, Kampung Kuchai, Malay heritage-enclave

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## **INTRODUCTION**

Kampung Kuchai, Ipoh, Perak is an early Malay settlement in Ipoh, and the second settlement after Pengkalan Pegoh. This kampong is located next to Sungai Kinta (Sungai Genta) and adjacent to Kampung Paloh. Kampung Kuchai existed around 1900 with the construction of the Masjid Panglima Kinta in 1898 and increased population density in Kampung Paloh. During the colonial era, Kampung Kuchai and Kampung Paloh were known as the ‘Malay Settlement’ and later called ‘The Wealthy Malay Enclave of Ipoh.’

Located strategically in Ipoh, these 10 hectares of land is one of the last few undeveloped sections of Ipoh that has caught the attention of property developers. In 2021, it was estimated the land value of Kampung Kuchai to reach RM1 billion based on its location and historical significance of the area. From the *Redevelopment Plan of Kampung Kuchai* under the *Special Area Plan of Ipoh 2020*, Kampung Kuchai will be redeveloped into a mixed-use development of commercial, tourism, and residential area (Jabatan Perancangan Bandar dan Desa, 2012). If what has been planned in the *Special Area Plan of Ipoh 2020* continues, it is afraid that Kampung Kuchai will slowly ‘disappear’ from the map of Ipoh. Hence, it is crucial to conserve and preserve the ‘originality’ of Kampung Kuchai to ensure the glorious history of Kampung Kuchai is restored as it is part of the historical value of Ipoh.

Thus, this project aims to promote the historical, cultural, and uniqueness of Kampung Kuchai in Ipoh, Perak by implementing cultural heritage-based trails in the area. Through the right approach, the identity of each building and historical site in Kampung Kuchai can become a new point of attraction for visitors to visit this heritage enclave.

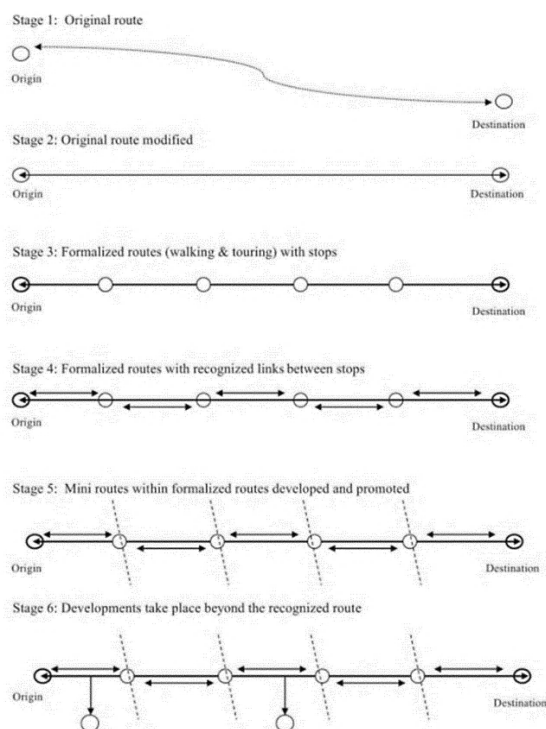
## **LITERATURE REVIEW**

The heritage trail is a new phenomenon in promoting the uniqueness of space and indirectly contributing to the socio-economic of the area. As highlighted by Timothy and Boyd (2015), there are four critical purposes of heritage trails: (i) promoting preservation and conservation of historical values by educating the general public about place history; (ii) enhancing a city’s image or a sense of place; (iii) fostering economic development through their promotion as tourism experiences, and (iv) achieving political aims. Heritage trails help preserve historical value, conserve cultural resources, and allow visitors to feel the past and present. Hence, a successful design cultural resource-based route could offer memorable experiences, cultural education, public enjoyment, and recreation for residents and tourists (Timothy & Boyd, 2015).

A uniquely designed heritage trail should help visitors experience a place through well-told stories. Types and categories of heritage trails vary depending on “length, location, and scope, from short, city-center walks, to extended hikes, scenic drives, and international trade routes” (Cantillon, 2020).

Therefore, every heritage trail will be different, depending on the story, place, and it could create empathy between people from different times, cultures, and places. Hence, a heritage trail helps to enhance the value of place, creates a learning atmosphere, and builds identity and a sense of place.

Based on Timothy & Boyd (2015), there are six stages of the evolution of routes from original tracks to developed routes (Figure 1). An original cultural trail could evolve “spatially, temporally, and purposefully from its original functions into more generalized touristic roles” (Timothy & Boyd, 2015, p. 22). The evolution portrays the need to include considerable public enjoyment, recreation, cultural activities, and other suitable image enhancement (New South Wales Heritage Office, 1995; Timothy & Boyd, 2015). The point of attractions along the trails and how the elements are portrayed are crucial as part of successful indicators for a heritage trail.



**Figure 1:** Six stages of evolution of cultural heritage routes.  
Source: Timothy & Boyd, 2015.

However, in creating an attraction, an object, building, or place must first be “valued, desired, preserved and [include] story that is interpreted by human beings” (Timothy & Boyd, 2015). Including these heritage assets will improve an understanding of the cultural context (Yunus, Endut, & Said, 2021)

and strengthen the element of authenticity. In addition, incorporating the local communities and tourism strategy should also be highlighted as part of establishing a trail. As highlighted by Aburamadan et al. (2021), “lack of awareness in the value of cultural heritage from local communities exacerbates the diminishing efforts in preserving cultural assets” (p. 3). By comprising the physical setting, activities, and meanings of a place (Ghani, Rahman, Nayan, & Bahaluddin, 2018), and the involvement of the local community, the trail will embrace different values for the visitors. Most importantly, the trail is enjoyable for the greatest possible number of users (New South Wales Heritage Office, 1995).

## **METHODOLOGY**

This study uses qualitative; site observation, and quantitative; questionnaire survey approaches. Integrating mixed-method in research helps acknowledge the theory or aspects of the research (Young, 2016). In addition, it also strengthens the validity and reliability of the data.

Site inventory and observation were conducted in Kampung Kuchai to gain direct information on the on-site situation, especially the heritage building conditions and its surroundings. In heritage conservation aspects, primary data gained from site observations help a researcher to “explore of and further learning about the site, helping them better visualize the richness of heritage, engaging, and communicating with history” (Liu, 2020). In addition, a researcher is more connected to the case studies through direct observation.

Besides site observation, a set of questionnaires was constructed and distributed among local visitors in the Old Town of Ipoh, Perak in February 2022. As Malaysia was still in the pandemic phase, the number of respondents approached for the study was limited to one hundred. Even with the smaller sample size, the selection of respondents was based on their familiarity with ‘heritage trails’ terminology and having visited a heritage trail once either in Ipoh, Perak, or other states in Malaysia. These inclusion criteria and selection rationale were adopted to ensure significant results from the survey.

The questions in the questionnaire are grouped into two sections; Section A, with questions related to demographics, and Section B, with questions associated with visitors’ preferences that influence them in visiting the proposed heritage trails. Applying Scale of Preferences questions give respondents various options regarding the subject. Closed-ended questions are applied in the questionnaire to define visitors’ perceptions of the heritage trail. This method is conducted to ensure that the findings from the questionnaire strengthen the outcomes gained from site observation on preserving the elements that still existed in Kampung Kuchai.

## **FINDINGS**

### **Study Site: Kampung Kuchai, Ipoh, Perak**

For Kampung Kuchai, Ipoh, Perak, this enclave still possesses elements that could be highlighted as the main tourist attractions to the place. According to the historical data, Kampung Kuchai was founded in 1900 by Toh Puan Saripah Rodziah and her husband; Seri Adika Raja Wan Mohammad Salleh. It is claimed that the Kampung Kuchai settlement was the starting point of the City of Ipoh. During its glorious era, Kampung Kuchai comprises a house of worship (mosque), Malay mansions, rows of shophouses, schools, and a government clinic. Under the Heritage Trail of Ipoh (Heritage Trail Map 2), seven buildings are highlighted in the trails located in the boundary of Kampung Kuchai (Figure 2). However, some potential buildings have been demolished, while some are deteriorating.



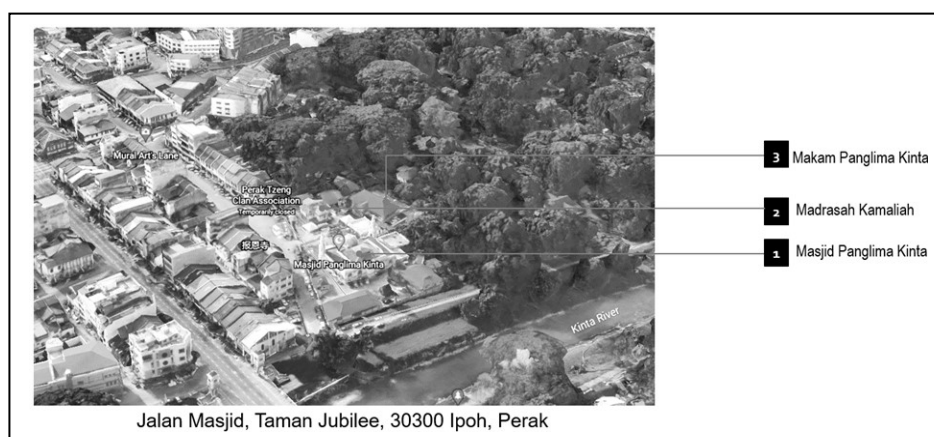
**Figure 2:** Map of Kampung Kuchai with heritage buildings included in the Heritage Trail of Ipoh (Heritage Trail Map 2).

Source: Author, 2021. Image retrieved from (Google Earth, 2021).

### **The Compound of Masjid Panglima Kinta**

In Islam, mosques are an integral part of a community. A mosque is not only built for worship, but it is “part of a complex which usually included a madrasa (religious school), shops to support the upkeep of the mosque, and other buildings with purposes” (Khan Academy, 2022). Masjid Panglima Kinta is also no exception as its construction was the nuclei of the early settlement of Kampung Kuchai. Masjid Panglima Kinta has become an educational center for the residents of Ipoh. By the time it was completed in 1898, no communities had lived in that area since Kampung Kuchai had yet to exist. Hence, the users were mainly local communities in the surrounding neighborhood, such as Kampung

Paloh, Ipoh, Perak. The compound of Masjid Panglima Kinta housed a *madrasa* known as Madrasah Kamaliah and an old burial ground (Figure 3).



**Figure 3:** Masjid Panglima Kinta and historical components located in its compound.  
Source: Author, 2021. Image retrieved from (Google Earth, 2021).

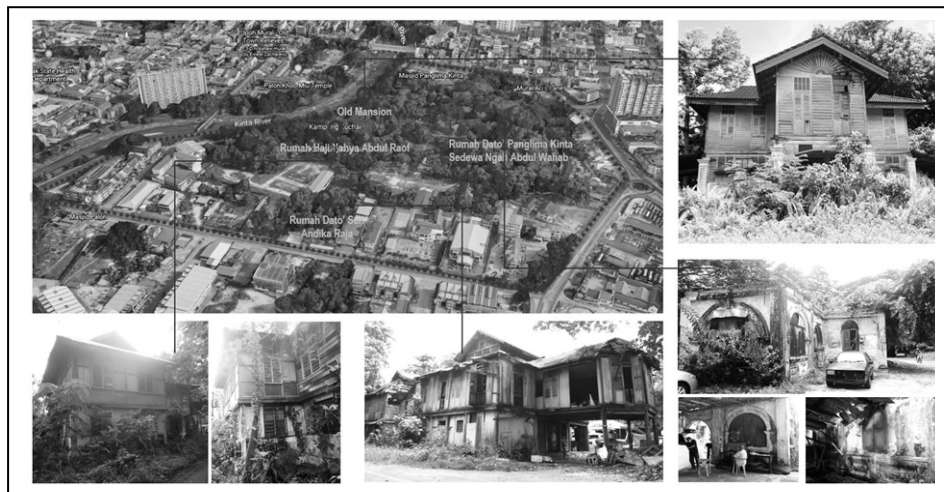
The compound of Masjid Panglima Kinta housed a madrasa known as Madrasah Kamaliah built in 1905 by the 12th Panglima Genta or Kinta; Che Wan bin Muhammad Yusuff. In the 1950s, Fakih Ghazali revived it as the first Arabic and Islamic school in Ipoh, and the mosque community ran it until the 1970s.

Besides the *madrasa*, the burial ground is located next to the mosque. The burial ground is believed to be reserved only for the descendants or heirs of Dato Panglima Kinta Mohamed Yusuff. According to Talib (2021), more than fifteen *makam* are located in the compound, including the *makam* of Dato Panglima Kinta (Talib, 2021a). In 2012, Masjid Panglima Kinta was gazetted as a Heritage Building under the *National Heritage Act 2005* (Act 645). However, the *madrasa*, spaces, and *makam* located in the compound are excluded from the list.

### Old Mansions

Once known as ‘Malay Settlement’ and later called ‘The Wealthy Malay Enclave of Ipoh,’ it is not surprising if this area still has some mansions that prove the existence of a Malay village here. The mansions that can still be identified are Rumah Dato’ Panglima Kinta Sedewa Ngah Abdul Wahab (1903), Rumah Seri Adika Raja (1901) and Rumah Haji Yahya Abdul Raof (1903) (Figure 4). Besides these three mansions, another mansion is believed to have been built in the 1900s. However, the building owner could not be identified (Talib, 2021). From the listed mansions, Rumah Dato’ Panglima Kinta Sedewa Ngah Abdul Wahab collapsed except for the front part, which is made of brick. As for Rumah Seri

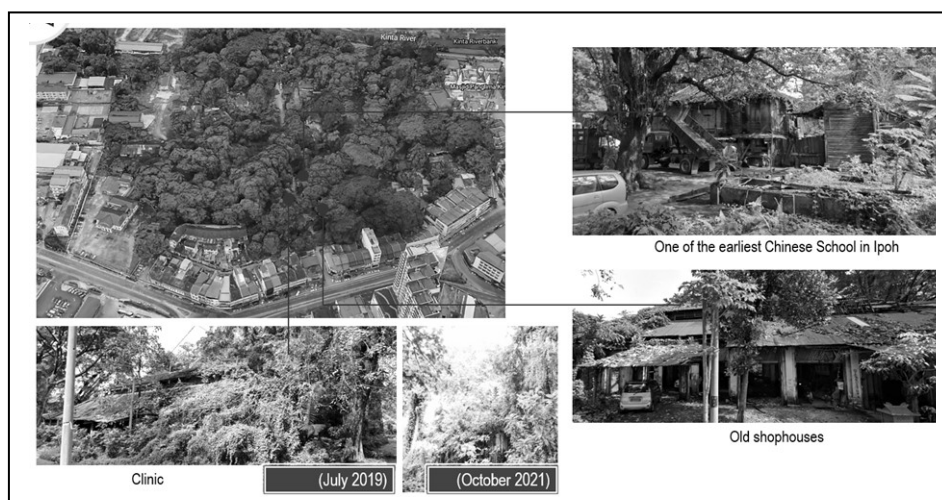
Adika Raja, the mansion is badly deteriorating. Both mansions have been converted into workshops.



**Figure 4:** The location of four mansions that still existed in Kampung Kuchai's enclave.  
Source: Author, 2021.

### **Other Significant Heritage Buildings**

As mentioned earlier in the article, the Kampung Kuchai enclave is also comprised of schools and a government clinic (Figure 5). It has the first Malay Girls School built in Ipoh, now known as the Aminuddin Baki Gallery, which is located next to the Masjid Panglima Kinta compound. In addition, Kampung Kuchai also housed one of the earliest Chinese Schools in Ipoh. Sadly, the conditions of all these buildings are also severely deteriorating. For example, the government clinic is hardly recognizable as it is almost collapsing and hidden by the overgrown bushes and trees.



**Figure 5:** The location of other significant heritage buildings located in Kampung Kuchai.

Source: Author, 2021.

### Rows of Shophouses

Besides the Masjid Panglima Kinta's compound, the old mansions, and other heritage buildings, the perimeter of Kampung Kuchai is completed with rows of shophouses. Most of the shophouses are located in Jalan Bendahara and Jalan C. M. Yusuff. Although the shophouses were built circa the 1910s to 1930s, each building still carries its history, identity, and characteristics. Hence, these buildings have the potential to be included as part of the heritage trail of Kampung Kuchai.

### Data Set: Questionnaire

A total of one hundred sets of questionnaires were distributed using Google Forms for selected respondents but only 68 were filled correctly and could be included in the studies. Hence, the overall response rate for this study was 68 percent. Data gained from the survey was analyzed by using the quantitative descriptive method.

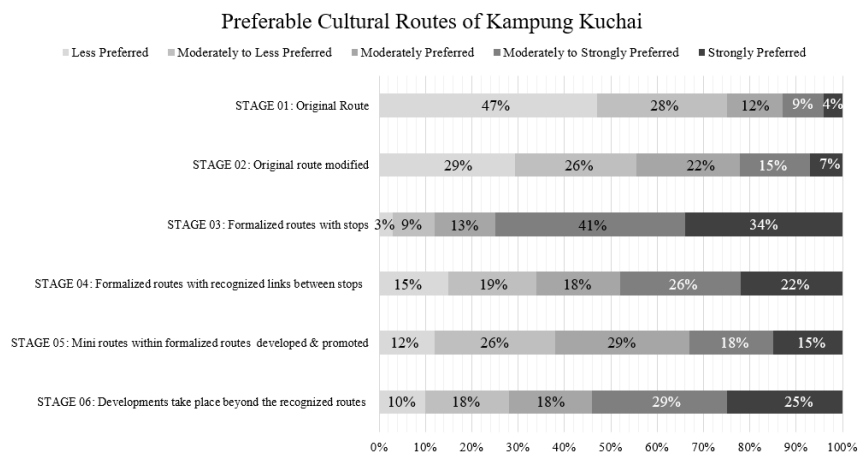
### Demographic Profile of Respondents

From the data obtained, with a total of 68 respondents (N=68), 40 respondents are male (58.82%), and 28 are female (41.18%). Age-related questions have been categorized into three groups; 21-30 years, 31-40 years, and 41-50 years. The results show that 41 respondents are aged between 21-30 years, which comprise 60.29% of the data, 22 respondents are between 31- 40 years (32.35%), and five are under the category of 41-50 years (7.36%). For a question related to location

or geographical data, 27 respondents live in Perak (39.71%), and 41 are visitors from outside of Perak (60.29%). These findings depict that the Old Town of Ipoh, Perak has unique values that could attract visitors, especially those living outside of Perak.

### Visitors' Preferences for Heritage Trails

Under Section B, the survey applied a Scale of Preferences (Scale 1 Less Preferred – Scale 5 Strongly Preferred) to indicate the respondent's level of preference for the heritage trails. The Scale of Preferences helps to quantitatively measure visitor-oriented development(s), preferences, and personal experiences (Chen & Chen, 2009) in the urban heritage area (Nayan, Jones, Ahmad, & Khamis, 2021). Included in the questionnaire was the diagram of six stages of development of the cultural heritage routes proposed by Timothy and Boyd in 2015 (Figure 1). These six stages of cultural routes are adopted in the questionnaire to investigate the preferable heritage trail of Kampung Kuchai among the respondents. Amongst the six cultural heritage routes listed in the questions, almost all respondents acknowledged Stage 03: Formalized routes with stops as being the most preferable trail for Kampung Kuchai, with 34% being strongly preferred (n = 23) and 41% moderately to strongly preferred. In contrast, Stage 01: Original route was less valued by the respondents, with only 4% recognizing it as most suitable as the cultural heritage route for the Kampung Kuchai (Figure 6). The findings agree with Timothy & Boyd that Stage 03 provides "a greater diversity of trail users [which] increased the number of visitors and bypassed in favor of more interesting locales" (Timothy & Boyd, 2015, p. 22).



**Figure 6:** Preferable cultural routes of Kampung Kuchai.



When asked about respondents' most preferred and most enjoyable trail to explore, from four sites listed; (i) archeological sites, (ii) industrial heritage sites, (iii) historic urban landscapes, and (iv) rural landscapes, 46% (n=31) voted for a heritage trail located in the historic urban landscape. Archeological sites are the least voted for, with 7% (n=7) (Figure 7). The findings reveal visitors' interest in exploring urban heritage sites and indirectly show the importance of developing an appropriate heritage trail for Kampung Kuchai. The questionnaire also includes visitors' preferences on elements of the trail. From the four elements listed; (i) cultural performances, (ii) ceremonies and festivals, (iii) traditional arts, and (iv) instagrammable spots, respondents have voted for traditional arts to be included in the trail (37%, n=25) (Figure 7).

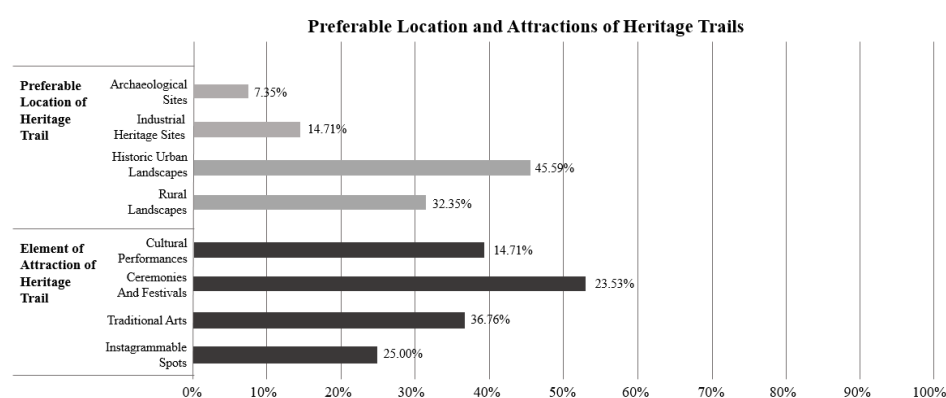


Figure 7: Preferable location and attractions for proposed heritage trail.

## CONCLUSION & RECOMMENDATIONS

Based on the list of significant heritage buildings located in Kampung Kuchai, it is undeniable that this area still possesses the identity of the community that once lived in this kampong. In addition, all the criteria that existed in Kampung Kuchai fulfilled the elements highlighted in the *National Heritage Act 2005 (Item 67: Declaration of National Heritage)*, which are:

*a) the historical importance:* Kampung Kuchai, which was founded in 1900, represents the early settlement and the establishment of the Old Town of Ipoh, Perak;

*(b) the good design or aesthetic characteristics:* This element has been portrayed in the design of the mansions, traditional houses, mosques, school buildings, government clinics, and shophouses which still carry the original features of the early 1900s architecture;

(c) *social or cultural associations*: Masjid Panglima Kinta and its compound for example, still being the important nuclei for social and cultural activities of Kampung Kuchai;

(d) *the potential to educate, illustrate or provide further scientific investigation in relation to Malaysian cultural heritage*; and

(e) *the importance in exhibiting a richness, diversity or unusual integration of features* (*National Heritage Act 2005 (Act 645)*, 2006).

Findings gained from this research should be implemented as part of the main criteria for establishing a successful heritage trail of Kampung Kuchai. By taking into consideration all of these elements, Kampung Kuchai could potentially be recognized as the first historical Malay Heritage Enclave in Ipoh. Again, the co-creation of trails between stakeholders, local residents, and visitors is essential in enhancing the cultural experience for all users (Nayan et al., 2021). With the proper action taken by the local authority, the community's involvement, and a better understanding of visitors' choices pattern (Amir, Osman, Bachok, & Ibrahim, 2014), this will enhance the image and sense of place in Kampung Kuchai and boost the economy among the local residents.

## **ACKNOWLEDGEMENTS**

A special thanks to the Centre for Knowledge & Understanding of Tropical Architecture & Interior (KUTAI) for sponsoring 50% of the PMJ Special Edition 2022 publication fees. May this effort encourage more scholars to publish in Index-Journal in the future.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**  
*Journal of the Malaysian Institute of Planners*  
**VOLUME 20 ISSUE 3 (2022), Page 37 – 49**

## **FINE-GRAINED PARALLELISM FOR POST-PANDEMIC CITIES: 12 DESIGN STRATEGIES FOR RESILIENT URBAN PLANNING**

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### **Abstract**

The COVID-19 pandemic has changed the way we live in the city. Social distancing will remain as a provisional code of conduct for unforeseeable outbreaks of pandemic diseases in the future. Social distancing is predicated upon reduced density of people in any given space and time. Since urban sprawl has been proved to be unsustainable, spreading out the urban density to suburbs cannot be the right direction to achieve this. Fine-grained parallelism is proposed as a single theoretical framework for an alternative post-pandemic urbanism. It is a way of maintaining simultaneous movement and co-presence, two essential properties of urban living, without the risk of crowding, by reconceptualising the existing spatial setting in a finer resolution. Existing urban spaces that have been underused, ill-used or unused can be reconfigured to achieve fine-grained urbanism for the resilient post-pandemic city.

**Keyword:** Post-pandemic city, Fine-grained parallelism, Density distribution, Decentralisation, Spatial flexibility

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## **INTRODUCTION**

Decentralisation became an important agenda during the COVID-19 pandemic. During a crisis, decentralisation delivers another strength, i.e. resilience (Gevers 2020). Decentralising a mega centre into smaller local centres enables redistribution of people and traffic. A self-sustained and walkable community saves unnecessary trips to the urban centre which helps to control the spread of viruses. There was a clear tendency during the pandemic that people were attracted to local neighbourhoods and shopping closer to home for smaller amounts, more often (The Economist 2020a, 2020b; Crawford 2020). People now pay more attention to their homes and towns than ever before and find new meaningful activities embedded in them. This is an important turning point in our contemporary urban life that will remain for a long time.

Decentralisation can be put into effect by devolving the domination of a major city into many local cities and towns outside of it in the wider region. However, we know the environmental and economic value of a compact city, so it is not a viable solution to stretch out the city to the suburbs (Stevenson et al 2016). Urban sprawl as a remedy to overcrowded cities has been an experiment in the last century, but it caused more traffic, inefficient land use and environmental harm (Osman et al 2017; Saxena and Chidambara 2016). Moreover, recent articles on COVID-19 found that crowdedness and economic status have more direct impact on the spread of the virus than population density itself (Lim et al 2021; Carozzi et al 2020; Hamidi et al 2020; Almagro et al 2020; Center for Active Design 2020). What then could be a sustainable solution to decentralisation of the modern city in a time when we expect more pandemics to come?

This paper proposes a concept of fine-grained parallelism that can provide a possible approach to decentralisation within the given boundary of the city. It is a way of seeing urban spaces in a finer resolution to make the best use of them rather than expanding the existing territory of the urban area. Finer re-configuration of a given space, finding under-used niche spaces, and increased links between them will offer spatial potentials and behavioural options for users. By using it as a single theoretical framework, we can enhance the performance of our cities at all levels of built environment to maximise adaptability and resilience to pandemics, climate change, and social transformation.

Cities are densely interweaved by built structures and flow systems, making social distancing a hard-to-achieve goal. Restrictions were enforced during the pandemic to prevent gatherings in public spaces but this could only be implemented by sacrificing the quality of everyday life. Fine-grained parallelism is a way of preventing the concentration of urban activities with minimum impact on human life, while maintaining the overall density of the urban population. It is not to advocate density at any cost. High density, if done right, makes the city more liveable and sustainable while overcrowding is something that should be

avoided (Jacobs 1961). Density would still work post-COVID-19 with well-planned urbanism (Miller 2020, Badger 2020). Thus, fine-grained parallelism aims to provide more nodes, routes, and occupiable spaces for a wider distribution of movements and events in the city.

Post-COVID-19 design strategies have been discussed and suggested widely in related industries and academic fields in recent years. However, there has been no meaningful attempt to integrate them to provide a consistent approach to a wide variety of urban planning agendas. This paper provides a single theoretical framework of fine-grained parallelism that is applicable to multi-level design interventions. Through the critical review and analysis of literature and case studies, we propose twelve design strategies that are applicable to the micro and macro urban scales for the resilient post-pandemic city.

### **FINE-GRAINED PARALLELISM**

Fine-grained parallelism has been defined in computer science as a way of configuring a computer with many small-capacity processors, enabling a programme to be broken down into a number of smaller tasks. Whereas a computer with several large processors can be efficient in executing a heavy work, a large number of small processors makes the whole amount of work to be evenly distributed to them; hence ‘fine-grained parallelism facilitates load balancing’ (Barney 2021).



**Figure 1:** Examples of Fine-grained parallelism in spatial planning

*Source: Author's own photos from Newcastle upon Tyne, UK*

The same logic can be applied to architecture and urban planning, especially during the time when a crowd needs to be dispersed to reduce density. It has been tested in many cities across the world during the COVID-19 pandemic that buildings and road networks are reconfigured to allow finer distribution of vehicular and human movements. Corridors were marked with arrows for smooth flow of users (figure 1a); building entrances were assigned a single direction of movement for entering or exiting (figure 1b); and street lanes were subdivided to separate different modes of traffic (figure 1c). These examples show how cities

can respond to the density distribution problem by simply changing the way we use the existing built environment.

Based on the hierarchy of built environment, fine-grained parallelism can be implemented at four distinct levels: the floor level, the building level, the block level, and the urban level. Thus, the urban system is defined in this paper as a spatial continuum that interconnects indoor and outdoor spaces. Inclusion of the indoor space, in particular the domestic space, is essential in the discourse of post-pandemic city planning since it has been proven to be one of the major locations for virus infection (The Health Foundation 2020). Table 1 outlines strategies in each level to achieve fine-grained parallelism. Three essential strategies were selected for each level, totalling twelve strategies. They are all different in terms of their scope and scale but they all aim to achieve a maximum degree of density distribution of people by providing more diverse routes and occupiable spaces. Diversified routes will provide navigational options for movement efficiency, and more occupiable spaces will provide habitational options for spatial flexibility. By increasing the capacity of movement and space use, fine-grained parallelism enhances urban resilience.

**Table 1:** 12 Design Strategies for Fine-grained parallelism

<b>Levels</b>	<b>Strategies for Fine-grained Parallelism</b>	<b>min. degree of intervention</b>
Floor level	• Ring connection of rooms	remodelling
	• Options of open and closed plans	remodelling
	• Supplementary spaces on the periphery zone	remodelling
Building level	• Pocket spaces in communal corridors	rebuilding
	• Comfortable and inviting staircases	remodelling
	• More building entrances and lobbies	remodelling
Block level	• Smaller perimeter blocks and courtyards	rebuilding
	• More shops and civic facilities along the street	remodelling
	• More dynamic and walkable routes	redefining
Urban level	• Subdivision of roads for various movements	redefining
	• Well-connected pedestrian network	redefining
	• Reinvigorating niche spaces & unused roads	redefining

*Source: author*

In implementing these strategies, there are three different degrees of intervention: redefining, remodelling, and rebuilding. The column on the right in table 1 indicates the minimum level of intervention needed to implement each

strategy. Redefining is the least energy consuming approach by which an existing building or urban structure is re-configured without demolition or construction. Thus, subdividing lanes for movement and repurposing the existing entrance in figure 1 fall into this lowest level of intervention. Remodelling normally involves partial demolition and partial construction, requiring a medium level of energy consumption. Finally, rebuilding is the most energy consuming approach that requires a whole-scale demolition and construction. These three levels of intervention provide indices on how much impact each strategy will make on the environment. It looks evident from table 1 that the degrees of intervention at the urban level are all redefining while other levels have mostly remodelling or rebuilding. With minimum changes, the urban-level spatial setting can quickly respond to environmental crises such as pandemics, while those in other levels tend to take a longer time and more resources to deal with them. In the following sections, a selection of successful cases will be analysed to show how fine-grained parallelism has been incorporated in their design approach.

## **EMPERICAL ANALYSIS OF 12 STRATEGIES**

### *FLOOR LEVEL*

The first strategy for fine-grained parallelism at the floor level is *ring connections of rooms*. When two rooms are connected to each other without mediation of a corridor, they create a room-to-room enfilade. When more rooms are linked in this manner to make a loop, the interior space embeds a ring structure where any room on it necessarily has two complementary access points from neighbouring rooms. A ring provides a higher level of flexibility in room use since rooms on it can be either independent or interdependent in its function. In other words, it gives an option whether a room's function be confined within it or spills out to neighbouring spaces (Seo 2013). This is particularly beneficial for domestic space because home activities can be easily re-distributed in a flexible way to support changing demands in time. Being reached via two separate routes, the room on a ring can control privacy and communication as well as functional interchangeability (Leupen 2005, Bijdendijk 2005).





**Figure 2:** Fine-grained circulation and activity distribution by addition of winter gardens in the front facade of Bordeaux social housing in France

Source: [www.archdaily.com](http://www.archdaily.com); Photos by Philippe Ruault and axonometric modified by the author

Figure 2 shows a social housing scheme in Bordeaux, France remodelled in 2016 by adding an extension at the front side of the elevation for winter gardens. Before the remodelling, the typical unit plan has rooms accessed via a central corridor as in figure 2(b). The plan did not provide any flexibility in terms of activity distribution and movement choices with all rooms disconnected from each other by the corridor. By adding a winter garden that stretches across the three front-side rooms, rings emerged as in figure 2(c), providing flexibility in circulation. The project also achieved two other strategic goals of fine-grained parallelism. With the existing front windows converted to full length glazed sliding doors, the winter garden can be either integrated with or separated from the front rooms. By implementing the second strategy of *options of open and closed spaces*, it benefits users to gain control over their spatial configuration (see Burkus 2016).

The addition of winter gardens also achieves the third strategy of *supplementary spaces on the periphery zone*. It provides an extra zone on the outer perimeter that can be utilised for the function of sanitisation, open-air relaxing, home-office working and gardening, all of which became crucial element over the course of the pandemic. Post-pandemic homes are expected to have new types of spaces such as a vestibule with sinks and storages, an internal third place to relax, green spaces, outdoor spaces, and home offices (Duncan 2020; Feintzeig 2020; Blackall 2020; Crawford 2020); and they are all likely to be allocated on the perimeter zone. In this regard, an ‘elaborated boundary’ can be an emerging design trend post-COVID-19 to fend off a hostile outdoor

environment while providing an extra space to accommodate the lockdown mode of domestic life.

### BUILDING LEVEL

All three strategies at the building level aim to provide more occupiable spaces within the navigational system for better dispersion of building users. The first strategy of *pocket spaces in communal corridors* is to reduce the movement friction on a long corridor which typically has no niche space (Levitt and McCafferty 2019, p.51; Mayor of London 2020a, p.53).

The photo in figure 3(a) shows a communal corridor in a residential building that is detached from the building mass in a way to provide a small entry zone to each flat. The main purpose of this is to offer each flat a transitional space as well as visual and acoustic privacy but it has a potential utility as a temporary niche space to step aside when a multiple number of people are moving. Figure 3 (b) shows an entrance hall where a comfortable, bright, and attractive staircase is well positioned for easy access. *Comfortable and inviting staircases* will encourage users taking it more often and reduce the chances of using crowded elevators (City of New York 2010, p.78). Figure 3(c) represents the concept of the third strategy at the building level: *more building entrances and lobbies*. A multiple number of entrances will lead to different clusters of flats in a building, distributing people's movement (The National Affordable Homes Agency 2007, 2.1.5; Mayor of London 2020b, p.14). To maximise this effect, a single entrance hall can have two entrance doors from each side of the building and a shop on the ground level can have their own entrance as in the photo.



**Figure 3:** (a) Communal corridor with entry zones to units; (b) a hall with an inviting staircase; (c) a residential building with many entrances and halls  
Source: (a)(b) *The Housing Design Handbook*, p.53 & p.280; (c) *Neckabrogen development: Gestaltungshandbuch*, p.47

### BLOCK LEVEL

A block is a basic unit of urban grid system normally defined by streets around it. It may be occupied by a single estate developed at the same time, or by many separate buildings developed in different times. Smaller blocks (ideally 80 to 100m on each side) as in figure 4(a) will help distribute the traffic of cars and pedestrians by increasing the total length of road network and the number of intersections (Llewelyn-Davies 2007, p.58; The Department of Transport 2007, 7.3.13; Jacobs 1961, p.196; Sim 2019, p.25; Speck 2018, p.89). Thus, the first strategy of *smaller perimeter blocks and courtyards* enables spreading of the traffic density. This also helps implement the second strategy, i.e. *more shops and civic facilities along the street*, that makes a self-sustained neighbourhood within a walking distance as in figure 4(b) (Birkbeck and Kruczkowski 2016, 2a). To further vitalise the street environment, it is necessary to generate transparent and human-scaled shop fronts with an attractive frontage zone with plants, benches, tables, and awnings which is often called ‘active facades’, ‘sticky edges’ or ‘soft edges’ (Speck 2018; Gehl 2011; Llewelyn-Davis 2007, p.85). The third strategy at the block level is *more dynamic and walkable routes*. In contrast to the wider urban fabric where pedestrians are naturally given multiple options to move from one place to another, urban blocks tend to have a limited number of routes within their boundary. Various types of fast and slow passages will support different trip purposes, potentially distributing movements.



**Figure 4:** (a) Smaller perimeter blocks in Heilbronn Germany; (b) Residential project in Vienna, Austria with shops on the ground floor; (c) Kings Crescent social housing regeneration, London, UK

Source: (a) <https://woehr.de/en/project/heilbronn-neckarbogen.html>; (b) <http://karakusevic-carson.com>; (c) ©Daniel Hawelka: [www.tovatt.com/projects/buildings/d10-3/](http://www.tovatt.com/projects/buildings/d10-3/); modified by the author

Figure 4(c) illustrates the masterplan of Kings Crescent social housing regeneration in London where grey perimeter buildings are existing houses refurbished and white buildings inside are new builds. The success of this project lies in its shaping and allocation of new builds in a way to form six small clusters. Each cluster enclosing a human-scaled courtyard, it cultivates small-bubble

interactions between residents. This configuration also inscribes a finer degree of internal pedestrian network as indicated by red arrows. The project is an excellent example of fine-grained parallelism. The regeneration clearly increased the density, but it split the existing scheme into smaller clusters and provides a wider variety of route choices for residents.



**Figure 5:** (a) Livingroom of the Sonnwendviertel, Vienna, Austria; (b) Via Verde affordable housing in New York

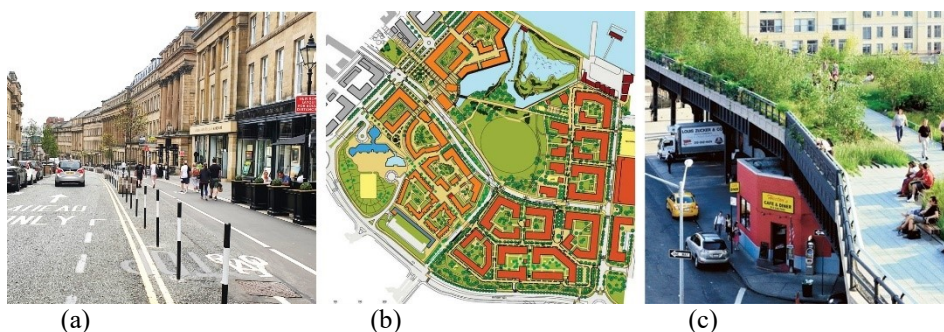
Source: (a) © Photo by Bruno Klomfar; <https://www.vlst.at/en/prj/sonnwendviertel/#51>; (b) © Photo by David Sundberg; <https://grimshaw.global/projects/via-verde-the-green-way/>

The third strategy of providing more walkable routes does not have to be implemented on the ground level. It could happen above the ground or on the roof top. The social housing project Livingroom of the Sonnwendviertel in Vienna, Austria in figure 5(a) adopted bridge connections between buildings and the affordable housing project Via Verde in New York in figure 5(b) linked several buildings of different height to provide a spiralling roof garden walkway starting from a ground level courtyard. Offering many alternative routes for various trips within a block minimises the concentration of moving bodies at any moment.

#### URBAN LEVEL

Fine-grained parallelism at the urban level also shares the same strategic goal of achieving diversification of movements and space use that helps spread density. The first strategy is *subdivision of roads for various movements*. Separation of different modes of traffic on the road has long been recommended for safety and efficiency (Department of Transport 2007, 4.2.4; Secured by Design 2019, 8.8). During the pandemic, it became more crucial to refine the urban flow system to decrease the level of friction. Many cities around the world redesigned their streets to establish multi-modal street lanes for uninterrupted and separate flows. Figure 6(a) shows Grey street in Newcastle upon Tyne in the UK which used to be a four lane vehicular road with two narrow footpaths along the building frontage. During the COVID-19 pandemic, only a single lane was marked for cars while the remaining lanes were allocated to accommodate bikes, pedestrians,

parking, and outdoor tables for cafes and restaurants. Thus, the same street that used to have only two categories of traffic, i.e. vehicles and pedestrians, now has been redefined to accommodate five.



**Figure 6:** (a) Grey street, Newcastle, UK; (b) Greenwich millennium village masterplan, London, UK; (c) The High Line park, New York.

Source: (a) author (b) [www.tovatt.com/projects/buildings/gmw-phase-1-village-square/](http://www.tovatt.com/projects/buildings/gmw-phase-1-village-square/); (c) © Center for Active Design

The second strategy at the urban level is a *well-connected pedestrian network* as shown in the masterplan of Greenwich millennium village in figure 6(b). This also has long been emphasised for a liveable neighbourhood but it became even more crucial for the post-pandemic city planning. Without multiple walkways that are interweaved and stretched long enough, the pedestrian flow would have to eventually converge onto the limited number of major roads, causing concentration of movement. This is why cul-de-sac or dead-end streets are not recommended in many contemporary cities (Urban Design London 2017, p.35; Department of Transport 2007, 4.2.5).

The third strategy of fine-grained parallelism at the urban level is *reinvigorating niche spaces and redundant passages*. There are various types of niche spaces in the city that are often residual and abandoned. Villagomez classified urban niche spaces into eight types: spaces between, spaces around, rooftops, wedges, redundant infrastructure, oversized infrastructure, void spaces, and spaces below (Villagomez 2010). What can be also included in this typology is redundant passages that have lost their usefulness. Old cities typically have organically grown roads trapped and fossilised within the urban grid, yet still possessing a narrative value of local history (Seo 2019). Through the lens of fine-grained parallelism, niche spaces and redundant passages provide a huge potential to accommodate various activities. Turning them into pocket parks, gardens, public facilities, attractive walkways, and habitable spaces will reinvigorate our cities. As this conversion will generate small and large destinations as well as enhancing the quality of urban environment, it will lower the load of existing destinations by offering additional spots for strolling,

lingering, and dwelling. Thus, they help redistribute density and reduce potential trip distances. Figure 6(c) shows a disused elevated railway in Manhattan that has been remodelled as a linear park. By creating a popular route out of the abandoned railway, the pedestrian flow can be effectively spread out to mitigate the concentration in other routes in the city.

## **CONCLUSION**

When the centre fails in a centralised system, the damage is critical, but the decentralised system with many small centres can still operate even when many of them fail. The purpose of fine-grained parallelism in urban planning is for load balancing, i.e. evenly distributing the density in main routes and destinations to multiple locations. Hence it is a way of implementing decentralisation by reconceptualising the existing urban fabric. Twelve strategies for fine-grained parallelism have been discussed in relation to real-world cases. They all aim to achieve density distribution of people through diverse routes and occupiable spaces. Diverse routes provide navigational options for movement efficiency while occupiable spaces provide habitational options for spatial flexibility – hence urban resilience. With varying design approaches, these twelve strategies operate at four different levels of built environment, ranging from building floor plans to urban networks, which when put together make a spatial continuum of the urban system. Three degrees of interventions, i.e. redefining, remodelling, and rebuilding, were also introduced in table 1 to gauge the minimum amount of energy consumption each strategy would require in its implementation. This revealed that urban-level interventions can be implemented more quickly and easily owing to their less energy-consuming strategies of redefining the current system. This also means that it will be more time and energy-consuming at the block level, the building level, and the floor level since they require remodelling and rebuilding as a minimum intervention. Therefore, municipalities and stakeholders need to make changes in their urban policy framework to set new criteria for long-term planning goals by incorporating the dimension of post-COVID-19 resilience.

## **ACKNOWLEDGEMENT**

A special thanks to the Centre for Knowledge & Understanding of Tropical Architecture & Interior (KUTAI) for sponsoring 50% of the PMJ Special Edition 2022 publication fees. May this effort encourage more scholars to publish in Index Journal in the future.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022





**PLANNING MALAYSIA:**  
*Journal of the Malaysian Institute of Planners*  
**VOLUME 20 ISSUE 3 (2022), Page 50 – 62**

## **ASSESSING CRITICAL RISK FACTORS FOR HERITAGE CONSERVATION PROJECTS IN COMPLIANCE WITH NATIONAL HERITAGE ACT 2005 (ACT 645)**

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### **Abstract**

The Malaysian government has consistently highlighted the significant value of historical buildings as one of the goals of sustainability initiatives. The heritage sites, locals, culture even assets are well preserved, highly valued, and renowned globally. However, significant risks and uncertainties have created challenges to heritage conservation projects. This paper aims to establish a Critical Risk Factors for Heritage Conservation Project in Malaysia and its relationship with National Heritage Act 2005. A quantitative research approach is used to achieve the two objectives towards attaining this aim. First, a systematic literature review is used to determine the critical risk factors for a heritage conservation project in a way to identify a significant risk involved in a heritage conservation project and finally to establish critical risk factors for a heritage conservation project in compliance with National Heritage Act 2005 (Act 645). For this paper, the only second objective was discussed. Based on the analysis, it can be concluded that fifteen (15) most critical risk factors could enhance heritage conservation projects at every stage in building a conservation framework. Usually, most of the critical risk factors can be mitigated prudently with the compliance of Section 40 (1) – (6), National Heritage Act 2005 (Act 645), focusing on the planning permission for Heritage sites.

**Keywords:** Critical Risk Factor; Heritage Conservation Project; National Heritage Act 2005 (Act 645); Planning Permission

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## **INTRODUCTION**

Building conservation is relatively known as a process of understanding, protecting and as essential to maintaining, repairing, restoring and adapting the historic property to preserve its cultural significance on architectural and cultural values. In Malaysia, extensive guidelines and provisions are developed by various parties in a way to protect valuable heritage property, such as National Heritage Act, Town and Country Planning Act and Local Government Act. National Heritage Department takes the responsibility to ensure the accomplished project meets the needs of conservation ethics for preliminaries, during and post conservation stage by introducing the Historical Architectural Building Survey (HABS) to document all the conservation project activities (Harun, 2020). Meanwhile, Town and Country Planning 1976 (Act 172) state the provisions regarding retaining the value of heritage property, while Local Government Act 1976 (Act 191) empowers local authorities to maintain or contribute to the maintenance of historical building or sites. Heritage conservation is defined as a process of upkeep and caring for a significant value of historical or architectural or aesthetic, or cultural significance, including the maintenance, preservation, restoration, reconstruction and adoption or combination of more than one of them, Nawī (2020); Roy and Kalidindi (2017); Hisham and Hassan (2015). Generally, building conservation works are dissimilar and riskier than a new project Nawī (2020). The nature of conservation work is the characteristic of heritage conservation projects usually are the non-standard scope of works, special approaches based on project type and unusual project management experience since it deals with technical skills and 'special' building material in order to maintain the authenticity and characteristic of the building Nawī (2020).

Consequently, it has been a significant risk and uncertainty creating challenges to building conservation projects, especially if the building has undergone several interventions such as building an extension or physical alteration (Harun, 2020). Risk is defined as an undefined event or condition that has negatively impacted the project performance's success (Zolkafli et al., 2012). Hence, identifying a risk throughout the heritage conservation project is crucial to ensure all the risks are successfully managed and treated properly. Zolkafli et al. (2012) listed pivotal points in common risks in conservation projects such as practical experience and expertise in such project, the minimum statutory requirement that affect the quality of specification, incomplete design information and solve by assumption, missing and lack of related document, and reliance or dependency to the specialist or craftsmanship. According to Mui et al., 2016, the experience and matureness of practitioners in a conservation project are the key elements that ensure the project is delivered within the time, cost, and quality of the project outcome. In addition, conservation work description depending on the existing condition of the building and unknown conditions due

to layers of previous construction methods make it more challenging. In terms of work documentation, a lack of information before the execution of works can affect the tendering process due to undefined costs. The conservation approach as consideration to achieve the conservation project outcome in Malaysia is by practising a charter from Burra Charter Australia. Eight (8) approaches are listed: preservation, restoration, replication, relocation, adaptive reuse, reconstruction, prevention, and consolidation. The study will begin by revealing significant risks contributing to barriers to efficacious heritage conservation projects.

## **RESEARCH BACKGROUND**

Harun (2011) defined conservation as a technical action taken by a historic building to prevent decay and prolong the building's lifespan. On the other hand, Rashid & Ahmad (2011) defined historic building conservation as a maintenance approach to preserve the authenticity of structures and fabric. Burra Charter (2013) also outlines the definition of conservation means all the processes of looking after a place to retain its cultural significance. In Malaysia, a systematic approach as a conservation framework was prepared by Ahmad (2006a; 2006b) for reference by practitioners in the heritage conservation project. It consists of a holistic approach comprising all conservation activities to ensure the projects are well planned and managed for the whole life cycle, as summarised in Figure 1. Building conservation is always aligned with risk management in conservation projects. The exemplary implementation will assist in managing risk and uncertainty in every stage of conservation works.

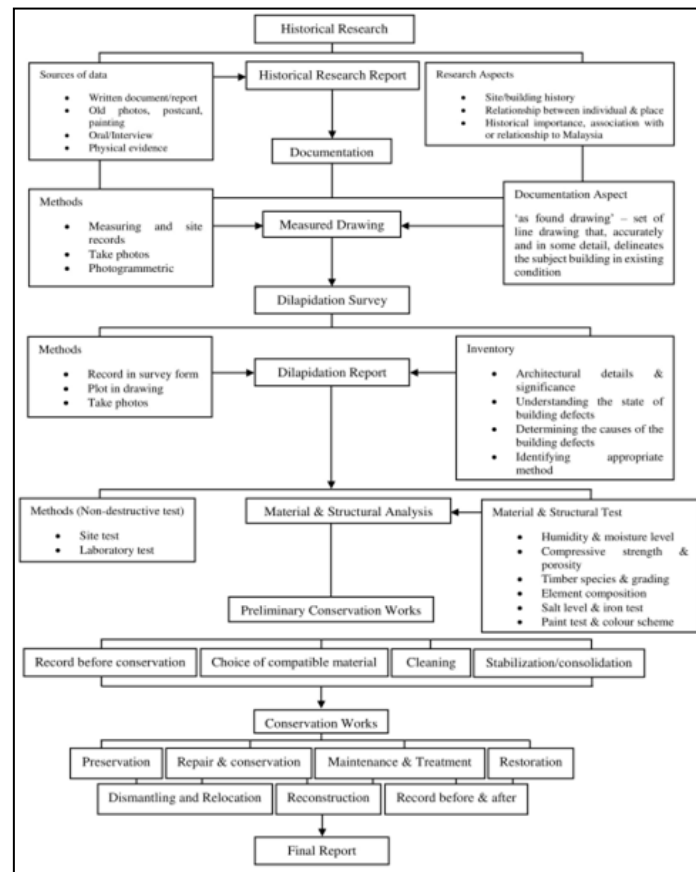


Figure 1: Heritage Conservation Framework in Malaysia  
Source: Harun (2011)

### Preliminary Investigation

The preliminary investigation is to identify related data on building history, architectural and social background. The objective and purpose are clearly defined before different approaches are taken. Harun (2011) state preliminary investigation is an important document that could help in the conservation work, comprised of original design drawings, drawing from a previous investigation, old photographs, old maps, old painting, or any previous historical report. All data shall be compiled and well documented for conservation as evidence and reference for the parties involved. In heritage conservation, issues in difficulties identifying the scope of heritage building projects frequently arise as on a lack of information on the existing structure, drawings and preliminary investigation (Perovic et al, 2016). In addition, incomplete design information may lead to the

consultant's assumption, which can lead to risk in the conservation projects (Reyers John & John, 2001).

### ***Dilapidation Survey***

The dilapidation survey started once the client received the preliminary survey report. Dilapidation survey is a practice of understanding the state of building defects, determining the causes of building defects, determining the methods and techniques that can be applied and turning into a reference for a client, consultant, or contractor, mainly to assist quantity surveyor and will become an additional item in document tender (Harun,2011). The outcome of the data shall be presented in photographic and digital documentation, including the proposed work method statement for rectification purposes (Kamal & Wahab, 2014).

### ***Preparation of Tender Document***

Based on a dilapidation survey report prepared by the appointed consultant, a quantity surveyor will prepare an estimated cost by referring to the level of building defect recorded, suitability of method and techniques proposed for remedial works (Kamal & Wahab, 2014). The collaboration between architect and conservator with quantity surveyor is crucial to determine the scope of work, specification of work and suitable conservation approach. The conservation cost must be aligned within the client budget to prevent overrun costs that may lead to project delay or leave it abandoned. Then, the client will appoint an experienced contractor for conservation works. The current practices in Malaysia were using the Public Works Department (PWD) and (Pertubuhan Arkitek Malaysia (PAM) contracts are determined not suitable for the nature of the conservation work because specific clauses are not relevant to the nature of building conservation (Lee & Lim, 2009).

Furthermore, the tender amount consists of high variance due to the estimated cost, which may affect assessing the contractors' most competitive and reasonable price (Lim & Ahmad, 2015). Other than that, issues with format and variability in tender documents, poor work description, the obscurity of specification clauses, and amendments to the Standard Form of Contract and the Method of Measurement (Lim & Ahmad, 2015). Insufficient information provides to the contractor as their references, such as drawing and specification, cause problems where the actual work on-site is not discovered until the work commences (Lim & Ahmad, 2015).

### ***Conservation Works***

The appointed contractor shall appoint a conservator to advise on behalf of the contractor about the technical aspects and assist the contractor with any problem during conservation works. The conservator must always remind and monitor the

projects to ensure they follow the conservation guidelines, ethics, and principles. The most important issue that must be stressed to the contractors is strictly following the specifications as agreed in contracts to retain the authenticity. Contractors are responsible for preparing a Historic Architectural Building Survey, which persistence to record all conservation work before, during and until the completion of the project. Thus, site meetings shall be frequently held to solve all problems that arise, which may prevent disputes between consultants and contractors (Kamal & Wahab, 2014). After handing them over to the client, the contractors will again be responsible for all defects. The inaccurate or inadequate site and survey information can cause risk in the conservation project because the data obtained are not helping much in the project (Zolkafli et al., 2012).

Furthermore, poor communication and interpretation among practitioners in conservation projects can cause different approaches in the scope of work during the conservation works (Azizi et al., 2015). Knowledge in heritage conservation is one of the essential issues, whereas experts and labour do not clearly understand the conservation method or techniques that can be applied (Harun, 2011). In addition, traditional building materials are not more available in the market and need to be duplicated, which can contribute to delays. In some cases, the material needs to be imported to any countries that are still available for production. Such material is needed and not impossible to import the craftsmen from any country, which can lead to higher project costs.

### ***Heritage Management***

The maintenance management shall be prepared to ensure that the building can be maintained in the conserved condition to prolong its lifespan. Maintenance begins once the defect liability period ends, and all the defects have already been made good by the contractor (Kamal & Wahab, 2014). The maintenance must follow the planned maintenance to prevent any deterioration that may cause the maintenance cost. The approach in maintenance work for historical buildings must refer to the previous conservation report to identify the appropriate approach taken, such as the method or techniques and material used. The final report on heritage conservation is an important document which comprises all related work processes and data about the building that has been conserved, which can be referred for future maintenance or any conservation activities (Harun, 2011). Maintenance personnel in most heritage buildings need proper guidelines to assist them in carrying out maintenance work which can act as a benchmark, such as preparing a maintenance programme and reference for third-party maintenance personnel (Rashid & Ahmad, 2011). The maintenance manual is a vital document as a reference for the historical building maintenance, which comprises all necessary data which the building had been conserved (Baharuddin et al., 2014).

## **RESEARCH METHODOLOGY**

This paper aims to establish a Critical Risk Factors for Heritage Conservation Project in compliance with National Heritage Act 2005 (Act 645). A quantitative research approach is used to achieve the two objectives towards attaining this aim. First, a systematic literature review is used to determine the critical risk factors for a heritage conservation project in a way to identify a significant risk involved in Heritage Conservation Project and finally to establish a Critical Risk Factors for Heritage Conservation Project in compliance with National Heritage Act 2005 (Act 645). For this paper, the second objective was discussed. The development of critical factors was confined to the literature published from 2015 onwards in academic journals and proceedings. A thorough examination was conducted to develop a depth-understanding of which factors are likely to happen due to the Heritage Conservation Project. A descriptive technique was adopted to validate factors and sub-factors of Critical Risk Factors for the Heritage Conservation Project. The questionnaire was conducted on a sample drawn from a database of G7 contractors listed in the Construction Industry Development Board (CIDB) Malaysia specialized in a heritage conservation project, which is B03 (17 nos), Registered Conservator listed by the National Heritage Department (52 nos) and an academician/researcher (31 nos) that has previous studies on the academic paper are selected to be part of the respondent. 100 copies of the questionnaires were delivered to the potential respondents by email and online survey in the 3rd quarter of 2021, particularly in July. However, only 80 copies and the response to the questionnaire were received. The response rate was 80% and consistent with the 20-30% norm for most survey surveys distributed in the construction industry (Yang et al., 2010).

## **FINDINGS AND ANALYSIS**

### ***Critical Risk Factor Analysis based on Ranking***

As shown in Table 1, a significant difference in dependencies between fifteen (15) numbers of essential factors was found. Discussing the result, from the perspective of heritage conservation project stakeholders, most respondents highlight that (F13: Lack of knowledge in continuous maintenance programme) is the most significant factor which could lead to the enhancement of heritage conservation projects at every stage in building conservation framework. Continued with (F1: Lack of an essential document for preliminary work), (F15: Lack of knowledge in maintenance manual), (F12: Lack of requirement for new construction and conservation), (F3: Lack of historical background information by the consultant and contractor), (F9: Incomplete drawing and specification cause assumption Conservation Project), (F8: Incomplete drawing and specification cause high variance in provisional and contingency cost), (F6: Lack of scientific and laboratory testing in terms of solution for restoration works),

(F4: Lack of scientific and laboratory testing in terms of dilapidation survey information), (F5: Lack of scientific and laboratory testing in terms of preparation of conservation cost), (F7: Incomplete drawing and specification cause high variance in provisional and contingency cost), (F14: Lack of knowledge by maintenance personnel), (F11: Poor consultant and contractor performance), (F10: Lack of guideline by National Heritage Department) and (F2: Lack of an important document for preliminary work).

**Table 1: Critical Risk Factors Overall Ranking**

*Source: Author (2022)*

<b>Factor</b>	<b>Critical Risk Factors in Heritage Conservation Project</b>	<b>Mean</b>	<b>Overall Ranking</b>
F1	Lack of an important document for preliminary work	4.78	2
F2	Inadequate and ambiguous information	2.80	15
F3	Lack of historical background information	4.64	5
F4	Lack of scientific and laboratory testing in terms of dilapidation survey information	4.40	9
F5	Lack of scientific and laboratory testing in terms of preparation of conservation cost	4.09	10
F6	Lack of scientific and laboratory testing in terms of solutions for restoration works	4.43	8
F7	Incomplete drawing and specifications cause incomplete preparation for the scope of work	4.00	11
F8	Incomplete drawing and specification cause high variance in provisional and contingency cost	4.53	7
F9	Incomplete drawings and specifications cause assumptions by the consultant and contractor	4.60	6
F10	Lack of guidelines by the National Heritage Department	3.35	14
F11	Poor consultant and contractor performance	3.45	13
F12	Lack of requirement for new construction and conservation	4.75	4
F13	Lack of knowledge in the continuous maintenance programme	4.82	1
F14	Lack of knowledge by maintenance personnel	3.68	12
F15	Lack of knowledge in the maintenance manual	4.76	3



### ***Compliance with National Heritage Act 2005 (Act 645)***

The entire critical risk factors found in this study should be mitigated wisely, especially during planning permission, to avoid project failure. Therefore, a holistic mechanism is crucial to identify a potential risk that can happen at the overall stage of a conservation project. Referring to Section 40 (Application for Planning Permission for Heritage Site), National Heritage Act 2005 (Act 645), all the applications regarding heritage sites shall get permission from National Heritage Department (NHD) before the project commences. Details of Section 40 are described below:

- 1) Section 40 (1) stipulates that the commissioner shall coordinate and advise the local planning authority before any planning permission or development order is granted involving a heritage site.
- 2) Section 40 (2) stipulates, Where the local planning authority refers any application by any person for planning permission or development order to the Commissioner, such application shall contain:
  - a) sufficient particulars to identify the monument to which the application relates, including its layout plan, measured building plan and photographs of its every angle, including the exterior and interior of such monument;
  - b) such other plans and drawings as are necessary to describe the work which is the subject of the application;
  - c) measures that have been taken to secure the safety of the heritage site and the neighbouring land; and
  - d) such other particulars as may be required by the Commissioner.
- 3) Section 40 (3) stipulates, for paragraph 2(c), neighbouring land means:
  - a) any land adjoining within a distance of two hundred meters from the boundary of the land to which an application under this section relates;
  - b) any land separated from the land to which an application made under this section relates by any road, lane, drain or reserved land, the width of which does not exceed twenty meters and which would be adjoining the land to which the application relates had they not been separated by such road, lane, drain or reserved land; or
  - c) any land located within a distance of two hundred meters from the land boundary to which an application under this section relates.
- 4) Section 40 (4) stipulates that the Commissioner shall advise the local planning authority to impose conditions when approving planning permission or a development order involving a heritage site.
  - a) Requiring compliance with any conservation guidelines and procedures issued by the Minister.

- b) requiring the making good of any damage caused to any heritage site after the works authorized by the planning permission or the development order are completed; or
  - c) requiring the protection and retention of any specified feature of the heritage site
- 5) Section 40 (5) stipulates, Where the planning permission is approved, the Commissioner shall liaise, cooperate, and coordinate with the local planning authority to monitor and supervise that the terms and conditions imposed relating to the conservation of heritage are complied with.
- 6) Section 40 (6) stipulates that any person who contravenes any condition imposed under subsection (4) commits an offence.

**Table 2:** Matrix Analysis of Section 40, National Heritage Act 2005 (Act 645), Heritage Conservation Process and Critical Factors in Heritage Conservation Project

Process	Heritage Conservation Process (Harun, 2011)	Section 40, National Heritage Act 2005 (Act 645)						Critical Risk Factors in Heritage Conservation Project
		Section 40 (1)	Section 40 (2)	Section 40 (3)	Section 40 (4)	Section 40 (5)	Section 40 (6)	
1	Preliminary Investigation	/	/	/	/	/	/	F1; F2; F3; F10; F11.
2	Dilapidation Survey	/	/	/	/	/	/	F2; F3; F4; F5; F6; F7; F8; F9; F10; F11.
3	Preparation of Tender	/	/	/	/	/	/	F3; F4; F5; F6; F7; F8; F9; F10.
4	Conservation Works	/	/	/	/	/	/	F6; F7; F8; F9; F10; F11; F12.
5	Heritage Management				/	/	/	F13; F14; F15.

**Legends:**

<b>F1</b>	Lack of an important document for preliminary work	<b>F9</b>	Incomplete drawings and specifications cause assumptions by the consultant and contractor.
<b>F2</b>	Inadequate and ambiguous information	<b>F10</b>	Lack of guidelines by the National Heritage Department
<b>F3</b>	Lack of historical background information	<b>F11</b>	Poor consultant and contractor performance
<b>F4</b>	Lack of scientific and laboratory testing in terms of dilapidation survey information	<b>F12</b>	Lack of requirement for new construction and conservation

<b>F5</b>	Lack of scientific and laboratory testing in terms of preparation of conservation cost	<b>F13</b>	Lack of knowledge in the continuous maintenance programme
<b>F6</b>	Lack of scientific and laboratory testing in terms of solutions for restoration works	<b>F14</b>	Lack of knowledge by maintenance personnel
<b>F7</b>	Incomplete drawings and specifications cause incomplete preparation for the scope of work.	<b>F15</b>	Lack of knowledge in the maintenance manual
<b>F8</b>	Incomplete drawing and specification cause high variance in provisional and contingency costs.		

*Source: Author (2022)*

Based on the matrix analysis in Table 2, the most critical stage of the heritage conservation project is stage No 2, which is Dilapidation Survey Stage. Ten (10) critical factors that should give serious attention to control that particular risk were recorded. At this stage, a dilapidation survey process known as the condition survey process shall execute prudently to provide a better solution for restoration work and assist the consultant in estimating the cost of the conservation project. Furthermore, due to the tender process timeframe and procedure, defecting nurture and dilapidation reports may not be as relevant as the time to action received. The method of collecting data, either by observation or verbal interview, must be carried out as visiting the archive is considered compulsory for the consultant appointed.

The second highest critical stage was the Preparation of Tender stage, were recorded eight (8) critical factors which are *F3; Lack of historical background information, F4; Lack of scientific and laboratory testing in terms of dilapidation survey information, F5; Lack of scientific and laboratory testing in terms of preparation of conservation cost, F6; Lack of scientific and laboratory testing in terms of solution for restoration works, F7; Incomplete drawing and specification cause incomplete preparation for the scope of work, F8; Incomplete drawing and specification cause high variance in provisional and contingency cost, F9; Incomplete drawing and specification cause assumption by the consultant and contractor, F10; Lack of guideline by National Heritage Department.* The entire critical factor was derived at the previous stage, which is not comprehensively resolved, thus resulting in poor budgeting and repairing scope for heritage conservation projects.

Next, in the Conservation Works stage were recorded seven (7) critical factors fall in this stage. Most of the critical factors are dealing with a poor consultant and contractor performance directly involved in this project. In addition, poor consultants refer to inadequate coordination between sub-consultants, thus resulting in a poor decision for total project cost and performance.

## CONCLUSION

In a nutshell, fifteen (15) most critical risk factors could lead to the enhancement of heritage conservation projects at every stage in building a conservation framework. Usually, most of the critical risk factors can be mitigated prudently with the compliance of Section 40 (1) – (6), National Heritage Act 2005 (Act 645), focusing on the planning permission for Heritage sites.

## ACKNOWLEDGEMENTS

A special thanks to the Centre for Knowledge & Understanding of Tropical Architecture & Interior (KUTAI) for sponsoring 50% of the PMJ Special Edition 2022 publication fees. May this effort encourage more scholars to publish in Index-Journal in the future.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**  
*Journal of the Malaysian Institute of Planners*  
**VOLUME 20 ISSUE 3 (2022), Page 63 – 75**

## **THE DEVELOPMENT OF A MALAY CULTURAL HERITAGE CENTER: KAMPUNG KUCHAI, IPOH, PERAK**

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### **Abstract**

In Ipoh, Perak, there is a place called Kampung Kuchai. It was a dense settlement with the Malay community at one time. The presence of this area reveals that the Malays have lived in Ipoh for a long time. The question is why the Kampung Kuchai area is not developed like other areas. This study was conducted to raise the potential of Kampung Kuchai as a Malay cultural heritage centre. The study aims to improve the identity of the Malay community and demand the importance of preserving the nation's culture. The researchers have chosen Kampung Kuchai as a case study by conducting site observations and interviewing several respondents who know the area. The strength of this area is not only in the development based on the nation's culture but also in implementing the development of goodwill by highlighting the diversity of building architecture, culture, and local way of life. The researchers found that this area has excellent potential to be developed as a Malay Heritage Center because of its strategic location. It has sufficient resources for developing traditional villages and local historical storytelling, a new tourism product in the Ipoh City Council area.

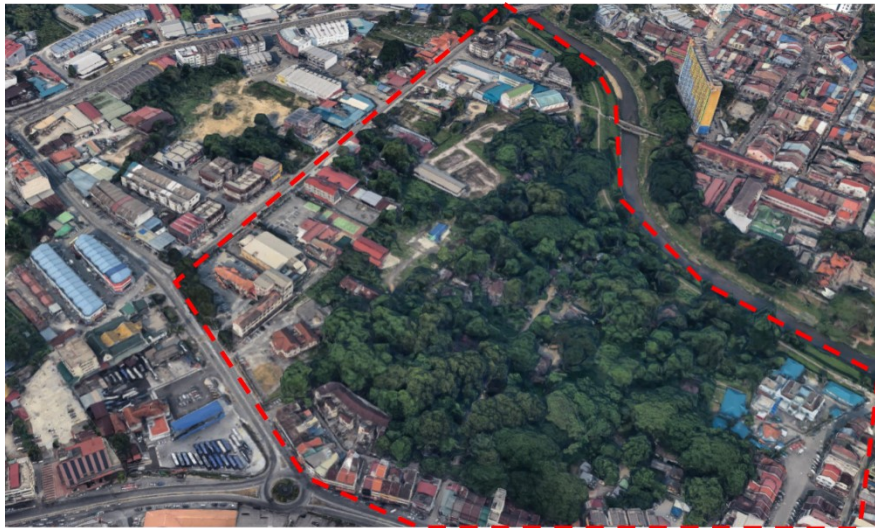
**Keywords:** Kampung Kuchai Ipoh, Malay Cultural Heritage Center, Malay Garden, Traditional Village, History and Heritage

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## **INTRODUCTION**

Ipoh is a city located in the district of Kinta, Perak Darul Ridzuan. Apart from that, Ipoh, the state capital of Perak, was moved from Taiping in 1937. Kinta district is also known as a tin mining area in Malaya because many mines successfully influenced the development of Ipoh at that time. This relocation occurred because Ipoh was growing in the economy and urban development. According to Ibrahim et al. (2011), Ipoh originated from a Malay and Orang Asli (Sakai) village, and at that time, Ipoh was not yet a tin mining area. In 1988, His Royal Highness Sultan Paduka Seri Sultan of Perak Darul Ridzuan, declared Ipoh as an area upgraded to 'City' status (MBI Town Planning Department, nd). Over the past 100 years, Ipoh was only inhabited by the aboriginal and Malay communities near Sungai Kinta. Among the earliest settlements in Ipoh are Kampung Paloh and Kampung Kuchai. Kampung Kuchai was founded around 1900, and at that time, it was called 'The Wealthy Malay Enclave of Ipoh' (Suara Perak, 2021). Based on the Special Area Plan (RKK), Kampung Kuchai has been placed under Site ZPP (Site B) as a mixed development/multi-use zone with key components such as commercial, housing, and tourism (MBI, 2020). With 10.83 hectares, the current land use is monopolized by vehicle workshop activities. Kampung Kuchai has many old buildings and houses that have the historical value of the 'Pekan Ipoh' opening. Figure 1 shows the current condition of Kampung Kuchai, Ipoh.

Looking at the importance of old buildings and functions, Kampung Kuchai is still rich in historical relics. The preliminary study results found that this area has mosques, Malay dignitaries' houses, and old schools. Therefore, Kampung Kuchai has the potential to be developed as a Malay Heritage Village, which will be equipped with Heritage Trail activities. With that, it can restore the identity and spirit of the village that has long been lost. In addition, it can further accelerate the tourism industry in Ipoh, which is currently primarily monopolized by the 'Old Ipoh Town' area. The most critical issues for the development of Kampung Kuchai involve architecture, sociology, local economy, migration of indigenous people, and land ownership.



**Figure 1:** Aerial View of Kampung Kuchai Area, Ipoh, Perak.  
*Source: Google Maps*

## **LITERATURE REVIEW**

In this study, several things are considered essential to help understand the community's way of life in Perak in the past. First, based on the literature review, the researchers found that the culture of the Malay community needs to be emphasized because they opened the town of Ipoh long before modernization took place.

### **The Concept of Malay Traditional Village**

'Kampung' is a Malay term that describes a village or rural settlement in Malaysia (Mohd Hussain et al., 2021). According to Zakaria et al. (2021a), the village is very close to the heart of the Malay community. The primary purpose of strengthening the concept of traditional Malay villages is to introduce the culture of the Malay community in the past to the younger generation today. The main attraction is the concept and atmosphere that does not change like the old Malay village. The need to apply the elements of security, socio-culture, privacy, and attractive landscape will make a settlement area more valuable. Malay traditional villages have been inhabited for more than one hundred (100) years, and the concept of architecture refers to their culture and way of life (Samsudin & Fitry, 2014). This concept will create a 'Sense of Belonging' in the Malay community and better appreciate their history.



### **The Malay Garden Concept**

The Malay Garden Concept is adapting a space or yard for beauty, food, medicine, and socializing. This concept highlights the importance of philosophy, taboos, and traditions to be implemented by the Malay community today (Zakaria et al., 2017). Like other common landscape concepts, this concept also applies hard and soft landscape elements in the layout of courtyards and outdoor spaces of houses or buildings (Md Syed et al., 2019). The softscapes are used for food, medicine, utilities, rituals, and aesthetics. Hardscape is applied for safety, socializing, and doing daily work. From the material point of view of building materials, this concept will need to use local materials (materials used by the previous society; however, the production method can use the latest technology). This concept's peculiarity is that the soft and hard landscape placement layout does not have strict guidelines. It is more tolerant and according to the needs of garden owners but still adapts the concept of the way of life of the Malay community (Zakaria et al., 2021b). Baharum (2019) stated, if referring to the Old Malay manuscripts, the concept of Taman Istana Melayu has three (3) main components, namely *Taman Larangan* (Forbidden Garden), *Taman Buruan* (Hunting Park), and *Taman Kerohanian* (Spiritual Garden). Zakaria et al. (2019) also think that Taman Istana (Palace Garden) is one of the main branches of the Malay Garden concept. Still, there are two (2) other types of gardens that also contribute to the hierarchy of this concept, namely *Taman Bangsawan* (Nobleman Garden) and *Taman Rakyat* (People Garden). Strongly supported based on the records in the old Malay history discussed by Shellabear (1994), Md Syed et al. (2019), and subsequently, Ismail et al. (2015), who have stated that a park is a place of social negotiation that is a symbol of the identity of the Malay rulers and nobles in the past which is the identity until now.

### **The Concept of Adaptive Reuse**

This concept is defined as the process of changing the function or structure of a historic building to be more contemporary after renovation. According to Mohamed & Alauddin (2016), the adaptive reuse concept is an important strategy to achieve sustainability in ensuring a continuous building life cycle and preventing building destruction. Ahmad (2009) stated that Malaysia has many existing potential buildings. However, most of these buildings are not well preserved, and most are in poor condition and not appreciated for their existence. Based on the arguments and views by Daeng et al. (2014), Malaysia is a country rich in historical buildings that are mostly part of the national heritage but have been neglected for so long. With the application of this concept, a building or area that displays the history and culture of the community will be more valuable from a commercial point of view and a tourist attraction.

### **The Concept of Heritage Trails**

The concept is vital in supporting the development of an area classified as local or national heritage and can be highlighted by emphasizing aspects of education. According to Mat Nayan (2021), the concept always be supported in its existence, the historical, and the city narrative. When planning a heritage trail, one should examine aspects such as visitor experiences that have not been explored in the urban heritage arrangement towards realizing the 'integration of received experiences' when traversing a route (MacLeod, 2016). Heritage trail activities will encourage and educate the community to appreciate, understand, preserve, and collect the local community's traditional art and cultural treasures. It is in line with the elements of tourism and heritage images that are often linked in every aspect. According to Ilias & Mansor (2012), heritage can exist without the presence of tourism. Still, tourism involving origin will not exist without heritage or historical value in a place or area.

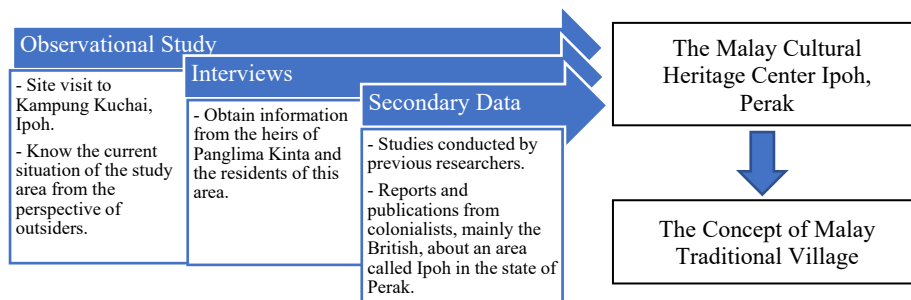
### **The Concept of Marketing Strategy**

As everyone knows, marketing strategy is the activities that the manufacturer of a product will carry out to meet the needs and desires of consumers (Stanton, 1984). Marketing activities will be able to increase sales revenue or increase the added value of a new product. According to Rafiq & Ahmed (1995), marketing strategies are seen as very practical to increase the value of a product: the product itself, price, promotion, place, people, process, and physical evidence. By fulfilling all these marketing concepts, it has been seen to strengthen a product further and make it more sustainable in the market. In addition, marketing will be seen as an activity that can convince clients/customers to try or taste the product they want to highlight (Zakaria et al., 2021c).

## **METHODOLOGY**

This study was conducted using qualitative methods: on-site observation and selected interviews. This study adapts Non -Probability Sampling (Purposive Sampling) to facilitate data collection. According to Patton (2002), this sampling method is widely used in qualitative studies to obtain accurate and extensive data. Since the study area at this point is very different from the original history of its existence, data from observations, interviews, and secondary data are essential to enable researchers to design study procedures. The observation method was conducted for three (3) days by the researchers focusing on the existing condition of the Site. Apart from that, the researchers have interviewed residents in Kampung Kuchai. The selection criteria for respondents were divided into two (2), namely, someone who was found on the day the Site was conducted and someone who could explain the history of the existence of Kampung Kuchai. After that, the researchers collected secondary data to find out the history and background of the study site.

Figure 1 shows the research procedure that the researchers planned.

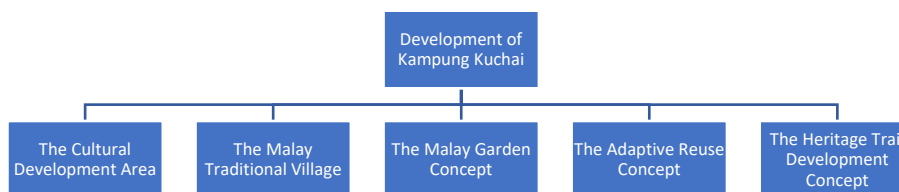


**Figure 1:** Study Procedure

Intending to form a study that can provide a high impact, the researchers have conducted three (3) stages, as shown in Figure 1. Finally, they will focus on the potential factors to create a concept that the Malay race elements will influence Kampung Kuchai. There are limitations to this study, namely the lack of respondents from the original Malay population and the condition of the Site, which is no longer a permanently inhabited area because it has been abandoned for so long. Currently, this area only has a business sector focusing on vehicle workshops.

## FINDINGS AND DISCUSSION

After conducting on-site research, the interview process, and searching for secondary historical data of Pekan Ipoh, the researchers found potential and opportunities for developing this area. From the information obtained, the researchers have divided it into several developmental potentials appropriate to the current situation. Refer to Figure 2, the development potential of Kampung Kuchai as a heritage site.



**Figure 2:** The Potential Development of Kampung Kuchai.

### Cultural Development Areas

This potential is based on the history and location of Kampung Kuchai in Pekan Ipoh. It is a place opened by the Malay community hundreds of years ago. History covers all aspects of human society. The area is strategic and close to the Kinta River in location. It supports increasing the value in terms of design and storytelling of the origins of the Malay community in Ipoh. Kampung Kuchai is situated not far from other races' cultural development areas, and these areas have long been known as tourist attractions today. Those areas are Concubine Lane which represents the Chinese community, and Little India, which highlights the cultural activities of the Indian society. As seen in Figure 3, we can create a triangle of cultural development in Pekan Ipoh when the Kampung Kuchai applies or emphasizes the cultural development of the Malay community as a whole. Referring to MBI (2020), a proposal to redevelop the Kampung Kuchai area has been planned involving activities such as the Sungai Kinta Green Network, hotels adapting traditional Malay architecture and commercial spaces. It shows the potential to be developed by adapting the culture of the Malay community.

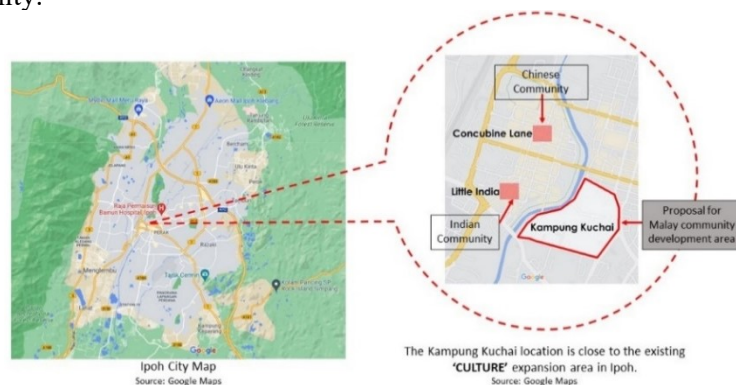
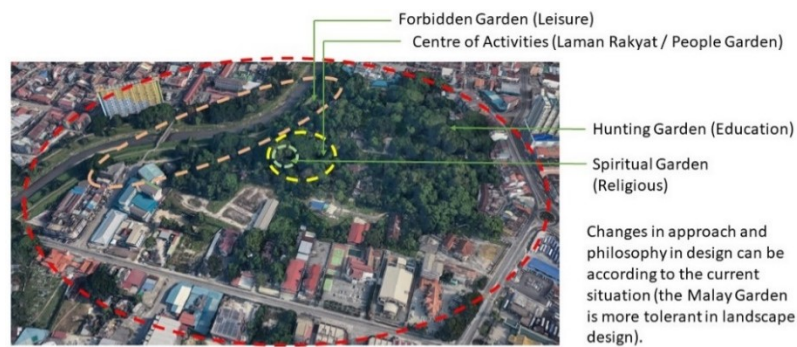


Figure 3: Cultural Development Triangle in Ipoh

### Development of Malay Traditional Villages

Creating something with a Malay identity will often be influenced by the Traditional Village concept, and as we know, there is nothing wrong with this concept. However, adapting the idea of a traditional Malay village in the city of Ipoh will probably be a rare thing to think about. Regardless of the population of Ipoh, where the Chinese are the majority, there will be a proposal to create a Malay village, making planning awkward for all aspects of development. However, based on the preservation of Ipoh's history and the potential for tourism products, it is seen as 'strange but proper to be developed. The implementation of this traditional village needs to adapt to the Malay settlement concept, and its development must be in line with the Malay Garden concept. Therefore, it requires an in-depth study of various aspects, especially economics, history, and

culture. Figure 4 shows the idea of a traditional Malay village based on the Malay Garden Model.



**Figure 4:** The concept of a traditional Malay village based on the Malay Garden Model  
*Source: Google Maps*

### **Adaptation of the Malay Garden Concept**

As explained earlier, the Malay Garden concept is referred to through writings in old manuscripts. In the case of Kampung Kuchai, the adaptation can be carried out comprehensively from all aspects of the Malay Garden concept, namely the Palace Garden, Nobleman Garden, and People Garden. To implement the Malay Garden concept in Kampung Kuchai, the researchers have considered the wide-scale type of Malay Garden, which is more focused on the type of Palace Garden. However, the current situation will change the approach and philosophy. More importantly, the design philosophy to be featured must be tolerant of land use and environmental issues. Referring to Figure 4, the Forbidden Garden, Hunting Garden, and Spiritual Garden are the highlights of the Palace Garden. Laman Rakyat is an adaptation of People Garden, a concept of gridded courtyard space implemented to place landscape elements in people's homes. The use of soft and hard landscape elements characteristic of the culture and hereditary use of the Malay community aims to highlight the originality of this concept.

### **Adaptive Reuse Concept**

The concept of adaptive reuse is implemented by maximizing existing resources that lead to the activities, design, and environment of a building or area. Most activities that focus on this concept will be in the central location, which can impact the existing buildings and give new functions to all the elements to be highlighted. The old buildings (Malay architecture), culture, heritage, history, community activities, 'trending' activities today, business activities, preservation, and conservation of local areas, highlighting of new images, and implementation of relevant guidelines are examples of succeeding this concept. In this study, the researchers found several significant buildings and the need for layout changes to

increase the development potential of Kampung Kuchai. To highlight this concept by providing suitable space and place for the performing arts and culture of the Perak community. The traditional performance and game activities shown to the visitors will remind us of the original place and its splendour in the past. Styling traditional clothing can recall the atmosphere of the Malay way of life in the past. Showing off the fashion will attract tourists who want to learn more about the local culture. Figure 5 below shows an example of adapting the adaptive reuse method in development. Kampung Kuchai is suitable for being used as a Live Museum that will tell about the history of the early settlement of the Malay community in Ipoh.



**Figure 5:** Example of adaptive reuse method in Kampung Kuchai.

### **Adaptation of the Heritage Trail Concept**

Kampung Kuchai has the potential to be developed as a Malay Heritage Village, which will be equipped with Heritage Trail activities. With that, it can restore the identity and spirit of the village that has long been lost. Road access systems (wayfinding) are essential in developing heritage trails to enable tourists or visitors to feel comfortable and informed, understand what the heritage is or what to highlight, and provide security. Furthermore, the use of elements for the main space, such as entrances/exits, circulation lanes, and landmarks, must be related to the images of Kampung Kuchai to create a sense of belonging for everyone who passes through it. According to Wan Ali and Ahmad (2021), architectural assets are significant because they depict Ipoh's glories and triumphs over the years; however, some heritage properties facing inappropriate façade modifications have resulted from faulty conservation efforts undertaken by the non-specialist workforce. In addition, historic and abandoned buildings in the area and surroundings of Kampung Kuchai need to be repaired to succeed in the development. The row of shophouses along with Jalan Masjid, Jalan C. M Yusuff,

Jalan Bendahara, Jalan Datoh, and Jalan Treacher Selatan has the potential to be used as a stop-point for the Heritage Trail route. Figure 6 shows the proposed route loop for the Heritage Trail that can be implemented in Kampung Kuchai.

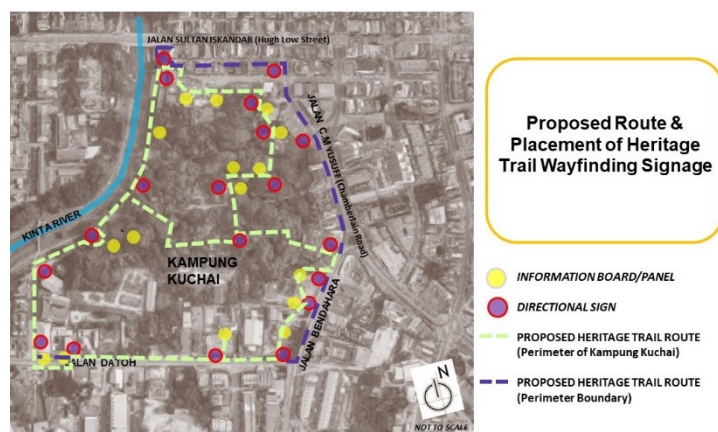
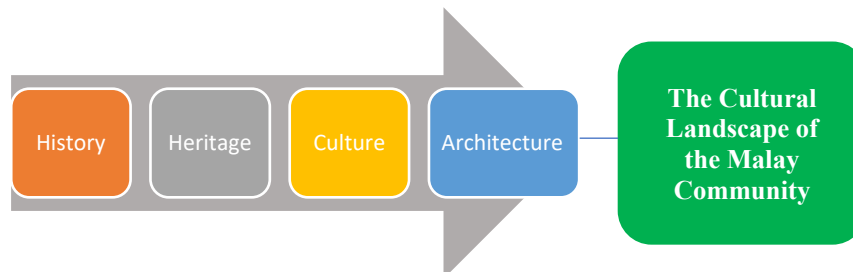


Figure 6: Proposed development of Kampung Kuchai Heritage Trail.

## CONCLUSION AND SUGGESTION

The strength of this area is not only in the development based on the nation's culture but also in implementing the development of goodwill by highlighting the diversity of building architecture, culture, and local way of life. If this project stands out, the tangible heritage (old buildings) can be saved, and the intangible heritage (culture/way of life) will be successfully highlighted to everyone. According to Mason (2002), all heritage values are related to an area's politics. It is part of the race for power and the effort that determines the future fate of a nation's heritage. The study by Harun et al. (2021) argues that traditional settlements are essential cultural land uses and landscape assets in terms of history, customs, culture, and architecture. Kampung Kuchai cannot stand independently because it still expects current land use elements to support it, such as the economic sector and property ownership. The researchers found that this area has excellent potential to be developed as a Malay Cultural Heritage Center because of its strategic location. It has sufficient resources for developing traditional villages and local historical storytelling, a new tourism product in the Ipoh City Council area. As a new development in the Kampung Kuchai, cooperation from the local community is needed because without their participation and sacrifice, the planning cannot succeed. According to Wan Ismail & Shamsuddin (2005), one of the significant challenges in protecting old or heritage buildings is ownership, most of which are privately owned. Potential to introduce Kampung Kuchai to the local and international level in tourism development.



**Figure 7:** Main Components of Malay Traditional Village Formation.

Figure 7 above shows the main components required for forming a Malay Traditional Village. The history, heritage, culture, and architecture are highlighted as the original face of the Site. The community's cultural landscape will be the main thing presented to the public because it will incorporate all aspects of the life of the Malay community. Let us look back at the theory of effective marketing strategies, namely Product (tourism), Price (economy), promotion (heritage and historical publicity), Place (urban village), People (local community), Process (concept adaptation), and Physical Evidence (known of its existence). As far as we are concerned, the potential development and planning discussed previously can be translated into reality with support from various parties involved.

### ACKNOWLEDGEMENTS

We want to thank the Ipoh City Council (MBI), Kulop Kinta Family Association, and KUTAI UiTM Perak Branch for their excellent cooperation in making this research a success. Thanks to the Institute of the Ministry of Housing and Local Government (IKPKT) for providing a platform for presenting the research results.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**

*Journal of the Malaysian Institute of Planners*

**VOLUME 20 ISSUE 3 (2022), Page 76 – 86**

## **TANAH ABANG, PERAK: THE LAYOUT AND PLANNING OF A 16<sup>TH</sup> CENTURY FORTIFIED MALAY ROYAL TOWN**

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### **Abstract**

The layout and planning of royal towns as capitals of Malay sultanates are based on principles of forming a palace complex complete with defence systems, infrastructures for economic activities, transportation systems, religious centres and surrounded by settlements. Sultan Muzaffar Shah I (1528-1549) built such a complex with a defence system in Tanah Abang as the first capital and administrative centre of his newly founded Perak sultanate. Regretfully today no trace of it have been found. However, based on the remains of the fort surrounding the area, the layout and planning of the palace complex in Tanah Abang, Kota Lama, Perak can be ascertained. Based on the period of 15<sup>th</sup>-19<sup>th</sup> centuries' layouts of other Malay royal towns as references, this study employs geomorphological study and topographic mapping to study the layout and milieu of Tanah Abang. Upon further probe the area was found to meet the essential characteristics of the layout of a Malay palace complex which often consisted of a complete and intricate network of centres for administration, defence, socio-economic activities and population concentration. The study also found that the remnants of the compacted earthen ramparts need an in-depth analysis regarding their structural condition, still well-preserved after almost 500 years.

**Keywords:** Tanah Abang, Royal Town, Malay Fortress

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## INTRODUCTION

The presence of well-preserved historic period fortifications in Peninsula Malaysia have been well documented. The most prominent among them include the forts of A Famosa, Kota Lukut and Kota Kuala Kedah. However, all of them have been continuously rebuilt and renovated well into the 19<sup>th</sup> Century and are no longer in their original forms (Illyani *et.al* 2020). The fortification at Tanah Abang is probably the earliest well-preserved Malay traditional defensive structure in its original form. The site was least likely to have been rebuilt or renovated after the demise of Sultan Muzaffar Shah I given that his successor, Sultan Mansur Shah I, had abandoned the old capital and relocated the royal seat to Kota Lama Kanan (Suprayitno, 2009). Tanah Abang is aptly categorised as *Istana Berkota* or Fortress-Palace by Kamarul & Noor Aisyah (2019), defined by a palace complex enclosed by fortifications. Aside from the sultan's palace, the royal town could have also housed an enclave for the nobles and mosque, apart from the traditional river harbour which was vital for transportation (Arbi 1985).

The Tanah Abang fortifications which consisted of substantial earthworks was first reported and mapped by the Survey Department (1919), and briefly described by Mohd Hamid Isa (1990) and Suprayitno (2009). The site is located on a 4.0848-hectare land belonging to the state government and is currently held under an agricultural title, located in a palm oil plantation (Lot no. 1721) on the eastern bank of the Perak River in Kampung Teluk Bakong, Perak Tengah District (Lat. 4° 7' 1.43" Long. 100° 59' 37.65"). On the 22<sup>nd</sup> September 1990, Mohd Hamid Isa from the Department of Museums and Antiquities had carried out a survey around the royal tomb of Sultan Muzaffar Shah I and reported the findings of rectangular defensive fort at the site. The walls were made of an earth bund 2 metres high and 4 metres thick, alongside the remains of an ancient water tank (Mohd Hamid, 1990). Suprayitno (2009) who revisited the site also mentioned the presence of the ramparts, as well as some blue and white Ming period Chinese ceramics. Upon further investigation on the other royal tombs found in the area some 16<sup>th</sup> Century Ming ceramics were found.

Studies on the position and orientation of the defensive wall as well as its layout can provide a better understanding regarding the layout and planning of a 16<sup>th</sup> Century Malay royal town on its defensive system for security, distribution of settlements, power structure and its economic status.

## THE SPATIAL SETTINGS OF A MALAY ROYAL TOWN

The layout of a royal Malay town is planned and established based on several general principles. They were mostly determined by the geostrategic position of the river which dictated the socio-economic activities, building orientations and pattern of settlements. By applying the layout principles of a royal town as a guide, it is possible to make an assessment on the arrangement and planning of the fortified royal town of Tanah Abang. Observations of other royal Malay

palaces in different locations can also be used as points of reference. Studies regarding the planning and layout of Royal Malay towns were published by Esmawee (1993), Noor Hanita *et.al* (2009), Firdaus (2010), Harun & Jalil (2012), Nurdiyana *et.al* (2017), Noor Aimran *et.al* (2018), Tengku Anis *et.al* (2018), Kamarul *et.al* (2019), Illyani (Illyani *et.al* 2018, Illyani *et.al* 2020) and Sharyzee (Sharyzee *et.al* 2020, Sharyzee *et.al* 2021).

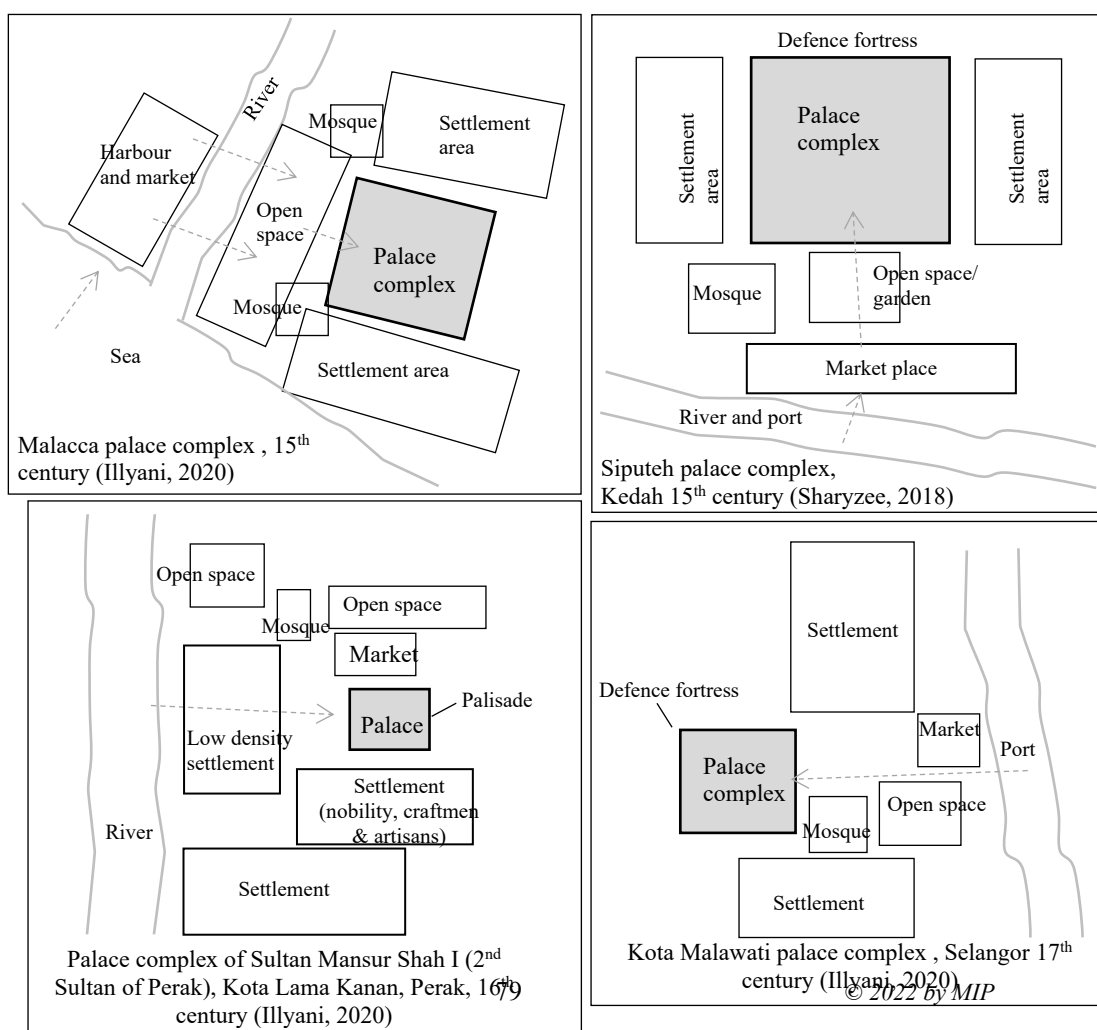
A royal complex does not only constitute a royal residence, but also incorporated spaces and/or structures for other functions such as a common gathering or audience, royal ceremonies, meeting of public representatives etc. (Esmawee 1993). Most Malay palaces were built near rivers which were often the only means of transportation and communication. The royal complex plays a pivotal role in the microcosmos of a traditional Malay town morphology and urban planning, where several buildings for administration, religious congregation, judicial trials, as well as food and weapon storages being part of the complex (Firdaus 2010; Noor Hanita *et.al* 2009; Harun & Jalil 2012). A royal complex served as a pulse around which settlements sprang up, and subsequently transformed into a multifunctional space with the rise of socio-economic activities. The morphology of a royal town is a combination of physical buildings and human activities, consisting of palaces, government and public buildings, a space for religious activities, a market place, and river port, all critical to serve the settlements (Nurdiyana *et.al* 2017; Illyani *et.al* 2018; Sharyzee *et.al* 2018; Shukri *et.al* 2020). When a monarch decreed for the establishment of a new palace complex, fortifications were among the most important structures to be erected (Kamarul *et.al* 2019; Sharyzee *et.al* 2020).

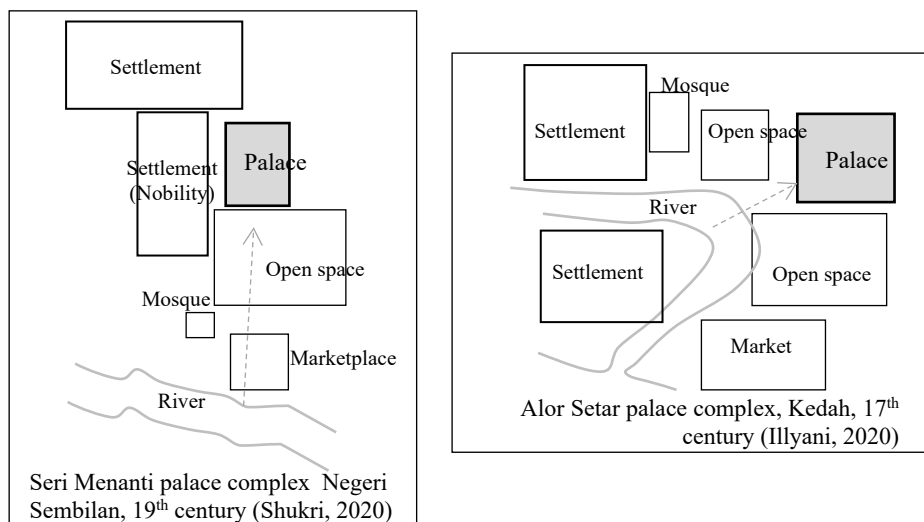
The royal residences, buildings and mosques were usually enclosed within a defensive feature either made of earth bunds, bamboo, bricks, stone, mortar and/or timber. Outside this fortification, there were open spaces, a market place, public mosque, river harbour and traditional *kampongs*, sometimes enclosed within another line of natural and/or artificial perimeter of defence. The multi-layered fortifications were meant to protect the royal town from from internal and external confrontations (Noor Aimran *et.al* 2018). Though located within the first line of fortification, the royal mosque was usually positioned closer to the public space, functioning as a medium of communication between the ruler and his people. The open space was often situated at the palace's foreground to provide the monarch an expansive view of the *kampongs* and the entrance to the town while fulfilling the need for security (Illyani *et.al* 2020). Some of the royal complexes were located centrally in the settlements between the two fortification lines, the first of which bordered the royal sanctuary itself (Tengku Anis, 2018; Shukri, 2020; Nor Aimran *et.al* 2018). Thus, the palace complex was accessed via the entrance to the place or town where the river port

or jetty was. A waterway like a river was the main transportation route apart from having the integrated advantage to a security system (Sharyzee *et.al* 2021).

Based on Diagram 1, examples of well-documented Malay royal towns included Malacca (15<sup>th</sup> Century), Kota Seputeh (15<sup>th</sup> Century), Kota Lama Kanan (16<sup>th</sup> Century), Kota Melawati (17<sup>th</sup> Century.), Kota Setar (18<sup>th</sup> Century) and Seri Menanti (19<sup>th</sup> Century). The layouts of all these royal towns were planned and arranged according to the position of the river and nature of the local terrain. The palaces were usually separated from the river banks by an open space or market place, while be surrounded or flanked by settlements and royal mosques. Similar factors could have influenced the layout, planning and arrangement of Tanah Abang. The latter two criteria of these riverine royal towns provide important points of references to suggest the possible planning and layout for the site of Tanah Abang.

**Diagram 1:** Layout of Malay palace complexes between 15<sup>th</sup> to 19<sup>th</sup> Centuries.





## RESEARCH METHOD

In order to understand the arrangement of the studied royal town and the factors considered by the ancient builders in planning the arrangement and layout, the palaeo-environment of the area and dimensions of the fortress needed to be mapped. To achieve this, the study involved three main steps; 1. Library research 2. Geomorphological studies 3. Topographic mapping. This research began with a review on previous literatures regarding the 16<sup>th</sup> Century Malay fort and history of Perak. The historical records, maps and topographical map provided important insights into the form and function of a Malay fortress in the 16<sup>th</sup> Century, as well as the cultural and political setup under which the royal town of Tanah Abang was established. It assisted in describing the physical and social environments of the royal town and its geostrategic position. Among the materials analysed in this study included some 16<sup>th</sup>/17<sup>th</sup> Century Portuguese and Malay records.

The location where a royal town should be built was planned and decided based on the geostrategic position of the locality, as well as the presence of favourable natural features for a well-defended and well-supplied settlement. Thus, it is necessary to understand the ancient landforms of the area as well as the course of the Perak river in the 16<sup>th</sup> Century. To do this, a geomorphological study was carried out by means of a field survey and analysis of the local contour map.

The contour map covering an area of 2,450 km<sup>2</sup> was generated using the digital elevation model of *Shuttle Radar Topography Mission* (SRTM), downloaded from the website of *United States Geological Survey* (USGS). The

SRTM data was extracted by using the *ArcMap* software to generate a map of 5 contour metres. The contour map produced by this software allowed observation to be made on geological and geomorphological features such as ancient river courses, river flood plains and areas with higher elevations such as hills. Detailed geomorphological survey in the study area was carried out to physically observe the images in the contour map, and to determine the presence of other surface features such as small variations in elevations.

In order to map the layout, orientation and dimension of the 16<sup>th</sup> Century fort of Tanah Abang, a topographic mapping needed to be carried out. This involved an overall and comprehensive documentation on the topography of the research area, especially variations of surface elevations due to the presence of the fortress and the royal gravesites. The topography of the area was mapped by using drone imagery, where the Mavic Pro 2 DJI model drone was flown at the height of 36.58 metres, covering an area of 28.2 acres, with a resolution of 0.5 inches per pixel. The drone had recorded and uploaded 414 photographs in 90 minutes around the area by using the application of *DroneDeploy*, which processed these data to produce an orthomosaic map and digital terrain model (DTM). Observation on the orthomosaic map and DTM allowed the fort remains to be detected. By comparing the elevation of the earthwalls and surrounding area's contour, the height and thickness of the fort could also be estimated.

The information generated from the drone images subsequently helped in plotting and digitally reconstructing the fort. By comparing the orthomosaic map and DTM with other riverine royal towns, as well as considering the geomorphological features of the area, the layout, planning and possible arrangement of the Tanah Abang royal town could then be analysed.

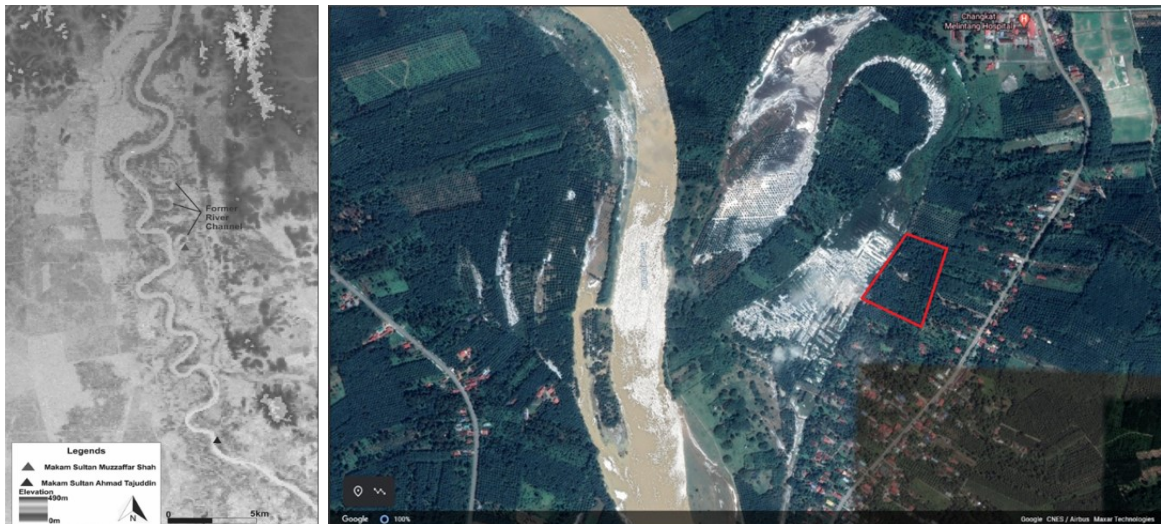
## **FINDINGS AND DISCUSSION**

The topography of Tanah Abang complex was level and in lowlands, mostly being flood-prone with a gradient direction of soil topography running from north to south (Figure 1). The undulating and hilly area flanked the eastern and north-eastern part, the highest point being 198 metres at Bukit Tunggul. The course of the Perak river changed five times particularly in the lower and middle reaches where most of the ancient capitals of Perak were located. In the past, the river would have meandered significantly, evidenced by the remains of the old dried-up banks still visible today. Present-day Tanah Abang site is located 652 metres from the eastern bank of the river and at the edge of a dried-up oxbow lake (Figure 2). This lake was previously one of the meanders that incurred a neck amputation resulting from erosion at the outer curve. The river then mostly flowed through these newly formed channels while slow and low waters at the meander cut off from the main waters gave rise to deposition at both ends of the bend in the form of clay blockages (Tjia, 1987).

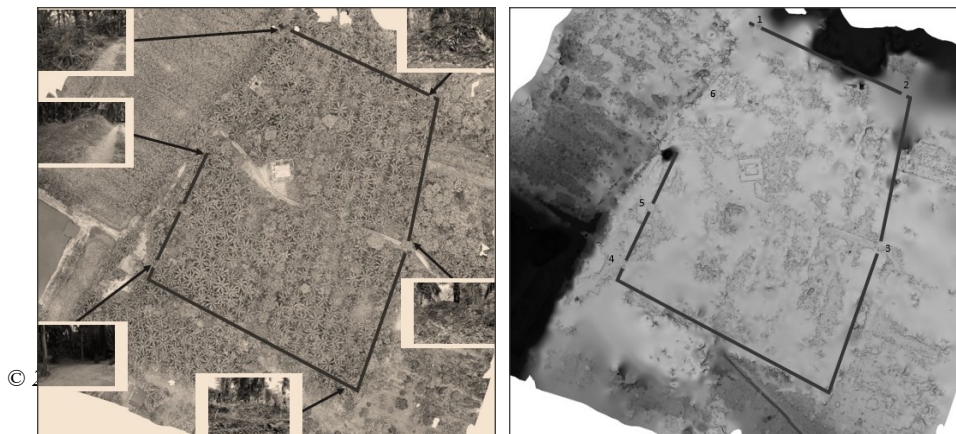


Mohd Jaki Mamat, Nasha Rodziadi Khaw, Suresh Narayanan, Hisham Atan Edinur, Noralisafik Wahid, Shyeh Sahibul Karamah Masnan, Nor Khairunnisa Talib, Nazarudin Zainun & Mohd Firdaus Abdullah  
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The orthomosaic map and DTM generated from the topographical survey had given substantial information regarding the fortress made of earth bunds, outlined in red in Figures 3 & 4. The earth bunds were made of sandy clay, with traces of organic matter on their surfaces. There are five gaps at the north, east and west walls, possibly demolished in recent times by local inhabitants. A large opening at the west wall facing the ancient bank of the Perak river was possibly meant for people and goods to the river harbour (Figure 3, 4 & 5). The height of the earth-bunds are between 1.2-2.0 metres at the south and east walls, and 0.6-1.2 metres at the north and west walls. The thickness of the walls is estimated at 3-4 metres. Within the fortifications, five ancient royal tombs were found, four of which were the original Batu Acheh which can be stylistically assigned to the 15<sup>th</sup>-17<sup>th</sup> Century (Suprayitno, 2009: Table 3.13)



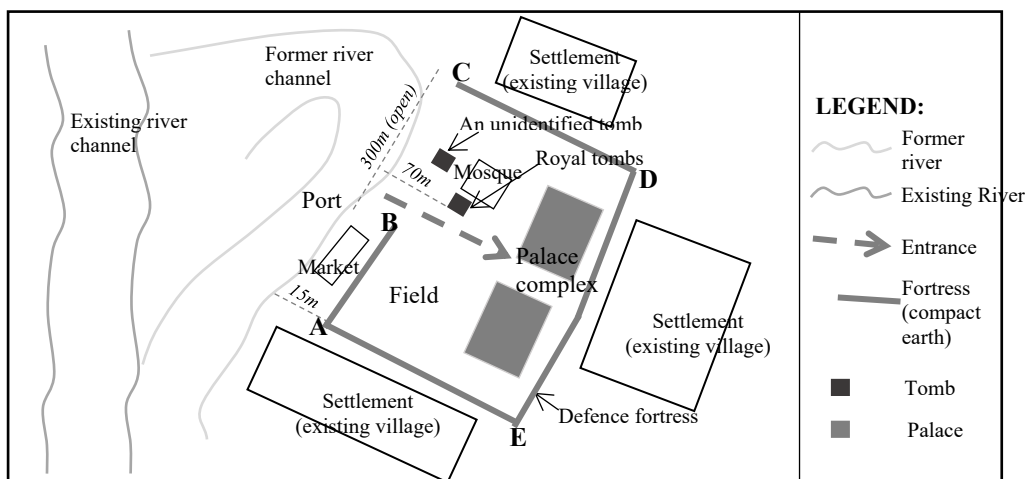
**Figure 1 (left):** Geomorphological map of the middle course of Perak River  
**Figure 2 (right):** Location of Tanah Abang royal town at the middle course of Perak River  
 Source: Google Earth



**Figure 3 (left):** Orthomosaic Map of Tanah Abang  
**Figure 4 (right):** Digital Terrain Model of Tanah Abang

As the first capital of a newly established kingdom, it was natural for Sultan Muzaffar I to construct a royal palace, mosque, market place as well as fortifications, making that area a bona fide royal and administrative complex. Based on the orientation of the area, the defensive fortifications of this complex are indicated by lines starting from points A, B, C, D and E (Figure 5). The estimated size of this complex is 700 meters wide and 900 metres long. The position of the fortress facing the river justifies the location of the jetty or river port, possibly located adjacent to the city between points A and C. The area near point B is the most accurate assumption considering the oxbow-shaped river route that facilitates control and monitoring of hostile threats from the north. The market position is between points A and B. It is the only area with flat land (15 meters wide) between the fort and the river. Point B to C is the main entrance to the palace complex based on the presence of a 300-metre-wide gap where no traces of defensive walls were found. The mosque was possibly located near the royal tombs and north wall. The function of the mosque, which connects the people and their ruler, requires a location which is easily accessible for people living outside the defensive wall.

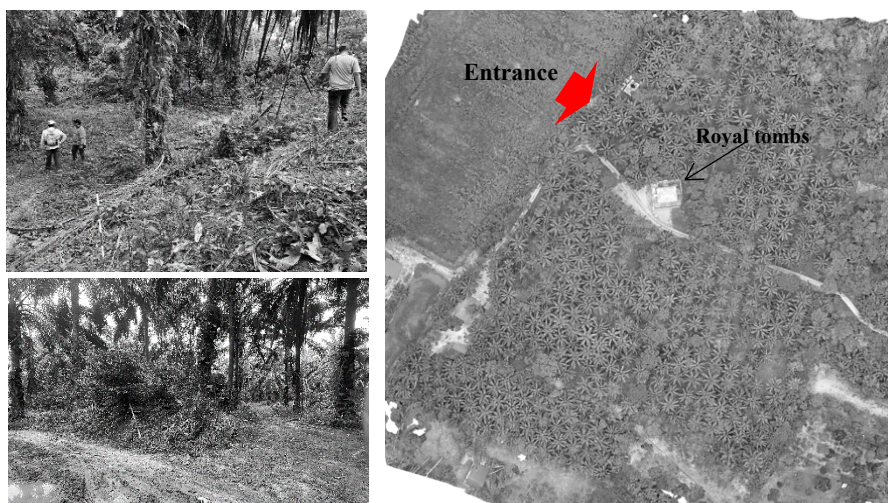
The position of the open space is located possibly parallel to the river bank, overlooked by the royal palace(s). A good view of this open space from the palace fulfils security and defensive requirement since all activities involving people and goods usually occurred in the vicinity of the waterway. Public and/or royal events were believed to congregate at this open space as well and its proximity to the river made it easily accessible. This layout of the Tanah Abang royal town suggested that the arrangement of building and spaces were planned by the 16<sup>th</sup> Century community in the area considering the geostrategic location, geomorphological setup as well as function of the area as a well-defended royal capital.



**Figure 5:** Possible configuration of Tanah Abang Royal Complex

## CONCLUSION

Historical evidence clearly stated the role of Tanah Abang as the palace complex and administrative centre of Sultan Muzaffar Shah I, which is supported by material evidences such as the remains of fortifications, tombs and city entrances. Such evidences contribute to the understanding of the morphology of this royal town. Although the earth bunds which had served as defensive features are still preserved, most traces of the palaces and other structures built within the defensive walls are long gone, probably due to the perishable nature of the building materials. However, the layout of the royal capital can still be conjecturally constructed based on the position of the defensive walls as well as consideration of the local terrain. In spite of its current isolation, Tanah Abang once had an advantageous position at a river's meander where well-defended stockades and military outposts would have been set up. At the same time, the location in the middle course of the Perak River gave the ruler control over the movement of people and goods from the upriver and downriver subordinate settlements. Thus, the site possessed the ideal geomorphologic setup and geo-strategic position for a political centre and trading post to be safely established.



To refer Figure 5; **Figure 6 (left above):** fortress at position E. **Figure 7 (right):** drone view Tanah Abang palace complex. **Figure 8 (left below):** Entrance at position C

In general, the buildings' positions in a palace complex consisted of royal residences, administrative buildings and mosques, while outside the town laid the markets, ports and villages. The presence of royal tombs within the fortification in Tanah Abang suggest the existence of a royal mosque. Apart from religious activities, the mosque was also an educational centre. It makes placing

the mosque in front of the palace and near the entrance an acceptable assumption. Markets and ports are among the main socio-economic activities at the site of Tanah Abang, based on the presence of settlements around the palace complex with wide entrances in front of and near the river. The findings at the Tanah Abang site and comparisons with previous studies in other Malay royal towns show apparent similarities in the layout of the Malay palace complex. This study thus supports the morphological theory that the layout and planning of a Malay royal town in terms of type and number of buildings and defence system requirements is strongly co-related to the riverine transport network.

### **ACKNOWLEDGEMENTS**

The authors would like to express gratitude to Universiti Sains Malaysia (USM) who had funded this study (short term grant; 304/PPBGN/6315216) as well as other various parties contributing to the success of the current study, in particular, the Perak State Museum Board, Perak Heritage Society and several individuals directly or indirectly involved. A special thanks to the Centre for Knowledge & Understanding of Tropical Architecture & Interior (KUTAI) for sponsoring 50% of the PMJ Special Edition 2022 publication fees. May this effort encourage more scholars to publish in Index Journal in the future.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**  
*Journal of the Malaysian Institute of Planners*  
**VOLUME 20 ISSUE 3 (2022), Page 87 – 98**

## **ASSESSMENT OF LANDSCAPE MAINTENANCE TOWARDS COST PLANNING: EXPERT VALIDATION ON THE CRITERIA OF SUSTAINABLE LANDSCAPE MAINTENANCE FOR PUBLIC PARK**

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### **Abstract**

In Malaysia, a substantial amount of money is spent yearly to maintain the public parks. However, there are still countless parks and open spaces that have been built with excellent facilities for the public but are being unkempt, deteriorating into disrepair and poorly maintained. Considering the importance of the public park to the community and how this is a critical link to landscape planning and maintenance, there is a need for a cost-efficiency study to set forth a strategy that best works to mitigate this issue. Adopting a quantitative research approach, the focus of this survey is to validate the expert's selection regarding attributes and parameters for the urban park maintenance checklist. The Percentage of Consensus of Agreement (PoCoA) analysis applied for this study has further demonstrated the significant sustainable landscape maintenance checklist criteria. The summary of these findings reveals the expert's preferences and validation process that further paved the conclusion on the need for sustainable landscape maintenance criteria that synergise to cost efficiency, linking to best practices for sustainable landscape planning and management.

**Keywords:** Sustainable landscape maintenance, Landscape maintenance criteria, Cost Implication, Landscape management

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## **INTRODUCTION**

Maintaining a landscape refers to the process of resisting deterioration. It means keeping the landscape in perfect condition. The aim of a landscape is many and varied, and gardens and open spaces seldom serve a single purpose. Thus, any area of amenity land may be managed to provide pleasant views or appearance, screening or shelter, nature conservation, horticultural excellence, botanical variety and education, space for sport and recreation, job-creation, or leisure gardening (Mohamed, Othman & Ariffin, 2012). Many of these purposes will be immediately self-evident from the layout of the land, but, in many others, the circumstances may have changed since the site was first laid and so obscured the original purpose. Therefore, whenever the maintenance is being planned or reviewed, it is essential to have a clear idea of the use and functions of the land.

For public open spaces, the maintenance process is somewhat more complicated (Parker & Bryan, 1989). Different individuals or groups will have other ideas and aspirations for the land, which have to be offset against the limitations of funds and even the political aspirations of the local authority. Some may favour nature conservation, and others seek relative formality or horticultural perfection. The style and intensity of maintenance will sometimes have a much more significant effect on the cost of upkeep than the organisation or efficiency of carrying it out. In general terms, Parker and Bryan (1989) highlighted that the more natural; or informal the layout and maintenance, the lower the cost. Conversely, the more formal or removed from nature, the more expensive the result. The detail or complexity of a site's layout will also influence its maintenance cost, apart from the type of landscape and its degree of formality (Cook & VanDerZanden, 2011). Simple designs are much more easily maintained by powerful machinery with fewer labour requirements for a given area. More complex layouts, with relatively small spaces, require much greater use of small equipment and manual labour and are consequently much more expensive to maintain.

Therefore, excellent and efficient maintenance plays an essential role in park safety. The issues of graffiti, garbage, vandalism, poorly maintained pathways, or planting contributed to a perception of lack of safety. These conditions insinuated that an area is uncared for and lacks supervision. If overlooked, a cycle of abuse is likely to occur in which legitimate users start to avoid an area as physical conditions deteriorate. The result is that parks can be taken over by inappropriate users and uses. Increased lighting, surveillance, maintenance and use of graffiti-resistant materials can decrease graffiti, vandalism, and inadvertent damage in a park. In turn, the area will project an image of being well cared for, and users will feel safer. In general, well-maintained areas enhance perceptions of security. Hence, considering the importance of the public park to the community and how this is a critical link to

landscape maintenance, there is a need for a cost-efficiency study that can set forth a strategy that best works to mitigate this issue.

Acknowledging the gap that relates landscape maintenance to cost-efficiency study in Malaysia, the main aim of this research is to evaluate the cost implication on the Malaysian public park. However, this paper will only focus on phase one data collection and findings that highlight the establishment of sustainable landscape maintenance criteria that best correspond to effective landscape maintenance, resulting in less maintenance cost. Significantly, the findings of this research can assist the local authorities in Malaysia in establishing the best maintenance criteria and practices with cost-efficient operation.

## **LITERATURE REVIEW**

Urban parks are essential components of everyday life and significantly contribute to users and urban residents, particularly for the quality of life of our increasingly urbanised society. The presence of natural assets and their components in the form of greeneries and water elements, and environmental services such as air, wind and microclimate stabilisation, provide social and psychological services, which are crucial for the comfort and wellbeing of urban dwellers (Rosli, Mohd Adzmi & Marzukhi, 2020; Chiesura, 2004). The Malaysian Government is fully aware of the importance of greeneries, urban parks and landscapes in the Nation's development. Acting on the awareness, the National Landscape Department (NLD) or Jabatan Landskap Negara (JLN) has intensified their effort and formulated strategies to achieve the Beautiful Garden Nation. The three strategies include:

- **Driving the Nation Towards a Higher Income Economy** – by providing a conducive landscape environment with its own identity to attract local and foreign investments.
- **Ensuring holistic and Sustainable Development** – through effective landscape planning, development and management.
- **Focusing on the well-being of the citizen** – by providing adequate landscape spaces for recreation and social interaction in Malaysian multi-cultural society.

(Jabatan Landskap Negara (JLN), 2011).

Subsequently, the National Landscape Department and the Institute of Landscape Architects Malaysia (ILAM) work collectively to materialise the Government's aspiration to build the "Malaysian Beautiful Garden Nation". Ever since, many urban parks and gardens have been developed throughout the nation, especially in Malaysian's major cities, to increase urban residents' quality of life and beautify the Nation (Ayob, Harun, & Mat Akhir, 2013). The aesthetic merit,



historical significance and recreational usefulness of urban parks enhance the attractiveness of an urban park in the eyes of potential users. Natural elements such as trees, water and greeneries in general increase the value of the land (Kolimenakis et al., 2021). Many empirical evidence signifies those parks and greeneries in the urban context contribute significantly to the urban residents' happiness and wellbeing (Saeedi & Dabbagh, 2021). Numerous studies have established the correlations between park design, physical characteristics of urban park elements and park maintenance with users' satisfaction (Chan, Si, & Marafa, 2018).

In addition, according to Bahriny & Bell (2020), park supervision, quality and effective maintenance, and access control in urban parks also contribute significantly to the feeling of safety, comfort and satisfaction among users. Liu & Xiao (2021) iterated that any well-used parks fulfil a certain level of users' satisfaction; thus, they require appropriately scheduled and effective maintenance to maintain the high level of users' satisfaction and safety. The operation and running of maintenance works involve a considerable chunk of the park's management budget. The current landscape practices and Standard Operation Procedure (SOP) in park maintenance may no longer be efficient as it requires a great extent of maintenance (Nam & Dempsey, 2020; R. Ibrahim, 2016; Zainol & Peng Au-Yong, 2016). The high maintenance cost triggered a financial burden on the states and federal governments, with smaller municipalities badly affected due to their limited maintenance budget.

As a result, proper and scheduled maintenance operations are often neglected or left out, causing significant declines in existing park quality. The rectification of run-down and poorly maintained parks has proven to be more complex and costly (Roziya Ibrahim et al., 2020). Besides being costly, the current maintenance practice of using a substantial amount of chemical fertilisers, pesticides, and fossil fuels for machinery and irrigation is also environmentally detrimental (Roziya Ibrahim et al., 2020). In addition to the national economic slowdown due to the current pandemic, budget for the landscape maintenance will continue to shrink (Mansor et al., 2019). Therefore, there is an imperative need for a paradigm shift to engage in more sustainable and effective landscape maintenance, specifically in our urban parks and other public green and open spaces.

## **METHODOLOGY**

In evaluating the cost implication on public park maintenance, this research applied a mixed-method approach, adopting Creswell and Plano Clark (2011) explanatory sequential design. However, the quantitative method was used to select the phase one data collection and analysis (expert validation on the landscape maintenance checklist) before proceeding to the second data collection

phase through a qualitative enquiry. Since this paper will only discuss phase one data collection and findings, the questionnaire survey's focus is to validate the expert's selection regarding significant attributes and parameters for the urban park maintenance checklist. In establishing the criterion and parameters for the checklist, the focus of the respondent for this questionnaire survey will be drawn to experts who practise within the Malaysia landscape industry. These experts range from academics, government sectors (including the local authority), landscape firms, landscape contractors, developers and nursery operators. With their experiences and knowledge about landscape planning and design, with construction and maintenance, it is expected that the responses received from these experts can establish a reliable and valid criterion for the landscape maintenance checklist.

Nevertheless, the sample size for the expert validation respondent, as suggested by scholars' ranges between 2 – 20 individuals (Armstrong, Cohen, Eriksen, & Cleeland, 2005; Colson & Cooke, 2017; Rodrigues, Adachi, Beattie, & MacDermid, 2017). However, due to the 'varies application of and implementation by', namely, Consultant, Contractors, Local Authorities and Private Agencies, we opt for Rodrigues's and Armstrong's approach by having 15 expert panels for the validation process. These expert panels were identified based on ILAM (Institute Landscape Architecture Malaysia) directory members. Notably, two sections were developed for this questionnaire: Part A - Respondent background and Part B- Criteria of the public park maintenance. A Likert scale of 1 to 10-point was used to identify the expert's rating pattern toward the outlined criteria for Part B. Ten parameters were outlined in this questionnaire sheet, with detailed attributes listed for each category. These criteria were organised based on the specific theme derived from the literature review exercise. All criteria highlighted in this questionnaire survey have comprehensively covered the initial landscape planning and design development phase, construction and implementation phase, and the scheduled maintenance period. Expert respondents were encouraged to highlight or suggest additional criteria that best support the presently outlined parameters. This explanatory sequential design analysed this quantitative data using the Percentage of Consensus of Agreement (PoCoA) and further described it through a descriptive quantitative approach. Through PoCoA, the percentage value considered as consensus was arbitrarily set at either 66.7%, 75%, 80% or 100% agreement among respondents (Ayob, 2020; Lau, 2010; Watson, Watson, Ackerman, & Gronvall, 2017). Utilising this basis, all attributes with a Percentage of Agreement equal to or higher than a Cut-off Point Percentage of 80.0% were further included in the final established landscape maintenance checklist.

## EXPERT VALIDATION ON THE CRITERIA OF SUSTAINABLE LANDSCAPE MAINTENANCE: ANALYSIS AND DISCUSSION

General information was asked in Part A of this questionnaire to establish expert bonding for this survey. 53% of the respondents in this survey were female, and 47% were male. Figure 1 illustrates that 53% of this sample is between 41-50 years old. This was followed by 34% of the experts aged between 31- 40 years and only 13% from this survey sample aged below 30. Furthermore, the majority of the expert stated that they have been practising in the landscape industry for more than seven years, with three respondents claiming to have 20 years of working experience in this industry. This information has further signified the expert's knowledge and ability regarding Malaysia's landscape maintenance operation practice. The final question for this section has illustrated that the variety of respondent backgrounds with 34% of them practise as landscape consultants, 20% of the sample practise as landscape contractors as well as working with the local authority (Landscape Department), and the remaining balance of the respondent work with the government sector and also practise as academic from the local higher institution (see Figure 1).

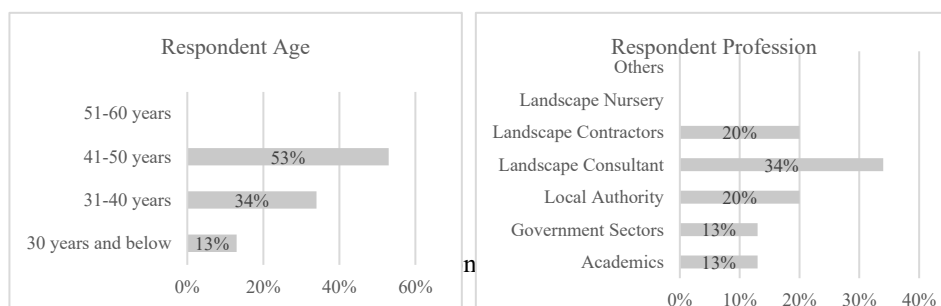


Figure 1: Respondent Profile

### *Verifying The Criteria for Public Park Maintenance: Expert Selections*

In Part B of this questionnaire survey, the experts were asked to rank between 1–10-point Likert Scale criteria for sustainable landscape maintenance based on their knowledge, understanding and expertise. Under this section, ten landscape maintenance themes have been outlined, and these include: 1- Plant strategically; 2- Fertilise organically; 3- Soil and composting; 4- Water efficiency; 5- Pruning and shearing strategically; 6- Pest and weed control; 7- Sustainable hardscape materials; 8- Minimising fuel consumption; 9- Sustainable drainage system (SuDs); and 10- Sustainable tools and equipment. All criteria highlighted in this questionnaire survey have comprehensively covered the initial landscape planning and design development phase, construction and implementation phase,

and the scheduled maintenance period. Under Theme I-Plant Strategically, nine criteria have been developed for the expert validation process. The findings of this quantitative survey show that most of the respondents strongly agree with these criteria highlighted in Table 1. Criteria 1(a) to (l) maintain a high score rating that ranges only between 7-10 points. The majority of results (except for criteria (g) pointed out from the Likert Scale score 10 (strongly agree) were above 50%, thus indicating the validity of criteria developed under this theme. Interestingly, parameters (a), (b), (d), (e), and (l) received a consistent score rating of 9-10 points (strongly agree). These results assertively portrayed the critical activities that must be considered by all related parties involved in landscape projects for further success of the landscape maintenance operation.

For Theme II: Fertilise Organically, only one highlighted criterion has been developed. This criterion emphasises- (a) Applying organic fertiliser instead of chemical. Interestingly, experts have validated this criterion with strongly agree where 93% of the experts confirm that this criterion can successfully link to effective and sustainable landscape maintenance operation. For Theme Three: Soil and Composting, the findings of this expert survey have demonstrated that criteria 3 (a) and (b) received an excellent of 9-10 points scoring range, thus indicating that recycling garden disposal material and reasonable practice of mulching can improve soil condition while retaining the soil moisture. This scoring and percentage results portray that expert acknowledge the activities outlined through items (a) and (b) as these can successfully link to sustainable landscape maintenance practice. Experts also validated that applying soil aeration helps fertile soil and improves drain soil, with 60% of the survey sample agreeing strongly with this statement.

Another essential parameter developed for the sustainable landscape maintenance checklist is water efficiency. It is undeniable that water plays a vital role that links to plant growth and its survival. Hence, five criteria have been developed to support Theme IV: Water Efficiency. Interestingly, 93% of the experts strongly agree (rated between 9-10 points) with criteria (a) applying drip irrigation system being validated by the experts as it contributes to sustainable landscape maintenance. The same percentage of experts (rated between 9-10 points) have validated that creating irrigation zones can contribute to an efficient watering system. A similar percentage (93% with rated score 9-10 points) goes to criteria (d) applying super absorbent polymer (SAP) where experts have strongly agreed that this growing gel helps to retain and improve the usage of water if it is added in planting media, especially during the initial plant growth (see Figure 2). A significant score is manifested for criteria (e), where most experts strongly agreed and validated rainwater harvesting as an effective and sustainable watering system, thus synergising to water efficiency practice.



**Figure 2:** SAP- industrial-grade water retention material for new planting  
Source: Author, 2021

Furthermore, Theme V: Pruning and Shearing Strategically is among the primary task involved during the operational maintenance phase. The results for both criteria demarcate the importance of pruning strategy and tree risk assessment as the sustainable activities included in the landscape maintenance operation checklist. Considerably important, Theme VI: Pest and Weed Control indicate that the experts acknowledge IPM, pest and disease control maintenance programs and weeding and loosening of the soil as the essential activities that result in sustainable landscape maintenance practices. The criteria developed for this study do not cater only for soft landscape purposes but are comprehensive enough to include hard landscape, labour skill (quality), and machinery. Hence, the focus of Theme VII- Sustainable Hardscape Materials emphasises the selection of walkway materials, energy-saving and reclaim items, and workmanship quality. Similar to criteria VI, experts have rated 8-point scoring and above, thus indicating that they confirm all six measures constructed under the theme of sustainable landscape materials are relevant. Notwithstanding, the high rated score is evident by criteria (c) use of energy-saving equipment, (e) use of local materials, and (f) ensuring the quality of materials and workmanship. These three parameters are getting 9 to 10 points scoring while the remaining criteria (a), (b), and (d) were also relevant as experts rated a high score (8-point and above) that explain their recognition toward these criteria establishment.

Further in Theme VIII, this section focuses on fuel consumption related to a green and sustainable environment. This parameter is developed to align and support the current Malaysian aspiration toward a low-carbon city goal. Hence, only one criterion was established under this section - (a) Choosing hybrid vehicles and alternative energy sources for landscape maintenance tools and equipment. Significantly, the experts rated a high score with 8-points and above (strongly agree), with 53% of the expert sample rated 10-points for this criterion.

The result confirms that experts recognise this attribute that dynamically synergises with a sustainable approach, linking to landscape maintenance practices.

Since the drainage system is also a part of the landscape maintenance focus, Theme IX: Sustainable Drainage System received a significant scoring result, where 93% of the experts rated 8-points and above (strongly agree) for this criteria rating. Subsequently, the findings of this survey exhibit the experts' recognition of Theme IX establishment. The final theme designed for this checklist emphasises sustainable tools and equipment. The criterion designed under Theme X focuses on (a) using advanced technology in maintenance, such as woodchippers machines, to solve the problem of large dumping ground space and support recycling practices. Using advanced technology in landscape maintenance operations can offer significant benefits to maintenance operators. With this focus, the experts have rated a high score of 8-points and above (strongly agree), thus portraying this criterion's significance and relevancy in the sustainable landscape maintenance checklist. This result confirms the benefit of utilising advanced technology for landscape maintenance while supporting recycling practices that collaborate with sustainable and green approaches.

## CONCLUSION

The findings based on the expert validation process enhanced the relevancy of the designed criteria as most experts have validated and confirmed that these criteria are significant for landscape maintenance checklist that comprehend the present green and sustainable approaches. Applying the Percentage of Consensus of Agreement (PoCoA) analysis, each expert is required to rank using the 10-point Likert Scale according to their knowledge and expertise, guided by the outlined checklist presented in the questionnaire. With the Cut-off Point Percentage of 80%, the PoCoA analysis has demonstrated that this Phase 1 result indicated 91% validity. The suggestion of the sustainable landscape maintenance checklist is depicted in Table 1 below. Hence it is evident that experts acknowledged these criteria, linking them to effective operational maintenance associated with cost-efficiency operation.

**Table 1:** The established Criteria for Sustainable Landscape Maintenance

NO	CRITERIA FOR SUSTAINABLE LANDSCAPE MAINTENANCE
<b>1</b>	<b>Plant Strategically</b>
a.	Applying native and local species in landscape design.
b.	Landscape design should retain as much as possible the existing plants and vegetation.
c.	Applying the less-water consumption landscape design (Xeriscaping).
d.	Planting selection (in landscape design) should include various heights and habits to enhance the ecological value and biodiversity.

e.	Applying hydro zoning (group shrub planting) for effective water consumption.
f.	Trees to be the main component of plant's collection since it requires less maintenance in comparable to shrub and ground cover.
g.	Applying slow growing species in planting scheme for less maintenance.
h.	Plant selection should be based on the prevailing environment condition.
i.	Utilise the nitrogen-produced plants from Fabaceae or Leguminosae family especially for an unproductive soil (symbiosis approach-plants that can provide minerals to other plants).
j.	Applying rain garden or bioretention area.
k.	Applying bigger size planting holes for new planting and to the areas with low annual rainfall. The suggested planting hole size is between 2-3 sizes of the root ball.
l.	Consider to apply root barriers to control fast root development, especially in urban landscape.
<b>2.</b>	<b>Fertilise Organically</b>
a.	Applying mix use of organic and chemical fertilisers to encourage plant growth.
<b>3</b>	<b>Soil and Composting</b>
a.	Recycling garden disposal materials to be used as mulching or organic fertilisers (cut grasses/grass clipping and dead leaves could be used for mulching. This helps to improve the soil texture and reduce the cost of disposal).
b.	Effective practice of mulching for retention of soil moisture. Suggested for compost mulching (include dried leaves, grass clipping, branches, crushed stone, shredded bark, coconut mulch, etc.).
c.	Applying soil aeration (for rich, fertile and properly drain soil).
<b>4</b>	<b>Water Efficiently</b>
a.	Applying drip irrigation system to reduce overspray towards other plants or structures.
b.	Applying root watering system for high efficiency (enable water, oxygen, and nutrients to bypass compacted soil thus easily reach the tree root system).
c.	Creating irrigation zones for efficient watering system.
d.	Utilising super absorbent polymer (SAP) for improving water use efficiency (growing gel for water retention). This additional water-holding material can be added in planting media as natural fibres and no-toxic gel (especially during initial plant growth).
e.	Practice rainwater harvesting for effective use of water source especially for watering the plants.
<b>5</b>	<b>Pruning and Shearing Strategically</b>
a.	Pruning is a long-term maintenance strategy and should be done by trained personnel. Types of pruning may include structural pruning, crown cleaning, crown thinning, crown restoration, etc.
b.	Conducting tree risk assessment for tree safety management.
<b>6</b>	<b>Pest and Weed Control</b>
a.	Applying the Integrated Pest Management (IPM) for an effective and environmentally sensitive approach to pest management.
b.	Include the maintenance program for pest and disease control.
c.	Perform weeding and loosening the soil.
<b>7</b>	<b>Sustainable Hardscape Materials</b>
a.	Reuse of old building materials in new construction.
b.	Applying permeable paving (pervious concrete and asphalt) that easily allow filtration and flow of stormwater runoff.
c.	Use energy saving equipment such as solar energy lighting or solar water pump system.
d.	Use reclaimed materials as part of landscape design (reuse and recycle vegetation, rocks, and soil generated during construction).
e.	Use of local materials to promote sustainability while enhancing the local character of the place.
f.	Ensure quality of materials and workmanship (to enable all works on the ground are according to design standards and specification).

<b>8</b>	<b>Minimising Fuel Consumption</b>
a.	Choosing hybrid vehicles and alternative energy source for landscape maintenance tools and equipment.
<b>9</b>	<b>Sustainable Drainage System (SuDS)</b>
a.	Applying the sustainable drainage system (SuDS) for better surface management and control.
<b>10</b>	<b>Sustainable Tools and Equipment</b>
a.	Use advanced technology in maintenance such as woodchippers machines to solve the problem of large dumping ground space and support recycling practices.

Source: Author.

## ACKNOWLEDGEMENTS

We would like to express our appreciation and gratitude to the Institute of Landscape Architecture Malaysia (ILAM) for awarding us the research grant title ‘Evaluation of the Cost Implication on the Public Park Maintenance’. Particularly a special thanks to the Centre for Knowledge & Understanding of Tropical Architecture & Interior (KUTAI) for sponsoring 50% of the PMJ Special Edition 2022 publication fees. May this effort encourage more scholars to publish in Index-Journal in the future.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**  
*Journal of the Malaysian Institute of Planners*  
**VOLUME 20 ISSUE 3 (2022), Page 99 – 111**

## **THE SIGNIFICANCE OF ROOF DECORATIVE ARCHITECTURAL COMPONENTS OF RUMAH LIMAS BUMBUNG PERAK (RLBP) TOWARDS HERITAGE INTERPRETATION OF PERAK TENGAH**

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### **Abstract**

*Rumah Limas Bumbung Perak (RLBP)* is one of the traditional Malay houses of Perak that can be seen in Perak Tengah. Perak Tengah is one of the regions in Perak with a rich collection of historical remnants such as traditional houses, tombs, and arts and crafts. The cultural heritage value it has is highly potential to be highlighted that can help boost the area's rural tourism. However, the lack of heritage interpretation due to limited research has disabled the effort to promote the rural heritage of Perak Tengah. Therefore, this research aims to understand and interpret the roof decorative architectural components of one of the traditional Malay houses of Perak, which is the RLBP, as part of the tangible heritage of Perak Tengah. Data collection was conducted using multiple case studies. A total of 20 roof decorative architectural components of RLBP have been analysed in the data analysis. The findings of this research contribute toward establishing the character and identity of the decorative architectural components of the RLBP as one of the tangible heritage values of Perak Tengah, thus enhancing the heritage interpretation of the area.

**Keywords:** decorative architectural components, roof, *Rumah Limas Bumbung Perak*, characteristic, heritage interpretation

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## INTRODUCTION

In all of the arts and technologies created by humans, architecture is the most visible form that manifests the cultural articulation of the people through the built form embedded with local identity and spirit (Nangkula Utaberta & Rasdi, 2014). The recent government policy of *Dasar Kebudayaan Negara* (DAKEN) 2021 has also outlined one of the important thrusts that strategized to encourage the research management, development and documentation pertaining the cultural treasure, discovery of old knowledge and the importance of protection and conservation effort of cultural heritage in architecture and built heritage towards shaping Malaysia as a developed and united nation that displays national identity and personality. The historical display of cultural assets such as language, literature, music, food, clothes, landscape and architecture may contribute to a region's heritage values and characteristics. Cultural heritage can be promoted through heritage interpretation to strengthen national, regional, and communal identities. Heritage interpretation is an inspirational and informational process that aims to expose the meanings of our cultural and natural resources (Harun & Mat Zin, 2018). Many tourists want to learn about the places they visit, and heritage interpretation can include factual information, such as building history, architectural styles, and construction techniques (Aplin, 2002 & Timothy, 2011). Interpretation and presentation of cultural heritage aspects should be promoted and shared with communities and tourists to raise heritage awareness (Lenzerini, 2011).

Rashid, Alauddin, Baharuddin, & Choo (2019) highlighted that Perak Tengah has various collections of historical remnants such as traditional houses, tombs, and traditional arts and crafts. There are 2 types of traditional Malay house in Perak, which is *Rumah Kutai* and *Rumah Limas Bumbung Perak (RLBP)* that contributes to the tangible heritage of Perak (Rashid, 2017). Tangible heritage assets should be preserved and promoted as part of the rural heritage of Perak, thus enhancing the economy and development of the rural settlements of the area (Harun, 2018). More than 20 cultural heritage resources are found along the riverbanks of Perak, including historic buildings with their own identity and characteristic (Harun & Mat Zin, 2018). However, it is not being promoted wisely, mainly via presentation and heritage interpretation. Among the many reasons for this issue is the lack of information on heritage resources (Harun & Mat Zin, 2018). Therefore, this research aims to understand and interpret the roof decorative architectural components of one of the traditional Malay houses of Perak, the RLBP, as part of the tangible heritage of Perak Tengah. The finding of this research is expected to enhance the heritage interpretation of Perak Tengah.

## RESEARCH BACKGROUND

### *Decorative Architectural Components of RLBP*

Nasir (1986) indicates that the decorative architectural components of the traditional Malay house of Perak can be commonly identified from the traditional houses located in the Perak Tengah and Kuala Kangsar. The carvings of the decorative architectural components still retained the authentic Perak style carving. The decorative architectural components are commonly located in the roof eaves, door, window panel and internal room partition. Meanwhile, Saleh et al. (2018) claimed that there are 9 decorative architectural components in the RLBP with 4 decorative architectural components on the roof, comprised of *Tunjuk Langit*, *Kepala Cicak*, *Papan Layang*, and *Papan Meleleh*. Whilst from the research particularly conducted on the decorative architectural components of RLBP, Rashid, Choo, Ramele, Baharuddin, & Alauddin (2018) concluded that the decorative architectural components of RLBP contribute to the exquisite characteristic of RLBP house architecture. The research found 9 decorative architectural components of RLBP that is comprised of *Tunjuk Langit*, *Kepala Cicak*, *Ande-Ande*, *Kayu Pemeleh*, *Kekisi*, *Gerbang*, *Kepala Pintu*, *Kepala Tingkap* and *Pagar Musang*. In the recent measured drawing research works conducted by Yaa'cob, Yusof, & Nordin (2021), the research found that the decorative architectural components of RLBP can be identified at the half wall of the *serambi*, the wall, the internal partition wall, on top of the interior door, on top of the entrance door, on top of the window, at the roof eaves and the bottom end of the wall. From the review conducted on the decorative architectural components of RLBP, it can be understood that the roof decorative architectural components of RLBP are comprised of *Tunjuk Langit*, *Kepala Cicak type I*, *Kepala Cicak type L* and *Papan Cantik* (fascia board). Although there has been little research highlighting the decorative architectural components of the RLBP, most of this research focuses on identifying the decorative architectural components of RLBP.

### *The Attributes of Decorative Architectural Components*

According to Nasir (1986), the decorative architectural components in the traditional Malay house comprise woodcarving elements. The attributes of woodcarving elements are commonly comprised of carving category, carving element, pattern, motif, placement, carving technique and function. Meanwhile, Said (2002) stated that the physical form of carved components could be regulated by types of incision and perforation, principal form and arrangement, design principles and motifs that regulate the carving composition. Hanafi (2000) discusses the woodcarving characteristic that comprises the types of woodcarving element, decorative function, motif and pattern of woodcarving in the traditional Malay house of both the east coast house and the west coast house. In the other

research, Rashid (2007) proposed an inventory checklist for studying carved components that outlined the types of carving, composition, design, pattern, motif, flower code, leaf code and carving component. Whilst from the master carver himself, Nordin (2009) explained in his book that the character of the carved components comprised of the form of the carving that exists either in the 3-dimensional or 2-dimensional carving, carving motif, pattern, style and the various type of incision and perforation used in the carving. On the material of the carved woodcarving components, Said (2005) & Leigh (2000) indicate that the carved woodcarving components are commonly made of *cengal* wood.

On the physical attributes of decorative architectural components of RLBP, Abdul Wahab et al. (2014) stated that *the gerbang* is one of the essential decorative architectural components found at the entrance porch of the RLBP. It functions to shade the *serambi* area from direct sunlight, where its attribute is comprised of various colours, patterns and motifs. The most commonly found motif is flora, geometry, lattice and spider web motif and the lattice motif. According to Saleh et al. (2018) that, decorative architectural components of RLBP are made of wood of the *meranti* and *chengal* types. He added that the attractive pattern and colourfully decorated gate at the *serambi* entrance equipped with the head of the newel post of the stairs heading to the *scramble*. This newel post's head was found carved with various motifs and shapes with the stairs' attractive, smoothed and carved railings. Yaa'cob, Yusof, & Nordin (2021) discussed the placement, perforation and incision types and the motif types of the decorative architectural components of RLBP. 3 types of perforation were found in the decorative architectural components, which are; direct piercing (*tebuk terus*), embossed carving (*tebuk timbul*) and low piercing carving (*tebuk layang*). Carving with direct piercing is found from the decorative architectural components located at roof eaves, the top of the door, window, wall and the internal wall. Apart from this, the motif of flora, fauna, calligraphy and geometry is among the most commonly found motif in the study. The calligraphy motif is commonly found in the carving on top of the door, the flora motif is found in the carving that is located on top of the door and window, whilst the geometry motif is commonly made from the combination of motifs that produced a unique geometrical motif.

## **METHOD**

### *Sampling procedure*

This research was approached using the exploratory research approach. In exploring the physical attributes of the decorative architectural components of the RLBP, the method used in collecting the research data is using multiple case studies. The data was collected through fieldwork observation and measured drawing of details method. There is an overall of 6 RLBP houses chosen from the

area along *Sungai Perak* as the samples gained from the RLBP houses inventory list published by Choo, Rashid, & Nazrul Helmy (2020). The selection of the 6 RLBP houses was based on the parameter set in this research in ensuring only the early type of RLBP house was chosen as the sample, which is; 1) The age of the house to be more than 80 years old, 2) The house is decorated with decorative architectural components, 3) The house roof is comprised of the *Limas Potong Perak* roof, 4) The window of the house is comprised of full-height window (*tingkap labuh*), 5) The house is located in Perak Tengah area, 6) Ease of accessibility to the house for the researcher to conduct the research. The sample parameter was developed from reviewing past research from previous scholars on the architectural character of RLBP. Since this study involves the tangible heritage of the traditional Malay house of Perak, the sample selection is limited only to the early type of RLBP rather than the overall RLBP that also includes the modern version of RLBP.

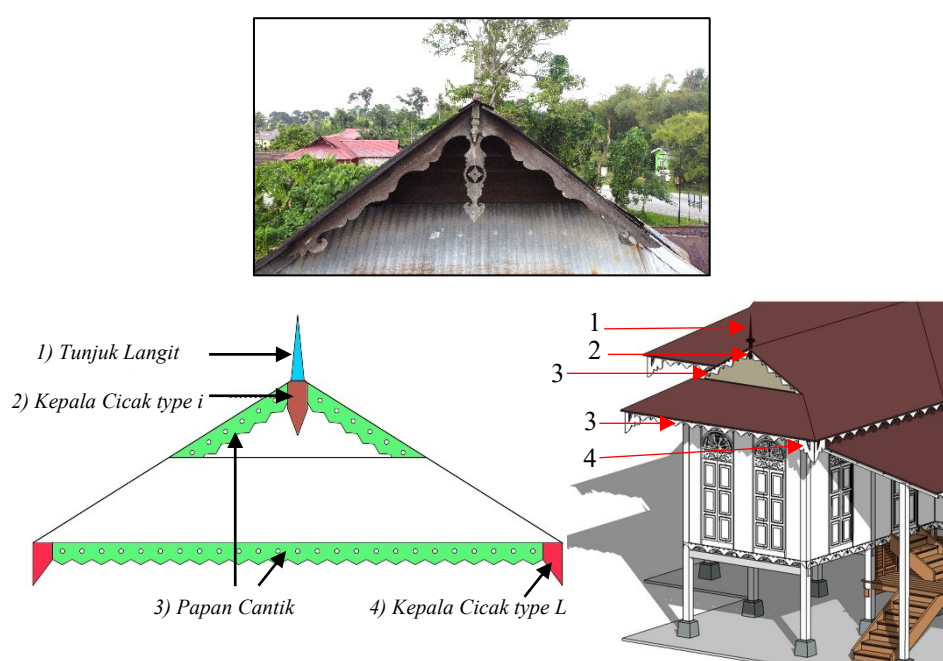
#### *Fieldwork Observation & Detailed Measured Drawing*

The fieldwork has been conducted on all 6 samples of RLBP houses chosen. The data on decorative architectural components were collected via observation. Throughout the observation, the researcher took field notes on the background information of the house. Besides, sketches on the house plan and placement of the decorative architectural components were taken and recorded. The researcher took the pictures using a digital camera, whilst a Mavic DGi Drone camera was used to take a picture of the highly inaccessible area. The researcher conducted measured drawings of details to gain further data on measuring the decorative architectural components. The measurement was collected using the manual measuring tools and the digital measuring tools recording the measurement data. The data gained from the fieldwork have been sorted and analysed accordingly by the researcher according to the attributes of the form type, form configuration, placement, shape, Malay principal form, motif, pattern and composition as identified earlier in the literature in analysing the physical attributes of the decorative architectural components of RLBP. The findings are discussed in the following section.

### **FINDINGS**

This research finding will discuss the physical attributes of the roof decorative architectural components of the RLBP. From the analysis conducted on the overall 20 decorative architectural components found in the 6 RLBP sample houses of the research, it can be found that the roof decorative architectural components of RLBP is comprised of 2 types of form, which is panel form type and the pole form type. The panel form type is found in the roof decorative architectural components such as *Kepala Cicak Type i(KCi)*, *Kepala Cicak type*

*L(KCL)* and *Papan Cantik (PC)*. The form type of *Tunjuk Langit (TL)* is found to be in the pole form type. This finding is in parallel to the previous research by Othman (2019), Utaberta et al. (2012) & Nordin (2009) that stated the form of decorative architectural components exists in the form type of either panel of the pole form type. In terms of the form configuration, the panel form type of the roof decorative architectural components of RLBP – KCi, KCL and PC is comprised of the single form configuration, whilst the pole form of TL is comprised of the single-piece pole form.

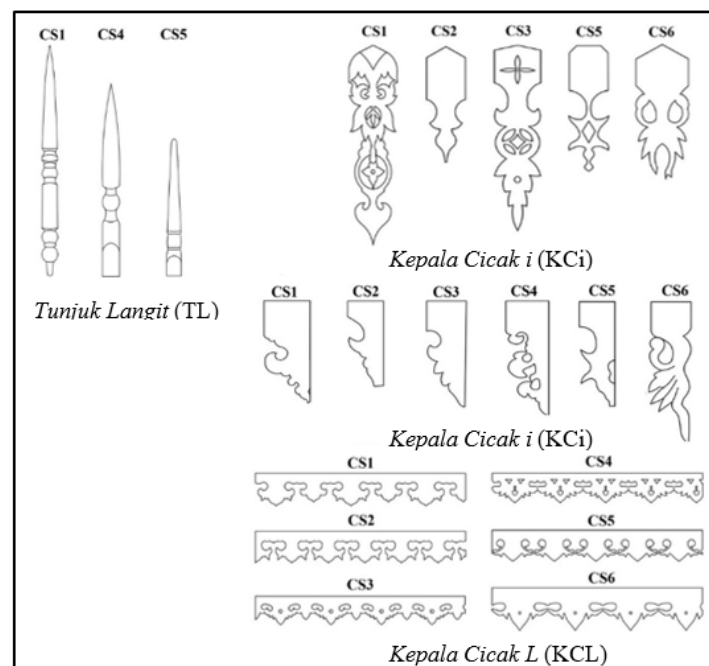


**Figure 1.** The placement of roof decorative architectural components at the roof of the *Rumah Limas Bumbung Perak (RLBP)*.

Source: Author

From the analysis of both the form type and the form configuration of the roof decorative architectural components of RLBP, it can be found that the panel form type in the single panel configuration is the most prevalent form typically found in the roof decorative architectural components of RLBP. The form and configuration of the panel are linked to fulfilling a variety of purposes on the roof of the RLBP house. The panel was found to function as a weathering board that sheds the seepage of rainwater from entering and damaging the roof components and also functions as a covering panel to cover and beautify the bare end of the RLBP roof structural components such as the roof ridge and rafters.

Meanwhile, the pole form of the *Tunjuk Langit* that is located at the end of the roof apex of the RLBP house functioned to connect the roof ridge and the *Papan Cantik* of the roof. Apart from this, the single-pole form of the *Tunjuk Langit* is attached to several symbolic meanings. Nakula (1985) explained that the single pole form of the *Tunjuk Langit* is symbolic to represent and remind the viewer of the core of the Islamic belief in the oneness of God, which is Allah. In some region, *Tunjuk Langit* is also known as the “*Nisan bumbung*”. The placement and form of *Tunjuk Langit*, similar to the form of the “*nisan*” (grave marker) that exist in pair, placed at the *Rumah Ibu* roof are embedded with a symbolic message in reminding the people of the impermanence of life, the inevitable death that awaits every single soul in their life.



**Figure 2.** A total of 20 roof decorative architectural components of the *Rumah Limas Bumbung Perak* (RLBP) analysed in the research.

Source: Author (2022)

The link between the form and configuration of the roof’s decorative architectural components and the practical function demonstrates the usefulness of the decorative architectural components that do not only function for decorative purposes. This finding follows the suggestions made by Ismail (1997) & Jamal (1992) that the Malay arts and architectural object is not only beautiful and exquisite in their appearance but also relates to the functional aspects of the



objects. In terms of the shape and principal form found in the roof decorative architectural components of RLBP, there are a few principal forms found in the roof decorative architectural components of RLBP, namely, *Lebah Bergantung*, *Stupa* and also *Punca Kala*. The principal form of *Lebah Bergantung* was found to be comprised of the inverted triangle shape. *Stupa* form was found to be comprised of the upright triangle shape. However, *Punca Kala* was found in the carvings of the Kepala Cicak type I (KCi) panel as the source of "*Punca*" of the carving panel. The most common principal form found in the roof decorative architectural components of RLBP is the *Lebah Bergantung* form. The inverted triangle shape of the *Lebah Bergantung* is attached to a certain symbolic meaning. According to Said (2002), several forms are commonly carved by the traditional Malay carver in the carving of the decorative architectural components. All of this form is embedded in symbolic meaning. Titof (2018) & Affendy (1994) explained that the form of *Lebah Bergantung* is derived from the analogy of the hanging bees. The symbolic meaning in this form is extracted from the personification of the hanging bees, viewed as hardworking, beneficial creatures that produce nutritious honey for the people and characterized as peaceful but brave creatures. This good personification of the bees is intended to be delivered as a message to the community in shaping a good individual and societal characteristic. This philosophical message or advice is conveyed via the metaphorical form of the roof decorative architectural components of *Kepala Cicak Type i*, *Kepala Cicak Type L* and *Papan Cantik* of the RLBP as a means of being gentle in conveying advice to the community that reflects the culture of "*berkias*" – decorative expressions in the communication of the Malay people. In addition, the principal form of *Stupa* that was found in the *Tunjuk Langit* form of the RLBP also reflected a particular symbolic meaning. As stated by Noor & Khoo (2003), the form of *Stupa* is the other form of *Gunungan*, which is characterized as a mountain-peak form. The meaning attached to the form is similar to the meaning attached to the form of *Gunungan*. As explained by Choo et al. (2021); Rashid (2007); Yahya, 1995 & Nakula (1985), the pre-Islamic motif and form has undergone an evolutionary process in which the motifs' usage, meaning, and design have been syncretized, appropriated, and conform to Islamic principles. The meaning of *Gunungan* has been incorporated and adopted into the mystic (Sufism) Islamic belief of the Malay in the Malay-Islamic era. The form is attached to the meaning that symbolizes the evolution, enlightenment and ascension journey towards Allah (unity in and with the divine). Meanwhile, the *Punca Kala* form found in the *Kepala Cicak Type i* panel is symbolic of the meaning related to time, symbolizing the natural cycle and occurrences linked to the temporal existence of the world, except for Allah S.W.T. According to Wan Su Othman (1984), cited in Inangda, Keumala, Arbi, & Faisal (2012), the form of *Punca Kala*, that has

been used as the starting form in the carving panel symbolizes a tauhid concept that nothing in this world is eternal except for Allah S.W.T.

According to Nordin (2009) & Othman (2019), a carving panel is comprised of motifs where the flora motif is the most common type of motif used in a carving panel. This motif is carved in several patterns such as single pattern, frame pattern and complete pattern with frame. Meanwhile, the motif is commonly carved using carving compositions such as *Awan Larat*, geometry, calligraphy and combination composition. This carving composition is commonly found in a detailed carving panel. A few motifs are found in the roof decorative architectural components of the RLBP, namely; flora, cosmos, a combination of flora and cosmos and a combination of flora and geometry. These motifs were found to be in either the single pattern or the frame pattern. Meanwhile, there is no composition found in the roof decorative architectural components of RLBP since the panel is comprised of a simple carving. The motif and pattern were found in the *Kepala Cicak type i*, *Kepala Cicak type L* and *Papan Cantik*. There is no motif and pattern found in *Tunjuk Langit* since the pole is comprised of a simple *larik* pole without any carving on the surface of the pole. The motif of *Kepala Cicak Type i* of RLBP contains the flora, a combination of flora and geometry, and a combination of flora and cosmos that exist in the single pattern carving. Meanwhile, the motif found in *Kepala Cicak Type L* is comprised of either flora or cosmos motifs that exist in the single pattern carving. The motif in the carving of the *Papan Cantik* panel is comprised of the flora motif that is carved in the frame pattern carving.

Attributes/ Roof DAC	TL	KCI	KCL	PC
<b>Form Type</b>	Pole	Panel	Panel	Panel
<b>Form Configuration</b>	Individual Piece	Single panel	Single panel	Single panel
<b>Placement</b>	Exterior Roof AJ, RI	Exterior Roof AJ, RI	Exterior Roof AJ, RI	Exterior Roof AJ, RI, SB, SL, DP
<b>Shape</b>	Triangle, Vertical rectangle & Triangle	Vertical rectangle & triangle	Trapezium	Triangle
<b>Malay Principal Form</b>	Stupa	<i>Lebah bergantung, Punca Kala</i>	<i>Lebah bergantung, Punca Kala</i>	<i>Lebah bergantung</i>
<b>Motif</b>	n/a	Flora, Flora & Geometry, Flora & Cosmos	Cosmos, Flora	Flora
<b>Pattern</b>	n/a	Single pattern	Single pattern	Frame pattern
<b>Composition</b>	n/a	n/a	n/a	n/a
Legend:				
CS - Case Study	SL - <i>Selang</i>	SB - <i>Serambi</i>	DE - Decorative architectural components	
AJ - <i>Anjung</i>	RI - <i>Rumah Ibu</i>	DP - <i>Dapur</i>	PC - <i>Papan Cantik</i>	
TI - <i>Tunjuk Langit</i>	KCI - <i>Kepala Cicak Type i</i>	KCL - <i>Kepala Cicak Type L</i>		

**Figure 3.** The attributes of roof decorative architectural components of RLBP.

Source: Author (2022)

Noor & Khoo (2003) stated that the surrounding environment – nature plays a huge role in the life of the traditional Malay people. The lush green rainforest provides the source of food, medicine, and material for the house building and inspires the craftsmen in the carving work. The close observation that the craftsmen had and learned from the surrounding nature is translated into the carving work. In addition, nature has contributed to forming part of the worldview of the Malay people. For that, the motif of flora, called “*bunga*” has had a special place in the traditional Malay community (Abdullah, 2012). The flora motif is commonly applied in the literature, culture, art and ritual practice for its beauty, smell and the benefits that the flower could bring. In the context of this research, the flora motif has been found as one of the most frequently used motifs in the roof decorative architectural components of the RLBP that reflects the worldview and culture of the Malay. Apart from this, the common usage of flora motifs also highlighted the influence of Islamic belief prohibiting figurative motifs in the arts. The application of the flora motif and the absence of the figurative motif application in the roof decorative architectural components of the RLBP reflect the importance of Islamic belief in the life of the traditional Malay people of Perak, where its values have been embedded in the meaning behind the motif and pattern of the carving.

## CONCLUSION

The research findings have highlighted the attributes such as the form type, form configuration, placement, shape, Malay principal form, motif, pattern and composition of decorative architectural components comprise a variety of attributes that contribute to the decorative character of the RLBP roof. The Malay craftsman has not arbitrarily designed these attributes; rather than it reflects a particular set of principles. This principle is comprised of the practical, decorative function of the roof decorative architectural components and, secondly, the symbolic, communicative function of the decorative architectural components in conveying the embedded philosophical message to the people. This set of principles reflects the culture of the Malay people that favoured humbleness in communication – “*berkias*” (decorative expressions), the closed ties that the Malay people had with the surrounding environment and the importance of Islamic belief and values in the people’s life. The findings of this research highlighted the characteristic of decorative architectural components of RLBP as one of the tangible heritages of Perak Tengah. In addition, the findings from this research support the heritage interpretation of the area, particularly about the historic building and cultural heritage of the Perak Tengah that was found lacking as suggested by previous research. Therefore, it is recommended that future researchers conduct future research on the other aspects of RLBP, such as its space planning and activities in enabling a comprehensive understanding of

RLBP, thus supporting the heritage interpretation of the tangible heritage of Perak Tengah.

### **ACKNOWLEDGEMENTS**

I want to express my sincere thanks and heartfelt gratitude to KUTAI UiTM Perak for funding part of the expenses of this publication and Universiti Teknologi MARA (UiTM) Perak for financing this research under the Geran Khas Insentif Penyelidikan Perak (GKIPP).

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**

*Journal of the Malaysian Institute of Planners*

**VOLUME 20 ISSUE 3 (2022), Page 112 – 123**

**THE CONSERVATION FRAMEWORK OF HISTORIC INTERIOR  
SCHEME AS A GUIDELINE FOR FUTURE HERITAGE MUSEUM  
PLANNING: A CASE STUDY OF ‘RUMAH TEH BUNGA’ IN GEORGE  
TOWN PENANG**

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**Abstract**

The heritage museum tourism has rapidly grown, contributing the most income to Government of Malaysia while receiving local and global tourists. Since Malaysian museums are among the most important tourism assets for the country, they must be given attention, especially the interior spaces of the museum. The interior spaces carry different stories. Due to their own unique historic interior scheme (HIS), different interior features, room functions, spatial designs, historic materials, finishes, and the associated historical events would fill the interior spaces. Unfortunately, the significance of HIS has gradually disappeared due to the exhibitions in the museums. Accordingly, not only the historic integrity in preserving the heritage museum buildings cannot be complied with, but also the significance of the HIS is not highlighted in the exhibition. This study aimed to propose a HIS conservation framework as a guideline for preserving the historic scheme of museum building interior. The evaluation method was used to measure the HIS and HES of the interior space of the museum. ‘Rumah Teh Bunga’ also known as the Penang Malay Gallery in George Town Penang has been selected for the case study. Hopefully, the HIS framework would inform the museum bodies to make the interior spaces of the museum more memorable for tourists.

**Keywords:** conservation, framework, interior, historic scheme, tourism

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## **INTRODUCTION**

Most of the heritage buildings in Malaysia have historically impacted the country. Therefore, the buildings need to be preserved and their history needs to be sought and shared, particularly by turning them into museums. Museums are often referred to as the “guardians of the nation’s history of treasures” because the role of the facility is appropriate for a heritage building (Ahmad, 2015; Harun, S. N., & Ismail, I., 2011; Karim, N. A., Harun, S. N., & Ayob, S., 2018). However, the question that arises is how far is a museum able to carry out its role as a guardian of heritage building, and how does a museum preserve and interpret a heritage building’s historic interior scheme?

A museum’s heritage building and its authentic interior characters have the power to notify the story of its passing. Some museums are the sole landmark, being monuments or fortresses. They stand as a sign of pride, like a palace or a mosque, and they are a place to commemorate the black tale of our country. One measure to preserve the country’s history is to restore and create an appropriate scheme for the transformation of historic buildings into heritage museums. Such a development would allow the museums to control and provide continuous care of the heritage buildings. The effort can also retain the buildings’ authentic characters in terms of architecture, craftsmanship, material and finishes, interior features, and interior scheme, which will deteriorate and fade with time if care is not taken. According to Abdul Aziz (2021), the museum’s heritage building may incur complexity and cause conflicting demands of meeting contemporary uses and expectations while still being obligated to retain cultural heritage values. However, Prihatmanti, Putri, and Devina (2017) realized its great benefits for social purposes, and commercial viability in these contemporary ages. Therefore, this study was conducted in order to propose an organized scheme of heritage museum building by proposing a framework conservation.

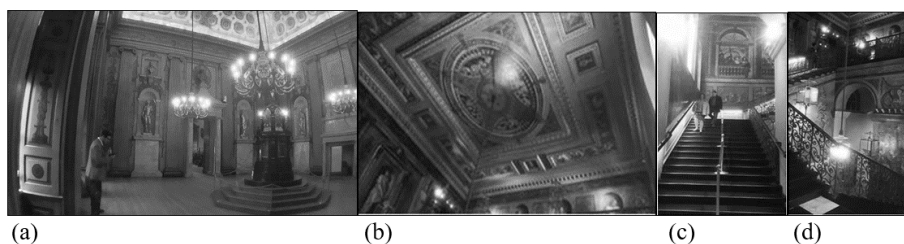
## **LITERATURE REVIEW**

### **Heritage Museum Building**

Heritage museum buildings are considered a unique carrier of historical and cultural memory. The main task of a heritage museum body is to preserve, communicate some aspects of the past, and share the past through the museum’s site, structure, interior and furnishings, and landscape. Heritage museum buildings are the natural settings for teaching and learning history, and they can be among the most effective environments for successfully carrying out such tasks (Waveney District Council, 2012). Therefore, heritage museum buildings are meant to not only display artefacts, but also exhibit the inside and outside of the building itself, and its association with the surrounding. In fact, the function and purpose of museums building are to not only store display items, but also serve as a place for visitors to gain the knowledge of cultural objects (Leandersson, 2015). Heritage museum buildings have their own



unique characters. Here, the historic interior character means the details on the ceiling, floor, wall, and other interior features of each of the spaces in the building (ICOM DEMHIST, 2014). Grimmer, A. E. (2017) stated that doors, windows, columns, and a grand staircase were also the important detailing that strengthened the character of a historic interior scheme in a heritage building. **Figure 1** illustrates example characters.



**Figure 1:** (a) Kensington Palace in London which has been transformed into a museum. (b) Grand Ceiling. (c) Grand Staircase. (d) Grand column in the heritage building museum of Kensington Palace London.

### **Historic Interior Scheme (HIS)**

In general, a historic interior scheme refers to the historic character of an interior building property that should be retained and preserved. The character of a historic interior building may be defined by the form and detailing of the interior materials, such as masonry, wood, and metal, plaster and paint; and interior features, such as moldings and stairways, room configuration and spatial relationships, as well as structural and mechanical systems (Morton & Hume, 1983; W. Brown Morton, Gary L. Hume, 1997). Kay D. Weeks and Anne E. Grimmer (1995) have described a HIS as encompassing historic interior features and finishes that are important in defining the overall historic characters of a building, including the columns, cornices, base boards, fireplaces and mantels, paneling, light fixtures, hardware, flooring, wallpaper, plaster, paint, and finishes, such as stenciling, marbling, graining, and other decorative materials that accent interior features. This definition has been widely supported by Grimmer (2017), Anne E. Grimmer, Jo Ellen Hensley (2011) and Morton III et al. (1997). These scholars maintained that the elements of the interior scheme were also the pulse of a heritage building and therefore, should be respected and not destroyed.

A HIS refers to an interior that is expected to possess characteristics such as the integrity of location, setting, workmanship, feeling, and association. These characteristics are associated with significant events and/or people; embody distinctive characteristics of a type, period or method of construction; represent the work of a master or possess high artistic value; and yield important historical information. The additional criteria for the designation of landmark interiors vary based on the type of interior, but most emphasize the distinct qualities of being

unique, innovative, intact, and consistent with the style of the exterior. Hence, the importance of HIS is upholding integrity (Alliance Greater Philadelphia, 2007; Jokilehto, 2006; Pearson & Marshall, 2011). Other than that, a HIS includes a decoration scheme. It should be based on an era, and the character of the era lends strength to the characters of the space (Young, 2007; Grignolo, 2014).

It can be concluded that a HIS is the historical character of an interior space that evokes the identity of an interior era. A HIS is also an important historical record that is the tangible expressions of a century’s identity and experience. Therefore, the HIS of historic space integrity should be respected in terms of location, setting, design, material, workmanship, feeling, and association. **Table 1** briefly presents the the HIS of historic space integrity criteria. These criteria will be used to measure the level of change of the HIS of the selected case studies.

**Table 1:** Summary of HIS of Historic Space Integrity Criteria

HIS of Historic Space Integrity Criteria	Finding of units
1. Location	Space location; Sense of location
2. Setting	Character of setting; Features setting; Setting of object/monument; Setting of furniture/masterpiece
3. Design	Design; Material; Technology; Space organization; Space proportion; Space structure; Space scale/size; Ornamentation
4. Material	Color; Pattern; Texture; Sense of period/time; Sense of space
5. Workmanship	Construction skill; Traditions technique; Ornamental details; Technique of making object/monuments, finishes and craft of people
6. Feeling	Physical characteristic; Historic scene
7. Association	Linking with historic people, historic event and culture

Source: Illustrated by Author (2019). Adopted from National Park Service (1997); Wyatt (2002); Jokilehto (2006); ICOM DEMHIST-ARRE (2014); The Georgia State University World Heritage Initiative (2017); Alho et al. (2010); Grignolo (2014); Duncan (2011); Little et al. (2000).

### **Heritage Exhibition Scheme (HES) and Heritage Interpretation for Heritage Museum**

The practice of Heritage Exhibition Scheme (HES) refers to the Heritage Building Museum Interpretation. Interpretation is fundamental for a department to foster recreation and heritage, and understand and engage in conservation. Interpretation helps to demonstrate the values that connect a heritage building to our communities. Nowadays, preserving a heritage place requires developing and improving the skills in heritage interpretation. To succeed in heritage interpretation, an ongoing commitment is required. Therefore, museum bodies should play their role in correctly by communicating the history of a heritage building museum. With regard to the interpretation of a cultural heritage place, the ICOMOS Charter has highlighted that there is no choice when preserving a cultural heritage that comes from a heritage site as all the elements of the site interpretation should be presented to the public honestly (ICOMOS International Scientific Committee, 2008). According to Dumbraveanu, Craciun, and Tudoricu (2016), the heritage interpretation is a vague concept,

expressed in general terms and usually covering all the activities carried out in situ in the museum in relation to visitors. However, the museum staff is mixed, consisting of, among others, conservation specialists, researchers in charge of providing information (be they historians, biologists, etc.), museum educators, and guides. Heritage interpretation can enhance a visitor's experience. It may also strengthen the relationship between a site and those who live around it (Liam, 2012). Tilden (1977) also reported six principles. Hence, the pioneer definitions of heritage interpretation are shown in Table 2.

**Table 2: The Six Principles of Heritage Interpretation**

<b>Six Principle of Heritage Interpretation</b>
1. Any interpretation that does not somehow relate what is being displayed or described to something within the personality or experience of the visitor will be sterile.
2. Information, as such, is not Interpretation. Interpretation is revelation based upon information, but both are different. However, all interpretations include information.
3. Interpretation is an art, which combines many arts, whether the materials presented are scientific, historical or architectural. Any art is to a certain degree teachable.
4. The chief aim of Interpretation is not instruction, but provocation.
5. Interpretation should aim to present a whole rather than a part, and must address itself to the whole man rather than any phase.
6. Interpretation addressed to children (say, up to the age of twelve) should not be a dilution of the presentation to adults, but should follow a fundamentally different approach. To be at its best will require a separate program.

Source: Tilden (1977)

Table 3 briefly presents the HES indicator adapted from the heritage interpretation criteria of a unit. These criteria and finding of unit were used to measure the degree of acceptance of an heritage exhibition scheme for the selected case studies. The criteria are simplified as follows:

**Table 3: Summary of HES for Heritage Museum Building Exhibition**

<b>HES Criteria for Heritage Museum Building</b>	<b>Analysis of LR</b>
1. Medium interpretation	Visitors' interaction, interpretation program and plan.
2. Story of history	History, building's history, tell the story of building, heritage story associated with building, cultural and people.
3. Display art	Building's setting and boundaries, building's architecture and physical, science and art, show the building, display the items of culture, display the architecture of building and features.
4. Program/Activity	Event, activities, cultural activities, heritage interpretation program and plan.

Source: Illustrated by Author (2019)

### The Theoretical Framework for Historic Interior Scheme Conservation for Heritage Museum Building

The criteria include: *Criteria 1* - The criteria of historic interior scheme (HIS) involve seven indicators: location, design, material, workmanship, association, feeling and setting; *Criteria 2* - The criteria in heritage exhibition scheme (HES) involve four indicators: medium interpretation, story of history, display art and program/activity. These criteria were proposed for evaluating the extent of change in the historic interior schemes for an heritage museum building. Those two main criteria would be a novel knowledge contribution to this research field. The criteria are illustrated in a theoretical framework as shown in Figure 2.

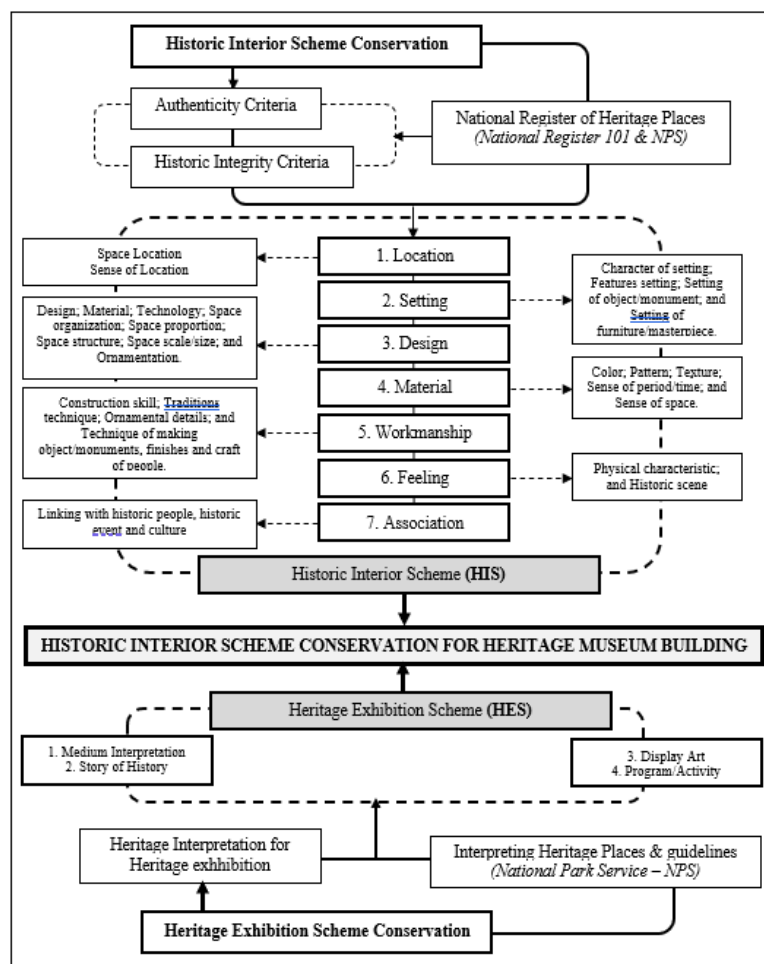


Figure 2: The Theoretical Framework for Historic Interior Scheme Conservation for Heritage Museum Building

## RESEARCH METHODOLOGY

### Evaluation Method: HIS & HES Evaluation

Two evaluations were used in this study: historic interior scheme (HIS) and heritage exhibition scheme (HES). The indicators were used as a unit analysis to measure the level of change for the HIS and degree of acceptance of the HES. Investigating the level of change on heritage building museum conservation requires: history research to identify historic character of the building; observation on site, researchers to participate as an observer evaluation on the level of change for the authentic historic character; fieldwork researcher; consultation with curator, conservator and museum staff; visual materials to identify the era and the authentic historic scheme.

This HIS and HES evaluation was conducted on the selected case studies. The researchers were assisted by museum experts and museum staff such as the curators, museum designer, and conservator. An evaluation rubric form was developed based on the evaluation criteria or unit analysis according to the results from the literature review. The following list was the criteria or unit analysis that HIS evaluation were evaluated based on the rubric scale adopted from ICOMOS (2008), marked in either blue, green, orange, and red (See Table 4a), and HES evaluation were evaluated based on weightage for degree of acceptance adopted from Kalman (1980), and marked in the gradient of yellow to red (See Table 4b).

**Table 4(a):** The criteria of rubric scale/severity of change to be assess in the HIS evaluation

Criteria	SCALE / SEVERITY OF CHANGED				
	5	4	3	2	1
1.Location	No change	Negligible change	Minor change	Moderate change	Major change
2.Design	Exceeds Expectations	Meet Expectations	Developing Expectations	Below Expectations	Very Low Expectation
3.Material					
4.Workmanship					
5.Association					
6.Feeeling					
7.Setting					

**Table 4(b):** The weightage for degree of acceptance to be assess in the HES evaluation

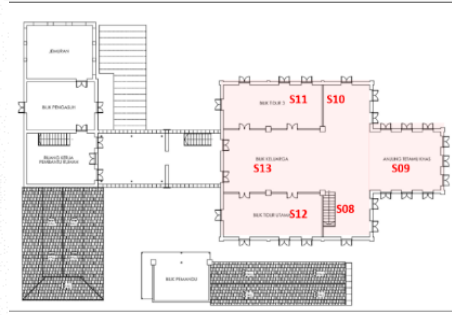
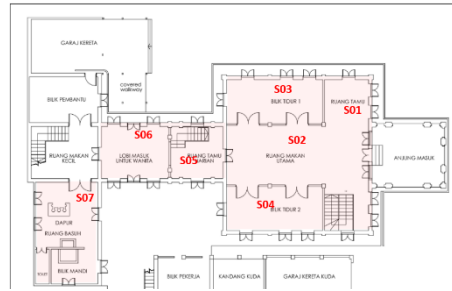
Point	Group	Color	Description
75 - 100	A	Yellow	Of major degree of acceptance for Medium Interpretation/Story of History/Display Art/Programme & Activity
50 - 74	B	Orange	Of importance degree of acceptance for Medium Interpretation/Story of History/Display Art/Programme & Activity
25 - 49	C	Light Red	Of value as a partial degree of acceptance for Medium Interpretation/Story of History/Display Art/Programme & Activity
0 - 24	D	Dark Red	Of no importance degree of acceptance for Medium Interpretation/Story of History/Display Art/Programme & Activity

**DATA COLLECTION**  
Case Study: ‘Rumah Teh Bunga’

**Figure 3(a) - Building**



**Figure 3(b) - Ground Floor**



**Figure 3(d) - Kitchen and wash area**

**Figure 3(c) - First Floor**

‘Rumah Teh Bunga’ is also known as the Penang Malay Gallery. ‘Rumah Teh Bunga’ is a heritage museum classified under the residential category. It is located at No. 138, Hutton Road, George Town, Penang. It was built in 1893 by one of the richest Jawi Peranakan, Tuan Abdul Wahab, in the late nineteenth century (Figure 2a). The interior of this mansion has a very strong historical character. The identity and character of the original history of the interior were preserved by the design and layout of the interior. The house has two floors. The house was originally stretched long to the back and it stood within a rectangular fence. The ground floor consists of spaces for formal activities, such as the living room and the dining area for outdoor guests, two bedrooms for outdoor guests, the women’s lobby, and the kitchen. On the ground floor are a small dining room, a maid’s room, a car garage, a work room and a horse barn (See Figure 2 a,b & c).

The upper floors (See figure 2c) of the house comprise spaces for personal and family activities, such as a special guest suite for the relatives, right ‘Anjung’, left ‘Anjung’, one main bedroom, one family bedroom, a family lounge, and a dressing room. All of these spaces were involved in exhibitions.

There are also other floors such as hallway lobby, maid work room, babysitting room and open sunroom. All of these spaces were not involved in exhibition activities but are used as staff walkways, staff offices, and staff lounges. The spaces evaluated were only those involved in such exhibition activities as described in the Table 5.

**Table 5:** List of interior spaces involved in the 'Rumah Teh Bunga' Exhibition

Space No.	Original Space	Original Function/Activity	Museum Function/Exhibition
S 01	<i>Main Guest Hall</i>	Welcome guest area	Opening Penang Island
S 02	<i>Main Dining Hall</i>	Guest dining hall	Info Corner (History)
S 03	<i>Bedroom 1</i>	Guest bedroom	Trade & Business Exhibition
S 04	<i>Bedroom 2</i>	Guest bedroom	Politic, Administrative & Haji Exhibition
S 05	<i>Daily Living Area</i>	Daily guest chat area	Traditional Food
S 06	<i>Ladies Entrance Lobby</i>	Women waiting area	Family Dining Lobby
S 07	<i>Kitchen, Wash Area, Bathroom &amp; Toilet</i>	Cooking, wash and shower area	Kitchen, Wash Area, Bathroom & Toilet
S 08	<i>Right 'Anjung'</i>	Family and guest area	'Tokoh' Exhibition
S 09	<i>Special Guest Hall</i>	Special guest rest area	Boria Performing Art
S 10	<i>Left 'Anjung'</i>	Family and guest area	Education & Publication Exhibition
S 11	<i>Bedroom 3</i>	Children bedroom	Penang Marriage Culture
S 12	<i>Master Bedroom</i>	Parent bedroom	Traditional Costume Exhibition
S 13	<i>Family Area</i>	Family rest area and dressing area	Family Area (setting with TV and sofa set) and Dressing Area

## ANALYSIS AND FINDING

### The Result of HIS and HES Evaluation in Penang Malay Gallery

Figure 3(a) and 3(b) show the results of the level of change for HIS and degree acceptance for HES in the 'Penang Malay Gallery' according to the evaluation indicators. Overall, the level of change for the 'Rumah Teh Bunga' was medium. This level was considered to be at the successful state of developing the expectation of an HIS scheme. The HIS of the 'Rumah Teh Bunga' was considered preserved; the shape, the historic features, and the significance of its interior space could still be seen and felt. As shown in Figure 3(a), the location of all spaces remains at the original position, however, there are changes in materials and workmanship due to the difficulty of obtaining original materials and craftsmen, and unfortunately most of room's setting has changed due to the changed to the new function. Nevertheless, only the kitchen and wash area (See figure 2d) managed to restore the original scheme and the original atmosphere of the Jawi Peranakan kitchen can be felt. Meanwhile, Figure 3(b) shows that the highest acceptance degrees of the heritage interpretation of 'Rumah Teh Bunga' are the use of display art. This method was used to display artefacts to (i) show off the design in the building, (ii) expose the physical space itself, and (iii) insert

moving objects like heritage furniture, accessories, rugs, tableware, foodware, kitchenware, and others. In fact, this interpretation of display art can also help revive and restore the historic interior scheme of the Jawi Peranakan home.

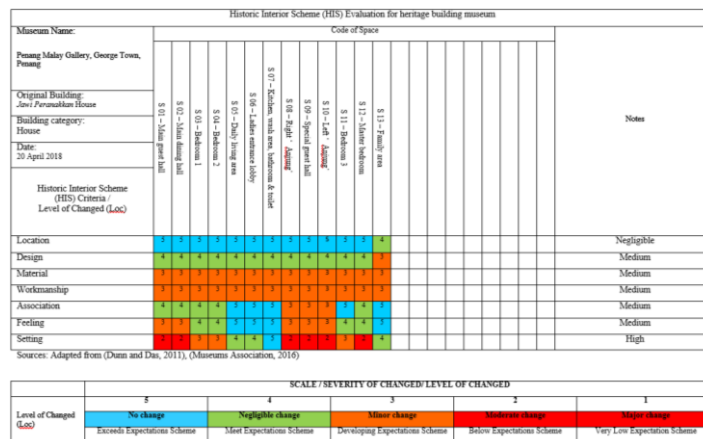


Figure 4(a): The result of the level of change of the HIS in ‘Rumah Teh Bunga’

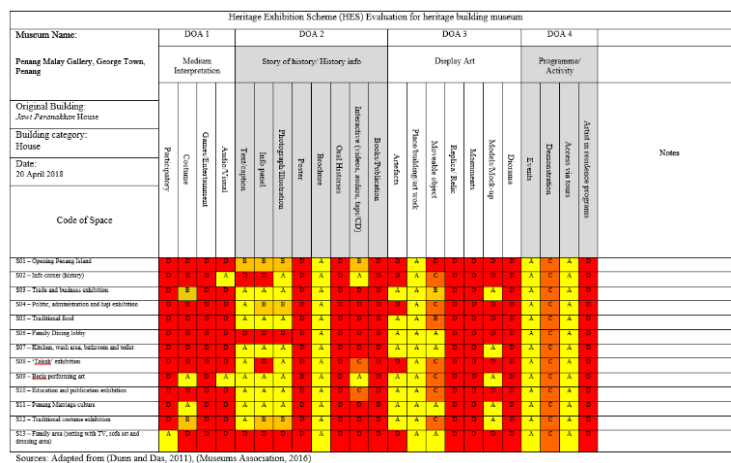


Figure 4(b): The result of the degree acceptance of the HES in ‘Rumah Teh Bunga’

## CONCLUSION

As a conclusion, the proposed HIS conservation framework is critical to counter the lack of guidelines to conserve the existing heritage buildings in Malaysia. Improvements of this framework include additional elements that are more focused and specific to interior space and the new function of the museum. The



improvement of this new element is necessary as a result of the efforts to conserve heritage museum buildings in Malaysia. Setting up these more specific guidelines is also a step towards culminating and sharing the knowledge and findings with museum experts and heritage building conservators in Malaysia.

## ACKNOWLEDGEMENTS

The authors wish to express a gratitude, especially to National Archives of Malaysia, Malaysian Museum Department, Department of Malaysian National Heritage and the museum experts for supporting, and sharing knowledge and experiences. A special thanks to the Centre for Knowledge & Understanding of Tropical Architecture & Interior (KUTAI) for sponsoring 50% of the PMJ Special Edition 2022 publication fees. May this effort encourage more scholars to publish in Index Journal in the future.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**  
*Journal of the Malaysian Institute of Planners*  
**VOLUME 20 ISSUE 3 (2022), Page 124 – 135**

## **INTERPRETATION OF HERITAGE SITE: VISITORS’ SATISFACTION ON THE INTERPRETIVE EXHIBITS IN DATARAN BANDAR**

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### **Abstract**

Interpretation of a building or a site could be made easier using interpretive exhibits. While protecting the built heritage and conserving the traditional and cultural values present a real challenge for conservation stakeholders, making sure that the history is being told clearly is also a must. This study aims to investigate the existing ‘realities’ on heritage interpretive exhibits at Dataran Medan Bandar, Alor Setar. The study assessed the existing presentation quality of the exhibits, whether they served the purpose of telling the history of the objects or monuments. The assessment revealed almost half of the respondents believed that improvement is needed. The findings reflected important aspects to be considered in the interpretation and presentation of comprehensive knowledge of and awareness in presenting the story of the place. The incorporation of integrated approaches of inculcating heritage values that are conveyed to visitors through effective presentation strategy supported by sustainable philosophy is proposed.

**Keywords:** Heritage interpretation, cultural mapping, heritage awareness and storytelling

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## **INTRODUCTION**

The most common reasons often associated to visiting heritage places are to see and listen to the values of historical appreciation and experience. Traditional settlements are one of the key cultural land-uses and landscape assets in terms of history, customs, culture, and architecture, and are physical evidence of the past (Harun et al., 2021).

Significant interpretive and wayfinding signages play an important role in transferring knowledge to visitors. An interpretive exhibit makes a topic “come to life” through active visitor involvement and extreme relevance to the daily life of visitors. Nevertheless, providing complicated interpretations have resulted in visitors experiencing frustration or misunderstanding of the meaning of the heritage or feeling disconnected from the message received. They might become unaware or ignorant of the cultural heritage’s significant values. Subsequently, they would not know how to appreciate their own heritage, let alone to love it.

Heritage refers to many assets or group of assets, natural or cultural, tangible or intangible, that a community recognises for its value as a witness to history and memory. There is a need to safeguard, protect, adopt, promote, and disseminate such heritage (Heritage Council, City of Montreal, 2005).

Tilden (1977) defined interpretation is an educational activity that aims to reveal meanings and relationships using original objects, by first-hand experience and by illustrative media, rather than simply to communicate factual information. His statement is aligned with ICOMOS (2008), which referred to interpretation as the full range of potential activities intended to heighten public awareness and enhance understanding of cultural heritage sites. These can include print and electronic publications, public lectures, on-site and directly related off-site installations, educational programmes, community activities, and ongoing research, training, and evaluation of the interpretation process itself.

Many scholars have defined heritage interpretation as the communication process. Shalaginova (2018) quoted Ham (1992), Veverka (2000), Murphy (2000), and Interpretation Australia (2005), and described that interpretation is simply a means of communicating ideas and feelings that help people understand more about themselves and their environment. As Murphy (2000) explained, heritage interpretation is an interactive communication process involving the visitor, through which heritage values and cultural significance are revealed, using a variety of techniques to enrich the visitor’s experience and enhance the enjoyment and understanding of the site.

This research examines the existing ‘realities’ on heritage interpretive exhibits at Dataran Medan Bandar, Alor Setar and assesses the existing presentation quality of the exhibits, whether they serve the purpose of telling the history of the objects or monuments. The objective is to assess the visitors’ expectation and perspective regarding heritage presentation at heritage sites of the Dataran and their perceived awareness.

## LITERATURE STUDY

### Historic Royal Malay Town of Alor Setar

Alor Setar, the 8<sup>th</sup> Administrative Centre and Capital of Kedah, was founded in December 1735 by the late Sultan Muhammad Jiwa Zainal Adilin Muadzam Shah, the 19<sup>th</sup> Sultan of Kedah (1710 – 1778). Early establishments in Alor Setar included Istana Kota Setar, Balai Besar, Balai Nobat, and Masjid Zahir, which were built around a centralised open field known as Padang Court.

Alor Setar became a traditional royal town before a new palace was built in Anak Bukit, which then turned into a new royal town of Kedah in 1738. The establishment of the town is in compliance with the concept of development of a Malay royal town. The concept of development of the royal town can be interpreted using the following factors:

- i. **Religious:** The belief and faith formed through the unification of religious teachings and wise practices (evidenced by Masjid Zahir, a royal mosque).
- ii. **Symbol of powers:** The existence of the ruler's powers can be clearly seen and sensed in the royal town area (evidenced by Kota Setar Palace, Royal Audience Hall or Balai Besar, Palace Gateways, Nobat Hall or Balai Nobat, and Clock Tower).
- iii. **Defence:** This former royal town area took into consideration all aspects of defence and was always ever ready for any disaster that might occur (evidenced by the fortress wall of Kota Setar with Kota Kuala Kedah as the first line of defence).
- iv. **Pragmatic:** Practical action that helps make the royal town a more effective and efficient settlement that provides comfort, safety, and well-being for both permanent residents and visitors (evidenced by residential settlements within the palace compound, public open space or 'Padang' area, Pekan Melayu and Pekan Cina as old towns or marketplace, jetty or river landing facilities along Anak Bukit River at Alur Setar, Tanjung Cali, and Kuala Kedah).
- v. **Boundary demarcation:** A physical form is evident that clearly notifies the public on the enforcement of the border line demarcation of the sovereign royal town area (evidenced by the protection wall built around Kota Setar Palace's compound).

(Syed Ariffin, 2019)

### Heritage Interpretation

The goal of interpretation at heritage sites is not only an instruction, but also to change the attitudes and behaviours of visitors towards the history and cultural heritage. The storytelling should motivate and inspire visitors by making it meaningful and exciting. The key to successful presentation of heritage sites

depends on the appropriate media selected for heritage interpretation. According to Harun (2021), this can be achieved in various ways, which are as follows:

1. Face-to-face verbal interpretation – guided tours, talk sessions, performance shows, workshops, and demonstrations.
2. Printed materials – articles, brochures, guides, signboards, interpretive panels: maps, infographics photographs and images, layout plans, banners, asset signs with dedicated and specially designed photo spots using specific assets as background, short videos, various choices of gifts/mementos/souvenirs that are attractive or handy or with delivery package.
3. Multimedia interactive: slide shows, digital screens, film shows, audio applications, websites, touch screens, etc.
4. Specially designed/designated/purpose made interpretation: monuments, statues, sculptures/artworks/images, scale models, wayfinding/road signages, guided trail signs, etc. Such physical interpretation or geography characteristic can be a heritage area's cultural landmark (*mercu tanda budaya*).

Ineffective interpretation and presentation of heritage sites would result in visitors experiencing negative perception that can lead to ignorance of heritage significance. The activities and physical characteristics of the site's physical features contribute to the unique identity of the historic space (Mohd. Lazim & Said, 2020). In general, old towns in Malaysia have many significant attributes that preserve various unique heritage values that should be shared with visitors. This story should be narrated through good interpretive exhibits.

Besides, unawareness or awareness for the wrong reason among visitors and local communities lead to the historical, cultural, or natural heritage evidence being completely forgotten or left in ruins, or disrupted in the ecosystem of heritage setting, or worse, a total loss, resulting in a loss of identity and pride of local communities, as well as a loss of opportunities for economic generation in the tourism industry. Yusoff et al. (2013) clearly affirmed that a nation's heritage resources will face extinction in the pursuit of modernisation and physical development if concrete, concerted, and timely efforts are not made to prevent it. Therefore, education strategy has an important role in creating heritage awareness among the society.

Although interpretive exhibits are often not considered in the whole development proposal, the impact of good and modern interpretive signages could trigger an efficient tourism promotion through word-of-mouth (WoM) and social media. Besides, using the storytelling methodology when describing the history of a

place or monument could provide contextual heritage education information to all.

## **METHODOLOGY AND DISCUSSION:**

### **Effectiveness of Interpretive Exhibits in Dataran Bandar**

The data collected during the study involved a questionnaire survey with a total number of 90 respondents who visited Dataran Bandar and some of the areas within the heritage trail route of the city. Randomized sampling methods targeting maximum 100 respondents were carried out between 1<sup>st</sup> March 2020 to 15<sup>th</sup> March 2020 at the peak of pandemik Covid 19. The number of tourists decreases due to pandemik and the country were shut down a few days later. Earlier, observations were also carried out, whereby a total of 16 places of interest or 'POI' were identified throughout the area. Out of these 16 POIs identified, only 10 were provided with interpretive signs (Table 1). The remaining six buildings or sites without interpretive panels were Sungai Anak Bukit, Monumen 250 Tahun Alor Setar (250 Years Alor Setar Monument), old shop houses, Bangunan Lama Mahkamah Syariah, Bangunan Wan Mat Saman, and Wisma Negeri.

**Table 1:** Places of interest at Dataran Bandar

No.	Places of Interest (POI) at the Dataran Site	Cultural Relevance	Interpretive panels
1.	250 Years Alor Setar Monument	Monument	No
2.	Kedah Art Gallery; Origin: Magistrate Building	Cultural heritage – building	Yes
3.	Medan Bandar (the square); Origin: Padang Court	Cultural heritage – site	Yes
4.	Royal Museum; Origin: Kota Setar Palace	Cultural heritage – building	Yes
5.	Royal Grand Audience Hall	Cultural heritage –building	Yes
6.	Nobat Hall	Cultural heritage – tower and traditional royal music	Yes
7.	Sultan Abdul Halim Gallery; Origin: High Court	Cultural heritage – building	Yes
8.	Zahir Mosque	Cultural heritage – building	Yes
9.	Anak Bukit River	Natural heritage – river	No
10.	Clock Tower	Cultural heritage – tower	Yes
11.	2-Storey shop houses	Cultural heritage – building	No
12.	Alor Setar Beginning site	Natural heritage – creek	Yes
13.	Archway replica of Kota Tengah Palace	Monument	Yes
14.	Wisma Negeri @ Former State Secretary Building	Cultural heritage – building	No
15.	Wan Mat Saman Building	Cultural heritage – building	No
16.	Old Syariah Court	Cultural heritage – building	No

## FINDINGS

### Visitors' Perception on the Interpretive Panels

In order to establish the effectiveness of the interpretive panels found on the site, assessment on the level of knowledge and understanding of the area's history was conducted.

In general, the result indicated that a majority of the respondents had slight knowledge of each site before visiting the Dataran heritage sites. More than three-quarters or 77% of the total visitors fell into the combined group of 'no knowledge-slight knowledge-neutral' on heritage awareness level before visiting the sites (Table 2).

**Table 2:** Respondents' knowledge on the history of the area

Heritage Sites	No knowledge	Slight knowledge	Neutral	Moderate knowledge	Full knowledge
i) Balai Besar	13	38	20	17	2
ii) Istana Kota Besar	17	35	18	18	2
iii) Balai Seni	13	37	19	18	3
iv) Balai Nobat	13	39	16	18	4
v) Galeri Sultan Abdul Halim	18	33	17	20	2
vi) Gerbang Istana Kota Tengah	26	33	17	12	2
vii) Masjid Zahir	8	33	18	23	8
viii) Menara Jam Besar	13	32	19	19	7
ix) Bermulanya Alor Setar	13	37	19	18	3
x) Dataran @ Padang Court	14	40	20	14	2
xi) Bangunan Wan Mohd Saman	23	33	18	14	2
xii) Wisma Negeri	19	30	18	20	3
TOTAL	190	420	219	211	40
Average – number of respondents (Total/12)	15.83	35	18.25	17.58	3.33
Percentage	18%	39%	20%	19.5%	3.5%
		77%		23%	

In addition, the result proved that they had high expectation on the storytelling style of the interpretive panels provided at the sites. The respondents categorised it as an 'extremely important' attribute during the visit. It is a strong indication that visitors' source of awareness and knowledge-gaining came from the story that they read on the interpretive sign. However, most of them felt



neither 'satisfied' nor 'dissatisfied' after reading each interpretive presentation signage at the respective sites. The majority perceived their satisfaction level as 'neutral' or 'status quo'.

Having read the story, almost two-thirds or 60% of the respondents who completed the visit formed the group that perceived 'very dissatisfied-dissatisfied-neutral' experience (Table 3). It clearly showed that the existing storytelling concept was unable to meet their expectation or improve their knowledge.

**Table 3:** Respondents' satisfaction level on the interpretive exhibits post-visit

Number of respondents against satisfaction level	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
i) Balai Besar	3	14	40	27	6
ii) Istana Kota Setar	14	13	38	16	9
iii) Balai Seni	5	10	33	34	8
iv) Balai Nobat	3	16	36	27	8
v) Galeri Sultan Abdul Halim	5	10	32	32	11
vi) Gerbang Istana Kota Tengah	3	13	41	26	7
vii) Masjid Zahir	6	11	26	28	19
viii) Menara Jam Besar	4	14	32	30	10
ix) Bermulanya Bandar Alor Setar	5	16	36	24	9
x) Dataran @ Padang Court	3	17	35	27	8
xi) Bangunan Wan Mohd Saman	4	16	36	27	7
xii) Wisma Negeri	3	16	37	25	9
<b>TOTAL</b>	<b>58</b>	<b>166</b>	<b>422</b>	<b>321</b>	<b>111</b>
Average - number of respondents	4.8	13.8	35.2	26.75	9.25
Percentage	5.3%	15.3%	39.1%	29.9%	10.3%
		60%		40%	

Moreover, only 8% of the visitors considered their visit as 'awareness experience'. The 'wow' factor or narrative strategy is possibly missing from the story content. For example, Wisma Negeri's storytelling should include the lost heritage of Istana Kota Tengah and its gateway or Gerbang Istana Kota Tengah. It will be the central point where the information of heritage complexes within

Dataran Bandar should be narrated. Other than that, interpretative panels of Bangunan Wan Mat Saman should include a description of Wan Mat Saman as a state figure and all of his contributions to the state. The building could be converted to a functional tourist-related building such as a café or information centre.

### **Getting the Story Right: The Contents of the Interpretive Exhibits**

Storytelling plays a significant role in heritage interpretation. The storytelling must offer a powerful and productive way of raising awareness, especially of intangible heritage. With proper descriptions and adequate narrations of notable heritage values, effective storytelling can promote visitors' knowledge and understanding, and make history as an interesting subject. The findings from the study indicated that 49% of the respondents agreed that improvement of the storytelling or narration and even content should be carried out in order to deliver effective interpretive exhibits (Table 4).

Besides, a relation has been established between 'interpretive signage' and 'enjoyable/informative/awareness creation' experience, which would then result in willingness for return visits and word-of-mouth (WoM) reference to visit the heritage sites at the Dataran. However, the storytelling content plays a more important role in relaying history.

This result of reduced percentage indicated that only 17% had improved their heritage awareness level and were satisfied with what they read. This result corresponded with the outcome of 'type of experience gained', whereby a very low percentage, i.e., only 8% of the respondents, believed they experienced 'awareness' after the visit.

The result showed that almost half of the total respondents (49%) believed that improvement of 'storytelling content creation' is needed at the Dataran (Table 4).

**Table 4:** Area of improvement at Dataran Medan Bandar

SUGGESTION FOR AREA FOR IMPROVEMENT ON INTERPRETIVE EXHIBITS	RESPONDENTS	PERCENTAGE
<b>I)</b> Storytelling content creation	44	49%
<b>II)</b> Include storytelling presentation via performance show	19	21%
<b>III)</b> Interpretative signage design to be more creative and attractive	18	20%
<b>IV)</b> Tour guide to be available if needed	4	5%
<b>V)</b> To provide heritage trail with continuity and clear direction	4	4%

<b>VI)</b>	Detour the vehicles along affected stretch	1	1%
	Total	90	100%

On the top of the list on reasons for dissatisfaction turned out to be ‘storytelling is not interesting’ (30%), and ‘lack of emphasis on storytelling of the strength/uniqueness of the Kedah Sultanate’ (21%) (Table 5). All these reflect important aspects of interpretation and presentation of comprehensive knowledge and awareness, which are required when presenting the Dataran site to visitors.

**Table 5:** Dissatisfaction as perceived by visitors on the current signage

REASONS FOR DISSATISFACTION	PAX	PERCENTAGE (%)
<b>i)</b> Storytelling is not interesting	27	30
<b>ii)</b> Lack of emphasis on storytelling of the strength/uniqueness of the Kedah Sultanate	19	21
<b>iii)</b> No direct pedestrian link – Mosque, <i>alur</i> (stream) and Clock Tower area separated by Lebuhraya Darulaman	12	13
<b>iv)</b> Not enough time	11	12
<b>v)</b> Others	8	9
<b>vi)</b> No clear guidance on flow of direction	6	7
<b>vii)</b> No clear way finding signage	4	5
<b>viii)</b> There is no narration on the original historical relationship of the establishment of Alor Setar town of Kedah	2	2
<b>ix)</b> No descriptive panel for storytelling	1	1
Total	90	100%

There was a substantial number of significant historical facts and messages or notable images or old photographs that were available but did not appear in the storytelling content. Scholars are of the opinion that aspects of local living culture and cultural landscape in the past could offer new aspects of heritage interpretation of cultural heritage sites surrounding the Dataran.

The factor of ‘uninteresting storytelling’ that resulted in ‘dissatisfaction’ as perceived by the visitors was almost similar to the high numbers of ‘ineffective heritage interpretation’ status of the existing storytelling method identified by scholars as a result of interviews. Information gathered on the scholars’ views covered various aspects of ‘heritage interpretation’. There are much more notable and factual ‘stories’ that are hidden and have yet to be told. The result showed that their attached heritage values were interconnected with their presence within the heritage site. The result in a way revealed that the storytelling approval process was vague. It clearly demonstrated that the final

narration had not gone through a proper ‘validation process’ for approval before it was displayed on the panel.

### **Bringing Out the Best of Tangible and Intangible Cultural Heritage Using Interpretive Exhibits**

Unexpectedly, only 6% of the total visitors came with the purpose to explore the local culture, which is supposed to be one of the main objectives of heritage interpretation. Possibly, the site is unsuccessful in creating awareness on the intangible aspects of local culture and past living culture to the visitors.

Despite a direct narration of site history, it is probably time for the state government to enliven this past tradition of ‘clock and nobat sound’ as an attraction element for visitors. Besides, due consideration should be given to other aspects of local culture with the same potential as suggested by the scholars:

- Using trishaw rides as a sightseeing attraction for Alor Setar, similar to Malacca, which used to be the means of public transportation back then until circa the 1970s.
- River cruise along Sungai Anak Bukit to create awareness of its presence as a natural cultural site with beautiful scenery that used to be a very essential waterway during the establishment of Kota Setar.

Interpretive interpretation of heritage sites must be able to convey heritage values by various means, not only via interpretive panels, as criticised by Veverka (2018) regarding pictures, graphics, and text within a usually square box stuck on a stick panel. Producing purposeful interpretive products, interpretive panels, exhibits, and other media should be pre-tested (evaluation) to observe if they accomplish their stated objectives (ibid). The importance of writing a good and effective story must be taken seriously by having them vetted by an approval committee consisting of members from various stakeholders. An effective storytelling strategy should include establishment of a proper process flow diagram to be followed.

### **CONCLUSION**

Storytelling on interpretive panels plays an important role in raising historical awareness and understanding. The history of how the town was founded has been well-narrated, but without experiencing the heritage setting associated with the actual view of cultural landscape and settlement journey, visitors will find it difficult to understand. The given examples of ways to provide additional learning motivation to visitors can be suggested as the solution in answering the question as quoted by Veverka (2018), “when is ‘interpretation’ NOT ‘interpretation’?”

Therefore, it is prudent for future heritage site conservation efforts to consider certain qualities that are a response to local traditions, architectural context, and cultural landscape, which include nature, flora and fauna, topography, and climate. From the results of this study, it can be concluded that satisfied visitors produce positive WoM that would lead to return tourists and also bring more new visitors. For that reason, it is important to provide heritage sites with effective heritage presentation. Heritage tourism creates economic activities that generate income. As highlighted by Said (2011), 'preservation of heritage' contributes to the local area, the sustainability of the heritage, and the benefit of the nation in general.

The existing 'realities' on heritage interpretations at heritage sites from the study revealed the uninteresting storytelling content and ineffective interpretive panels that were used as media to convey heritage values as discussed through the findings in Table 5. The real task is to create heritage interpretation through the use of 'tangible to intangible to universal' (if any) linkages and the links that reveal meanings, which help create awareness about the site.

Besides, most of the respondents called for integration of interpretive exhibits in the form of interactive media at the Dataran. It showed that interactive media have a positive benefit that can help to attract visitors to the heritage sites. Lighted interpretive signages with other elements of landscape/street lighting will enhance safety and allow for easy reading, which are currently unavailable. Since the Dataran is able to pull the crowd at night, it is prudent to consider interactive light, sound, and music shows on selected building façades facing an open area with ample crowd capacity of the Dataran. The interactive screen façade will provide visitors with a glimpse of the virtual heritage or history lessons, using fun and education to remind them of the past. Furthermore, with purposeful narratives that highlight the importance of heritage conservation, the audience will have greater understanding, care, and appreciation of preserving and maintaining the local heritage.

## **ACKNOWLEDGEMENT**

A special thanks to the Centre for Knowledge and Understanding of Tropical Architecture and Interior (KUTAI) for sponsoring 50% of the PMJ Special Edition 2022 publication fees. May this effort encourage more scholars to publish in indexed journals in the future.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**  
*Journal of the Malaysian Institute of Planners*  
**VOLUME 20 ISSUE 3 (2022), Page 136 – 147**

## **LANDSCAPE AND PLANTS PROFILE ANALYSIS IN RURAL PERAK**

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### **Abstract**

Landscape and plants portrayed the evolution and development of the society through culture, local identity, and sustainability. The plants' evolution is perceptible and measurable to be examined and documented for future reference. Therefore, this study aims to examine the changes in plant selection through plant profile illustration. The illustration is based on data collection and secondary evidence between the years 2010 to 2020, in Perak Tengah. The objectives are to analyse plants profile associated with society's needs and impacts on the landscape setting. This paper ventures on the historical settings of plants in *Rumah Kutai*, evolution in contemporary and in the commercial the landscape through the plant height profile to evaluate the personal needs, economical influences, and self-resilience. This paper concludes the evolving role and profile of the home landscape, from logistic to holistic pursuing the physical, spiritual and economical needs of the local community and planning agenda in the 21st century.

**Keywords:** landscape, plants, Malay and profile

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## **INTRODUCTION**

The development of the landscape from nomadic times has again proven the existence of interconnection and dependence between man and the environment. These barriers evolved in line with the development of civilization. Human reliance on the environment is modified according to needs, technology, aspirations, and accessibility of resources. This is observed from the change in the use of plants especially for the Malay people who are assimilated with culture. For example, the need for large tree crops that are used to serve as shading, boundary markers and food sources in the village yard are now decreasing and limited according to the case. Although the constraints of the surrounding space limit the selection of crops, the community still tries to continue to have some of the traditional spaces and plants that are synonymous with culture. Among them are the provision of kitchen or cooking plants, ornamental plants for aesthetic value, as well as the use of landscape furniture such as jars, couch and hanging plants depicting the continuity of the culture tradition. Therefore, this study takes the initiative to approach and examine the chronology of changes that involve similarities and differences from the cultural landscapes that are modified to the co-landscape.

This study documented the selection of crops as well as landscape patterns from several sample studies from traditional villages around Perak Tengah that are inhabited by the Malays and which have an immediate landscape surrounding the house or dwelling. This documentation is carried out by observation, brief interviews, photo elicitation and illustrations analysis of the sites. There are three kampongs involved in analysis for contemporary landscape in year 2010, and commercial landscape in year 2020. The results of the study are summarized and tabulated for comparison purposes in order to see changes of plants profile and the development of landscape in Perak rural areas. The plants profile were tabulated using grid system through photo elicitation. Meanwhile, the classification and changes in crop selection are reflected through the height profile of the crop. In general, this study highlights the needs of the landscape and the importance of its sustainability for next generation. This study is supported by a fundamental theory between the relationship and dependence between landscape and man. Thus, this theory is also felt to be able to bind the current way of life with the future subsistence living.

### **Conceptual and Theoretical Approach**

The framework of the basic theory that underpins this study is based on the introduction of Gutkind's theory (1952); Gutkind was a prominent philosopher who linked the concept of i-It and i-Thou, which are:

- 'I-Thou' means: the relationship of human adaptation with the surrounding nature



- 'I-It' means: human relationships captivate the surrounding nature

As early as the Neolithic period, (after going through the Paleolithic and Mesolithic phases of hunting and moving to live), humans began to build their own settlements.

It was here that humanity began to cultivate, build equipment and preserve livestock. Science and history have proven that the relationship and communication between man and the environment is real. Like Gutkind's theory, man modifies the environment to meet the needs of life. Thus, this environment or landscape is the closest component to any change due to the current influence that will often be adapted and re-adapted.

Among other things, the theory found in the summary of Zube's et.al project (1982), in which they continued the work of the study in environmental psychology introduced by Ittelson (1978) who touched on landscape perception theory (Hussain, 2017), is also considered appropriate for this study. This is because some of the elements that need to be taken into account for use in landscape studies generally revolve on the interconnection of interactions between humans and the environment. It also involves the inherent and practical needs and requirements between the two instruments. Thus, home landscaping is significant in measuring changes, adaptations and continuity of life, especially in examining aspects of heritage retention as a survival aspiration.

## **MALAY LANDSCAPE IN RURAL PERAK**

Upon relatively understanding the plants profile in cultural landscape, rural areas were destined to best represent the plants typology. For centuries, cultural landscape of Kutai has been Perak's most referred setting that became a replicable tradition. This landscape carries a variety of meanings, interests and benefits to humans, environment as well as cultural civilization. For example, the former Malay community recorded a change in the profile of the chosen plants especially for the rural community in traditional village areas. The cultural landscape of *rumah* Kutai consists of big trees (overstorey) that function as shelters and barriers, as well as providing resources and supplying food and wood. During the early nineteenth century, the tallest and most significant trees planted by the Malay was Coconut Palm (*Cocos nucifera*). Coconut palm trees, also known as thousands benefits trees, play a major role in providing food, resources and medicines, besides resembling the symbolic culture of 'newbirth' in a family. However, this cultural value is decreasing. Therefore, in line with the landscape development within centuries, it is the aim of this study to document plants through examining the plants heights and functions. These criteria could be the benchmark indicators for the analysis of plants and the landscape of Malay community specifically in rural Perak.

### The Cultural Landscape

According to Dewan Bahasa & Pustaka (1991), landscaping means the state of the garden or the area around a house (an area etc.) which was also defined by Mustapha Kamal (1989) as a site that includes topography, social, economic, and cultural activities of man. Meanwhile, the Cultural or Anthropogenic Landscape is translated by a German historian, Oto Schlüter (1906), as a landscape that displays unity between man and culture (Hussain, 2017, Singh, 2013). Thus, these definitions depict the relationship between man and surroundings which is reflected in the ground theory by Gutkind Theory.

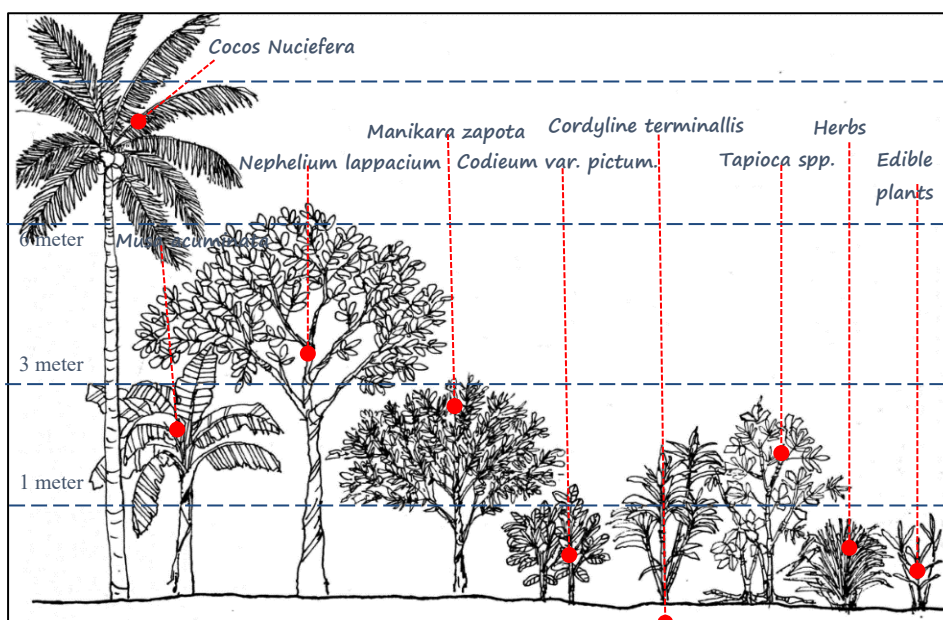


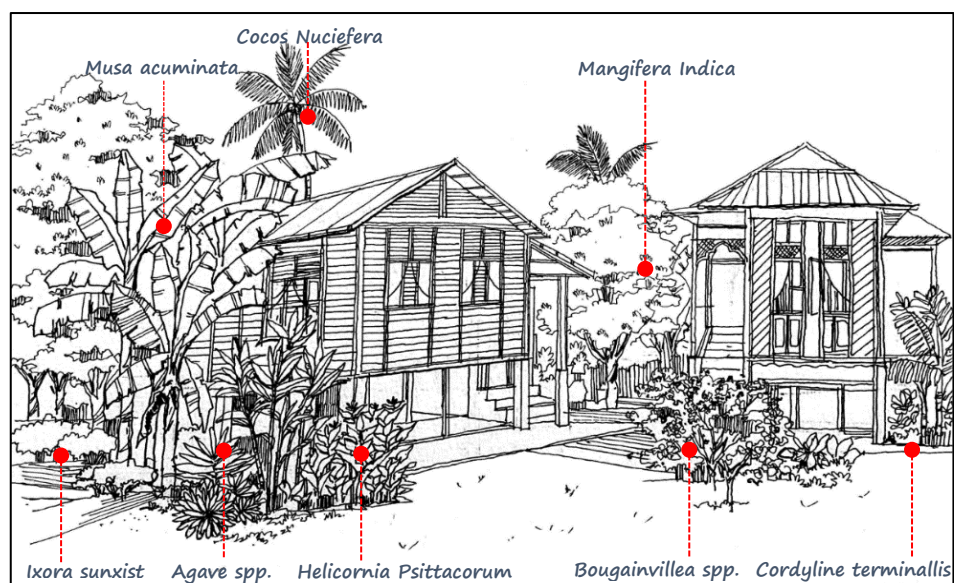
Figure 1: Plants Profile of the Cultural Landscape  
Source: Author illustration (IHS 2022)

Zakaria et.al. (2017, 2021) in their studies highlighted that the soft landscape is a plant element of the Kutai house in Perak. Among the common trees identified in the Kutai compound are *Musa acuminata* (banana tree), *Mangifera indica* (mango tree) and *Cocos nucifera* (coconut tree) which are known to have a variety of uses, functions and benefits. Besides, the regular species of shrubs include *Codieum var. pictum* (pudding tree) and *Cordyline terminallis* (*jenjuang*) which have variations in colour and present the aesthetical value of traditional landscapes. Moreover, plants in a Kutai house would also consist of groundcovers, herbs, medicinal and edible plants, which are also usually found in a kitchen garden. Figure 1 illustrates the common plants and landscape profile that surrounds Kutai houses in Perak. These plants are extracted

from previous research by Zakaria et.al. (2017, 2021), Hussain and Ahmad (2012, 2017) and Salleh et.al (2016).

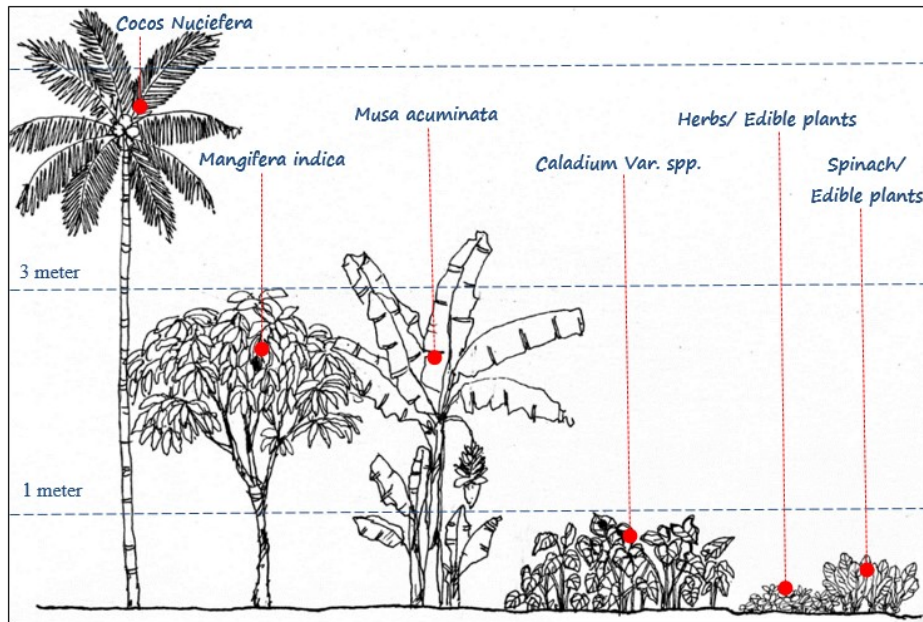
### The Contemporary Landscape

Contemporary landscapes, on the other hand, are transformations or continuations of cultural landscapes adapted by humans to the current environment. Studies conducted by Hussain and Ahmad (2012, 2017) found that several traditional villages within Perak Tengah provide a comprehensive picture of common elements that are typical and still used by the Malay community in their house compound or immediate land. This included the soft capes elements such as fruit trees, food trees, palm trees and shrubs for aesthetic values, and herbs for medicinal use.



**Figure 2:** Plants composition around *rumah* Kutai during Contemporary Landscape  
Source: Author illustration (IHS 2022)

Thus, this aligns with the cultural needs to provide the daily supply. However, ritual plants that carry oblique beliefs have been subsequently forgotten. In fact, the modern development and mentality of society is now more realistic and open in meeting the current needs. Moreover, this contemporary landscape courtyard still highlights the image of a neat, simple and manageable Malay landscape.



**Figure 3: Plants Profile of the Contemporary Landscape**  
Source: Author illustration (IHS 2022)

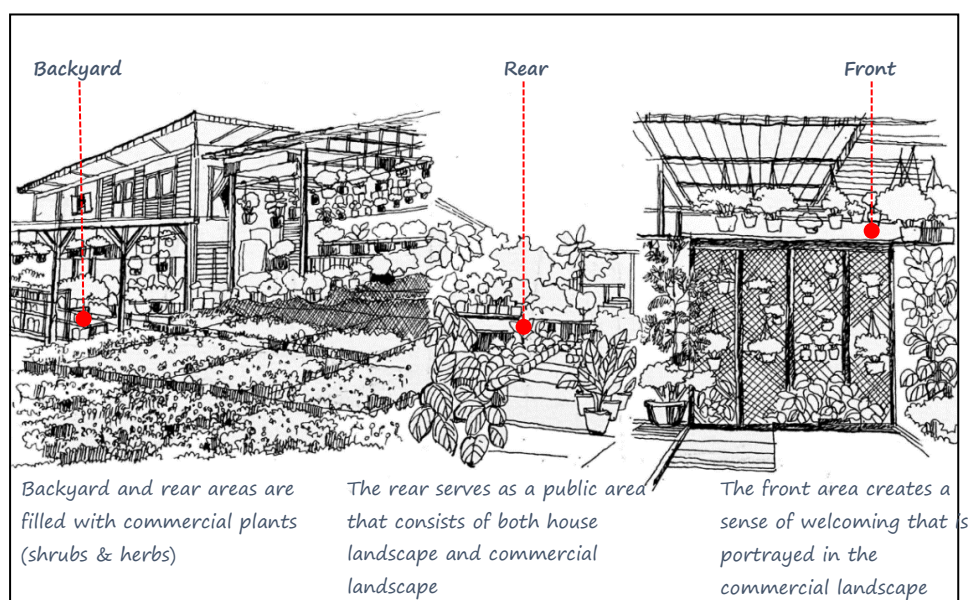
Figures 2 and 3 illustrate the house compound which is composed by 20% overstorey trees, 40% of understorey trees and 40% of shrubs, ground covers and others. The data were analysed through case studies conducted by Hussain, Ahmad (2012, 2017), Adnan, Othman (2012) and Zakaria et. al (2017, 2021).

### **The Commercial Landscape (Post-pandemic era)**

The requirements of the pandemic season, SOP regulations and the implementation of MCO during pandemic in year 2019 had limited the community's movement to only 10km radius of their residents. This restriction had both negative and positive impacts towards the economy, health, emotions, activities and communications of the community. Therefore, utilizing time, space and activity within the accessible house compound became mandatory. Various initiatives to be involved in landscaping, planting, or gardening activities turned out to be essential not only in fulfilling time, extending hobby, and improving health but also in venturing into new profitable businesses.

This situation reflects back on the Gutkind's theory and human civilisation on how man could manipulate the environment for survival. Therefore, the society began to utilize their surroundings, immediate land and in fact the house compound with exchangeable or marketable elements including

plant materials, fertilizers, and garden elements. This has limited and decreased the accessible plant size option within the compound.



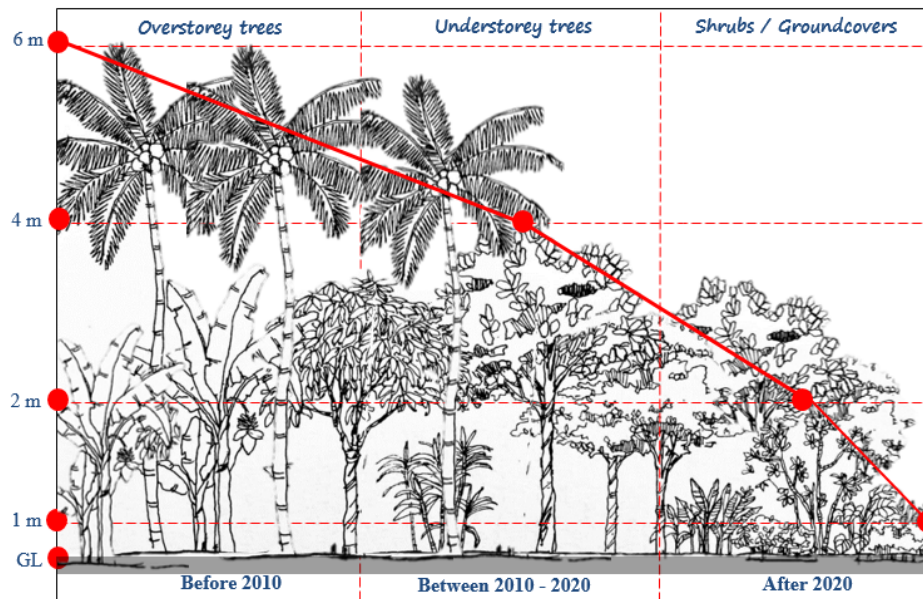
**Figure 4:** Plants composition of the Commercial Landscape during pandemic

Source: Author illustration (IHS 2022)

Figure 4 illustrates the sample of house compounds that have been filled with various plants for commercial use. Subsequently, this situation has turned the logistic landscape into holistic landscape in which the compound is no longer providing surveillance but has the potential to make business, supply materials, feed the community, provide new job opportunities, and improve activities and enhance life quality during the pandemic. Furthermore, figure 4 also illustrates that the commercial landscape has decreased the plants profile into only 10% of overstorey trees, 30% of understorey trees and the majority of 60% involve the shrubs and herbs that serve as aesthetical, food and medicinal plants. Among the preferred or 'viral' plants during the pandemic includes *Caladium (keladi)* from various species with a variety of distinctive shapes, colours, and peculiarities. Besides, green vegetables and herbs such as *pegaga*, mint, *kesum*, spinach, kale and cleric also gained the attention of many. These plants are favourable as they can easily 'survive', have a low risk, and are cheap and easy to breed for commercialisation and making profit.

## THE CHANGING PLANTS PROFILE: AN ANALYSIS

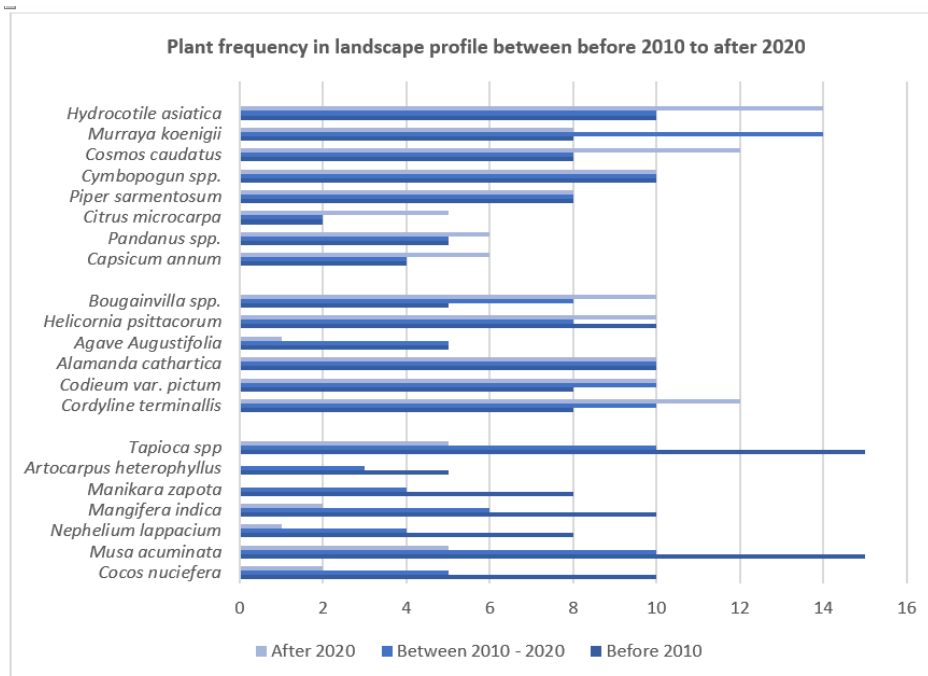
Current changes and needs lead to the initiation of continuity and sustainability of life. Economic pressures, security factors, especially the spread of the current pandemic virus, have changed various dimensions of life and survival.



**Figure 5:** Plant profile showing height decrease in landscape  
*Source: Author illustration (IHS 2022)*

Specifically for the Malay society in Perak, they will tolerant again with nature. The society learn to adapt and readapt. Landscape needs are no longer about meeting individuals or logistical needs only, but also about quality of life and shifting to sustainability. Current situation has proven the various efforts and enhancements of plants that are not only regarded as a hobby and ancillary activities, but also as fulfilling activities that meet the demand and need of the community. The home environment is transformed from a standalone space into a commercial space.

The results of the observation on the evolution of the Malay landscape around the rural Perak showed that there was a change in priorities related to the use of space, elements and activities according to current needs. These changes mainly involve plant material selections that provide the accessibility, management, maintenance, and preferences. As illustrated in Figure 5 that shows the changes in in height of the plant profile, this study analyses the most cited and referable plant species through studies by Adnan et.al (2012), Zakaria et.al (2017, 2021), Hussain, Ahmad (2012,2017), and Harun et.al (2020).



**Figure 6:** Plant frequency in current landscape profile  
 Source: Author illustration

Figure 6 presents the frequency of common plant species cited by many researchers. The cluster of overstorey trees are shrinking in number and size which indicates the high profile of trees is getting smaller and lower. Meanwhile, the cluster of understorey trees which represents fruit trees and aesthetic remains moderate but vigorously less than shrubs, small plants, and ground covers. As the year 2019 marked the beginning of a global pandemic crisis, it witnessed an extensive landscape mostly catered within house compound. With the restricted space, edible plants, namely *Hydrocotyle asiatica* (*pegaga*), *Murraya koenigii* (*pokok kari*), *Tapioca spp.* (*ubi kayu*) and *Musa acuminata* (*pisang*) are used for food and materials, are the most demandable, followed by aesthetical shrubs such as *Cordyline terminallis* (*jenjuang*), *Alamanda cathartica* (*bunga loceng*) and *Codieum var. pictum* (*pokok pudding*) for treat and passions.

### CHALLENGES AND POTENTIAL LANDSCAPE IN PLANNING

Landscape planning has always relied on plant materials, functions and spatial to pursue society demand. Changes in plant selection have subsequently changed the plants profile and criteria in house compounds. This study only focuses within the house compound as accessing more than 10km radius during the pandemic became the restriction and limitation to the study. Table 1 indicates the changing

criteria of plants between the eras before 2010 to after 2020. Today, the criteria continue to be sufficient and exhibit the landscape implications. In planning, sustaining landscape profiles are important in; (i) preserving the authenticity of tradition, (ii) establishing the expertise of the field, (iii) managing natural resources and (iv) conserving the heritage (Harun et. al (2017), Harun et. al (2021), Raja Abdul Kadir et. al (2020)).

**Table 1:** Changing criteria of the Plants Profile from before 2010 to after 2020

	<b>Cultural landscape</b>	<b>Contemporary landscape</b>	<b>Commercial landscape</b>
<b>Plants Height</b>	Over storey trees	Under storey trees	Shrubs & Small Plants
<b>Plants Width</b>	Wide	Moderate wide	Small
<b>Plants Function</b>	Shelter, Culture	Aesthetic, Resources	Lifestyle, Economic
<b>Planting Areas</b>	Immediate & Extended land	Immediate land	House compound

*Source: Author*

Despite the challenges faced, the nature of landscaping and plant profile has undeniably a unique and high-value potential. The future plants profile for home landscape is speculated to grow to accommodate the endemic living. The height or profile of plants is dictated by these changes influenced by society and economy. Research shows that the economical height for home landscape ranges between 0 to 1 meter tall which is subsequently sufficient within a house compound or immediate land in residential areas. Although the profile is decreasing, it does not disturb the plants potential and capabilities of the cultural-traditional landscape, which are:(i) having high commercialization value, (ii) providing extensive tourism opportunities, (iii) displaying heritage identity, and (iv) manipulating profit for the local economic sector. Perhaps, there are potential in investigating other influential factor of these evolution, such as the plant habitat, planting composition and landscape purposes. Therefore, the involvement of all sectors including government, public sector, NGOs and private sector is very important to strengthen the desire in maintaining and promoting the landscape potential especially in plants and materials to equip the resilient living for future generations.

## **CONCLUSION**

The role played by these landscapes and crops turns out to have a direct impact on the development and planning that are closely related to culture, traditions and



local heritage. The activities and aspirations undertaken by such local communities are seen to be effective in meeting the overall needs that are holistic, comprehensive and practical in maintaining the sustainability and survival. Among other things, the contemporary and commercial landscapes highlighted are also significant in nationalizing the development between different eras in both conventional and sustainable living. Besides, this comparative and evolutionary study is able to discuss the plants profile as the 'evergreen' element that meets the current needs and developments throughout the ages. Landscape and culture are the closest components of human civilization and remain important in educating and providing a more resilient and competent generation in the future. As humans and the environment will continuously connect, the research of the evolution in landscape remains importantly essential especially in accommodating the planning strategies, regulatory and society adaptation to life.

#### **ACKNOWLEDGEMENTS**

Special thanks to the Research Management Institute (RMI), UiTM Perak Branch, for granting us a full trust to conduct this research. A special thanks to the Centre for Knowledge & Understanding of Tropical Architecture & Interior (KUTAI) for sponsoring 50% of the PMJ Special Edition 2022 publication fees. May this effort encourage more scholars to publish in Index Journal in the future. Hopefully, the idea and imperatives shared in this paper are able to enrich the landscape and plants perspectives that may lead to the pursuit of cultural heritage and sustainability specifically to KUTAI and research of Malay landscape in Perak.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**  
*Journal of the Malaysian Institute of Planners*  
**VOLUME 20 ISSUE 3 (2022), Page 148 – 159**

## **THE ASSESSMENT ON KAMPUNG KUBU, TANJUNG MALIM, PERAK AS A HERITAGE VILLAGE**

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### **Abstract**

The conservation of heritage villages in Malaysia seems to receive more attention from government and private organizations. However, the assessment guidelines are still unclear, and urban development tends to ignore these historical settlements. This study aims to assess Kampung Kubu, a historical settlement in Tanjung Malim, Perak, by discussing its potential as a heritage village. The study focuses on heritage significance based on the criteria used for heritage village assessment in other states. Descriptive data is obtained from reviews on historical documents and articles, field observation, and interviews with the village and local authority representatives. The findings showed that Kampung Kubu displays strong evidence in the historical aspect, based on the traditional houses, historical landmarks, weaponry, and proper documented historical records. Therefore, it is recommended for this village to be developed for heritage tourism to support its recognition as a heritage village as a part of the urban development.

**Keywords:** Kampung Kubu, heritage village, conservation, historical settlement

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## **INTRODUCTION**

Understanding the values practised by the local community and its authenticity helps in preserving the heritage character of rural areas. Rural heritage has a significant role in creating a sense of place and acting as a catalyst for the regeneration and sustainability of a village settlement. Traditional villages are significant regional settlements that come from human and nature interaction with social and cultural values. Cities and villages in Malaysia have played a remarkable role in enhancing the living multicultural heritage, as portrayed by society's different religious and cultural practices (Radzuan & Ahmad, 2017). Malay traditional villages have existed as a settlement that portrays the Malay cultural landscape. The setting system, organization of space, time, meaning, communication, cultural landscape, and physical elements are the determining elements in a Malay settlement. By enhancing the heritage character of the village, a tool for people who lives in a rural area can be obtained to make them part of the rural development process (Nair, Singh & Munoth, 2020).

## **RESEARCH BACKGROUND**

Uncontrolled development has caused the destruction and deterioration of traditional villages' historical and physical characteristics. These villages, which once held important events, had deteriorated in terms of their historical function as today they are often surrounded and dominated by modern suburban development (Radzuan & Ahmad, 2017). On the other hand, even though Malaysia has begun to list heritage sites, the government has yet to produce a set of criteria to ensure that cultural value is identified correctly and appraised (Hashim, 2017). As a result, social practices such as rituals and festivals are neglected as a protected cultural heritage (Mustafa & Abdullah, 2013), leading to villages with these heritage values not being qualified as heritage sites.

It is also vital to include traditional villages as part of heritage assessment since little attention has been given to conserving and protecting this area. Many conservation efforts often emphasize the building and the area of land (Mat Nayan, 2017). In addition, academic research focuses less on safeguarding intangible cultural heritage in a village setting (Abet, 2021).

Kampung Kubu in Tanjung Malim, Perak is a Malay settlement in Malaysia that has inevitably been transformed through several phases of changes resulting in a new village character. The development of Tanjung Malim city has made the village idle or relatively isolated. Therefore, this study aims to assess Kampung Kubu for it to be conserved as a heritage village. The study's objectives are to compile the criteria used to design a heritage village and identify the significances as the criteria for Kampung Kubu to be gazetted as a heritage village.

## LITERATURE REVIEW

### *Heritage Village*

Heritage village is a cluster of traditional dwellings, including their surroundings, open spaces, trees and any associated community, service or ancillary buildings that represent the social history and cultural heritage of a community or ethnic, indigenous communities. A heritage village's construction and spatial nature reflect its rural or urban origins, although they may have been subsumed by urban expansion (Penang Heritage Trust, 2012). A heritage village can also be defined as a traditional neighbourhood or a specific district with historic significance, where both the physical characteristics and its inhabitants, living with their traditions, skills, and other cultural practices (Radzuan & Ahmad, 2020). However, heritage village protection, unlike other cultural heritage protection, needs to consider the people and the community, including their living conditions and overall village development.

In Malacca, seven villages have been recognized as heritage villages by PERZIM under the Conservation and Preservation of Cultural Heritage Enactment 1988 (Amended 2008): Kampung Morten, Kampung Chitty, Kampung Portugis, Perkampungan Baba Nyonya Melaka, Kampung Banda Kaba, Kampung Bukit China and Kampung Parit Sidang Seman (Yaman, Ramele & Ariff, 2021). In other states, Kampung Air Hangat, Mahsuri Tomb, Sarawak Cultural Village, Mari Mari Cultural Village are also registered as heritage villages based on the uniqueness of traditional houses of different ethnic communities (Abet, 2021). Each village is gazetted under the criteria of significance which is indicated in Table 1.

**Table 1:** Heritage Villages in Malaysia and Their Significances

<b>Heritage Village</b>	<b>Significance</b>
Kampung Morten, Melaka	Traditional Malay River village
Kampung Chitty, Melaka	Chitty ethnic community
Kampung Portugis, Melaka	Portuguese ethnic community
Perkampungan Baba Nyonya, Melaka	Baba Nyonya ethnic community
Kampung Banda Kaba, Melaka	Traditional Malay village
Kampung Bukit China, Melaka	Chinese ethnic community
Kampung Parit Sidang Seman, Melaka	Traditional Malay village
Kampung Air Hangat, Kedah	Folklore/myth
Mahsuri Tomb, Kedah	Folklore/myth
Cultural Village, Sarawak	Bidayuh, Iban, Orang Ulu, Chinese, Melanau, Malay, Penan ethnics
Mari Mari Cultural Village, Sabah	Dusun, Rungus, Lundayeh, Bajau, Murut ethnics

Source: Yaman, Ramele & Ariff (2021), Abet (2021)

### ***Heritage Village Criteria***

The recognition of a site's heritage values pays much attention to the cultural heritage values. According to ICOMOS (2002), cultural heritage is an expression of a community's ways of life passed down through generations, including customs, practices, places, artefacts, artistic manifestations, and values. The term 'cultural heritage' relates to how today's culture uses the past. It is a modern or postmodern reflection of the past that contributes to national and regional identity formation.

In Melaka, the government has listed a few attributes as criteria that need to be considered in the heritage village recognition process under the Conservation and Restoration of Cultural Heritage 1998 Enactment (Amendment 1993). These attributes consist of (i) traditional architectural attributes (building design and style); and (ii) socio-cultural attributes (residents' culture and custom, daily activities of the communities, traditional craft, and food business).

In Malaysia, Rahil, Ghani & Sarkom (2020) suggested that the role of the community in shaping the environment and atmosphere of their village, and the architectural heritage does contribute to the identified values and significant values of a heritage village. Meanwhile, Mat Nayan (2017) suggested a few criteria that could potentially identify to ensure these heritage elements are not neglected and taken into consideration for new development. These criteria include (i) historical and current research; (ii) connections between building/village and its surrounding; (iii) aesthetic appeal; and (iv) setting.

Other criteria used by other countries as heritage significance to assess a heritage village are summarized in Table 2.

## **RESEARCH METHODOLOGY**

Malaysian related acts and enactments, and significances in the conservation of heritage villages, mainly carried out by Yaman, Ramele & Ariff (2021), are reviewed. The criteria used in Malaysian practices are compiled with criteria listed in other countries, mainly by Bhandari, Kaur & Grover (2016) in Table 2. The compiled criteria are used as attributes to assess Kampung Kubu to reveal its potential to be gazetted as a new heritage village in Malaysia and suggest new criteria to be added to a designation of a heritage village.

Kampung Kubu, which is in the district of Tanjung Malim (Figure 1), Perak is chosen as the case study due to its historical values related to the establishment of the settlement, a historical event which involved the sultanates of Perak, Selangor and Pahang, and the cultural values of Rawa ethnic. In addition, Tanjung Malim is in Muallim, a district that has the potential to become a rapidly developing district in the southern region of Perak. Therefore, it is crucial to include the conservation of Kampung Kubu as a heritage village in the development planning to prevent this village from further modernization and urbanization.

**Table 2:** Heritage Village Criteria and its Indicators

<b>Attribute</b>	<b>Criteria</b>	<b>Significance Indicator</b>
<b>Historical</b>	Demonstrate a strong association of life, events, or activities of a person/clan/organization.	Associated with a significant event or historic phase. Maintains or shows the continuity of a historical process or activity. Associated with person/s whose life, career or acts hold strong historical significance.
<b>Scientific</b>	The place has the potential to add to the information that will enhance human understanding of the natural, historical and culture of the region.	Has knowledge that may lead to a greater understanding of an aspect of local history. Has knowledge that may aid in comparative analysis of similar places.
<b>Architectural</b>	Noteworthy or significant aesthetical characteristics.	Important for distinctive aesthetic attributes. Important for its creativity in design (architectural style) or technical advancement (construction technique). Possesses landmark quality. Important for contribution to the local landscape.
<b>Social Value</b> <b>Spiritual Value</b>	The place displays any community or group important for spiritual, social, or cultural reasons.	A place of high value for a community or an entire group on account of social, cultural, or spiritual grounds. Contributes to a sense of identity for a community. A place that has a religious context or any secular. Important owing to inner qualities or believed to be spiritual. All cultural values passed through materials and habits are a part of the heritage.

*Source: Bhandari, Kaur & Grover (2016)*



**Figure 1:** Location of Kampung Kubu in Tanjung Malim  
*Source: Google Map, 2020*

Relevant local documents related to the history and development of Kampung Kubu are reviewed, and an interview with a villager, who is the 5th generation of Dato' Haji Mustapha bin Raja Kemala is carried out to reveal the heritage significance of the village. Field observation was also done to identify other significances of architecture and sociocultural attributes. However, this study is limited to an interview session with one person in the village due to the COVID-19 pandemic's Movement Control Order (MCO). Therefore, it avoids variation in the information collected on the history and background of the case study.

## **FINDINGS AND DISCUSSION**

### ***Historical Significance of Kampung Kubu***

The southern part of Perak, including Tanjung Malim, was often threatened by Selangor for its strategic tin trade area where Selangor controlled the collection of trading tax based in Kuala Bidor. Perak paid tribute to the Siamese government to ensure it received protection from Selangor's threats. The border dispute between Perak and Selangor became a point of contention between the two states to the point of war among the inhabitants of Tanjung Jambu (the earlier name of Kampung Kubu). British intervention in reconciling the two sides of Perak and Selangor was resolved with a border agreement called the Anderson Agreement in 1825, where Sungai Bernam has become the border of the two states.

Tanjung Jambu was also used as a fort to protect Dato' Haji Mustapha bin Raja Kemala, the chief of Rawa tribe, a place official, and a loyal follower of Bendahara Tun Wan Mutahir bin Bendahara Tun Ali, head of Pahang (1857-1863). He was said to fled to this village with a few loyal commanders during the civil war between two sons of Bendahara Siwa Raja Tun Ali (Bendahara Pahang):



Bendahara Tun Wan Mutahir and Wan Ahmad (Sultan Ahmad Al-Muadzam Shah) in Pahang (Official Portal of MDTM, 2021). After a fort built by Dato' Haji Mustapha succeeded during the second attack from Pahang in 1871, Dato' Haji Mustapha was appointed as the village leader, which was then known as Kampung Kubu (a fort village). He was later appointed as the old chief of Mukim Ulu Bernam and the first chief of Tanjung Malim by Sultan Selangor, Sultan Abdul Samad Ibni Almarhum Tengku Abdullah in 1876.

His residence in Kampung Kubu became the centre of tax collection from 1876 to 1897, where he was assigned to collect boat tax and tin ore in the Tanjung Malim area. Later, the tax collection centre was moved to the resthouse area (today known as the Sarang Art Hub). He also built the first mosque in Tanjung Malim here in this village in 1870, located in his residence's area, where it has become a centre for Islamic scholars. However, this mosque was demolished during the Japanese occupation, resulting in a new *surau*, Madrasatul Al-Mustaufiah, built around the 1960s. The Klang War in Selangor in 1875 and Gee Hin and Hai San's conflict in Ipoh had also forced the Malays and Chinese to migrate to this village. In the early 1900s, the Hokkien Chinese built two rows of shophouses with a wood structure along Sungai Bernam to form a city-like business centre in the area.

### ***Scientific Significance of Kampung Kubu***

Kampung Kubu is also documented in a historical record by Sir Frank Swettenham, who was the Assistant of Perak in 1874, Resident of Perak in 1889 and Resident-General of the Federated Malay States from 1896 to 1901, during his adventure to Tanjung Malim. In his adventure, he had also witnessed the glory and wisdom of Dato' Haji Mustapha in the era of his reign.

The monochrome paintings and watercolours were produced in 1885 during his journey from Perak to Selangor and directly to Pahang (Lim, 1988). The paintings illustrated their views along the route from the point of view of British understanding of the region through visual recordings made while traversing Sungai Bernam and Sungai Pahang. Drawings of Dato' Haji Mustapha looking at Sungai Bernam, merchant ships anchored in Sungai Bernam, and the old mosque in Kampung Kubu were included in the book, *Frank Swettenham & George Giles: Watercolours & Sketches of Malaya 1880-1894* (Figure 2). All the drawings are stored and displayed today at the National Gallery of Art.

Meanwhile, weapons used during the civil war between Pahang and Kampung Kubu during the arrival of Dato' Haji Mustapha were also kept until today. These weapons were brought by Dato' Haji Mustapha and his followers from Pahang and were used during the protection at the fort built in Kampung Kubu and other areas in Tanjung Malim. Some cannons were displayed in the village, some were kept in Universiti Pendidikan Sultan Idris (UPSI) Museum, and some were kept by the leader's heirs (Figure 3).



Figure 2: Drawings of Sungai Bernam in Frank Swettenham & George Giles: *Watercolours & Sketches of Malaya 1880-1894*  
Source: Tuanku Bainun Library Collection (2021)



Figure 3: Cannons displayed at Kampung Kubu (left) and UPSI Museum (right)  
Source: Tuanku Bainun Library Collection (2021)

### ***Architectural and Aesthetic Significance of Kampung Kubu***

Kampung Kubu's layout remains a traditional Malay kampung located along the river. There are 13 traditional Malay houses, a *surau*, an orchard, an edible garden, and a compound for public activities (Figure 4). The residential areas covered 2 acres out of a total village area of 5 acres. However, some of the traditional Malay houses have been altered due to modernization, mainly influenced by the development of Tanjung Malim town and the need for bigger spaces due to the increasing number of family members. Most of the houses, inherited from their families, are two-storey buildings, where some of the upper floors are occupied by owners and rented to tenants on the lower floor. Seven out of 13 houses are surrounded by fences directly connected to the open road, while the other six are opened and built close to each other.



**Figure 4:** Village Layout and Traditional Malay Houses in Kampung Kubu

### ***Sociocultural Significance of Kampung Kubu***

Kampung Kubu was a settlement believed to be established by the Batak tribe, led by the Batak king, whose daily activities were hunting and fishing (Official Portal of MDTM, 2021). Later, it was also inhabited by the Bugis people who fled from Selangor in 1790 after the Dutch conquered the state (Syed Mansor et al., 2018). Today, the old Bugis grave behind the Cathay Ulu Bernam Theatre shows the evidence of Bugis people's settlement during that time. Later, Dato' Haji Mustapha, the chief of the Rawa tribe in Gali, Raub, Pahang, arrived in Tanjung Jambu with a few loyal commanders to seek protection from the Pahang people's attack due to civil war in the state (Official Portal of MDTM, 2021). Instead, they were welcomed by the Bugis people, and today, all Kampung Kubu's inhabitants are the fourth generation of Dato' Haji Mustapha. Although some of the essential cultural traditions among the Rawa community are no longer practised here due to Islamic rule, the inhabitants annually organize programmes promoting Rawa ethnic through food, exhibition, traditional games, and performances (Figure 6). These programmes are jointly organized with the neighbouring village, Kampung Simpang Empat and UPSI.



**Figure 6:** Muallim Rawa Festival at UPSI in 2018  
*Source: Muallim Rawa Festival 2018 Facebook Page (2021)*

### ***Discussion***

The criteria identified in Kampung Kubu that can be the historical, scientific, architectural/aesthetic, and sociocultural attributes, and lead to the assessment of the village as a new heritage village are listed in Table 3.

### **CONCLUSION**

This study compiled the assessment criteria for the recognition of a heritage village in Malaysia and other countries to propose a new list of criteria to reveal the potential of Kampung Kubu in Tanjung Malim, Perak, as a new heritage village in the country. The list consists of historical, scientific, architectural/aesthetic, and sociocultural attributes. As a result, Kampung Kubu can be identified as an old Malay settlement built in 1870 as Tanjung Jambu, historically related to a series of wars involving the states of Perak, Selangor, and Pahang, documented as one of the important views in the record of Sir Frank Swettenham, built with a layout of a traditional Malay kampung located along the river, and the cultural traditions practised by the Rawa community. Like the heritage village of Kampung Morten, Malacca, which is in the World Heritage Site of Malaysia, Kampung Kubu can also be an example of a typical Malay village which is locked in development but is still lingering on with its history. Findings from this study can be used to stimulate Kampung Kubu's conservation and development plans and promote Kampung Kubu as one of the important heritage villages at the national level to prevent the extinction of its historical value amidst the urbanization and modernization of Tanjung Malim.

### **ACKNOWLEDGEMENTS**

The authors would like to acknowledge the representatives from Kampung Kubu and Majlis Daerah Tanjung Malim for providing the information on the history and background of Kampung Kubu. Special thanks are due to the Centre for Knowledge & Understanding of Tropical Architecture & Interior (KUTAI) for sponsoring 50% of the PMJ Special Edition 2022 publication fees. May this effort encourage more scholars to publish in indexed journals in the future.

**Table 3:** Heritage Significance of Kampung Kubu

Attributes and Criteria	Heritage Significance
1 Historical Attribute (The village demonstrate a strong association of life, events, or activities of a person/clan/organization)	<ul style="list-style-type: none"> <li>• Kampung Kubu demonstrates several historical events:                             <ul style="list-style-type: none"> <li>○ Became a concentration point after Selangor-Perak's border was determined by Anderson Agreement, 1825</li> <li>○ Used as a fort in civil war of Perak and Pahang, 1871</li> <li>○ Boat tax and tin ore collection point (1876-1897)</li> <li>○ First mosque in Tanjung Malim</li> </ul> </li> <li>• Kampung Kubu is associated with Dato' Haji Mustapha bin Raja Kemala who was:                             <ul style="list-style-type: none"> <li>○ A palace official and loyal follower of Bendahara Tun Wan Mutahir bin Bendahara Tun Ali, head of Pahang (1857-1863)</li> <li>○ First Penghulu of Ulu Bernam and first chief of Tanjung Malim</li> </ul> </li> </ul>
2 Scientific Attribute (The village has the potential to add to the information that will enhance human understanding of the natural, historical and culture of the region)	<ul style="list-style-type: none"> <li>• Kampung Kubu has evidential value as a historical relic, local document, books, drawings and historical record (Historical Record of Frank Swettenham)</li> <li>• The fort was equipped with cannons, spears, swords, and daggers, which still remain here and some are displayed in UPSI Museum</li> </ul>
3 Architectural/Aesthetic Attribute (The village displays distinctive aesthetic vernacular landscape, local architectural characteristics of the built structure (architectural style) or technical advancement (construction technique))	<ul style="list-style-type: none"> <li>• Kampung Kubu displays a layout of traditional Malay kampung, where there are <i>surau</i>, orchard, edible gardens, traditional Malay houses, compound for public activities</li> <li>• 13 traditional Malay houses still existed in the village; however, some of them have been altered due to modernization and urbanization</li> </ul>
4 Sociocultural Attribute (The village displays community or group important for spiritual, social, or cultural reasons)	<ul style="list-style-type: none"> <li>• Kampung Kubu displays Rawa cultural practices through festivals held annually with UPSI and the neighbouring village</li> </ul>

Source: Author, 2022

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**

*Journal of the Malaysian Institute of Planners*

**VOLUME 20 ISSUE 3 (2022), Page 160 – 171**

**ASSESSING A CONDITION OF TIMBER DEFECT FOR PERAK TRADITIONAL MALAY'S ARCHITECTURE: AN INITIAL STEP TO CREATING ENTITY RELATIONSHIP (ER) MODEL IN DATABASES MANAGEMENT SYSTEM (DBMS)**

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**Abstract**

The significance value of Traditional Malay's House is relying on its architecture and strength ability of timber building and reflect the cultural value to the society. The uniqueness of this house is on the use of timber material such as Meranti, Jati and Chengal which prominent as a robust, long lasting and not easy to deteriorate spontaneously. Numerous factor that affects to the timber material and make it deteriorate can possibly cause by external forces, biological agents, temperature and the poor standard of workmanship. An existing information is very crucial in a way to 'boost up' locality economy especially in the aspect of heritage tourism. Local authorities as an administrative agency can play an important role as an 'information provider' to the ministry in promoting the tourism sector if they have a comprehensive database. The primary issue of tourism data is no comprehensive information about the traditional Malay house at respective administrative area in terms of building performance as well as defect analysis as to ensure a sense of historical place is preserved successfully. The aim of this paper is to develop Databases Management System for Perak Traditional Malay's House based on defect pattern at eleventh (11) nos. of Perak which focusing on Rumah Limas Bumbung Perak. Based on that analysis, it can be summarized that defect which often attacked a timber building, especially in tropical country especially in Malaysia was mainly caused by moisture problems and biological attack. A continuous exposure to these environmental agents and pests without proper maintenance and care with preventive measures will speedily decayed the buildings materials especially timber. Therefore, this paper is intended to explore a possibility of building condition assessment activity towards a data creation for database management system by exploitation a benefit of geographical information system (GIS).

**Keywords:** Perak Traditional Malay's House; Condition Assessment; Timber Defects; Database Management System (DBMS); Entity Relationship; Geographical Information System (GIS)

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## **INTRODUCTION**



A Traditional Malay's House has a lot of significance value especially on its architecture and strength ability of the timber building which brings the significance cultural value to the civilisation. According to Baharuddin et al (2020), the traditional Malay house is fully construct using the timber material which is from many kinds of timber types such as Meranti, Jati and Chengal which classified as a vigorous material and does not deteriorate spontaneously compared to other material. Timber would only deteriorate if it was attacked by the certain external forces. Therefore, Bakri (2014) in his study revealed that timber will provide excellent and lasting performance under a certain condition. However, it also faces several potential threats to service life, including fungal activity and insect damage which can be avoided in numerous ways. He added, timber is a hygroscopic material, which means it naturally absorbs and releases water to balance its internal moisture content with the surrounding environment. It was agreed by Reyers & John (2001), that a key important factor to controlling decay is to control moisture. Normally, a moisture content of timber is measured by the weight of water as a percentage of the oven-dry weight of the timber fibre. A minimum moisture content for decay to propagate is 22 to 24%, so building experts recommend 19% as the maximum safe moisture content for untreated wood in service. Water by itself does not harm the wood, but rather, wood with consistent high moisture content enables fungal organisms to grow. According to Harun (2020), National Heritage Department Malaysia (NHDM) has outlined the process to investigate historic buildings which namely architectural research, documentation on measured drawings, and dilapidation survey or building condition assessment with laboratory analysis. Therefore, this paper is intended to explore a possibility of building condition assessment activity towards a data creation for database management system by exploitation a benefit of geographical information system (GIS). By using this method, it can help ministries and local authorities standardize tourism information data as well as facilitate them to monitor and update the latest data regarding tourist attractions, tourism activities and other important information as to re-boost tourism industry in Malaysia after COVID-19 pandemic. (Soffian et al., 2021).

## **RESEARCH BACKGROUND**

According to Baharuddin et-al (2020), most of the vernacular architecture style are classified in the form of old Malay palaces, traditional houses and mosques, schools, offices, rest houses and hospital which located along the Sungai Perak. Rashid (2018) in his book entitled "*Rumah Kutai: Documentation of Memories*" that Perak Traditional Malay's Architecture styles can be divided into two (2) main categories:



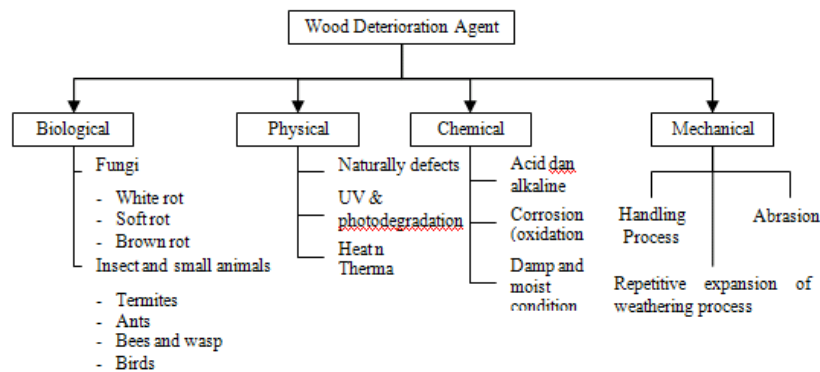
**Table 1:** Rumah Kutai (a) and Rumah Limas (b)

	<p><b>a.Rumah Bumbung Melayu or Rumah Kutai</b></p> <p>Based on the architectural view, Rumah Kutai can be refers as traditional Perak Malay house in where the house is defined by 'Rumah Ibu using Bumbung Panjang' or 'Bumbung Melayu' criteria.</p>
	<p><b>b.Rumah Limas Bumbung Perak or Potong Belanda</b></p> <p>It was believed that it is imitation the Dutch style during the colonial era. The design of roof of 'Rumah Limas Potong Perak' is well known on the west coast of the peninsula Malaysia.</p>

Source: M. N Baharuddin et-al (2020)

### **Timber Defect on Traditional Malay's House**

Based on study by Baharuddin et-al (2020), timber strength in Malaysia was classified into two (2) categories which it is naturally durable based on the types of timber while the other group was identified as timber that required treatment as to strengthen its properties. However, timber defect and damages still can affect the timber performance. According to study by Bakri (2014), defects can be referred to fault on something that detract from perfection, while building damage can be seen when any structure, material, equipment, and element of the building was not fully functional as to acceptable standard and function. He also further explains, defects are noticeable within the structure, fabric, services and other facilities of the flawed building. Most of the typical defects found in tropical climate in Malaysia are rotten timber, a slumped roof, damaged or deteriorated block walls, and slumped ceilings. He also added, timber properties are very flexible material for building structure, can deteriorate easily if no preventive action is taken to protect and avoid it from worsening. It was agreed by Johar et al (2013), which claimed that the presences of defects in timber houses are becoming more common because of biological agents, temperature and the poor standard of workmanship. Referring to the figure below, it was recognized four (4) major group for timber deterioration agents, where; biological, physical, mechanical and chemical agents (Johar et al, 2013).



**Figure 1:** Typical Defects on Timber Building  
*Source: Johar et-al (2013)*

Thus, determination of these condition is vital and can be conducted via observation to the area of the building by using visual inspection to identify and diagnose a building defect (Baharuddin et-al, 2020).

### ***Geographical Information System Capabilities in Perak Malay’s Traditional House***

As a component of Spatial Data Management, the Geographical Information System (GIS), may locate, document, and model geo-referenced spatial information. Recognizing the significance, most planning institutions are aggressively incorporating technology (mainly GIS, simulation, and modelling) into their courses (transport, urban growth, and environmental) (Evans-Cowley, 2010). GIS is a generic idea that allows data to be captured, stored, manipulated, and analysed on the earth's surface to aid decision making that affects spatial organisation. (Sun and Li 2016). Apart of the application of the GIS system, namely Data Based Management System (DBMS), it can facilitate a process in building inspection process in terms of storage a data after visual condition survey been execute on site. DBMS in the assessment of timber defect pattern in Perak Traditional Malay’s Architecture indirectly benefits the assessor in confirming the data and information of the timber defects in Malay’s traditional architecture house by including the exact location for each type of defect in respectively house.

## RESEARCH METHODOLOGY

The aim of this paper is to establish a Timber Defect Pattern of Perak Traditional Malay's House which focusing on 'Rumah Kutai' Perak as well as creating an initial step of Database Management System (DBMS) towards integrated information regarding a building performance. Towards attaining this aim, a qualitative research approach is used to achieve a main objective which to analyse the development of Timber Defect Pattern at the eleventh (11) nos. of Perak Traditional Malay's House located at Perak Tengah District. The critical stage in this research is to assess the existing condition of the building through building condition survey. A pro-forma survey was established as a checklist and being used to identify the types of timber building defect, the possible causes and the location of defects. The inspection is carried out by using Visual Inspection or Condition Survey Protocol 1 as to diagnosing a building defect for the traditional house before transferring the information to the DBMS in GIS approach. A few observations and procedures need to be followed such as top to down approach, which start the inspection from the highest level of the house i.e roof space. Then, the survey will be move from the internal building to the external façade with reasonable care. A several valuable information such as building background which is the property belongs to whom, year of built and completed, global positioning station (GPS) location, timber types, any maintenance information regarding the property and any related information were gathered during that inspection. At the time of survey, a weather condition is sunny day.

Furthermore, the analysis was made based on element by element; the column, beams, walls, floors, windows, doors, roof, plinth and stairs, diagnosing the building defect and defect possible causes.

## FINDINGS AND DISCUSSION

In order to achieve the objective No. 3, eleventh (11) nos. of Perak Traditional Malay's House located at Perak Tengah District was selected as a case study as follows:

**Table 3:** Case Study Information


No	Perak Traditional Malay's House (PTMH)	Building Age	Types	Timber Material	Location / Coordinate	Photo
1	PTMH 1	200 years	<i>Kutai Anjung Beranda</i>	Chengal	Parit / 4° 28' 14" N / 100° 54' 20" E	

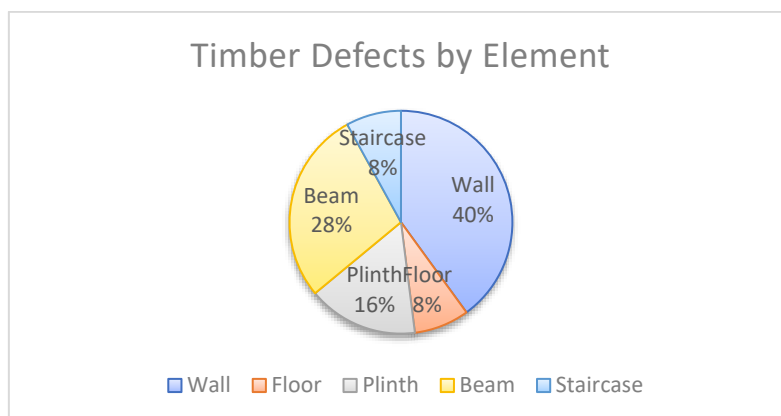
Figure 2: PTMH 1

2	PTMH 2	150 years	<i>Kutai Anjung Beranda</i>	Chengal	Parit / 4° 28' 11" N / 100° 54' 21" E		Figure 3: PTMH 2
3	PTMH 3	100 years	<i>Kutai Anjung Beranda</i>	Chengal	Parit / 4° 27' 02" N / 100° 54' 25" E		Figure 4: PTMH 3
4	PTMH 4	100 years	<i>Kutai Anjung Beranda</i>	Chengal	Bota Kanan / 4° 24' 37" N / 100° 53' 33" E		Figure 5: PTMH 4
5	PTMH 5	100 years	<i>Kutai Anjung Beranda</i>	Chengal	Bota Kanan / 4° 20' 30" N / 100° 53' 17" E		Figure 6: PTMH 5
6	PTMH 6	100 years	<i>Kutai Anjung Beranda</i>	Chengal	Bota Kanan / 4° 20' 47" N / 100° 53' 05" E		Figure 7: PTMH 6
7	PTMH 7	175 years	<i>Kutai Anjung Beranda</i>	Chengal	Bota Kanan / 4° 19' 27" N / 100° 54' 28" E		Figure 8: PTMH 7
8	PTMH 8	100 years	<i>Kutai Anjung Beranda</i>	Chengal	Bota Kanan / 4° 19' 28" N / 100° 54' 28" E		Figure 9: PTMH 8
9	PTMH 9	100 years	<i>Kutai Anjung Beranda</i>	Chengal	Bota Kiri / 4° 21' 47" N / 100° 53' 35" E		Figure 10: PTMH 9
10	PTMH 10	100 years	<i>Kutai Anjung Beranda</i>	Chengal	Bota Kiri / 4° 21' 53" N / 100° 53' 36" E		Figure 11: PTMH10
11	PTMH 11	100 years	<i>Kutai Anjung Beranda</i>	Chengal	Bota Kiri / 4° 21' 57" N / 100° 53' 45" E		Figure 12: PTMH11

*Source: Author (2022)*

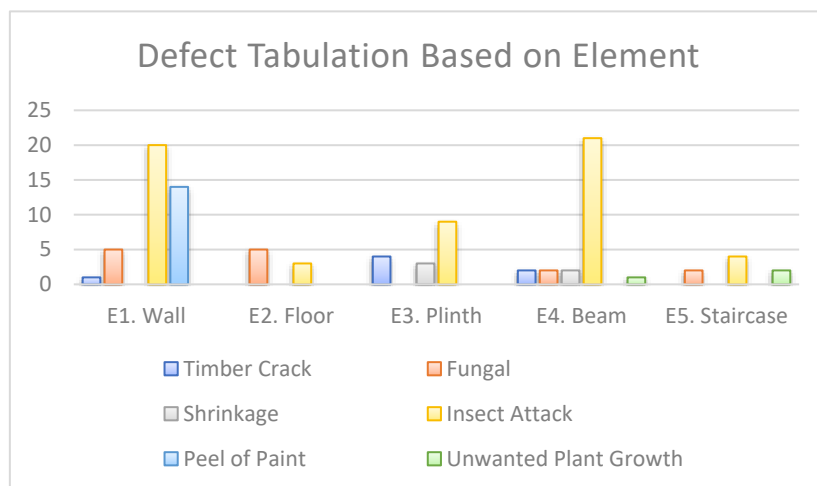
### **Defects Tabulation at Perak Traditional Malay's House**

Figure below shows a tabulation of defect for eleventh (11) nos. of Perak Malay's Traditional House. There are five (5) major elements were counted in this study, whereas six (6) category of building defects were set up as a common typical defect occurred at timber building (Baharuddin, 2020).



**Figure 13:** Defect Tabulation Based on Building Element  
*Source: Author (2022)*

Figure 13 shows a breakdown of defects in each element found in the eleventh (11) nos. of case study. Overall, based on survey, hundred (100) numbers of defect were recorded as a common failure and shortcoming during this exercise. The highest percentage of defect occurred at the building element is wall (40%), beam (28%), plinth (16%), followed by staircase and floor were recorded 8% respectively. Generally, the defects happened will absolutely decrease a timber building performance in terms of aesthetic point of view (Johar et-al, 2013).



**Figure 14:** Defect Tabulation Based on Building Element  
*Source: Author (2022)*

Figure 14 shows a breakdown of defects in each element found in the eleventh (11) nos. of case study. The highest percentage of defect caused by insect attack due to biological agent where it can be affected by insect attack consisting of Termites/ Wet Rot/ Dry Rot/ Beetles. According to survey, the building element focusing on beam (21 nos.) and wall (20 nos.) as well as plinth (9 nos.) recorded a higher number of defects occurred rather than floor (0 nos.) and staircase (0 nos.). Based on the analysis, it can be summarizing that most of the external facades recorded the highest percentage of defects due to external factors of biological attack and environmental agents. Continuous exposing to the environmental factor such as extreme weather condition contributes as a main factor of this findings. Meanwhile, for wall elements which considered as building fabric that concealed a building space internally and externally, was recorded the second highest percentage due to the fungal attack of dry and wet rot. Plinth and decorative elements similarly experienced the building defects since most of the decorative elements or ornamentation are being design based on normal 'timber' grade as to easy the carpenter to carving the timber materials with certain design and motifs (Baharuddin et al, 2020). Few defects were identified in the floor and staircase inspection. Those presents are the result of biological factors, physical and mechanical factors. Fungal attack, insect attack due to termites/ wet rot/ dry rot/ beetles are the commonly occurred for the floor and staircase element while unwanted plant growth is complemented for a small number of defects for staircase (Nawi, 2020). To conclude, this assessment is intent to establish the similarity and pattern of Perak Traditional Malay's House

focusing on 'Rumah Kutai' gives an overview of the existing condition, particularly those made from timber building element. The importance of this study where it can be used to creating a comprehensive Database Management System (DBMS) for Perak Malay's Traditional House, then followed by formulating a framework or guidance of proper remedial measures in terms of maintenance planning which focusing on timber building elements as to conserve a heritage identity at this area. Unlike with other property, most of the building in this study was left unoccupied since the owner died and the custodian of this building was inherited to their relatives. Subsequently, it was used only during festive season such as hari raya festival, resulting a development of termites' colony attack was rapidly growth (Bakri, 2014). Furthermore, a main factor due to the lack of maintenance and care of the building contribute the major causes of defects throughout the buildings. Therefore, a holistic prevention measures need to be taken in a way to overcome these issues. A comprehensive database management for Perak Traditional Malay's House is crucial and thus its preventive measures will minimize the risk of extinction of heritage significance element at certain places or district.

#### ***Creating of Entity Relationship (ER) in Databased Management System (DBMS)***

Generally, DBMS can help in store the data systematically and can show the detail analysis through the supporting map view. The data and analysis can be easily monitor and also can be identify virtually to help in any of decision making based on the issues and problems occurred from the defect data collection (Wilson, 2009). Then, the ER Diagram method by Chen (1976) is used in this study to form a Databased Management System (DBMS) for Timber Defect Pattern in Perak Traditional Malay's Architecture variables that have three main mechanisms which are entities, attributes and relationship. The database in this study covers 5 main building elements of Perak Traditional Malay House which is wall, floor, beam, plinth and staircase and the specifics of the components will be utilised as variables of each building element's defect such as:

- i. Entities: The components of entities are grouped according to the division of building elements that had been listed in this study.
- ii. Attributes: Defect diagnosis variables of the Perak Traditional Malay House is the data that had been collected from the inventory from each unit of the house such as timber crack, shrinkage, insect attacks, peel of paints, unwanted plant growth, and fungal.
- iii. Relationship: Relationship meaning is that of a verb that links two nouns (entities). Sharing on defect Databased and Management in Perak

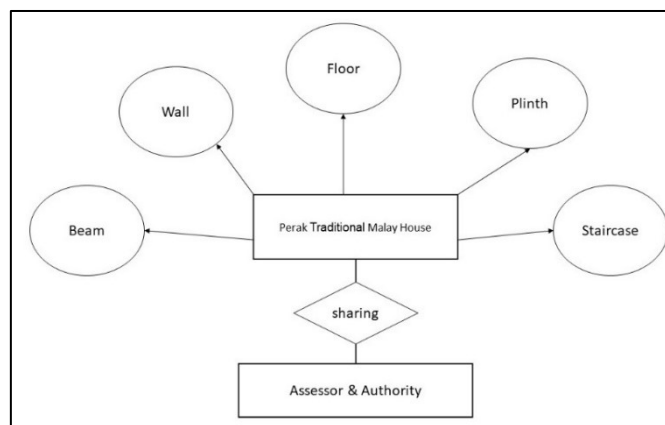
Traditional Malay House in this study is important in giving a comprehensive view to the assessor and also to the Authority to look at the details on the defect and will lead to the suitable method in maintaining and solve the problems by using the right materials and precise procedure.

The following table shows the details with respect to the attribute component for which building elements and types of defects on each of the elements in Perak Traditional Malay House.

**Table 4:** Attribute for ER development

<b>Attribute</b>	Perak Traditional Malay House Number Building Elements  Defect Diagnosis	Each Perak Traditional Malay house will be code with a number for easy identification on the types of defects based on the building element's defects inventory  There are 5 Building elements that had been listed in this study which is reflect to the different function and important elements in Perak Traditional Malay House.  Based on the listed Building element's, each of it will be assess trough the types of defect diagnosis which had been categorized to 6 parts with different causes and factor. This is the key element in this study which can be as a prove in making a decision on rehabilitation and others process in future.
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*Source: Author (2022)*




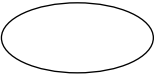
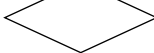
**Figure 15:** ER diagram symbols

*Source: Author (2022)*



The key entities and their inter-relationships are represented by symbols and connections in the ER Diagram. The following graphic was created by Chen (2002) to depict the basic components:

**Table 5: ER Diagram of Perak Traditional Malay House Database**

COMPONENTS	SYMBOLS	
Entity	Rectangle	
Attributes	Circle	
Relationship	Diamond	

*Source: Author (2022)*

## CONCLUSION

In a nutshell, based on the analysis, it can be concluded that both owner or caretaker for each Perak Traditional Malay House and respective local authority should have a decent synergy between others as to ensure a cultural significance element at certain element should be protected and conserved. As a policy maker as well as government agency, a proper database management for traditional Malay house is crucial for local authority as to monitor its performance in providing as much as information for heritage tourism such as ‘heritage trails’ of Perak Tengah District. At the same time, owner or caretaker of the building must emphasis on the maintenance aspect of the timber house since it was recorded as a main factor of timber decay in the building. A reasonable care of timber elements, such as the routine maintenance works is being conducted by the owner as to avoid the peel off paint defect, the painting works must be done in very five years which using the old method which is using the oil-based paint which eventually proven as a good solution of timber decay in the context to prevent environmental factors. Therefore, with a good synergy between both parties, it is believed that a ‘pearl’ of Perak Tengah District which is significance heritage values for traditional Malay house will be continuously preserve with a proper maintenance strategy throughout digitalization strategy.

## ACKNOWLEDGEMENTS

We would like to acknowledge and extend heartfelt gratitude to the Ministry of Higher Education and Universiti Teknologi MARA (UiTM) for funding this study under the Fundamental Research Grant Scheme (FRGS) – (Ref: FRGS/1/2021/SSI02/UITM/02/10). A special thanks to the Centre for Knowledge &

Understanding of Tropical Architecture & Interior (KUTAI) for sponsoring 50% of the PMJ Special Edition 2022 publication fees. May this effort encourage more scholars to publish in Index Journal in the future.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**

*Journal of the Malaysian Institute of Planners*

**VOLUME 20 ISSUE 3 (2022), Page 172 – 183**

## **ACCESSIBILITY AND INCLUSIVITY OF PLAYGROUNDS FOR CHILDREN WITH DISABILITIES IN MALAYSIA**

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### **Abstract**

Playing is one of the most crucial physical activities for children's development worldwide. Due to the unsuitability of the playground's design and the available play equipment, children with disabilities (CwDs) frequently experience difficulties when playing, especially at public playgrounds, amusement parks, and other recreational areas. They have consistently been mistreated and ignored in several ways. When designing and developing a playground, the accessibility and inclusivity of the space are crucial factors that should be considered. in preparing playgrounds for Children with Disabilities (CwDs). Two objectives are highlighted in this study, 1) to determine the criteria of accessible and inclusive playgrounds for disabled children in Malaysia and 2) to investigate the current accessibility and inclusivity of playgrounds for children with disabilities in Malaysia. The research methodology used is the qualitative method by using semi-structured interviews with caregivers of disabled children. The findings from the study conclude that most of the public playgrounds designed in Malaysia (even including inclusive playgrounds for Children with Disabilities (CwDs)) have still not met the needs of children with disabilities. The findings from this study hopefully will ensure that disabled children in Malaysia have the accessibility to play in inclusive playgrounds happily in the future.

**Keywords:** playgrounds, disabilities, accessible, inclusive

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## **INTRODUCTION**

A playground can be categorised as an open space which is an area or territory that accommodates human outdoor activities (Kusumo Dewi et al., 2017). A playground needs to be accessible to welcome every child. However, an accessible playground is not always inclusive for children of all physical and mental abilities (No Fault, 2018). According to Talay et al. (2010) children with disabilities, have limited accessibility and usability to the playground and they do not support interaction with others. This means that playground designs overlook or pay less attention to the requirements of children with impairments. Soltani et al. (2012) stated that children with disabilities are often faced with problems in public areas and one of the problem areas is in public playgrounds.

Datuk Fatimah Abdullah, Sarawak Welfare, Women and Community Wellbeing Minister, stated that local government authorities should make cities and towns more accessible to handicapped people. (Lai, 2017). Soltani et al. (2012) urged responsible parties to take care of this issue and no longer discriminate against the needs of disabled children. In Malaysia, there has been no study on the need for proper public playgrounds for children with disabilities (Soltani et al., 2012). Besides, Jabatan Landskap Malaysia (2010) realized that recreational parks and playgrounds are still not friendly to disabled people because of accessibility and facilities factors.

Islam (2015) also shared the same opinion, saying that public convenience and environment are not user-friendly due to the lack of infrastructure support from the government and the low awareness among the public. These are challenges for this community to socialize and be independent. The following goals have been established, which are to develop the standards of accessible and inclusive playgrounds for the use of children with disabilities and to examine the present accessibility and inclusiveness of playgrounds for children with disabilities.

## **LITERATURE REVIEW**

### **Accessible Playground**

A playground needs to be accessible in order to welcome all kids (Gutierrez Jr. et al., 2007). A playground that is easily accessible is one in which everyone can go around without difficulty. Accessibility is about easy to travel, to move, to approach or to entry. Accessible is the interpretation that if a child is in a wheelchair, the child is able to access some of the facilities in the playground environment (Michael Siu et al., 2015).

Accessibility in the built environment is becoming increasingly important in Malaysia, not just to prepare for an ageing population and CwDs, but also for the general populace (Jaafar et al., 2017). Based on Talay et al. (2010), several barriers were identified with the normal playground. They are parking lot, accessible entry point, pedestrians' ways, ramps, ground surfaces,

playground equipment, transportation/mobility and safety, The playground needs to be accessible to welcome every child including children with disabilities (No Fault, 2018). According to Wazani et al., (2020), children with Disabilities has limitation to participate in activities in inaccessible environment. Hussein & Mohd Yaacob (2012) interpreted accessible as a situation where even children who are on a wheelchair are able to access the playground environment easily. The Americans with Disabilities Act of 1990 (ADA) accessibility rules require playground designers to adhere to the standards. The standards regarding accessibility mentioned:

- i) The playground must have clear paths and pathways leading to the play equipment.
- ii) Every child should be able to travel freely on smooth pathways and slopes, as well as use grasp bars with ease.
- iii) Every child should be able to move securely between pieces of play equipment.
- iv) On an accessible route, the playground must provide at least one of each kind of ground-level play equipment.
- v) Half of the playground's play equipment must be in an easily accessible path.
- vi) Handrails on both sides of the ramp are required.
- vii) To protect the safety of users, playgrounds must utilise ADA-compliant safety surface and undergo regular inspections and maintenance.

### **Inclusive Playground**

Inclusive playgrounds are intentionally created to offer a secure environment for children of all abilities to play together, as well as to be developmentally suitable for children with and without disabilities (Luk and Au, 2015). The concept of inclusive first emerged as a strategy to guarantee that all children, regardless of aptitude, are integrated into the community. Today, inclusiveness is commonly viewed as a method for ensuring that everyone feels included, participated, and connected. Inclusive playgrounds are those that are particularly intended to allow children of varying abilities to play together rather than merely beside one another (Fernelius and Christensen, 2017). Inclusive playgrounds are also described as “Playgrounds for all Abilities” or “Playgrounds for children with disabilities.” (Luk and Au, 2015).

An inclusive playground means that the user can interact with every aspect of the playground whether they are confined to a wheelchair or not. A playground that is inclusive it not only accessible, but it encourages and facilitates children's interaction with other users. According to Kaplan (2013), there are eight keys to inclusion based on the Inclusive Play Design Guide.

- i) The playground needs to include all different types of play equipment.
- ii) Each type of physical play equipment must provide multiple challenge levels.
- iii) In the playground, a module structure must be supplied so that children who do not slide or climb can play on each deck or level.
- iv) Place comparable types of equipment in the same location to promote similar play at different ability levels.
- v) Separate activities into pods to make the playground easier for the user.
- vi) Make wheelchairs and strollers simpler to access and manoeuvre by using appropriate surfaces.
- vii) Identify the most engaging play equipment and make sure the play space is accessible and useable for all children.
- viii) Passage routes around and through the playground and adjacent areas are broad enough for people and wheelchairs to pass.

### **Children with Disabilities (CwDs) and Playground**

Disabilities come from the word ‘disable’ which covers the definition of impairments, activity limitations, and participation restrictions. According to WHO (2018), an impairment is an issue with the physical structure or function by an individual and it limits an activity when carrying out a task or action. “A child with disabilities is a child evaluated as having mental retardation, a hearing impairment, a speech or language impairment, a visual impairment, a serious emotional disturbance, an orthopaedic impairment, autism, traumatic brain injury, another health impairment, a specific learning disability, deaf-blindness, or multiple disabilities, who needs special care and extra attention, special education, and related services.” (Baxter, 2007). Nevertheless, McArthur et al. (2007) stated that there are 5 general types of disabilities which are blindness, deafness, physical disabilities, mental health disabilities and intellectual or learning disabilities.

The Persons with Disabilities Act 2008 (Act 685) (PWDA) defines PWDs as those who have long-term physical, mental, intellectual, or sensory disabilities that prevent them from fully participating in the community or public life (Kaur et al., 2015). According to statistics from Jabatan Kebajikan Masyarakat (2016), the total number of people with disabilities was about 409,269 people in Malaysia and Selangor has the greatest amount of disabled persons. The data shows that the highest number of categories of disabilities is learning disabilities, followed by physical disabilities. Meanwhile, as stated by UNICEF (2013), the total number of disabled children under the age of 18 years old was about 114,933 children. Humanium (2019) found that this group is most

often separated from other children by being kept in special institutions and away from their families.

## **RESEARCH METHODOLOGY**

In order to explore the accessibility and inclusivity of a playground designed for disabled children, a qualitative method has been used for this study. The study has been divided into three phases.

### *Phase 1: Literature review*

The process starts with gathering information through reading on the related topic based on past dissertations, journals, articles and books. It is then followed by writing the literature review related to the study.

### *Phase 2: Data collection*

The qualitative method has been conducted through semi-structured interviews to gather accurate data (Creswell, 2013). Semi-structured interviews contain structured and unstructured interview elements. In semi-structured interviews, the interviewer crafts a set of identical questions that all interviewees must respond to. The interviews with eight (8) caregivers/parents and caregivers from Care Centres for Children with Disabilities were conducted face-to-face and online. Purposive sampling was used throughout these interviews.

Due to the broad scope of the topic and the time constraint, the interview has been limited to caregivers in identified playgrounds suitable for children with disabilities in Kuala Lumpur, Shah Alam and George Town, Penang. Four (4) identified playgrounds that are partly or fully designed especially for Children with Disabilities have been identified through interviews with local authorities and parties related with disable children. The information has been thoroughly studied and it was agreed that these (4) four playgrounds which are Titiwangsa Lake Park Kuala Lumpur, Aman Park Petaling Jaya Selangor, Elmina Park Shah Alam Selangor and Youth Park George Town Penang was the best sample for this research and represent the playground specifically design for Disable Children in Malaysia.

### *Phase 3: Data analysis*

Thematic analysis was used for analysing the interview result. The steps start with familiarising the collected data, assigning preliminary codes to the data, searching for patterns in codes/keywords across the different interviews, reviewing patterns, defining and naming the pattern and producing a report.



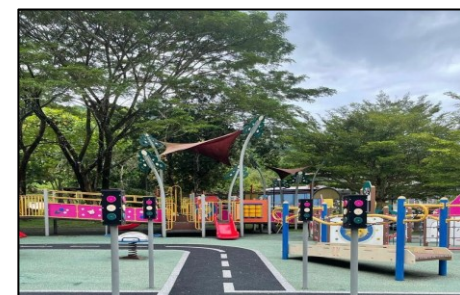
**Figure 1:** Titiwangsa Lake Park Kuala Lumpur



**Figure 2:** Aman Park Petaling Jaya Selangor



**Figure 3:** Elmina Park Shah Alam Selangor



**Figure 4:** Youth Park George Town Penang



## DATA ANALYSIS

The data have been collected from eight (8) interviewees at four (4) identified playgrounds. The playgrounds are:

- i. Titiwangsa Lake Park Kuala Lumpur - (TLPKL)
- ii. Aman Park Petaling Jaya Selangor - (APPJ)
- iii. Elmina Park Shah Alam Selangor - (EPSA)
- iv. Youth Park George Town Penang - (YPGT)

The interviewees are coming from various backgrounds, and it makes the data collected more reliable. Three (3) of eight (8) interviewees are caregivers at the Children with Disabilities Care Centre. The disabilities of the children under their supervision are varied compared to the caregiver/ parent with the children of one disability.

**Table 1:** Demographic of Interview Participant

Code	Age	Sex	Location	Position
<i>iv1</i>	38 years	Female	TLPKL	Parents / Caregiver
<i>iv2</i>	43 years	Female	TLPKL	Caregiver
<i>iv3</i>	29years	Male	APPJ	Parents / Caregiver
<i>iv4</i>	39 years	Female	APPJ	Parents / Caregiver
<i>iv5</i>	45 years	Female	EPSA	Caregiver
<i>iv6</i>	44 years	Male	EPSA	Parents / Caregiver
<i>iv7</i>	33 years	Female	YPGT	Parents / Caregiver
<i>iv8</i>	50 years	Female	YPGT	Caregiver

**Table 2:** Type of Disabilities for Children with Disabilities (CwDs)

Code	Types of disability (for CwDs only)				
	Learning	Physical	Mental	Visual	Speech
<i>iv1</i>		√			
* <i>iv2</i>	√	√	√	√	√
<i>iv3</i>			√		
<i>iv4</i>	√				
* <i>iv5</i>	√	√	√		√
<i>iv6</i>		√			
<i>iv7</i>	√				
* <i>iv8</i>	√	√	√	√	√

Most of the interviewees agreed that children with visual disabilities are the most difficulty accessing the playground. No special route with visual

disabilities equipment is provided for them. Only Aman Park Petaling Jaya provided the route for children with visual disabilities. Meanwhile, accessibility for physical disabilities is only fully provided at Youth Park George Town. Aman Park Petaling Jaya, Elmina Park Shah Alam and Youth Park George Town provided ramps and berms to make sure the playground is more accessible for wheelchairs and mobility devices users, but Titiwangsa Lake Park Kuala Lumpur has still not provided enough ramps and berms. The interviewee also agreed that most of the playgrounds are free from deterrents (i.e., slopes or narrow paths) and it makes the playground more accessible for all.

In many of the playgrounds, children with disabilities cannot move around or are free to play around. Results from this study showed that the new parks like Elmina Park Shah Alam and Youth Park George Town have ample space for children with disabilities to move around and can easily reach to play with the equipment. The design of the playground already took notes on the need for accessibility and inclusivity for Children with disabilities.

Most of the playground provided a levelled, smooth path and was safe for children to move around. Only Aman Park at Petaling Jaya needs to consider the condition of the path. Most of the paths in the playground are slippery and very dangerous to all users of the playground. Signage is very important, especially in a playground that is used by Children with Disabilities.

Enough signage was provided to help CwDs at two of the playgrounds, Aman Park and Youth Park George Town Penang. Meanwhile, another two playgrounds still need additional signage. Means of access for CwDs specifically for physically disabled children from the parking lot to the playground should be the first concern in creating an accessible playground. Only parking at Youth Park Penang is accessible to all users compared to other playgrounds. Aman Park provided the nearest parking in the back area, but the user needs to enter the playground from the back entrance.

**Table 3:** Accessibility of Playground for Children with Disabilities (CwDs)

Item	Accessibility of playground	Responses							
		√=Yes x=No xx= Not really 0=Not enough							
		iv1	iv2	iv3	iv4	iv5	iv6	iv7	iv8
		TLPKL		APPJ		EPSA		YPGT	
1	Children with visual disabilities can easily access the playground.	xx	xx	√	√	x	x	xx	xx
2	Children with Physical Disabilities can easily access the playground.	xx	√	xx	√	√	xx	√	√
3	Ramps, berms or other ways are provided with handrails to make it more accessible for children with disabilities, wheelchairs and mobility devices user.	0	0	√	√	√	√	√	√
4	There are deterrents (i.e., slopes or narrow paths) making accessibility difficult.	xx	xx	xx	x	x	x	x	x
5	Children with all disabilities can easily move around the playground .	x	√	xx	xx	√	√	√	√
6	Children with all disabilities can easily reach and play with all the playing equipment.	xx	x	x	xx	√	√	√	√
7	Paths are levelled, smooth and safe for children to move around	√	√	x	x	√	√	√	√
8	Enough signage is provided to help CWDs.	0	0	√	√	0	0	√	√
9	The location of the parking is near the playground.	x	x	√	√	x	x	√	√

Three analytical issues on the inclusivity of playgrounds from the four playgrounds are identified. The first issue is that some of the public playgrounds such as Aman Park Playground and Youth Park are not designed according to the intended user or age group. It limits the user and makes the playground not inclusive to all. The second one is Titiwangsa Lake Park and Aman Park does not provide enough play equipment suitable for all children's abilities. Most of the equipment and activities are only suitable for normal children and it makes

children with disabilities (CwDs) feel not inclusive with the environment and this creates the third issue, where children cannot play together side by side.

Most of the playgrounds do not fully meet the criteria of inclusive playgrounds. Only Youth Park George Town meets the criteria but the playground is not catered for all ages, only for children below 12 years old.

**Table 4 :** Inclusivity of Playground for Children with Disabilities (CwDs).

Item	Condition of inclusivity of playground	Responses √=Yes x=No xx= Not really 0=Not enough							
		iv1	iv2	iv3	iv4	iv5	iv6	iv7	iv8
		TLPKL		APPJ		EPSA		YPGT	
1	Playground is suitable for all ages.	x	x	√	√	√	√	x	x
2	All playground users can enter by using the same route.	xx	√	xx	xx	√	√	√	√
3	Every child can play side by side without differentiating their abilities	xx	xx	xx	xx	√	√	√	√
4	Inclusive play equipment and activities are provided enough for normal children and Children with Disabilities	0	0	0	0	0	0	√	√
5	Activities offered appeal to all children's senses - textures, a mix of shapes and sounds.	√	√	√	√	√	√	√	√
6	The rest of the areas are suitable for children and caregivers to sit side by side without differentiating the abilities.	xx	xx	√	√	√	√	√	√

## CONCLUSION

This study investigated the current situation of playgrounds for children with disabilities in Malaysia and the investigation has concentrated on the accessibility and inclusivity of the playground. The study concludes that most of the public playgrounds designed in Malaysia (even including inclusive playgrounds for Children with Disabilities (CwDs) have still not met the needs of children with disabilities. The entire playground should offer accessibility and inclusivity to every child whether disabled or not. The Local Authorities or parties related to Children with Disabilities should stress the guideline that the playground specially made for Children with Disabilities needs to fulfil.

The enforcement should be applied to the playground too. The playgrounds need many improvements, the local authority, playground provider and designer need to design an accessible and inclusive playground that every

child in the community will enjoy. A further study on the importance of accessibility and inclusivity of playgrounds should be done to make sure the community realised the importance of inclusive playgrounds to all.

## ACKNOWLEDGEMENTS

This research was funded by the Malaysian Ministry of Higher Education (MOHE) as part of the Fundamental Research Grant Scheme (FRGS). Project code: FRGS/1/2019/SS06/UITM/02/15.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**

*Journal of the Malaysian Institute of Planners*

**VOLUME 20 ISSUE 3 (2022), Page 184 – 195**

## **THE APPLICATION OF GREEN ADAPTIVE REUSE OF HISTORICAL BUILDINGS IN UNESCO CITIES**

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### **Abstract**

Adaptive reuse can help increase operating efficiency, and "green adaptive reuse" is the best option for historical buildings. There are no specific important environmental elements in the Malaysia Green Building Index (GBI) that are catered for, particularly for the reuse of historical buildings in the Malaysian setting. There is a vital need to identify certain essential environmental aspects that can be used to develop green features in Malaysia's adaptive reuse projects. This study examines the perspectives of adaptive reuse practitioners who have worked on historical building adaptive reuse projects through semi-structured interviews. These findings may assist GBI Malaysia in strengthening by identifying the fundamental environmental aspects for green adaptive reuse and classifying and sorting the elements into major categories in a meaningful sequence compatible with historical connections, sustainable and city planning knowledge.

**Keywords:** Green Adaptive Reuse, Historical Buildings, UNESCO Cities, Environmental

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## **INTRODUCTION**

The historical culture of many Malaysian states provides unique opportunities for the reuse of historical buildings. The adaptive reuse of historic buildings helps to save energy and resources. The green concept of sustainable techniques and technologies can be incorporated into building planning and modernization, as well as creating a healthy environment for people to live in. The Leadership in Energy & Environmental Design (LEED) accreditation scheme for green buildings, which honours the finest building practises and initiatives, was successfully established by the US Green Building Council (USGBC). This certification programme is currently one of the highest sustainability standards in many construction fields. However, in Malaysia, there are no specific key environmental features in the Malaysian Green Building Index (GBI) that cater specifically to the reuse of historical buildings. This problem leads to a critical need for establishing specific key environmental features that can be used to implement green features in Malaysian adaptive reuse projects. Therefore, this study's aim is to explore the specific elements of green environmental features that are implied in adaptive reuse projects in Malaysia.

The result would be beneficial in implementing green concepts towards historical buildings in Malaysia. An old woolstore may become an apartment building, a university or a hotel. Malaysia's state offers many opportunities to reuse historical buildings. Sekeping projects have so far completely reused historical structures, including Sekeping Kong Heng (Perak), Sekeping Victoria, Sekeping Pinang (Penang), Sekeping Sin Chew Kee, and Sekeping Backland (Kuala Lumpur). The adaptive reuse of existing stocks saves energy and resources. A green concept towards methods and technologies can be incorporated to modernise the building's performance and to generate a healthy space in to live and work. In the United States, they have successfully provided US Green Building Council LEED Platinum for several adaptive reuse projects that capably meet the highest current sustainability standards. The key problem here is that in Malaysia, there are no specific key environmental features in GBI Malaysia that are specifically for the reuse of historical buildings. This problem leads to the critical need to establish specific key environmental features that can be used to rate green concepts in adaptive reuse projects. Thus, this study's aim is to investigate the essential parts of green environmental features that should be included in Malaysian adaptive reuse projects. This study also examines the perspectives and experiences of adaptive reuse practitioners who have worked on historical building adaptive reuse and conservations projects. The end result would be useful in determining a green concept for giving new life to historical buildings.



## **THE IMPORTANT OF GREEN ADAPIVE REUSE IN CITY PLANNING**

Because the majority of adaptive reuse projects are located in older areas of cities and neighbouring towns, they are more centrally located and have easy access to transportation and markets. While increased urban density may result, this is not always a bad thing when compared to other options. The adaptive reuse idea provides the opportunity to integrate new town planning development that blends old or historical buildings with new and modern structures. This is because reusing building stocks may bring character to the adaption plans and provide historical links that can attract visitors and tourists. Aside from that, the combination of old and new may be quite appealing. A large number of completed adaptively adapted building stocks are beloved or historic landmarks. Despite this, the bulk of them are not thought of as outstanding examples of environmental planning. This approach has the greatest promise since it integrates environmental considerations into local and regional planning.

### **GREEN ADAPTIVE REUSE**

The design and construction process of transforming the functions, structures, fabric, or building envelopes of historical buildings into new and contemporary ways is known as adaptive re-use. Multi-project team members who have the vital management skills and work with the historic and contemporary value of the design and construction aspects must be able to handle the tough practise. (Alauddin, K 2014).

Previous research in adaptive reuse projects has determined on project team knowledge and skills, such as an individual's ability to do common adaptive reuse tasks. according to Langston (2011), green adaptive reuse, is an ideal technique that integrates expressed and active benefits in a synchronizing scheme that leads to green adaptive reuse. Langston (2011) used the iconCUR assessment to evaluate certain adaptive reuse efforts in Australia. By adding new capabilities to old structures, this is the most effective approach to green them. Many researchers agreed that skills and knowledge are acute to the success of adaptive reuse projects (Watson 2009a, 2009b). on the other hand, the concept of "green," draws merely a smidgeon of the researcher's attention. There is a scarcity of green adaptive reuse research. In recent years, the use of green building concepts has become increasingly widespread. The green index of most buildings in the United Kingdom has been determined. The idealised interpretation of the green concept for building, according to the Governor's Green Government Council, is to ensure the healthiest possible environment with the effective design solution that effectively emulates all natural processes and the condition of the existing building. The majority of developed countries have well-established green building evaluation tools for historical buildings.

It is critical to integrate well with green and adaptive reuse concepts because the results can be spectacular. They have successfully provided US Green Building Council LEED Platinum for several adaptive reuse projects in the United States, which meet the highest current sustainability standards. The former Bushels Team Company Building has received a 5-star Green Star rating from the Green Building Council of Australia, which is equivalent to Gold LEED certification. Currently, Malaysia has only one green initiative: green building for new and existing buildings separately (Greenbuildingindex2011). Malaysia's GBI must support the green concept by reusing historic buildings as part of the overall life-cycle of the city and district. Green Buildings should be designed and operated with the protection of Malaysian built heritage and the preservation of a distinct cultural identity in thought, by promoting locally owned businesses and flexible new uses.

### **KEY ENVIRONMENTAL FEATURES**

The sustainability of historical buildings is the main focus of this review. The main factors to achieve the green idea in the adaptive reuse of historical buildings are energy efficiency, indoor environmental quality, sustainable site planning and management, material and resource efficiency, and water efficiency.

#### **Energy Efficiencies Such as Performance of The Historical Buildings, Renewable Energy and Sustainable Maintenance**

Energy efficiency of a historic building refers to the energy needed or utilised for the building to function (Asman et al., 2019). According to Asman et al. (2019), passive heating and cooling as well as insulation of the building envelope also help by the conservation of energy as heat transfer will be reduced. In France, the sustainability approaches of the majority of buildings include renewing the building envelope's insulation, replacing windows with double-glazed ones, and fixing HVAC systems (Shahi et al., 2020). Therefore, the improvement of the energy efficiency and energy conservation of a building will reduce the emissions of carbon dioxide (Zhou et al., 2019; Calise et al., 2020).

#### **Indoor Environmental Quality Including Indoor Air Quality, Thermal Comfort, Lighting Visual and Acoustic Comfort of The Historical Buildings**

Indoor Environmental Quality (IEQ) comprises indoor air quality, thermal comfort, lighting, visual and acoustic comfort (Al-Obaidi et al., 2017; Karaca et al., 2020; Vladoiu et al., 2021). According to Martinez-Molina et al. (2018), providing thermal comfort is one component of a comprehensive approach to historic building preservation and adequate indoor conditions. The crucial criteria, such as fully natural ventilated spaces, providing mechanical ventilation and air conditioners, providing an auto-controlled indoor temperature system, and

controlling moisture and humidity, were selected to assess the actual conditions for adaptive reuse of historical buildings (Al-Obaidi et al., 2017). Besides indoor air quality and thermal comfort, lighting and visual comfort are two important factors for adaptive reuse of historic buildings (Marzouk et al., 2020; Shahi et al., 2020; Asman et al., 2019). For example, the use of lighting lux levels. LED lights are used extensively in Penaga Hotel, Penang (Dewiyana et al., 2016) and Colonial Shophouses, Kuala Lumpur (Al-Obaidi et al., 2017) to promote light efficiency and energy saving. Furthermore, some of the strategies to achieve great natural lighting and visual comfort, such as blind and tinted glass windows, were used, and the wide opening of windows gives the maximum external view and day lighting for occupying the building (Kilian et al., 2018; Marzouk et al., 2021; Mehr et al., 2018). Acoustic comfort also plays a major role in the adaptive reuse of historic structures that enhance the comfort of those who use their inner spaces (Khalil et al., 2021; D'Orazio et al., 2020). According to D'Orazio et al. (2020), controlling individual noise is the only way to cope acoustic contentment in historic buildings. Acoustic materials such as polyester and hybrid jute-polyester composites have been recognised to have high density and act as an insulation to reduce noise and sound impacts when installed in buildings (Mehr & Wilkinson, S., 2018; Aly et al., 2021).

#### **Sustainable Site Planning and Management Such as Facility Management and Reduce Heat of Historical Buildings**

A facility management inspection includes an overall inspection as well as a building condition analysis. The facility evaluation examines the building's present structural integrity, as well as the state of its roof, windows, HVAC, plumbing, and utility systems (Miraj et al., 2021). According to Chew et al. (2017), green facility management encompasses waste minimization, energy management, and utility reduction throughout the life cycle of a facility. Furthermore, the green building should use renewable energy sources for heating and cooling (biomass wood pellets, geothermal heating, solar thermal heating, and absorption cooling) (Cabeza et al., 2018).

#### **Material and Resources Including the Reuse and Recycle Material of Historical Buildings, The Specific Sustainable Material That Maintain, Waste Management and Possible of Extra Green Products**

The environmental benefits are the use of theory on recycling and reusing for sustainable redevelopment (Tam & Hao, 2019; Mak et al., 2019). Reusing is a technique for extending the life of historic structures and to decrease the consumption of construction material resources (Sharifi & Farahinia, 2020; Lu et al., 2019). When steel is recycled, the main source of avoided environmental burden is reuse (Sanchez et al., 2019). Bricks are another building material that

can be reused and recycled; blab al discovered that 70% of 2500 bricks could be reused, with the remainder destined for recycling (De Gregorio et al., 2020). Therefore, recycling of materials and reuse of structural elements can contribute to the reduction of construction waste in landfills (Sharifi & Farahinia, 2020). Furthermore, the ecological impact, such as greenhouse gas emissions, can also be reduced at the landfill (Tam & Hao, 2019).

### **Water Efficiency Such Water Recycling and Harvesting in Historical Buildings**

Conservation of water is the basic principle of green building (Huo et al., 2017). Water efficiency efforts should be made to ensure that the materials and systems that are used help in the reduction of water consumption in historical buildings (Asman et al., 2019; Oyewole & Komolafe et al., 2018). Efficient use of water will have a direct economic impact on a structure as the water and wastewater systems of buildings are powered by energy (Asman et al., 2019). Hence, the increase in water efficiency adds to the decrease in waste production arising from its treatment, thus improving environmental sustainability (Luthy et al., 2020). Ultimately, by conserving and using water efficiently, there will be energy savings, leading to a reduction in greenhouse gas effects on the environment (Chhipi-Shrestha et al., 2017). Water efficiency focuses on the 5R practises of i) consumption reduction, ii) loss and waste reduction, iii) re-use of water, iv) recycling of water, and v) resorting to alternative sources (Asman et al., 2019; Pradhan et al., 2019).

### **RESEARCH METHODOLOGY**

The problem is that adaptive reuse is one of the greenest approaches. As a result, an interpretative research approach was chosen since it may capture information regarding practitioners' actions and experiences related to adaptive reuse activities. Furthermore, when considering green adaptive reuse, "environmental aspects" of historical buildings must be considered in terms of their impact on natural ecosystems as well as green input.

Since of MCO and Covid-19, interviews were chosen as the primary data gathering strategy because they are an effective approach for learning about issues that cannot be observed directly. Interviews were conducted to learn about person's perspectives and experiences with green approaches in adaptive reuse projects. Although the interviewer has a list of issues to discuss, they are allowed to change the language and sequence of the questions. The interviewer focused on the following general themes:

- Understanding on Green Adaptive Reuse

- Understanding towards Environmental Elements of Green Concept for Adaptive Reuse of Historical Buildings
- The Perceptions on Key Environmental Elements of Green Concepts for Adaptive Reuse Project of Historical Buildings in Heritage City

The interviews with the conservators took place over the course of a month. Interviewees were chosen based on their potential to contribute to the study through tacit and explicit knowledge of adaptive reuse. Using the technique of selective sampling, representatives from six government conservation initiatives in the regional heritage city were chosen and invited to participate in the study. Due to MCO, the interview process was conducted entirely online via Google Meet.

The acquired data was analysed using content analysis as the primary technique. The text generated from the interviews was analysed with word and excel, allowing themes to emerge. The codings can be changed and incorporated as the research and report creation advances, making it easier to distinguish conflicts and contradictions. The major themes that needed to be considered during the green adaptive reuse process were determined through this procedure.

## **FINDINGS FROM SEMI-STRUCTURED INTERVIEW**

The findings of the interviews corroborated up the idea of adaptive reuse as a way to complement the green key elements. The interview was conducted with five significant professionals with over 5 years of expertise in adaptive reuse and conservation projects. The same questions were asked to all interviewees in the same order, allowing for a more accurate comparison of responses between the two inputs. Due to MCO, this set of interviews was conducted online.

Before delving into the six key elements of environmental adaptive reuse, the interviewer was asked about the application process for adaptive reuse in heritage city. All interviewees mentioned that the application is still under Section 40, Federal Territory (Planning) Act 1982, if the projects are under the Department of National Heritage (DHN). Any proposal needs to be submitted to the DHN, but the only difference is the approach, such as adaptive reuse. The physical conservator will be appointed by DHN to assist and provide a guide during the review process for the proposal to reuse the heritage building in Heritage City. All participants agreed that the adaptive reuse approach is the most popular in conservation practice. This is due to the minimum requirements and regulations in terms of using modern elements while at the same time maintaining the authenticity and originality of the external façade or fabric. They also agreed that adaptive planning is the best approach to achieving environmental development, but focused on historical buildings. The GBI key elements are for any new buildings, but they are also complementary and compatible with the

historical buildings in the heritage city. It is also mentioned that the original design of historical buildings already has elements of natural beauty, such as saving energy, having indoor environmental quality, and natural materials (salvage material), and also allows for any possible innovation to suit the new functions of the historical buildings.

From the literature review, six key elements were used, including energy efficiency, indoor environmental quality, sustainable site planning and management, material and resources, water efficiency, innovation, and environmental impact. Both agree that the adaptive reuse approach is actually a green concept already. The details of perception from both are summarised in Table 1.

**Table 1:** Interviewees' perspectives on six key environmental elements in adaptive reuse projects of historical buildings in heritage cities.

Main Question	Trigger Question	C1	C2	C3	C4	C5
<b>Main Question</b> Could you share your perceptions on the key environmental elements of the green concept in adaptive reuse projects for heritage buildings?	Question 1a: Energy Efficiency	Yes	Yes	Yes	Yes	Yes
	Question 1b: Indoor Environmental Quality	Yes	Yes	Yes	Yes	Yes
	Question 1c: Sustainable site planning and management	Yes	Yes	Yes	Yes	Yes
	Question 1d: Material and resources	Yes	Yes	Yes	Yes	Yes
	Question 1e: Water Efficiency	No.	No.	No	No	No
	Question 1f: Innovation	Yes	Yes	Yes	Yes	Yes

*Source: Authors*

## DISCUSSION

The adaptive practitioners revealed that the adaptive reuse approach already has green or environmental elements in nature. All five agree that the reuse of the whole structure, from the external façade, interior, and materials, is sustainable and achieves the five key elements of environmental protection, except for the water efficiency or reuse of the water. This is due to the condition of the structure to adapt to these particular elements. Furthermore, the interviewer also mentioned that innovation elements have two impacts: negative and positive. The advantage is that it is compatible with modern contemporary, which is appropriate for the new functions of historical buildings such as hotels or restaurants. But at the same time, they need to consider the negative impacts, such as the waterfall in the buildings in the cold environment, which may reduce the strength of the existing material. Another point is the landscaping. The big tree is not suitable because it

will affect the existing structure due to enlargement of roots. However, innovation in terms of internal design, such as using the natural environment to enhance the indoor quality, is allowed with the small trees in the vast.

As per previous research by Elsorady (2013), sustainable adaptation embodies energy and reduces waste materials. It is supported that the adaptive reuse approach is the best approach with the minimum amount of conservation regulations. The adaptive reuse also allowed for the redesign of the interior of the building with new and modern components that were appropriate for the new functions as long as the main characteristics of the historical buildings, such as the external façade and certain interior parts, were preserved (Rani & Devina, 2017). This implies that green adaptive reuse also supports conservation practise with the flexibility in certain elements but at the same time complements the environmental aspects, especially in heritage cities in Malaysia (Halim and Thambi, 2021). This finding shows that, this could support the strategy of the city and regional planning application.

## **CONCLUSIONS**

The article investigated the perceptions of key adaptive reuse and conservation practitioners in undermining the six key environmental elements compatible with the Green Building Index for new buildings. Clearly, according to perceptions, the adaptive reuse approach preserved cultural identity, promoted environmental awareness, resulted in a more efficient use of underutilised or abandoned historical buildings, and achieved environmental benefits. The lack of water efficiency is not a critical point; rather, it is dependent on the structural strength of historical buildings themselves. As a result, work needs to be done at Green Buildings Index to make the six environmental elements compatible with any historical buildings that may be known as the Green Adaptive Reuse Index (GARi) framework as a starting point (future research). This will serve as a guideline for achieving environmental benefits as well as increasing the number of historical buildings in the heritage city.

## **ACKNOWLEDGEMENTS**

The researcher would like to thank the MITRAN-EK Research Grant (600-RMC/MITRANS IRES 5/3(012/2020) from Universiti Teknologi MARA for supporting this study. A special thanks also goes to the Centre for Knowledge & Understanding of Tropical Architecture & Interior (KUTAI) for sponsoring 50% of the PMJ Special Edition 2022 publication fees. May this effort encourage more scholars to publish in Index-Journal in the future.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**

*Journal of the Malaysian Institute of Planners*

**VOLUME 20 ISSUE 3 (2022), Page 196 – 204**

## **EVALUATION OF SOCIAL IMPACT ASSESSMENT (SIA) PRACTICES USING SWOT ANALYSIS: A CASE STUDY IN INDIA**

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### **Abstract**

Social Impact Assessment (SIA) has been incorporated into part of EIA legislative structures in most nations following the adoption of the National Environmental Policy Act (NEPA) in the USA. The assessment acts as a policy instrument for evaluating a project's socio-cultural consequences and for advising socio-political stakeholders on its social viability. The instrument also provides operational advice for tackling any negative social effects the policy could have, with a focus on improving its positive effects. However, the traditional SIA has been deemed insufficient for measuring social consequences and has received little emphasis in the appraisal process compared to economic and environmental impacts. Two case studies and a SWOT analysis were conducted to analyse and compare the Social Impact Assessment (SIA) by using a matrix analysis. The findings indicate that both case studies have similar indicators to each term that integrates with one another. The focus on the term is weaknesses, particularly during the redevelopment of a report, which is still lacking in many ways.

**Keywords:** Social impact assessment, environmental impact assessment, SWOT analysis, matrix analysis

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## **INTRODUCTION**

Social Impact Assessment (SIA) has been incorporated into the EIA legislative structures in most nations following the adoption of the National Environmental Policy Act (NEPA) in the USA (Aucamp, 2015; Esteves et al., 2012; Finsterbusch, 1995; Kruger & Sandham, 2018). According to the International Association for Impact Assessment (IAIA) (1999), EIA has been defined as “the process of identifying, predicting, evaluating, and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made.”

The SIA is a type of blueprint instrument that is used to assess a project’s socio-cultural consequences, the purpose being to advise socio-political stakeholders about its social viability. The assessment also provides operational advice for offsetting any negative social effects the policy could have, with a focus on improving its positive effects (Esteves et al., 2012). Martinez & Komendantova (2020) note the SIA to be a significant instrument that can educate planners and decision-makers about the possible social and/or economic consequences of a planned project. Knowing about these potential consequences ahead of time might aid decision-makers in determining whether a project should proceed, proceed with some modifications, or be revoked altogether.

An SIA’s most useful outcome is the development of plans for abatement to minimise a project’s potential harm to people and communities. This objective is in line with the International Principles for Social Impact Assessment’s definition of SIA as follows: “the process of analysing, monitoring, and managing the intended and unintended social consequences, both positive and negative, of planned interventions and any social change process invoked by those interventions” (Vanclay, 2003). Since their inception in the 1970s in the United States (IADB), SIAs have been adopted widely by the Global South and international entities, such as the World Bank (WB) and the Inter-American Development Bank (IADB). The SIA is a hybrid of science and political process (Freudenburg, 1986) and contributes to advising the designation of mitigation and enhancement measures (Mahmoudi et al., 2013). A previous study has shown that both the SIA and EIA have the same authoritative purpose, but the former focuses more on the social aspect or dimension of the environment (Kruger & Sandham, 2018).

SIA is proven to be a suitable approach based on an integrated assessment that acknowledges and evaluates both the biophysical and social aspects of projects, programmes, and policy initiatives. However, the assessment lacks a suitable scientific foundation due to limited scientific publications on the theoretical foundation, opportunities, and limitations of such an assessment method to date (Dendena & Corsi, 2015). According to Kruger & Sandham (2018), one study has examined the effectiveness of SIAs from various viewpoints, including legislative and institutional design, assessment preparation

and quality, SIA influence on decision-making processes, and public involvement in them. The relationship between project technical and social parameters and SIA performance, on the other hand, is largely unexplored.

As previously stated, the socio-technical composition of projects and sectors has a significant impact on their local consequences and interactions with communities. Consequently, a deeper understanding of these designs is important for SIAs to address and manage social-economic effects (Miller et al., 2015; Martinez, 2020). One study by Mahmoudi et al. (2013) found some major issues that SIA encounters, particularly with regard to its theoretical foundations and methodological challenges. Hence, enhancing SIA by integrating it with a parallel and dynamic risk assessment is beneficial for addressing the issues that are prevalent in SIA. The methodology, techniques, and strategy still require enhancement despite significant advancements in SIA since the 1970s. This study seeks to assess the SWOT analysis from several case studies and determine the functionality of the SIA.

## **LITERATURE REVIEW**

Despite being insufficient for measuring social consequences, the traditional SIA has remained unchanged (Pimentel da Silva et al., 2021). A deeper clarity into the social aspects of development can be gained by merging the assessment of social impacts with social concerns (Mahmoudi et al., 2013). SIA grew in popularity in the late 1970s and early 1980s because of EIA's perceived intense focus on biophysical components, which often reduced social dynamics as influenced in the infrastructure projects to a supporting role in the review process (Dendena & Corsi, 2015). There is a compelling character of environmental consequences (Othman et al., 2021) in addition to the factors already described as limiting the SIA from being implemented as a process in and of itself, or in conjunction with the EIA. SIA is also an indicator of a shift in identifying social issues as drivers of business risk as part of a management approach for effectively responding to consequences.

Nonetheless, according to Dendena & Corsi (2015), when it comes to identifying and structuring alternatives for actions to be taken, social practitioners typically have little influence. As a result, the limited resources devoted to social assessment, in conjunction with regulators' limited capacity to provide quality assurance of proposed actions, have a significant impact on the standard of SIAs, with developers being inclined to draw up assessments that meet the bare minimum of policymakers' expectations. Moreover, a study by Lucas et al. (2022) found that social implications are often given less weight in the appraisal process compared to economic and environmental impacts.

The lack of political significance placed on social assessments has led to a reluctance to commit significant resources to them during a project's implementation. One study found that the lack of the rules and regulations of SIA

is the most inconvenient and not effective due to methodological inadequacy (Khan, 2020; Martinez & Komendantova, 2020). Similar to the risk assessment, due to a lack of information and awareness, the SIA is not extensively used as part of the assessment (Muthuveeran et al., 2022).

Pimentel da Silva et al.'s (2021) study highlights that to improve the SIA, it is necessary to (i) include other cultural, livelihood, and well-being parameters in addition to socioeconomics and (ii) introduce the concept of development limits, which would seek to ensure socially acceptable, economically feasible, and environmentally friendly development. However minor consideration of social issues in project evaluation, particularly in the context of public works, has frequently resulted in social objections by environmental organisations. Another flaw is that many social assessments solely engage professional stakeholders in the area (Lucas et al., 2022).

## **METHODOLOGY**

This paper is a brief narrative literature review of several studies related to the factors that contribute to the effectiveness, perception, or acceptance of SIA as a planning tool at the project level. Literature on social assessment was adopted as an example and output in this study. A descriptive SWOT analysis, which consists of Strength, Weaknesses, Opportunities, and Threat analysis, was formulated in the findings to explore the credibility of SIA as a planning tool.

Houben et al. (1999) denote a SWOT analysis as a type of analysis used in small and medium-sized businesses' strategic planning procedures. By maximising strengths, minimising weaknesses, utilising opportunities that are there, and avoiding threats, the SWOT analysis seeks to enable decision-makers to create a qualitative structure of a process or system (Fertel et al., 2013). Strengths and weaknesses impose pressure on a system as a whole, while the external environment controls opportunities and threats (Phadermrod et al., 2019). SWOT frequently emphasises strengths on which to build a strategy or weaknesses to eradicate, the purpose being to accomplish predetermined goals while simultaneously highlighting chances to seize or risks to be mitigated (Goffetti et al., 2018).

## **ANALYSIS AND DISCUSSION**

### ***Strength, Weakness, Opportunities, and Threat Analysis***

The SWOT analysis, shown in Table 1, followed the process adopted by Rathi (2017) in evaluating the environmental impact assessment at the project level in India.

**Table 1:** SWOT Analysis of Environmental Impact Assessment (EIA) at Project-Level

<b>Internal</b>		<b>External</b>	
<b>Strength</b>		<b>Opportunities</b>	
<ul style="list-style-type: none"> <li>• Well-defined</li> <li>• Well-developed regulatory mechanism</li> <li>• Incorporating international protocols</li> <li>• Strong judiciary</li> <li>• Citizen rights</li> </ul>		<ul style="list-style-type: none"> <li>• Educate project proponents</li> <li>• Developing a system of assigning EIA studies to the consultants by an independent body</li> <li>• Involving the public at the scoping stage</li> <li>• Public participation after the drafting stage</li> <li>• Evolving a mechanism for third-party monitoring</li> <li>• Follow-up projects based on environmental approvals</li> <li>• Peer review of EIA reports</li> </ul>	
<b>Weaknesses</b>		<b>Threats</b>	
<ul style="list-style-type: none"> <li>• Scoping</li> <li>• Establish realistic environmental baseline conditions</li> <li>• Impact assessment</li> <li>• Evaluation of impact significance</li> <li>• Environmental management programme</li> <li>• Consideration of alternatives</li> <li>• EIA review</li> <li>• Monitoring</li> <li>• Follow-up</li> </ul>		<ul style="list-style-type: none"> <li>• Short-term view on natural resources</li> <li>• Overlooking limitations of project-level EIA</li> <li>• Lack of efforts in improving the quality of EIA reports</li> <li>• Non-ethical practices</li> </ul>	

All the elements in the SWOT analysis (Table 1) have their merits and drawbacks, along with opportunities and threats of EIA implementation in India. Among those listed as structural failures are weak administrative structures, inadequate screening and scoping, subpar EIA reports, insufficient review, poor public involvement, and insufficient mitigation measures and monitoring implementation. It can be shown that rules on EIA are founded on a rationalist approach and often follow an information processing model in deciding whether to grant environmental approvals to a proposed project.

Expert appraisal committees at the central and state levels determine the terms of reference (TOR) for conducting EIA for a proposed project. However, after thorough site-specific studies are completed, the TOR provided at the beginning of the application process for environmental approval is not

revisited. Such a shortcoming then leads to an evaluation of impact significance. The impacts are listed without thorough analysis by relevant functional expertise. Effect significance, which is essentially a function of impact features and impact importance, is not well understood. There is no shortlisting of activities that could significantly alter the relevant environmental features with a focus on severe and critical consequences for effective mitigating strategies. Since effect quantification is typically not done, determining the importance of impacts becomes challenging. The guidelines provided for the determination of significance from UNEP (2002) are not fully utilised. Many of the impacts are considered trivial without any explanation, leading to little understanding of the impact evaluation and analysis procedures. The outcome, therefore, is a shaky EIA process.

Nonetheless, the political realities of decision-making differ in developing nations, where the establishment of manufacturing, energy, and infrastructure projects, as well as the creation of widespread employment opportunities, are prioritised over long-term natural resource management. The issue becomes interesting when the media reveals a violation of environmental approval requirements and public interest litigations get filed in courts.

Another case study (Paliwal, 2006) demonstrated the integration of a SWOT analysis that may have similar indicators in each term. The meaning of the SWOT term in this context is Strength (S), Weaknesses (W), Opportunities (O) and Threats (T). Both case studies used SWOT analysis to evaluate the environmental impact assessment conducted in their respective country. Table 2 summarises the SWOT analysis based on the findings extracted from the case studies.

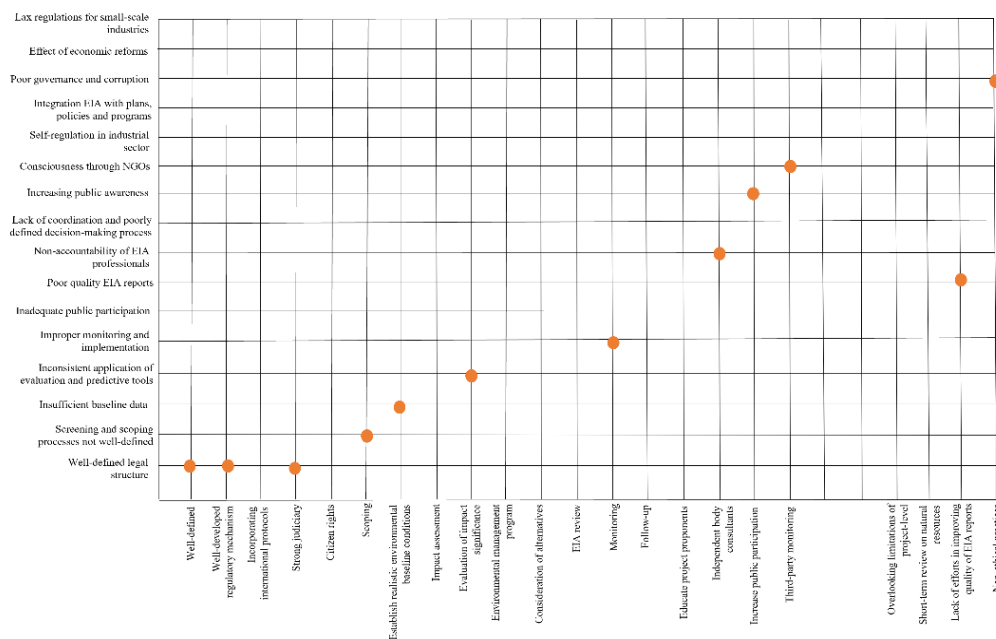
**Table 2: SWOT Analysis of Environmental Impact Assessment (EIA)**

<b>Internal</b>	<b>External</b>
<b><i>Strength</i></b>	<b><i>Opportunities</i></b>
<ul style="list-style-type: none"> <li>• Well-defined legal structure</li> <li>• Presence of a well-knitted regulatory structure</li> </ul>	<ul style="list-style-type: none"> <li>• Increasing public awareness</li> <li>• Growing consciousness through Non-Governmental Organisations (NGOs)</li> <li>• Self-regulation in the industrial sector</li> <li>• Integration of EIA with plans, policies and programs</li> </ul>
<b><i>Weaknesses</i></b>	<b><i>Threats</i></b>



- Screening and scoping processes are not well-defined
- Insufficient baseline data
- Inconsistent application of evaluation and predictive tools
- Improper monitoring and implementation
- Inadequate public participation
- Poor quality EIA reports and non-accountability of EIA professionals
- Lack of coordination and poorly defined decision-making process
- Poor governance and corruption
- Effect of economic reforms
- Lax regulations for small-scale industries (SSI)

Based on the SWOT analysis above, several indicators are significantly similar to those in the previous study. A matrix analysis (figure below) shows the integration of both analyses in terms of their indicators for each term.



The matrix analysis shows several indicators that can be integrated from both studies. For example, strengths term stated that well-defined in terms of regulatory or legal mechanisms, as well as a strong judiciary. However, for the

weaknesses, it shows that the process during the assessment is not precise as the scoping, insufficient or inconsistent baseline data, evaluation and monitoring activities. For opportunities, both studies mentioned that public participation and involvement of third parties are essential in exposing more people to the SIA. Finally, the threats that can be harmful to SIA are poor quality of the reports and non-ethical practices, such as poor governance and corruption that happened in a country.

## CONCLUSION

Social Impact Assessment (SIA) is still in its early stages and is incorporated into EIA in one document. Therefore, SIA requires further improvement in terms of environmental aspects. The social aspects should not be politicised, and public participation is compulsory prior to the development of a particular area. A SWOT analysis is one method for ensuring the effectiveness of SIA as a planning tool at the project level. The analysis in this study highlights the elements that need to be catered to for the future enhancement of the tool. Most weaknesses come from the procedures for developing an environmental impact assessment, which is also part of SIA.

## ACKNOWLEDGMENTS

We would like to thank all who participated in this study for giving perception, ideas, and acceptance of social impact assessment at the project level.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**  
*Journal of the Malaysian Institute of Planners*  
**VOLUME 20 ISSUE 3 (2022), Page 205 – 216**

## **MODELLING THE COMMUNITY ADAPTIVE BEHAVIOUR TOWARDS AIR POLLUTION: A CONFIRMATORY FACTOR ANALYSIS WITH PLS-SEM**

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### **Abstract**

Air pollution has become a serious threat to public health due to the rapid economic development globally, and urban air pollution is thought to cause 1.3 million deaths annually. Urban areas have a huge potential for human exposure to the severity of air pollution and health concerns. Therefore, it is essential to advance our understanding of the factors influencing behaviour to provide compelling evidence for successful behavioural interventions and guidelines. Doing so will increase the practicality of public adaptation to the guidelines. Yet, little is known about the adaptive behaviour toward air pollution. This study aims to establish a predictive model of factors impacting the adaptative behaviour of urban Malaysians toward air quality. A deductive theory-generating research approach and a correlational research design were used in the development of a new ABR model. The following seven factors were tested: values (VAL), attitude (ATT), perceived vulnerability (PVL), perceived severity (PSV), self-efficacy (SEF), response efficacy (REF), and risk perception (RPN). Klang Valley served as the study area, and a multi-stage cluster sampling technique was used to select the respondents (n = 440) of a face-to-face questionnaire survey. In conjunction with PLS-SEM analyses, confirmatory factor analysis (CFA) was used to evaluate the structural models. The results demonstrated that PLS-SEM CFA is suitable for building a reliable structural model to examine community adaptive behaviour.

**Keywords:** Air Pollution, Adaptive behaviour; Confirmatory Factor Analysis

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## **INTRODUCTION**

Air pollution is a mixture of harmful gases and particles released into the atmosphere due to either natural or human activities (Bai et al., 2018; Ferguson et al., 2020; Leh et al., 2020). While human activities are the primary cause of air pollution, humans and other creatures are the ones that suffer the repercussions of this pollution. Most empirical studies on air pollution have focused on metropolitan areas in developed nations (Chen et al., 2016; Dedoussi et al., 2020; Lu & Liu, 2015; Sun et al., 2018), yet the rapid urbanisation in developing nations may have a more profound impact (Manisalidis et al., 2020). Based on the findings from a national survey covering more than 4300 cities, World Health Organization (WHO) reports that more than 80% of the urban population resides in areas that do not comply with PM2.5 air quality guidelines (World Health Organization (WHO), 2020). Therefore, air pollution is anticipated to play a greater role in the association between urbanisation and health outcomes. This relationship may be particularly significant for rapidly developing economies and densely populated Asian nations, which are gradually exposed to poor air quality.

Previous studies have demonstrated that the negative impacts of pollution on human health are closely related to a polluted environment, which diminishes the quality of life (McCarron, 2022; Tainio et al., 2021; Zhang et al., 2018). People's behavioural responses to air pollution may alter its effects, but this has yet to be identified in the literature (Ban et al., 2017; Id & Min, 2019). Generally, people substantially impact air quality, and therefore, their behavioural adaptations and responses will mitigate the effects of pollution. This study tackles the lack of insight into adaptive behaviour toward air pollution and the factors underlying the various behavioural responses, emphasising the significance of persuading people to reduce their exposure to air pollution and diminish the health risk and effects.

## **RESEARCH BACKGROUND**

Due to the increasing number of motor vehicles, increased industrial activity (stationary), and transboundary pollution from neighbouring countries, air pollution has now emerged as one of Malaysia's most persistent environmental problems (Fadzly et al., 2018; Sahrir et al., 2019; Sentian et al., 2019). The increasing numbers of urban populations in the next decade highlight the need to investigate air pollution's source, variability, and impacts. However, assessing air quality data does not automatically lessen pollutant exposure and promote public health. Instead, the measure is the initial step in a multi-stage process of external and internal cues motivating and facilitating individual behaviour change to promote public health (McCarron, 2022). For example, avoiding haze, staying indoors, and using facemasks can lessen air pollution.

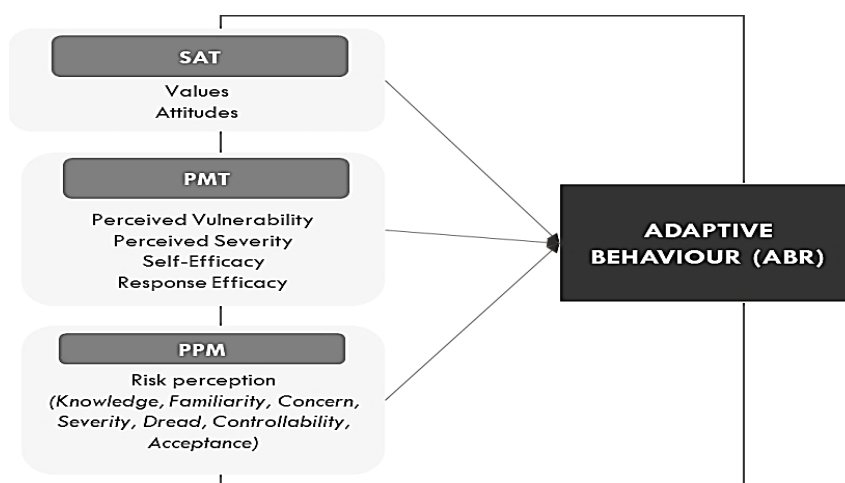
Studies on air pollution in Malaysia have primarily concentrated on the atmospheric components of pollution, with a focus on quantifying the level and contaminants (Althuwaynee et al., 2020; Franklin, 2017; Sahrir et al., 2019; Zahari et al., 2016). However, there is little evidence on the social impact of pollution, and much research has not focused on adaptive behaviour towards air pollution. People can alter their behaviour to lessen the environmental effects because they appear to adapt to positive and negative life changes by altering their standards, goals, and expectations (Gifford & Nilsson, 2014). For example, Ruan et al. (2020) found that coping and threat appraisal leads to adaptive behaviour in their ability to cope with the risk. Therefore, the detrimental impacts of air pollution can be lessened with a greater knowledge of people's behavioural responses to poor air quality.

In 2011, the Department of Environment (DOE) Malaysia unveiled its five strategies under the "Clean Air Action Plan," which encouraged actions to create a more environmentally friendly industrial infrastructure, lower vehicle emissions, prevent haze from open-burning fires and forest fires, boost self-efficacy, and increase community engagement and awareness of air pollution (DOEM, 2013). As a result, urban Malaysians have begun small-scale personal protective behaviours, such as wearing protective masks and limiting outdoor activities to lower the risks of adverse health consequences from air pollution while they wait for regulations to enhance ambient air quality (De Pretto et al., 2015; Wong et al., 2017). However, given the negative impacts of air pollution, strategies must be developed to help people lower their daily exposure. The psychosocial perceptions of air pollution, environmental concerns, and environmental knowledge have all been mentioned in previous studies as factors influencing the individual-level response to haze episodes (Liu et al., 2018; Mirzaei-Alavijeh et al., 2020), but the effects of the interactions between multiple factors have received as little attention (Ban et al., 2017). Adaptive behaviour is still a developing idea that has not been conceptualised or thoroughly measured.

## **THEORETICAL BACKGROUND**

The efficacy and extent to which an individual achieves the norms of personal independence and societal duties have been universally viewed as adaptive behaviour (Price et al., 2018). The combination of conceptual, social, and practical abilities that people develop to help them operate in their daily lives can also be defined as adaptive behaviour (Schulkin, 2011). However, the idea of adaptive behaviour, as noted in previous studies, is still in its infancy. The debate continues, particularly on how to define adaptive behaviour. Furthermore, explaining human behaviour in all its complexity is challenging, thus necessitating a theory that is centred on describing specific facts and linkages in the research.

Among the few well-known theories that analyse behaviour toward environmental risk are the theory of environmentally significant behaviour (TESB) (Stern, 2000), the theory of planned behaviour (TPB) (Ajzen, 1991), and the protection motivation theory (PMT) (Rogers, 1975). The social adaptation theory (SAT) (Kahle, 1984) is one of the key theories that explain cognitive functions such as values and attitude. This theory is pertinent to this study because it focuses on the adaptive behavioural reactions in the community to urban air quality. Consequently, the PMT and SAT theories could be used to explain how the community in this study adapts to urban air pollution. The SAT and PMT are also excellent illustrations of a theory that even academics from other fields, like psychology and sociology, may use to explore various empirical occurrences. These theories adhere to the terminology and concepts of studying adaptive behaviour.



**Figure 1:** Conceptual Framework

The SAT theory, though is more frequently applied to marketing and consumer behaviour (Coelho et al., 2014), can also be used as a framework for this study to present novel insights into how people adapt to their environments. For example, in terms of cognitive function, attitude (ATT) and values (VAL) are the variables that can explain adaptations to air pollution. Although the PMT originates from health psychology and is frequently used as a framework for comprehending reactions to triggers that make people aware of possible risks, the association between protective behaviour in adaptation behaviour has been supported by considerable research (Koerth et al., 2013). This theory has two elements—threat and coping appraisal—which can be alienated into perceived

vulnerability (PVL), perceived severity (PSV), self-efficacy (SEF), and response efficacy (REF). How the general public perceives and accepts the risk of air pollution may influence how an individual behaves (Huang et al., 2017). Therefore, risk perception (RPN), considered as The Psychometric Paradigm (PPM) (Slovic, 1987), is a significant variable in adaptive behaviour toward air pollution. The seven variables constitute the foundation of the conceptual framework of the Adaptive Behaviour (ABR) model for air pollution in the urban community. Figure 1 illustrates the conceptual framework for this study.

### **METHODOLOGY**

A descriptive or correlational research study was chosen after the study’s objectives were established, and the instrument employed was a face-to-face questionnaire, as adopted in the previous studies (Bazrbachi et al., 2017; Zhao et al., 2018). The focus was placed on Klang Valley which comprise cities that have experienced substantial expansion and development over time, leading to the deterioration of the local air pollution. The Klang Valley’s households (residential units) served as the basis for defining the population for this study. A multi-stage cluster sampling technique was primarily used to divide the study area into smaller areas until the sampling units were attained. The computed sample size was found to be 400 samples from the entire Klang Valley population using the Yamane's (1967) method for sample size, with an error of 5% and a confidence level of 95%. A total of 440 samples was calculated to be the appropriate sample size with a 10% margin of error (Suresh & Chandrashekar, 2012) to prevent unattended or missing questionnaires.

A three-step sampling method was used when population data for a specific urban area was available. The first step was to choose a district inside the city. All the communities within this district with more than 5,000 residents were used as the primary sample units based on the proportion to population size (PPS). In the subsequent stage, one of the communities was randomly selected, and 440 of its houses were then chosen using a systematic sampling technique. Next, to obtain the skip interval pattern for the sampling frame, the region was divided into many areas, and the *k*th element was calculated by dividing the sample size by the population (dwelling units). Finally, residents of households above 18 who could independently complete the questionnaire were requested to do so. The questionnaire was designed with three sections and 81 items, including 13 in the demographic sections (refer to Table 1).

**Table 1:** Items based on section

Section	Dimension	Code	Number of items
<b>ABQ</b>			
Section I – Part A	Concern behaviour	ABR	6



Section I – Part B	Daily normal behaviour		7
Section I – Part C	Protective behaviour		2
<b>SAQ</b>			
Section II – Part A	Values	VAL	10
Section II – Part B	Attitudes	ATT	8
<b>PMQ</b>			
Section II – Part C	Perceived vulnerability	PVL	6
Section II – Part D	Perceived severity	PSV	6
Section II – Part E	Self-efficacy	SEF	8
Section II – Part F	Response efficacy	REF	8
<b>RPQ</b>			
Section II – Part G	Risk Perception	RPN	7
<b>Demographic Questionnaire</b>			
Section III	Demographic Information		10
	Self-reported experience		2
	Health status		1
<b>Total items</b>			<b>81</b>

Statistical analysis of the survey data was carried out using IBM SPSS software. A partial least square (PLS) analysis was performed using the SmartPLS programme. To overcome the shortcomings of the first-generation approach, such as multiple regression, researchers now frequently adopt second-generation techniques, i.e. structural equation modelling (SEM), to incorporate unobservable variables that are indirectly quantified by indicator variables. Multiple regression, logistic regression, analysis of variance, and methods like exploratory and confirmatory factor analyses are the main components of the first-generation approaches (Hair et al., 2017). However, when the research goal is to predict and explain the variance in important target variables using several explanatory constructs, the PLS-SEM is very appealing. The phenomenon under study is the testing of VAL, ATT, PVL, PSV, SEF, REF, and RPN, which lead to the adaptive behaviour of the community.

## RESULTS

Confirmatory factor analysis (CFA) is a unique type of factor analysis used most frequently in social research in statistics. By estimating the causal relationship between the relevant variables (given the variances, covariances, or means from the observed variables), the CFA is used to assess the validity and reliability of a measurement model (Goodboy & Kline, 2017). To establish the causal relationship between the latent variables in this study, the SEM adopted combined CFA and path analysis. Prior to testing the hypothesis, a CFA was conducted to determine if the framework of determinants fits the acquired data. The CFA was conducted by evaluating the measurement model (internal consistency reliability,

convergent validity, and discriminant validity threshold). All Cronbach's alpha values ranged between 0.756 and 0.912, and the composite reliability value ranged between 0.839 and 0.929, exceeding the specified threshold values (Chin, 1998b; Nunnally & Bernstein, 1994) as exemplified in Table 2.

**Table 2:** Cronbach's Alpha and Composite Reliability

	<b>Cronbach's Alpha (<math>\alpha</math>)</b>	<b>Composite Reliability (CR)</b>
<b>ABR</b>	0.869	0.896
<b>VAL</b>	0.858	0.892
<b>ATT</b>	0.876	0.881
<b>PVL</b>	0.848	0.864
<b>PSV</b>	0.756	0.839
<b>SEF</b>	0.912	0.929
<b>REF</b>	0.881	0.895
<b>RPN</b>	0.796	0.859

KEY: **ABR** = Adaptive Behaviour, **VAL** = Values, **ATT** = Attitude, **PVL**= Perceived Vulnerability, **PSV**= Perceived Severity, **SEF** = Self-efficacy, **REF** = Response Efficacy, **RPN** = Risk Perception

A variable is considered to have convergent validity if three conditions are met: (1) all individual items must exceed 0.7; (2) the second composite reliability value must be greater than 0.7; and (3) the AVE value must be greater than 0.5 (Fornell & Larcker, 1981). Table 3 indicates a composite reliability of greater than 0.70 (the minimum criterion of reliability), thus confirming that the research instrument meets the standards for internal consistency. While the numerous loadings are less than 0.7, the indicators with loadings less than 0.708 may be preserved if an AVE of at least 0.5 is reached, as prescribed by Ramayah et al. (2018). As indicated from the findings, all the measurement items for the constructs meet the threshold for convergent validity.

**Table 3:** Discriminant Validity using Fornell-Larcker Criterion

	<b>ABR</b>	<b>ATT</b>	<b>PSV</b>	<b>PVL</b>	<b>REF</b>	<b>RPN</b>	<b>SEF</b>	<b>VAL</b>
<b>ABR</b>	0.704							
<b>ATT</b>	0.169	0.723						
<b>PSV</b>	0.458	0.039	0.726					
<b>PVL</b>	0.189	-0.042	0.139	0.725				
<b>REF</b>	-0.355	-0.563	-0.283	0.047	0.718			
<b>RPN</b>	0.230	-0.001	0.140	0.303	0.002	0.780		
<b>SEF</b>	0.658	0.267	0.452	0.060	-0.581	0.170	0.787	
<b>VAL</b>	0.695	0.375	0.341	0.139	-0.548	0.147	0.631	0.737

Note: Diagonals represent the square root of the AVE while the off-diagonals represent the correlation

The third method for evaluating discriminant validity is the HTMT, an improved criterion proposed by Henseler et al. (2015). If the AVE of the latent

variable is greater than the squared correlations of the latent variable with other model constructs, discriminant validity is established. The outcome of HTMT inference demonstrates that the confidence interval did not have a value of 1 on any of the constructs, thus supporting the discriminant validity. As shown in Table 4, all the values satisfy the HTMT requirement. Several variables were eliminated from the model since their loading values were low and affected other measurement aspects. Eliminating these variables did not cause the model to surpass the specified threshold.

**Table 4:** HTMT Criterion

	<b>ABR</b>	<b>ATT</b>	<b>PSV</b>	<b>PVL</b>	<b>REF</b>	<b>RPN</b>	<b>SEF</b>	<b>VAL</b>
<b>ABR</b>								
<b>ATT</b>	0.173							
<b>PSV</b>	0.530	0.232						
<b>PVL</b>	0.167	0.069	0.189					
<b>REF</b>	0.340	0.745	0.265	0.082				
<b>RPN</b>	0.228	0.086	0.179	0.349	0.063			
<b>SEF</b>	0.735	0.294	0.507	0.069	0.589	0.178		
<b>VAL</b>	0.773	0.444	0.370	0.116	0.633	0.154	0.712	

KEY: **ABR** = Adaptive Behaviour, **VAL** = Values, **ATT** = Attitude, **PVL**= Perceived Vulnerability, **PSV**= Perceived Severity, **SEF** = Self-efficacy, **REF** = Response Efficacy, **RPN** = Risk Perception

## DISCUSSION

The main objective of this study was to develop and validate the ABR model to measure the factors driving community adaptive behavioural responses towards air pollution. Intriguingly, the results indicate that the CFA generated the best model fit in terms of factor loadings. The CFA could confirm the reflective measurement model and reflect the use of PLS-SEM to maximise the explained variance of endogenous latent constructs and predict the ABR model in this study. In a reflective measurement model, the indicators of a construct are attributed to that construct. Testing the measurement model is the first step in a PLS path modelling analysis. It examines the extent to which the study items measure what should be measured, their accuracy in representing each construct, and whether or not they meet the standards for validity. One of the contributions of this study is the use of an approach for developing and validating a prediction model by reviewing theories and literature on adaptive behaviour. This method allowed the researcher to identify similarities and differences across diverse fields. By revealing the significant variables constructions of the model, this study contributes valuable information to the development and implementation of air pollution protection guidelines. Consequently, by identifying the key predictors of the community's current behaviour, this research contributes to developing the pillars of an effective and sustainable society.

## CONCLUSIONS

This study conveys its theoretical and practical contributions by establishing and validating the ABR model to measure the adaptive behaviour of a community towards air pollution. Regarding the key predictors of adaptive behaviour, the literature indicates little consensus in elucidating the position. The findings of the study, however, demonstrate that the variables chosen at the beginning of the study are reliable predictors for identifying the factors that influence behavioural adaptation among the urban population of Malaysia. Future studies may advance the current study, mindful that the study was conducted in an urban setting, where the sample was collected. This will restrict its applicability to countries with distinct cultural and geographical settings. Future studies may also test the predictability of the model in other countries with different cultural settings to identify any potential cultural and setting-based stimulus on adaptive behaviour towards air quality.

## ACKNOWLEDGEMENTS

This research was supported by Research Management Centre, Universiti Putra Malaysia.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**  
*Journal of the Malaysian Institute of Planners*  
**VOLUME 20 ISSUE 3 (2022), Page 217 – 226**

## **EXPLORING RISK PERCEPTION AND INTENTION TO IMPROVE THE AIR QUALITY**

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### **Abstract**

Numerous environmental issues, particularly those with higher risks, have steadily come to the forefront of the public's concerns in recent years with the increased awareness on environmental quality. For example, air pollution is one of the main causes of death worldwide and contributes to the rise in the risk of chronic diseases. In the Turkish city of Adana, air pollution has long been recognised as a serious environmental and health concern with well-documented negative consequences on human wellbeing. Although important, little is known about how the general public views the risk of air pollution. Thus, this paper focuses on risk perception and behavioural intention to air pollution. Adana city in southern Turkey was chosen as the study area. The results showed that socio-demographic factors and perceived risk of familiarity with air pollution are significant factors influencing Adana inhabitants' willingness to pay for bettering the air quality. Additionally, it implies that the authority might provide a significant contribution by creating strategies to lessen the effects of air pollution on people, particularly in cities where air pollution is a problem.

**Keywords:** Risk Perception, Behaviour Intention, Air Pollution

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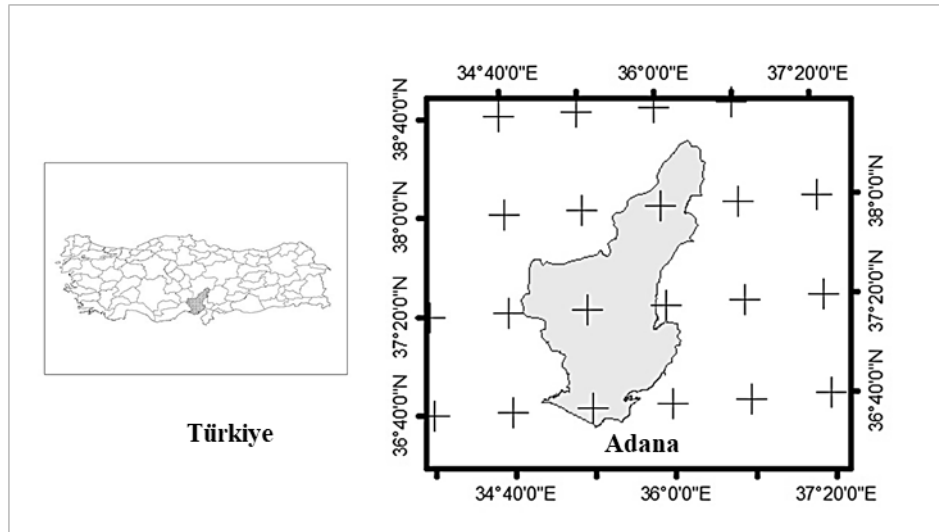


## **INTRODUCTION**

The air quality is declining nowadays due to the growth of industrialisation, the rise in the number of private vehicles, and the combustion of fossil fuels. Moreover, air quality has become a regional concern due to the nature of air pollution and the ease with which its sources can be dispersed inside a city and to a larger range of surrounding cities (Sahrir et al., 2019). Additionally, urban air pollution continues to pose a serious threat to millions of urban residents worldwide and is thought to be responsible for 4.2 million deaths yearly (World Health Organization (WHO), 2020). Since 97.2 per cent of Turkey's urban population is exposed to harmful particulate matter (PM<sub>10</sub>), the country has one of Europe's highest rates of premature deaths (Health and Environment Alliance (HEAL), 2015). As a result, the PM<sub>10</sub> measurements in the centre of Adana city for the year 2018 have exceeded the air quality limit values for safeguarding human health and the ecosystem (Ministry of Environment and Urbanisation Turkey, 2018). Improving air quality is critical to developing sustainable cities because an increasing proportion of Turkey's population now lives in urban areas. Since sulfur dioxide (SO<sub>2</sub>) and particles exceed national air quality requirements in some urban and industrial areas, ambient air pollution still threatens the human health (Büke & Köne, 2016; Zahari et al., 2016). A study by Sahrir et al. (2020) shows that most of the community in Adana cannot accept the risk posed by air pollution, since different people react to it differently, and some are more impacted than others.

Adana is one of the biggest cities in Turkey, located on the Cukurova Plain of the Mediterranean Region (refer Figure 1). Cukurova Region has experienced rapid urbanisation and industrialisation over the past four decades (Say et al., 2017). It is the most crowded city, with an urban population of 2.263.373 in 2021 and 2.258.718 in 2020, with a growth rate of 2.1% (Turkish Statistical Institute (TUIK), 2022). The reason for the population rate and massive population in Adana is rural-to-urban migration for sectoral employment opportunities and quality of life.

Moreover, their ability to control the risk of air pollution was average. Therefore, risk perception is crucial in a public health risk situation because it affects which hazards people care about and how they respond to them. Increasing exposure levels and personal risk perception may drive behavioural changes in risk response (Bergstra et al., 2018). However, research frequently concentrates on air pollution disparities between metropolitan or regional areas, risk perception of air pollution and adaptation strategies, but less often is research on the risk perception and behavioural intention in improving the air quality. In addition, most studies focus on the perception of risks associated with diseases, accidents, natural catastrophes, or harmful activities, but few studies consider air pollution-related risks. Therefore, it is important to recognise the behaviour intention to reduce air pollution and how people perceive the risk of air pollution.



**Figure 1:** Location Map of Adana

## **LITERATURE REVIEW**

Numerous epidemiological studies have established the detrimental effects of air pollution on human health, particularly on the cardiovascular, pulmonary, and respiratory systems (Chen et al., 2018; Wakamatsu et al., 2017). Accordingly, studies have shown that public reaction to environmental exposure is significantly influenced by research on risk perception. Risk perception is the quantitative assessment of risks' desired and present riskiness and intended control (Ban et al., 2019). Regarding various risks, it depends on the individual. However, it can be defined as particular aspects of air pollution that affect how it is perceived concerning the concept of perception and its social relationships (Oltra & Sala, 2014). According to Slovic (1987), seven perception elements can be used to categorise risks (such as those associated with air pollution and human health): knowledge, familiarity, concern, severity, dread, and acceptance. People and nature are interdependent; humans contaminate the environment, and the environment one lives in directly affects his or her health and wellbeing. Therefore, understanding and forecasting the effects of environmental contamination requires research on how people perceive health risks and air pollution.

Additionally, it has been discovered that the intention to reduce air pollution affects how people adapt and perceive risk. However, differences in perception between individuals and social groups may be explained by the attenuation of risk processes and social amplification (Oltra & Sala, 2014, 2018).

People's behavioural intention has attracted study due to the link between perceived risk and risk behaviour. This is because a basic problem in environmental economics and psychology has been how perceived risk affects people's behavioural intentions (Li & Hu, 2018). The theories and empirical investigations are in agreement with the significance of risk perception in illuminating people's risk-related behavioural intention.

Risk perceptions are established as significant predictors of behaviour and behavioural intentions in the social psychology literature on behavioural research (Ajzen, 1985). For example, a previous study by Li & Hu (2018) stated that more than 80% of those surveyed said they would use environmentally friendly transportation or pay an environmental tax to enhance Jinchuan's air quality. Evidence from this study also implies that lowering air pollution is a crucial political move to enhance the public's well-being. This also has been supported by Liu et al. (2021), indicating that risk perception can significantly influence consumer behaviour and intention to reduce the impact of air pollution. Furthermore, the findings show that socio-demographic characteristics, geographic location, self-reported experience, and health indicators all impacted the perceived risk of air pollution and their behaviour (Sahrir et al., 2020). Thus, the public's response, in turn, establishes the foundation for the public's involvement in risk mitigation. The findings of this study may help policymakers and other stakeholders concentrate on what is essential to reduce public environmental risks.

## **METHOD**

This study aimed to examine the connection between risk perception towards air pollution and behavioural intention. Due to the characteristics of the target respondents in this study, cluster sampling is used. Respondents were selected for this study from regions that have been grouped into clusters based on geographical dispersion. A sample of 200 people between the ages of 18 and 65 who were stratified by age and gender in Adana took part in the questionnaire survey. Risk perception of air pollution was separated into seven aspects based on the psychometric paradigm approach by Slovic (1987) as an independent variable and behavioural intention as a dependent variable, as listed in Table 1. Socio-demographics were treated as potential factors impacting variables for each behavioural intention aspect. P-values were employed to quantify the notion of statistical significance of evidence, and a significance threshold of  $p < .05$  was selected. The analysis of all the data was done with IBM SPSS Statistics.

**Table 1:** The parameters of the binary logistic regression model

	<b>Models</b>	<b>Variables</b>	<b>Description</b>
Dependent variables	Behaviour Intention	Environmental taxes Extra money (exclude tax)	Dichotomous variable (Yes = 1; No = 2)
Independent Variables	Risk Perception	Knowledge Familiarity Concern Severity Dread Controllability Acceptance	Continuous variables: Knowledge, familiarity, perceived concern, severity, dread, controllability, and acceptance of local air pollution are the that describe the risk perception of various components
	Age	18–25 26–35 36–50 51–65 ≥ 65	Categorical variable: 18–25 years old = 1; 26–35 years old = 2; 36–50 years old = 3; 51–65 years old = 4; over 65 years old = 5
	Educational Background	No schooling completed Primary school Secondary school Degree holder	Categorical variable: no schooling completed = 1, primary school = 2, secondary school = 3, bachelor’s degree = 4, master and above = 5
	Monthly household income	0-1500 TL 1500-2500 TL 2500-4000 TL 4000-5500 TL 5500 TL and above	Categorical variable: representing the annual income of the family 0–1500 TL = 1, 1500–2500 TL = 2, 4000–5500 TL = 3, ≥ 5500 TL = 4

## RESULTS

About 50.5 per cent of the 200 respondents were male, and 49.5 per cent were female. The age range for 30.5 per cent was 36 to 50 years old. In addition, 47 per cent of respondents said they had completed or were currently completing their degree programmes, and 2% said they had not. As shown in Table 2, most respondents chose not to pay for tax and extra money to improve the air quality. This study concludes that the predictors of behavioural intention for air quality improvement were educational background and familiarity with risk (refer to Table 3). The residents unfamiliar with air pollution (coefficient =  $-.637$ ,  $p = .004$ ) deliberately considered paying environmental taxes to improve the air quality.

**Table 2:** Descriptive analysis

Percentage (%)	Yes	No
Would you like to pay environmental taxes?	49.5	50.5
Would you like to pay extra monthly money to improve the air quality in Adana?	49.0	51.0

Moreover, residents unfamiliar with air pollution (coefficient =  $-.273$ ,  $p = .005$ ) are willing to pay extra money to improve air quality. Hence, familiarity with air pollution strongly influences the behavioural intention to improve air pollution. Additionally, the educational background significantly influences the respondents in paying taxes (coefficient =  $.772$ ,  $p = .008$ ) and extra money (coefficient =  $-.403$ ,  $p = .029$ ) to improve air pollution in their area. This is consistent with the previous study as socio-demographics influence behaviour towards air pollution.

**Table 3:** Effects of multi-angle predictors on behaviour intention analysed by a binary logistic regression model

	Behaviour Intention	
	Tax	Extra Money
Knowledge	.161	-.140
Familiarity	-.637**	-.273*
Concern	-.288	-.018
Severity	-.035	-.067
Dread	-.389	.061
Controllability	.374	-.065
Acceptance	.127	.067
Age (years) 18–25	.358	-.077
Education background	.772**	-.403*
Monthly household income	.043	-.146
Cox & Snell R Square	.142	-.140
Nagelkerke R Square	.252	-.273

Significance levels: \* $p < .05$ , \*\* $p < .01$

## DISCUSSION

Anthropogenic activities are the main causes of air pollution and global warming. The results of this study shed light on the mechanisms underlying people's desire to improve air quality by willing to pay to reduce the risk. This has the benefit of eliciting risk perceptions (thoughts and judgements) from those who are (possibly) exposed to specific dangers that are researched and can provide details on the causes of behaviour and potential influences on this. The findings show that the educational background was some factor that contributed to the intention to improve air quality. This is in line with a previous study by Ban et al. (2017),

which specified that greater education may impact the perception score, suggest a higher risk perception of local air pollution, and may increase the intention and willingness to pay for the environment. Additionally, education level has been proven to significantly impact respondents' perceptions and behaviour in various environmental research (Fu et al., 2019). Moreover, the previous study shows that young people's behaviour is essential to reducing air pollution (Kaushik, 2016), even though this study does not show the significant value of age towards the behaviour intention in improving air quality.

As mentioned by Bakar et al. (2020), environmental behaviour contains behaviours like interacting with the environment, carrying out duties or activities, demonstrating abilities and talents, and acting appropriately. Thus, the intention of this behaviour may be improved by focusing on risk perception, as this study found that familiarity with the risk may contribute to the behaviour. When the respondents are familiar with the pollution levels in their neighbourhood area, they tend to pay extra money to improve their air quality. Notwithstanding that this study has found that monthly household income does not significantly influence willingness to pay, research by Fu et al. (2019) says otherwise. Income has the greatest impact on behaviour intention to pay for improving air as wealthier people were willing to pay more for current air pollution and had greater pollution mitigation measures. A study by Bazrbachi et al. (2017) also stated that Higher-income respondents are more willing to pay to preserve their existing standard of living. This study found that most respondents are unwilling to pay due to improved air quality. This is in line with the study by Wang et al. (2016), as they discovered that people do, however, tend to believe that the government should have a larger role in smog control and prevention, as seen by the fact that they would rather pay for their protection than support such initiatives.

## **CONCLUSIONS**

This study aimed to add knowledge on the impact of environmental risk on behavioural intention to improve air quality. To assess each variable, a binary logistic regression model was employed. The results of this study could help stakeholders and policymakers concentrate on what is essential to reduce environmental risk for the general public while increasing the intention to improve air quality. Public health practitioners can plan and manage community activities, policy needs, and communication strategies by understanding public perceptions of environmental risks, contaminants, and health impacts. Risk perception and socio-demographic variables all substantially impacted the behaviour intention with air pollution. Therefore, it is essential to constantly increase public understanding of the environmental health risks associated with air pollution, including the sources of exposure, types of impacts, and initial preventative measures. In addition, several strategies need to be implemented

other than just focusing on environmental tax in reducing and improving air quality.

Public policy is an important tactic for enhancing air quality and people's health related to air pollution. The findings might also give policymakers some understanding of how and why residents care about improving air pollution. In conclusion, the current research raises the possibility that integrated elements of risks may be responsible for behaviour intention during smog occurrences. Therefore, policymakers should employ several strategies to encourage individual action, such as enhancing each person's sense of air pollution and promoting adopting strategies to deal with it. In addition, future studies could investigate behaviour intention toward reducing the impact of air pollution and or by comparing behaviours may obtain more exciting findings. Finally, the knowledge presented in this research may help understand how the public perceives air pollution, particularly regarding public involvement.

## ACKNOWLEDGEMENTS

This study is supported by Mevlana Exchange Programme.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**  
*Journal of the Malaysian Institute of Planners*  
**VOLUME 20 ISSUE 3 (2022), Page 227 – 238**

## **POPULATION REDISTRIBUTION AND CONCENTRATION IN MALAYSIA, 1970-2020**

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### **Abstract**

This paper uses published census data to examine population redistribution and concentration in Malaysia since 1970. The population growth rate varied widely across states and districts, and between urban and rural areas. Consequently, the population has become ever more concentrated in the cities. In 2020, 41% of the population lived in 12 districts, making up 2.6% of the total land area. About one in four Malaysians live in the Greater Kuala Lumpur (commonly known as the Klang Valley – comprising the Federal Territory Kuala Lumpur and four adjacent districts in Selangor), compared to 4.3% in 1970. The population in urban areas increased from 28% in 1970 to 75% in 2020, and most are in the cities. The rapid growth of urban population and concentration of population in major cities pose sustainable development challenges. However, the agglomeration of diverse labour pools provides economies of scale.

**Keywords:** Redistribution, Concentration, Population growth, Urbanisation, Population Density, Conurbation

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## **INTRODUCTION**

Migration, population redistribution and development are closely interrelated. Uneven population growth and distribution are the results and causes of regional and urban-rural disparities in development (Bertinelli & Strobl, 2007; Fan, 2005; Frick & Rodríguez-Pose, 2018; Rees et al., 2017; Sato & Yamamoto, 2005; Tey et al., 2019). Net migration is the primary determinant of contemporary population redistribution and concentration (Borgegård et al., 1995; Fan, 2005; Gibson & Gurmu, 2012; Newbold, 1999; Rees et al., 2017; Zhou et al., 2021). According to classical economic and geographical theories, population concentration results from the advantages of densely populated regions, where accessibility to human resources reduces transportation costs and enhances the economies of scale (Borgegård et al., 1995; Morrill, 1979; Zhou et al., 2021). The development of new energy sources, technology, and large-scale economic activities have a concentrating effect on population redistribution (Bertinelli & Black, 2004; Borgegård et al., 1995; Sato & Yamamoto, 2005). Migration from less developed to more developed regions has exacerbated regional disparity in socio-economic development (Bertinelli & Strobl, 2007; Frick & Rodríguez-Pose, 2018; Johnson et al., 2012; Salvia et al., 2020). There are mixed findings on the effectiveness of population redistribution policies and programs in influencing population mobility and human settlement patterns (De Koninck & Déry, 1997; Salvia et al., 2020).

In Malaysia, population redistribution and rapid urbanisation occurred concurrently with fundamental economic changes. In 1970, about half of the workers were engaged in agriculture, but this declined to 10% in 2021. There was a corresponding increase in the manufacturing and sales/services/construction sectors from 8.2% and 44% to 17% and 73%, respectively (DOSM, 2022b). Concurrently, wide variations in the rate of population growth across states resulting from unequal regional development have given rise to population redistribution from the less developed states/regions to the more developed states/regions (DOSM, 2011a, 2011b, 2022a). While the urban population has grown exponentially, the rural population has stagnated. As a result, the urbanisation level rose from 28% in 1970 to 75% in 2020. Moreover, three-quarters of the migrants had moved from one urban centre to another. Most of these were from smaller towns to the metropolis, with Klang Valley (Kuala Lumpur and four adjacent districts in Selangor) as the primary destination (DOSM, 2021, 2022a).

Population redistribution and urbanisation have become increasingly important policy issues in Malaysia. Accordingly, the Government launched the development corridors under the Ninth Malaysia Plan (2006-2010) to reduce disparities between rural and urban areas and between less developed and more developed regions. The five development corridors comprised: i) East Coast Economic Region (ECER); ii) Northern Corridor Economic Region (NCER); iii)

Iskandar Malaysia (IM) in the South, iv) Sabah Development Corridor (SDC); and v) Sarawak Corridor of Renewable Energy (SCORE), to create 1.9 million, 3.1 million, 1.4 million, 2.1 million and 3 million jobs respectively (Economic Planning Unit, 2006). Currently, the Twelve Malaysia Plan (2021-2025) envisages that by 2040, about 85% of the population will reside in urban areas. Hence, the New Urban Agenda under the Plan aims to foster a sustainable urban economy through green and resilient urban development (Economic Planning Unit, 2021).

Despite the importance of population distribution in development planning, there are few studies on migration and population distribution in Malaysia (Chitose, 2001, 2003; Hussain et al., 2014; Jali, 2009; Samat et al., 2019; Tey, 2014). This paper seeks to elucidate the redistribution and concentration of population in Malaysia to stimulate more research on the causes and consequences of these relatively neglected demographic processes and outcomes to inform policy.

## **DATA AND METHODS**

Data for this paper are drawn from the published reports of the decennial population censuses for the period 1970-2020. In addition, this paper uses data on urban agglomeration from the World Urbanization Prospects: 2018 Revision (United Nations, 2018). In this paper, urban population refers to gazetted areas with a population of 10,000 or more in the core areas and the adjoining built-up areas (DOSM, 2011b, 2022a).

The paper uses simple statistical analysis by cross-classifying population distribution, growth rate, density and concentration, and urbanisation by state and district over the different periods. The average annual rate of the population is computed based on the exponential growth rate. The population concentration index was constructed using Hoover's method.

## **RESULTS**

### ***Population growth and distribution***

The population of Malaysia has grown from 10.44 million in 1970 to 32.4 million in 2020, at an average rate of 2.3% per annum. The rate of population growth decelerated to 1.7% between 2010 and 2020. The population living in urban areas has increased from 28.4% to 75.1%. However, the population growth rate has been uneven across states and regions, resulting in dramatic population redistribution and concentration.

In 1970, Perak was the most populous state. However, its proportionate share of the total population has declined steadily from 15% to 7.7% in 2020. In contrast, Selangor's population increased phenomenally by more than seven-fold, from 982 thousand to about 7 million. This extraordinary increase boosted Selangor's share of the total population from 9.4% in 1970 to 13.1% in 1991 and

21.6% in 2020. Sabah's population grew more than five-fold from about 600 thousand to 3.4 million. Sabah became the fourth most populous state in 1991 (9.9%) and the third most populous after Selangor and Johor since 2000. Johor and Pahang maintained their share of the national population at about 12.4% and 4.9%, respectively, over the past five decades. All other states registered a significant decline in the relative share of the national population.

Between 1970 and 2020, the proportion of the population in the central region (Kuala Lumpur and Selangor) rose from 15.7% to 28%, while that in the Sabah and Sarawak region rose from 15.6% to 18.4% (a decline from 19.5% in 1991). The northern region (Perlis, Kedah, Pulau Pinang, and Perak) registered the sharpest decline from 32.7% to 20.5%, followed by the southern region (Johor, Melaka and Negeri Sembilan) from 20.7% to 19%, and the eastern region (Kelantan, Terengganu, and Pahang) from 15.3% to 14%.

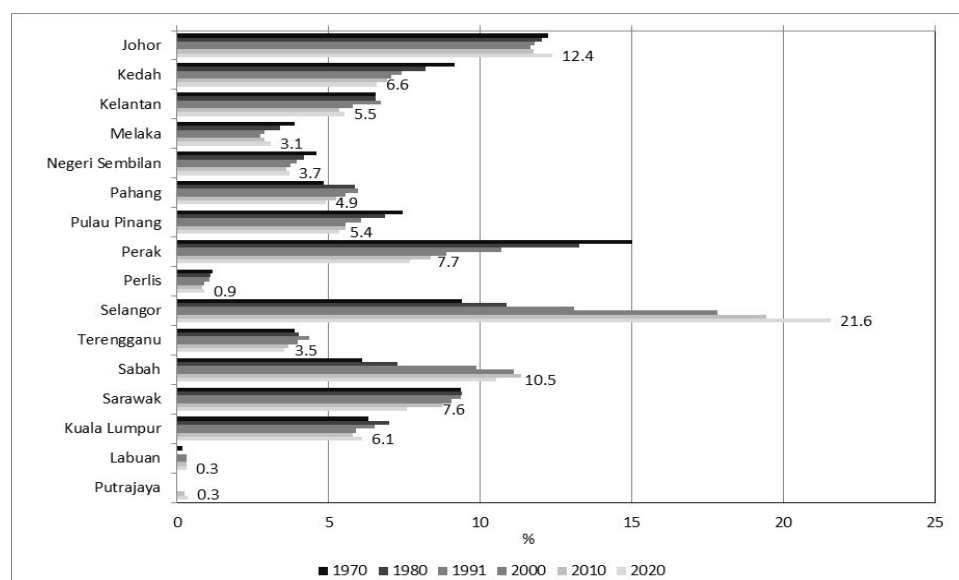


Figure 1: Population distribution by state, 1970-2020  
 Source: DOSM (various years)

### Population concentration

The population is heavily concentrated in a few densely populated districts and metropolitan areas. The combined population of the 12 most populous districts increased from 6.0 million in 1991 to 13.3 million in 2020. These figures translate to 34% and 41.1% of the national population, while the land area in these districts made up only 2.6% of the total land area. Five of the six most populous districts in 2020 are in the Klang Valley, making up about 23% of the national population (Table 1). On the other hand, the 25 least populous districts had a combined

population of 500,543 or 1.54% of the national population in 2020. Most of the least populous districts are in Sarawak. In Peninsular Malaysia, eight districts had a population of less than 60,000 each (table not shown).

**Table 1:** Population of the twelve most populous districts in 2020 (changes since 1991), the annual rate of growth, and population density

<b>District</b>	<b>1991</b>	<b>2000</b>	<b>2010</b>	<b>2020</b>	<b>Annual rate of growth</b>	<b>Land area</b>	<b>Population density (2020)</b>
Petaling	633,165 (3.6)	1,184,180 (5.3)	1,765,495 (6.4)	2,298,123 (7.1)	4.4	487 (0.15)	4,719
Kuala Lumpur	1,145,342 (6.5)	1,305,792 (5.9)	1,588,750 (5.8)	1,982,112 (6.1)	1.9	243 (0.07)	8,157
Johor Bahru	704,471 (4.0)	1,081,978 (4.5)	1,334,188 (4.9)	1,711,191 (5.3)	3.1	1,066 (0.32)	1,605
Ulu Langat	413,900 (2.4)	864,451 (3.9)	1,138,198 (4.1)	1,400,461 (4.3)	4.2	833 (0.26)	1,681
Klang	406,994 (2.3)	643,436 (2.9)	842,146 (3.1)	1,088,942 (3.4)	3.4	632 (0.19)	1,723
Gombak	352,649 (2.0)	537,525 (2.4)	668,694 (2.4)	942,336 (2.9)	3.4	653 (0.20)	1,443
Kinta	627,899 (3.6)	703,493 (3.2)	749,474 (2.7)	888,767 (2.7)	1.2	1,305 (0.40)	681
Seremban	263,383 (1.5)	383,530 (1.7)	536,147 (2.0)	692,407 (2.1)	3.3	954 (0.29)	726
Kuching	369,200 (2.1)	494,109 (2.2)	598,617 (2.2)	609,205 (1.9)	1.7	1,498 (0.45)	407
Melaka Tengah	296,897 (1.7)	371,263 (1.7)	484,885 (1.8)	597,135 (1.8)	2.4	359 (0.11)	1,663
Timur Laut	395,714 (2.3)	416,369 (1.9)	510,996 (1.9)	556,557 (1.7)	1.2	126 (0.04)	4,417
Kota Bharu	366,770 (2.1)	398,835 (1.8)	468,438 (1.7)	555,757 (1.7)	1.4	403 (0.12)	1,379
Total	5,976,384 (34.0)	8,384,961 (37.8)	10,686,028 (38.9)	13,322,993 (41.1)	2.8	8,559 (2.60)	1,557
Malaysia	17,563,420	22,198,276	27,484,596	32,447,385	2.1	329,847	98

*Note:* Figures in parentheses denote the percentage share of the district population and land area to the total.

*Source:* DOSM (various years)

The Hoover index of population concentration compares the distribution of the population of the region, state, and district with the relative size of the land area (Rogerson & Plane, 2013). The statistics show a rise in population concentration across all levels. The concentration index at the regional level rose from 42.8 in 1991 to 47 in 2020 as more and more people moved to the central region. The concentration index rose from 45.7 to 48.2 at the state level

for the country as a whole. At the district level, the concentration index rose from 50.9 in 1991 to 57.4 in 2020 (Table 2).

**Table 2:** Population concentration index

<b>Concentration index, <math>I_c</math></b>		
	<b>1991</b>	<b>2020</b>
Regional level (Malaysia)	42.8	47.0
State level (Malaysia)	45.7	48.2
State level (Peninsular Malaysia)	30.0	38.3
District level (Peninsular Malaysia)	50.9	57.4

Notes:

$x$  is the percentage of the population in each area

$y$  is the percentage of the total land in each area

$i$  is a data category, such as a region or area

$n$  is the number of categories

Source: DOSM (various years)

In 2020, the concentration index by district was highest in Kelantan (63.2) and lowest in Pulau Pinang (21.7) (Table 3). The high concentration index in Kelantan can be explained by the concentration of the population in Kota Bharu (31% of the state population). In contrast, its land area constitutes only 2.7% of the land area in the state. On the other hand, in Pulau Pinang, the disparity in the population and land area is less pronounced – 32% of the population resides in Timur Laut, which constitutes 12% of the land area in the state.

In Negeri Sembilan, 57.7% of the population resided in Seremban, the most populous district, where the state capital is located. In contrast, only 14.6% of the population in Sabah resided in the state capital, Kota Kinabalu, which is the most populous district (Table 3). In interpreting these figures, there is a need to consider the number of districts in each state. The number of districts ranges from 3 in Melaka (besides Perlis, which has only one district) to 27 in Sabah and 40 in Sarawak.

**Table 3:** Population concentration index at the state level by district, 2020

<b>State</b>	<b>Concentration index</b>	<b>The most populous district in the state</b>	<b>District share (%)</b>
Johor	44.4	Johor Bahru	42.7
Kedah	38.6	Kuala Muda	25.6
Kelantan	63.2	Kota Bharu	31.0
Melaka	40.8	Melaka Tengah	40.8
Negeri Sembilan	46.0	Seremban	57.7
Pahang	35.0	Kuantan	34.4
Pulau Pinang	21.7	Timur Laut	32.0

Perak	41.1	Kinta	35.6
Selangor	49.5	Petaling	32.9
Terengganu	36.9	Kuala Terengganu	20.0
Sabah	45.5	Kota Kinabalu	14.6
Sarawak	60.2	Kuching	24.8

Source: DOSM (various years)

### Urbanisation and urban agglomeration

Malaysia has been urbanising rapidly, from 28.4% in 1970 to 51% in 1991 and 75.1% in 2020. The urbanisation level and pace varied widely across states. In 1970, only two states had an urbanisation level of above 50%, but this increased to eight in 2000 and all except Kelantan in 2020. More than 90% of the population in Selangor, Pulau Pinang, and Melaka live in urban areas, while Kuala Lumpur and Putrajaya are fully urbanised (Figure 2).

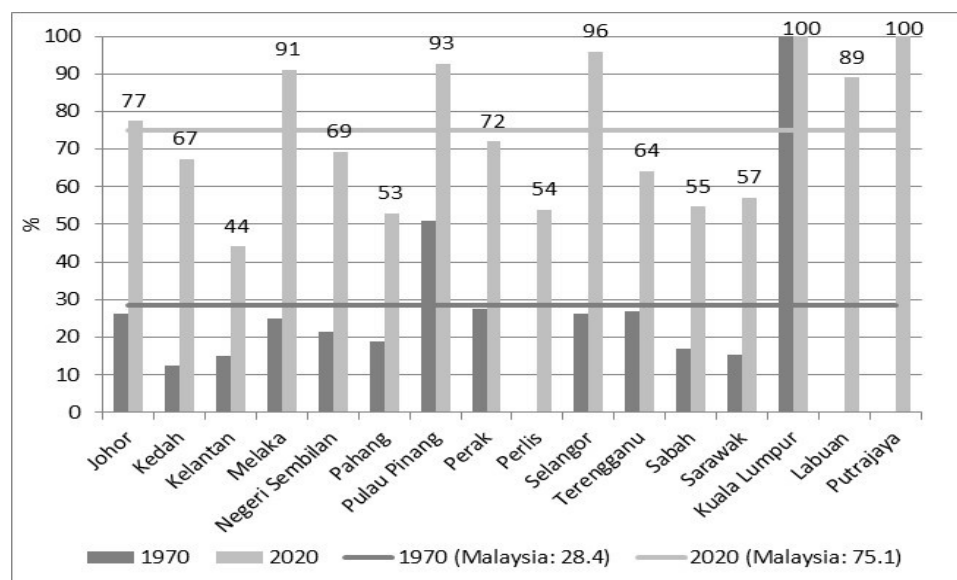


Figure 2: Urbanisation level by state, 1970 and 2020

Source: DOSM (various years)

The population tends to concentrate on large metropolitan areas within the urban system. For example, in 1970, Kuala Lumpur was the only conurbation with more than 300,000 inhabitants. This number increased to five by 2000, and further to twelve in 2020, with a population of 14.2 million. About 44% of the total population, and 58% of the urban population, reside in these metropolitan areas.

With its satellite cities Petaling Jaya, Gombak, Ampang, Subang Jaya, and Shah Alam, Kuala Lumpur is the largest conurbation, making up 56% of



these conurbations, or 33% of all urban population. Greater Kuala Lumpur is also the fastest-growing metropolitan, increasing by 18-fold between 1970 and 2020. The primacy index (population of the largest city/population of the second-largest city) had increased from 1.8 in 1970 to 7.8 in 2020. Kota Kinabalu conurbation, starting with a small population base, expanded 14-fold. In contrast, Georgetown, Ipoh, and Kuching registered only a three-fold increase in population over the same period (Table 4).

**Table 4:** Population of conurbations (city centre and satellite towns) with 300,000 inhabitants or more in 2020, 1970-2020

	1970	1980	1990	2000	2010	2020	Annual rate of growth	Increment (times)
Alor Star	66	72	151	186	254	342	3.3	5.2
Georgetown	272	314	518	575	708	794	2.0	2.7
Ipoh	247	295	447	537	664	814	2.4	3.3
Johor Bahru	136	247	417	630	807	1,024	4.0	7.5
Kota Bharu	90	171	227	252	297	348	2.7	3.9
Kota Kinabalu	41	109	154	307	413	550	5.2	13.5
Kuala Lumpur	451	971	2,098	4,176	5,810	7,997	5.7	17.7
Kuala Terengganu	99	181	223	255	315	384	2.7	3.9
Kuantan	90	132	194	289	383	503	3.4	5.6
Kuching	193	229	273	422	510	612	2.3	3.2
Sandakan	81	111	151	277	323	375	3.1	4.6
Seremban	95	133	186	291	373	475	3.2	5.0

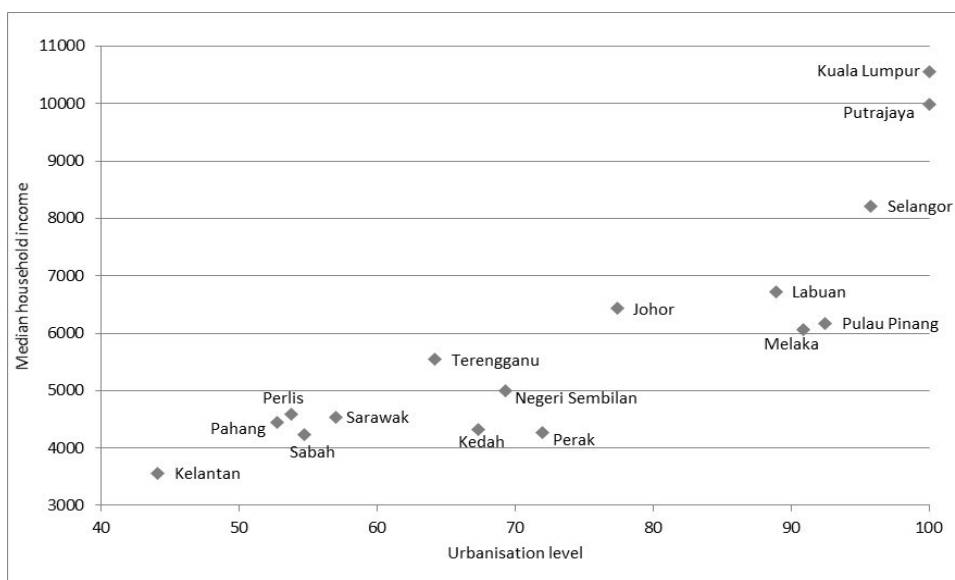
*Note:* Georgetown was not listed in the *World Urbanization Prospects: 2018 Revision*.

*Source:* United Nations (1980, 2018)

Figure 3 shows a strong correlation between urbanisation and household income. More urbanised states tended to have higher household income, indicating urban sector employment's wage premium than rural agrarian employment. The economic opportunities in the urban areas attracted the more resourceful segments of the population, contributing to higher income.

### **Population density**

The population density of Malaysia increased from 33 in 1970 to 99 people per square kilometre in 2020. This figure is still relatively lower than 154 people per square kilometre for Southeast Asia. The population density varies widely across states/territories, from 20 people per square kilometre in Sarawak to 1,659 in Pulau Pinang and 8,157 in Kuala Lumpur. In Peninsular Malaysia, Pahang has the lowest population density, at 44 per square kilometre. Between 1970 and 2020, the population density increased more than four-fold in Selangor and Sabah and more than three-fold in Johor and Pahang (Table 5).



**Figure 3:** Scatter-plot of urbanisation level and median household income by state  
*Source: DOSM (various years)*

**Table 5:** Changes in population density by state, 1970-2020

State	1970	2020	% change
Johor	67	209	211.9
Kedah	101	225	122.8
Kelantan	46	119	158.7
Melaka	245	583	138.0
Negeri Sembilan	72	180	150.0
Pahang	14	44	214.3
Pulau Pinang	751	1,659	120.9
Perak	75	118	57.3
Perlis	152	348	128.9
Selangor	199	880	342.2
Terengganu	31	89	187.1
Sabah	9	46	411.1
Sarawak	8	20	150.0
Kuala Lumpur	3,784*	8,157	115.6

*Note: \*1980*

*Source: DOSM (various years)*

## **DISCUSSION AND CONCLUSION**

This paper examines population redistribution and concentration across states and districts and highlights the population concentration in the metropolis. Most past studies examined migration in and out of Kuala Lumpur and Selangor separately (Chitose, 2001; Jali, 2009; Tey, 2014). However, this paper considers the Kuala Lumpur conurbation, or the Klang Valley, as one region because of the ease of accessibility to the workplace, amenities, and services within the region (Linard et al., 2012; Salvia et al., 2020). Following Rees et al. (2017) approach, this study assumed a bidirectional causality between population concentration and socio-economic development. The better opportunities in the more developed states resulted in net migration, and migrants contributed to the socio-economic development of the receiving areas.

Given the complex pattern of human settlement related to socio-economic polarisation, multiple indicators are needed to present the different aspects of population distribution and concentration (Morrill, 1979; Newbold, 1999; Rees et al., 2017). Hence, this paper uses various indicators to highlight the increased concentration of the population in a few states, districts, and metropolia over the past fifty years. Notably, Greater Kuala Lumpur's population increased almost 18-fold during this period. It is home to about one-quarter of the national population. This region is the federal capital site and is the administrative, industrial, commercial, education, health, and transportation hub. Migrants from all over the country have moved to take up jobs in cities where economic activities are most vibrant. In addition, the concentration of institutions of higher learning in Greater Kuala Lumpur has attracted many youths looking for a job and settling down in this region upon graduation.

In some countries, population concentration and dispersion occur simultaneously (Borgegård et al., 1995). Malaysia has implemented various policies to foster more equitable regional development and to redirect the population to small towns and rural areas. Efforts were also made to plan and manage the cities. These policies include the National Urbanization Policy, the National Physical Plan, and the National Housing Policy to provide the necessary physical and social infrastructure for implementing the Habitat Agenda. In addition, an ambitious Corridor Development Plan for the development of five regional growth corridors was implemented under the Ninth Malaysia Plan (2006-2010) to create job opportunities to redirect the population away from the Klang Valley. However, these policies and programs have yet to achieve the goal of population dispersion.

The rapid growth of urban population and concentration of population in major cities have given rise to sustainable development challenges. The existing infrastructures are inadequate to cope with the rapid growth of the cities, resulting in traffic congestion, environmental pollution, escalating housing costs, and crime. The rapid increase in population has also strained social services, such

as education and health facilities, transportation, and garbage disposal. On the positive side, cities are centres of economic growth, providing the impetus for socio-economic innovation and change. The agglomeration of diverse labour pools facilitates knowledge and information sharing, fostering new enterprises and technological innovation for businesses to grow. The Government can also take advantage of the economies of scale to provide infrastructure and social services more efficiently.

### **ACKNOWLEDGEMENTS**

This publication is partially funded by the Faculty of Business and Economics, Universiti Malaya Special Publication Fund.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**

*Journal of the Malaysian Institute of Planners*

**VOLUME 20 ISSUE 3 (2022), Page 239 – 254**

## **INVESTIGATING OVERTOURISM IMPACTS, PERCEIVED MAN-MADE RISK AND TOURIST REVISIT INTENTION**

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### **Abstract**

This research explores the interrelationships between overtourism impacts, perceived man-made risk and revisit intention among tourists visiting Melaka UNESCO World Heritage Site (WHS). The aim of the study is to illustrate the overutilization of destination resources and subsequent human risk that shape tourist behavioural from the outlooks of sustainable and tourism impacts. Five hundred and ninety-three responses were quantitatively collected through an online data collection. Partial least square structural equation modelling (PLS-SEM) is employed to investigate the research hypotheses. It can be reported overtourism impacts have positive and significant influence on the perceived man-made risks. However, this is not the case for the relationship between overtourism impacts on revisit intention, and the perceived man-made risk on the latter construct. This renders the potential mediation role of perceived man-made risk as insignificant. The findings heighten the unique dynamics of overtourism within developing WHS planning in shaping tourist revisit intention.

**Keywords:** Overtourism Impacts, Man-made Risk, Revisit Intention, Sustainability, World Heritage Site

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## **INTRODUCTION**

The growth of global middle class over the last decade has seen more people spend a portion of their disposable income to travel. Along with the improved interconnectedness in the shape of digital and physical connectivity especially in the advanced and developing countries, the global tourism industry has subsequently grown to be one of the bedrocks of the global economy in terms of gross domestic products (GDP) and job creations. With the industry viewed by many countries as a primary economic driver, it has been deemed as one of the prominent density-contributing elements toward cultural institutions and urban attractions (Adie et al., 2019; United Nations World Tourism Organization (UNWTO), 2018; World Travel & Tourism Council (WTTC), 2019). This is due to the nature of tourism activities where they have become further intertwined with the local community's spheres which include the utilisations of public transportation, facilities, paths, museums, attractions, and other services (Koens, Postma & Papp, 2018).

As the industry is also reliant on the environmental quality, scholars have also raised their concerns on the impacts of tourism towards the natural ecosystem (Avcikurt et al., 2015; Bhuiyan et al., 2018; Rääkkönen et al., 2019). The impacts would range from the exhaustion of natural assets, air contamination, physical harm to ecologies, logging, and loss of scenery (Bhuiyan et al., 2018). Furthermore, overtourism has several negative consequences, including traffic and parking concerns, community dissatisfaction from misbehaving tourists as well as increased living expenses for locals and tourists (Adie et al., 2019; Rasoolimanesh et al., 2019). These impacts are severely felt since the leading tourism destinations have reached overload point as cities from Europe, Asia, and Pacific experiencing overcrowding in terms of the tourism market size and global overnight stays (WTTC, 2019). Evidently, this phenomenon can be observed in Melaka of Malaysia since the destination was recognized as a World Heritage Site (WHS) by United Nations Educational, Scientific and Cultural Organisation (UNESCO) (Santa-Cruz & Lopez-Guzman, 2017).

This recognition generated significant impacts in terms of economic growth, employment, and poverty reduction despite the serious impacts of the phenomenon on tourism sustainability (Goodwin, 2017; Oklevik et al., 2019; UNWTO, 2018). Therefore, achieving the right balance between the fiscal return and preservation of sociocultural and environment has become a challenge amongst the tourism stakeholders. The unconstrained tourism growth which leads to excessive negative impacts will be a threat to the long-term survival of a tourist destination despite the economic gains by the commercial and service sectors (Koens et al., 2018; Pinke-Sziva et al., 2019; Seraphin et al., 2018). This can be attributed to the deterioration of experiential quality among the tourists as they compete with the permanent residents for space, amenities and services (Dodds

& Butler, 2019; Singh, 2018). This is worsened by the reduction of the perceived security of tourists as they feel uncomfortable by the overtourism phenomenon. In fact, potential tourists perceived overcrowding as the highest rated risk which may lead to lower tourists' decision to revisit a destination (Tasci & Sönmez, 2019).

As highlighted by Viet et al. (2020), tourists evaluate the risks they are likely to face throughout the trips before making tourism decisions. Since tourists strive to avoid visiting a risky destination, it reflects the prominent role of perceived risk in shaping their travel choices and behavioural intentions (Ritchie et al., 2017; Ruan et al., 2017). These situations enable the classification of the tourism risk as natural and man-made disasters (Sönmez & Graefe, 1998a), not only have an impact on the tourist sector and tourism security, but they also jeopardise a country's economic structure (Berdychevsky & Gibson, 2015). According to Ritchie et al. (2017), man-made tourism risk increases the chances and intensity of a natural disaster and this subsequently have an impact on tourism sectors and sub-industries.

Overall, the current study posited man-made risk (MMR) as a potential mediating factor on overtourism impacts (OVT) and tourist revisit intention. This relationship is underpinned by the theoretical framework of overtourism through the lenses of sustainability and tourism impacts. Investigation on these interrelationships is crucial given the dearth of empirical works that explicitly linked the MMR with OVT with most of them focused on the dynamics between perceived risk and revisit intention (Yin et al., 2020; Liang & Xue, 2021). Furthermore, empirical evidence generated in the context of a developing UNESCO WHS such as Melaka provides a niche contribution to the tourism body of knowledge. This is because it can be used as a meaningful comparator to other overtourism empirical works in other conventional and developed settings. With this in mind, the next section explicates the literature on overtourism, MMR and revisit intention with hypotheses development. This is followed by methodology, results and ends with theoretical and practical implications.

## **LITERATURE REVIEW**

### **Overtourism**

Overtourism is another term for tourist intensification within and around urban areas (Jover & Díaz-Parra, 2020). Used frequently to characterise an overutilisation of the assets, infrastructure, facilities and other components of a place, it is important to highlight that there is yet to be a universal consensus on the overtourism's definition and typology. This can be attributed to the recent entry of the concept in the tourism lexicon in 2017 where there is yet to be a sufficient body of knowledge to be synthesised by the scholars and industry practitioners (Singh, 2018; Veríssimo et al., 2020). Despite still in its infancy



stage, the phenomenon has become the main signifier for extreme adverse tourism impacts within a very short time. Furthermore, the phenomenon can be considered as dynamic trend that has a substantial impact on a destination's appeal, as well as the interactions of tourism stakeholders such as residents, tourists, and a variety of agents (Bellini & Pasquinelli, 2017; Milano et al., 2018).

It is documented in the literature that environmental, economic, and socio-cultural can be considered as the impacts of overtourism (Cheer et al., 2019; Peeters et al., 2018; Wall, 2019). Atzori (2020) noted that despite the improved economy through employment and increasing tourism income, overtourism also leads to high economic dependency on the sector, inflation, and increases in property prices and living expenses. As for the socio-cultural impacts, it includes unpleasant tourist behaviour, distress and frustration of hosts, host/tourist animosity, criminal behaviour, lifestyle modifications, reduction of cultural distinctiveness, deficient involvement of stakeholders in tourism development, overtourism during high season, and negative view and discontentment of visitors (Peeters et al., 2018; Wall, 2019). While contamination of water, air, land, and noise are among the general denominators of environmental impacts reported in the overtourism literature (Atzori, 2020).

Given the impacts of overtourism are commonly delineated based on tripartite pillars of sustainability, this study adopted the three elements of economy, environment and socioculture to measure the construct of OVT as per Berselli et al. (2022) and Mihalic (2020).

### **Man-made Risk**

According to Mansfeld and Pizam (2006), tourism risk can be derived from plethora of crises that comes in numerous forms. It can range from extremism to sexual provocation, non-violent financial crime to public disorders, corruption to swindling, noise to vandalism, visitor mistreatment of facilities to technological change. Based on this premise, Sönmez & Graefe, (1998a) classified these crises as either man-made or natural disaster. Tourism has been hit by several of the natural disasters in recent years, which were caused by man-made disasters (Ruan et al., 2017). Extreme traffic, sewage, garbage, oil seepage, and water pollution are all examples of man-made disasters (Huan, 2007). All of these can potentially result in long-term and severe damage (Ruan et al., 2017).

Thus, tourists' assessments of the MMR disasters are more probable to influence their travel decisions and behaviour (Kozak et al., 2007). This is because MMR may even have a negative impact on tourists value discernment (George & Swart, 2012). In fact, there has been an increase in anxiety about man-made disasters while tourists decide where to go and make trip plans with friends or family (Kozak et al., 2007). This illustrates the typical direct impact of man-

made disasters on travel decisions and benefits as tourists are generally more concerned about them (Berdychevsky & Gibson, 2015).

### **Revisit Intention**

Tourists' intent to revisit is seen as a critical predictor of the travel industry's long-term financial performance especially within the tourism body of knowledge (Mat Som et al., 2012; Wang et al., 2012). Many studies discovered repeat tourists will spend more nights at a destination, involve in further undertakings, and create constructive word of mouth which eventually leads to reduction of spending by the tourism stakeholders in marketing than first-time visitors (Zhang et al., 2018). Revisit intention refers to visitors' inclination to return to a specific area or country and to encourage it to others (Yoon & Uysal, 2005). According to Cheng et al. (2019), the expenditure on tourism products and services is dependent on the total figure of visitors which is influenced by the destination revisit intention. Considered as a post-consumption behaviour to a certain extent, it refers to the tourist's evaluation of the possibilities of returning to the place or tendency to suggest the destination to others (Cole & Scott, 2004; Khasawneh & Alfandi, 2019; Stylos et al., 2016).

### **STUDY HYPOTHESES**

The intention to revisit, which is a significant representation of tourism, might be considered as a precursor of tourist behaviour (Yin et al., 2020). Tourists may become confused and frustrated in packed and overcrowded situations, resulting in a negative experience and perceived insecurity (Hyun & Kim, 2015; Tasci & Sönmez, 2019). Tourism services may not operate efficiently in congested surroundings (Yin et al., 2019a, 2019b), compromising the quality of tourists' experiences with tourist locations. In the same vein, past literature also demonstrated that natural disasters, politics, and performance all have an impact on whether tourists return (An et al., 2010). Similarly, Cetinsoz and Ege (2013) suggested that tourists shunned returning to Asia and South America owing to MMR such as political instability. Taken altogether, the current study proposed the following hypotheses:

*H1 - OVT influence MMR*

*H2 – OVT influence tourist revisit intention*

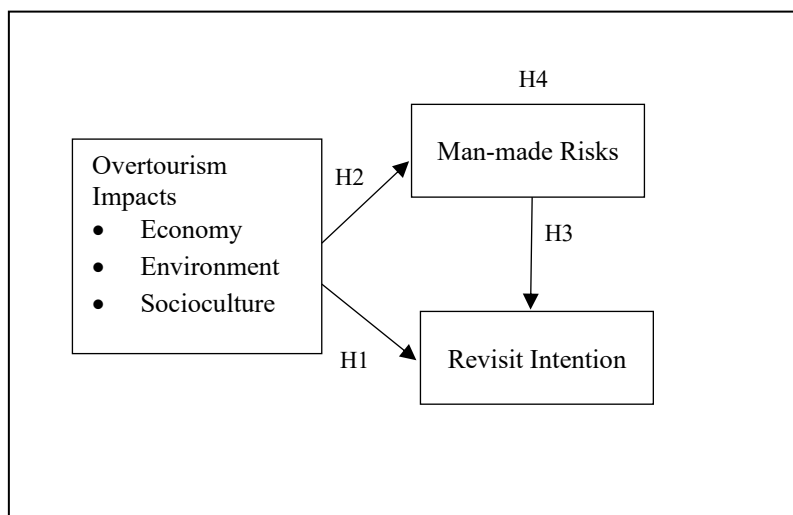
*H3 - MMR influences tourist revisit intention*

*H4 - MMR mediates the relationship between OVT and tourist revisit intention*

### **METHODOLOGY**

The purpose of this paper is to evaluate the mediating influences of MMR on OVT and tourist revisit intention in Melaka UNESCO WHS. Figure 1 illustrates

the research framework and hypothesis. To execute the study, quantitative research design and cross-sectional approach is employed to collect the data from the study population of tourists visiting Melaka. They were approached through online platform and were purposively sampled.



**Figure 1: Research Framework**  
*Source: Author*

First section of the questionnaire consists of respondents' demographic profile along with their travel pattern and behaviour. The ensuing sections measure OVT (Tsai et al., 2016; Kuščer & Mihalič, 2019) MMR (Ruan et al., 2017) and revisit intention (Park et al., 2019). A 5-point Likert scale with the range from 1 (strongly disagree) to 5 (strongly agree) were used to measure the constructs (see **Appendix 1**). As recommended by Hair et al. (2018), the minimum sample size is set at 185 respondents based on formulae of to have at least five times observations as the number of variables to be analysed (5:1 of observation-to-variable ratio). Five hundred and ninety-three completed responses were collected as majority of the tourists (75.4%) were females. The result is similar to other contemporary research who obtained majority figure of female tourists at Georgetown UNESCO WHS (e.g Noraffendi & Rahman, 2020; See & Goh, 2018). The demographic biasness can be attributed to the global trend of female travellers as the dominant market in leisure and business travel (Singh & Gupta, 2021; Zhang & Hitchcock, 2017). In fact, Asian solo female travel market is growing exponentially in many Asian countries such as in Malaysia (Awang & Toh, 2018). Finally, around 85.3% of the tourists in this study were between 18 and 30 years old as most of them travelled for leisure purposes (68.3%).

This paper employed the Partial-least Square-Structural Equation Modeling (PLS-SEM) to analyse the study model and hypotheses. PLS-SEM is used owing to the study's exploratory nature and non-normal data distribution (Hanafiah, 2020; Hair et al., 2011). Furthermore, PLS-SEM is also considered as effective in assessing complex interrelationships between the constructs given its strong and robust nature in estimating structural model (Henseler et al., 2009).

## **RESULTS**

Since the second-order formative construct was present and unequal number of indicators in lower-order reflective constructs, this study adopted the disjoint two-stage approach of hierarchical models for analysis purposes (Becker et al., 2012; Ali et al., 2018). Following the procedures, the first step of this approach required the estimation of measurement model minus the second-order construct. After the lower-order constructs are integrated as the indicators of second-order construct, the reliability and validity were again need to be tested before the final structural model assessment (Sarstedt et al., 2019; Hair et al., 2019).

### **Evaluation of Measurement Model**

The criterion for assessing reflective measurement model is the evaluation of reliability, convergence validity and discriminative validity of the constructs (Hair et al., 2019). The reliability of the constructs can be referred to factor loadings, composite reliability (CR), Cronbach's alpha and average variance extraction (AVE). All constructs were reliable since the reliability values exceed the minimum limit of 0.7 (Hair et al., 2019). The item loadings and AVE statistics of each reflective indicator were higher than the recommended threshold (Hair et al., 2011; Hanafiah et al., 2021), illustrating achieved convergent validity for all variables. To examine discriminant validity, Heterotrait-Monotrait (HTMT) ratio of the correlation was used. All HTMT values of latent variables were clearly lower than the threshold value of 0.90 (Henseler et al., 2015).

Stage-two examines the second-order formative construct for its measurement model and the structural model analysis (Hair et al., 2019; Sarstedt et al., 2019). In this stage, the formative measurement model was evaluated by estimates of indicator weights, significance of weight and multicollinearity of indicators (Loureiro & Jesus, 2019). The overall result of VIF values demonstrates no issues of multicollinearity with the weight of all indicators and respective loadings of OVT and MMR were significant as per Hanafiah (2020).

### **Assessment of Structural Model and Hypotheses Testing**

As the measurement model evaluation was adequate, the statistical significance of path coefficients,  $R^2$  value (coefficient of determination), and  $Q^2$  (blindfolding-based cross validated redundancy measure) of the structural model were

evaluated (Hair et al., 2019). It can be reported that predictive power of OVT on MMR ( $R^2 = 0.06$ ) and the former construct on revisit intention ( $R^2 = 0.01$ ) is very weak. Furthermore, the  $Q^2$  values presented in Table 1 were close to zero, indicating that the model has no sample predictive relevance for both variables in the path model.

**Table 1:** Structural model assessment

Construct	$R^2$	$Q^2$
Man Made Risk	0.06	0.053
Revisit Intention	0.01	-0.006

Afterward, the hypothesis testing between the constructs in structural model were measured based on the values of path coefficients ( $\beta$ ) and significance levels (P) as per Hair et al. (2011). The estimation of the structural model's path coefficient results in Table 2 reported that both OVT (H1:  $\beta = -0.057$ ;  $t = 1.107$ ;  $P = 0.268$ ) and MMR (H3:  $\beta = -0.043$ ;  $t = 0.990$ ;  $P = 0.322$ ) were not significantly affecting the revisit intention. However, OVT had a significant impact on MMR (H2:  $\beta = 0.249$ ;  $t = 6.058$ ;  $P = 0.000$ ) at 0.001 confidence level. This means that H2 is supported. In terms of indirect effect of OVT on revisit intention through MMR as a mediator variable; the result is statistically insignificant ( $\beta = -0.011$ ;  $P = 0.349$ ).

**Table 2:** Hypotheses testing

	Path Coefficient, $\beta$	T Statistics	P Values	Remarks
H1: OVT -> Revisit Intention	-0.057	1.107	0.268	Not Supported
H2: OVT -> MMR	0.249***	6.058	0.000	Supported
H3: MMR -> Revisit Intention	-0.043	0.990	0.322	Not Supported
H4: OVT -> MMR -> Revisit Intention	-0.011	0.936	0.349	Not Supported

Note: \*\*\* $p < 0.001$

## DISCUSSION

Plethora of past studies denote the tourism crowding as a vital antecedent of intention to revisit (Seetanah et al., 2018; Wu et al., 2018) and would reduce tourist satisfaction (Luque-Gil et al., 2018; Sanz-Blas et al., 2019). This reflects how the crowding phenomenon is reported to have crucial influence on revisit intention, indicating aversion among the tourists to the overtourism destination (Yin et al., 2020). In contrast, overtourism is also considered as an important

indicator among the tourists to gauge the popularity of tourist destinations (see Petr, 2009). Therefore, contrasting evidence and opposing views are found in the literature in assessing OVT. In line with this notion, it needs to be established that the present study found overtourism in a UNESCO WHS of a developing country had an insignificant impact on revisit intention. The nature of the findings illustrate that even though tourists are troubled by the phenomenon, it might not play any pivotal role in shaping their revisit intent. This may be attributed to the lack of emphasis among the tourists on the OVT towards experiential values in their travel decision making.

Importantly, the sustainable growth, success and competitiveness of any destination is contributed by the integrated values perceived and experienced by tourists. Such values especially in overtourism context can only be delivered through strong collaboration and networking activities among key destination stakeholders (see the works of Azinuddin et al., 2020; 2022; Mior Shariffuddin et al., 2020; 2022). On top of that, it is also posited these activities also shape how the risks are managed by the destination management organizations (DMOs) and perceived by tourists. This is notable considering the dynamics between OVT and MMR reported in the current study. In the same vein, MMR is also found to have insignificant impacts on the revisit intention. This is interesting to note especially in the context of Malaysia, where Ahn (2019) emphasises that the risk perception is not important for tourists traveling in the country. This proved in the context of a destination which is beleaguered by various issues that lead to eventual risk discernments, it appears that such dynamics would not have significant bearings on the revisit intention.

## **CONCLUSION**

The current research proposed an analysis on revisit intention through the lenses of overtourism phenomenon, where the subsequent results provide a peculiar picture of the tourism industry. There are three theoretical implications of this study. First, this research can be considered as one of the early empirical initiatives that conceptualize and operationalize overtourism phenomenon through sustainability and tourism impacts perspectives. Second, the paper extended the tourism knowledge by exploring the mediating impacts of MMR on OVT and revisit intention, which are rarely studied in the existing studies. Third, the analysis of interrelationships between the abovementioned variables in the context of UNESCO WHS in a developing setting offers a unique and valuable insight in understanding the overtourism phenomenon.

In terms of the managerial implications, DMOs should strive to solidify the networks between the public, private and hybrid entities to offer a safe environment for visitors, allowing them to have positive travelling experiences. Improvements of service quality, public infrastructure, and environmental

comforts would be favourable for tourists' relaxation. In the same vein, the findings also heightened the need for WHS policymakers to emphasised tactical measures to combat MMR in order to increase the perceived safety and security of the tourists. Therefore, the importance of evaluating the tourist risk perception cannot be understated from the managerial point of view given stronger tourism attractions were insufficient to entice tourists and survived in the competitive tourism markets. This can be achieved through risk minimization and tactical measures which aim to solidify the standing of the destination amongst the tourists, and subsequently shapes a better and sustainable future for overtourism UNESCO WHS.

Despite the significant contributions and issues raised in this study, it is important to consider its limitations. First, the results should be treated with caution, as different outcomes are possible if the analysis on environmental and contextual factors are conducted in other settings, where it can potentially lead to new empirical and practical insights. Future reconnoitring and differentiation of the various effects of OVT for different research settings or other historic centres would be valuable for validating these findings and improving the replicability of the suggested research model.

#### **ACKNOWLEDGEMENTS**

This research was supported by Ministry of Higher Education (MOHE) through Fundamental Research Grant Scheme FRGS/1/2019/WAB12/UNISZA/01/1, titled 'Developing Typology and Institutional Framework of Overtourism to Enhance Destination Sustainability in Malaysia'.

#### **DISCLOSURE STATEMENT**

Following international publication policy and our ethical obligation as a researcher, we report that we have no conflict of interest.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022

## Appendix 1: Survey Instruments

Code	Items
<i>Overtourism (Economic Impacts)</i>	
EC1	Local tourist products and services are expensive
EC2	The price of accommodation is high
EC3	Restaurants are always overcrowded in Melaka
EC4	Choices of tourist products (handicrafts, souvenirs) are insufficient due to overtourism
EC5	Overtourism leads to poor quality of goods and services
EC6	I feel overtourism benefits the economic well-being of local communities
EC7	I feel overtourism brings positive development to Melaka's tourism
<i>Overtourism (Sociocultural Impacts)</i>	
SC1	The increased tourists' flow makes me feel uncomfortable
SC2	Overtourism leads to moral degradation due to cultural differences
SC3	Overtourism causes changes in local cultures and traditions
SC4	Overtourism leads to increasing crimes rates
SC5	Overtourism increases the conflict between residents and tourists
SC6	Overtourism makes me feel unsafe
<i>Overtourism (Environmental Impacts)</i>	
ENV1	Overtourism increases the damage of natural environment
ENV2	Overtourism contributes to coastal erosion in Melaka
ENV3	Overtourism leads to excessive land reclamation of coastal areas in Melaka
ENV4	Overtourism causes air pollution
ENV5	Overtourism contributes to seawater pollution
ENV6	Overtourism contributes to river pollution
ENV7	Overtourism contributes to noise pollution
ENV8	Cleanliness is a serious issue in Melaka due to overtourism
ENV9	Overtourism leads to traffic congestion in Melaka
ENV10	Overtourism decreases the ambient quality of tourist attractions in Melaka
ENV11	The distribution of tourist attractions is concentrated in a few areas
ENV12	Overtourism leads to the degradation of heritage buildings
ENV13	Overtourism leads to oversupply of hotels in Melaka
ENV14	Overtourism leads to oversupply of tourist attractions in Melaka
<i>Man-Made Risks</i>	
MM1	I feel worried about my safety in Melaka
MM2	Overtourism makes me feel insecure during the trip
MM3	I will avoid traveling to crime-risk areas
MM4	Controlling diseases may affect the attractiveness of tourist destination
MM5	The travel risk would negatively affect my satisfaction and experience in Melaka
<i>Revisit Intention</i>	
IR1	I will visit Melaka in future
IR2	It is more interesting to visit Melaka than any other destinations
IR3	I am loyal to Melaka
IR4	I will tell other people positive things about Melaka
IR5	I will recommend Melaka to others as a travel destination



**PLANNING MALAYSIA:**  
*Journal of the Malaysian Institute of Planners*  
**VOLUME 20 ISSUE 3 (2022), Page 255 – 269**

## **LOCAL COMMUNITY PERSPECTIVE ON RESPONSIBLE TOURISM AND DESTINATION SUSTAINABILITY**

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### **Abstract**

The tourism industry has relied on long-term planning and is anticipating growing availability and demand for socially, ecologically, and economically responsible tourism. As a novel idea, responsible tourism practices may boost efforts for sustainable tourism development, improving the image and competitiveness of tourism destinations, and averting overtourism. The purpose of this research is to examine at the link between responsible tourism and destination sustainability in Cameron Highlands communities. This study employed a descriptive research and a cross-sectional design. In order to complete the study, questionnaires were distributed to local communities in three (3) Cameron Highlands sub-districts: Ulu Telum, Tanah Rata, and Ringlet. According to correlation and regression tests, the study found a significant relationship between responsible tourism and destination sustainability. As a result, destination sustainability necessitates a greater emphasis on the development of environmental consciousness, sustainable livelihood, and community well-being. Because local communities are a component of the tourism experience, the study findings can help tourism stakeholders execute tourism development plans based on local community views and quality of life.

**Keywords:** Responsible tourism, destination sustainability, local community

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## **INTRODUCTION**

Tourism is a global phenomenon with high ideals and sensitivity to natural and cultural settings. It has been a real human activity throughout history (Abbasi & Pajohanfar, 2014). Tourism is still the second greatest contributor to the national economy, and over the last few decades, it has not only increased substantially as a tool for regional economic growth, but it has also become a key socioeconomic strength in both developing and mature markets (Mohd Ariffin et al, 2016). Tourism is a major revenue generator in Malaysia; as a result, the Malaysian government has invested significantly in the industry (Aman et al., 2013), and the tourism industry is recognised as one of the primary sources of foreign exchange earnings and a catalyst for the nation's economic development, accounting for at least eight to ten percent of gross domestic product (GDP) (Mosbah and Abd Al Khuja, 2014).

Nonetheless, tourism has considerably contributed to environmental degradation, overtourism, negative social and cultural consequences, and habitat fragmentation, despite its economic advantages. These good and bad features are referred to as tourism impacts, and they have a significant impact on both the local community and tourists (Brida et al., 2011). Furthermore, due to the worldwide danger of climate change, limited natural resources, and severe socioeconomic inequities, businesses and individuals are being pushed to quantify the implications of tourism on the environmental, social, and economic surroundings (Choi and Sirakaya, 2006).

Although tourism promotes robust economic production, it constantly poses issues for practitioners and politicians since tourism is created at a high cost for the people in these locations, which are already under stress owing to the negative implications of tourist development (Buckley et al., 2003; Sari and Nazli, 2021). As a result, the world is presently seeking for a strategy to achieve sustainable development through greater availability and demand for socially, ecologically, and economically responsible products (Mathew and Nimmi, 2021).

In response to destructive and exploitative practises as international tourism expands into developing countries (Lee, Bonn, Reid, and Kim, 2017), responsible tourism engages in activities that promote growth while preserving the existing environment and protecting local communities' culture, history, heritage, and achievements (Debicka and Oniszczyk-Jastrzabek, 2014). To improve the existing sustainable tourist growth, responsible tourism was developed and established in tourism study and practice (Spenceley, 2010; Caruana et al., 2014).

Responsible tourism, according to Farmaki, Constanti, Yiasemi, and Karis (2014), is a component of sustainable tourism that is expanding internationally to benefit tourist firms and destinations. Responsible tourism is a tourist management strategy that seeks to maximise economic, social, and

environmental advantages while minimising negative consequences on tourism locations (Debicka & Oniszczyk-Jastrzabek, 2014; Xin & Chan, 2014).

Although responsible tourism has become an established area in tourism research and practice as a broad set of tourist interactions with engagement and benefits for local communities that minimises negative social and environmental impacts (Caruana et al., 2014), most studies on responsible tourism have only included the perceptions of tourists or service providers (e.g., Spenceley et al., 2002; Tearfund, 2002; van der Merwe and Wöcke, 2007) and limited studies have been conducted to critically examine the relationship between responsible tourism and destination sustainability from perspective of local communities. As a result, a research on responsible tourism and destination sustainability that connects with local populations is required, particularly in the Malaysian setting.

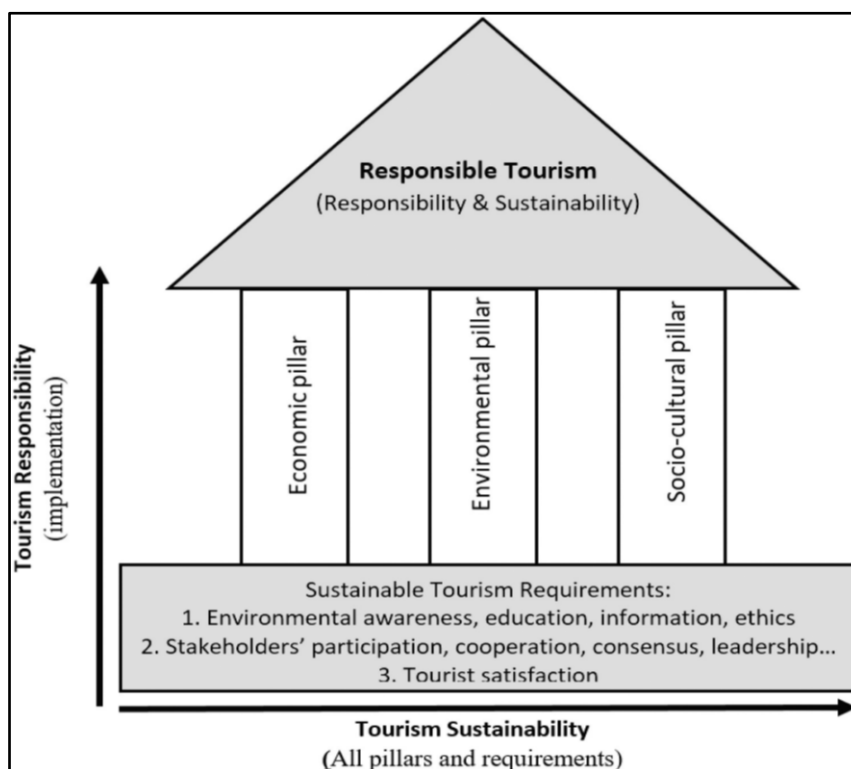
## **LITERATURE REVIEW**

### **Responsible Tourism**

According to some, mass tourism may cause a slew of social and environmental issues in a region. It turns out that the notion of responsible tourism arose in response to mass tourism (McCabe et al., 2012; Wheeler, 1994). Krippendorf (1987) was one of the first academics to coin the phrase "responsible tourism." According to Wheeler (1994), responsible tourism arose as a reaction to mass tourism becoming entangled in the green dilemma and has been championed as a suitable road forward. While there are various variances, responsible tourism may be roughly defined as a catch-all word for this type of tourism that should be more caring and attentive.

Responsible tourism has a long history as a proactive strategy to ensuring the destination's long-term viability (Tay et al, 2016). Despite the lack of official statistics, current trends indicate that a responsible tourist strategy is being established (Mody et al., 2017). Responsible tourism is an approach to tourism that seeks to enhance the cultural, economic, and environmental elements of tourism (Debicka & Oniszczyk Jastrzabek, 2014; Lee et al., 2017). Tourism is not a type of responsible tourism. Rather, it is a paradigm, a method of conducting business that promotes environmental, cultural, and societal responsibility (Mody et al., 2014). As shown in Figure 1, Mihalic (2016) provided an idea of responsible tourism activities based on three pillars: economic, environmental, and socio-cultural.





**Figure 1:** Proposed Understanding of Responsible Tourism Practices (based on the three pillars) (Mihalic, 2016)

According to Sariskumar and Bhavan (2018), responsible tourism covering socio-economic, cultural, and environmental sustainability of destinations that will also involve stakeholder engagement is crucial today to ensure the competitiveness, clean image, and quality of life of the community in the tourist destination. A triple bottom line strategy, including economic responsibility, social duty, and environmental responsibility, is what Mathew and Kumar (2014) define as responsible tourism. Responsible tourism can be broken down into four categories: economic responsibility, social responsibility, cultural responsibility, and environmental responsibility, according to Sariskumar and Bhavan (2018) and Mathew and Nimmi (2021). As a result, in the section that follows, the four components of responsible tourism—economic responsibility, environmental responsibility, cultural responsibility, and social responsibility—are addressed and evaluated.

#### Economic responsibility

According to Mathew and Nimmi (2021), economic responsibility felt by the community as a result of responsible tourism strengthens the community's perception that tourism activities are focused on fostering domestic procurement, bettering living standards, and generating greater employment opportunities. This sense of economic responsibility increases and improves the satisfaction with material well-being in their lives, which reflects their satisfaction with their own possessions and comforts (Kim et al., 2013).

#### Social responsibility

To make social responsibility a reality, the local community must actively participate in planning and decision-making, as well as providing capacity building. According to Mathew and Kumar (2014), the Cape Town Declaration (2002) advocated that social responsibility be defined as evaluating social consequences based on the operation's life cycle, which includes the planning and design phases, in order to minimise negative impacts and maximise good ones. In order to secure access for all, especially for marginalised and at-risk groups of people and communities, social responsibility works to make travel a socially inclusive experience.

#### Cultural responsibility

According to Mathew and Nimmi (2021), responsible tourism is also concerned with preserving local customs and culture. Promotion of local arts and culture, marketing of regional mementos, cultural interchange, preservation of the local environment, etc. are all ways that local culture, rituals, and customs are supported and made easier to practise. Activities promoting cultural responsibility may also have unintended consequences that have an impact on how the community perceives its members' emotional wellbeing.

#### Environmental responsibility

Environmental responsibility is concerned with the planet's natural resources and how society, communities, and corporations use them (Costa, 2019). Environmental sustainability is seen to be a natural ecosystem that needs to be preserved for both the present and future generations (Sutawa, 2012; Ciraci, Turgut and Kerimoglu, 2008; Chahal and Devi, 2016). Nair, Mohamed, and Chiun (2015) claim that responsible tourism and environmental management can be integrated at any stage of a project's life cycle, from inception through decommissioning. In short, for responsible tourism, the environment must be taken into account at every stage of planning and development.

## **Destination Sustainability**

A destination is a geographical location that provides the necessary services and infrastructure for visitors and provides tourists with an experience (Buhalis, 1999). One of the key factors that can guarantee the long-term sustainability of tourism is the constancy of a destination's competitiveness and attractiveness, according to Nadalipour et al. (2019). Equity across and across generations is a key component of sustainable development, which emphasises both the needs of the current generation and the necessity of protecting resources for future generations. In the same way, it is envisioned that sustainable tourism development will be able to meet the demands of both present and future visitors as well as host communities (Nadalipour et al., 2019).

However, because diverse needs exist in various locations, it is challenging to adopt sustainable tourism that focuses on the industry as a whole (Risteski et al., 2012). As a result, the idea of sustainable tourism can serve as a guide for creating a list of particular indicators to determine the sustainability level (Jaini et al., 2012). The ability of a place to remain competitive and attractive throughout time is one of the primary variables that can ensure the sustainability of tourism in that location (Nadalipour, 2019). In general, the destinations of today ought to continue to be popular and competitive. By doing this, the destination considers the economic and social prosperity of society while using the resources and potential of its environment in a sustainable and effective manner.

According to Fyall and Garrod (2020), destinations are focal points for tourism activities and therefore for tourism studies. However, in recent years, destination managers have faced a significant challenge in achieving balanced economic growth that improves the tourist experience while also maintaining the natural environment and increasing the well-being of the host resident population. According to Chan (2010), achieving sustainable tourism growth while maintaining competitiveness is a common aim for each tourism destination in both developed and developing nations. In the development of sustainable tourism, it is critical to define the indicators used to assess the level of destination sustainability, as well as the primary contributing factors.

According to Ritchie and Crouch (2000), in order to be competitive, a tourism destination's growth must be sustainable not just economically and environmentally, but also socially, culturally, and politically. The necessity to establish sustainable tourism in destinations gave rise to the notion of sustainable tourism destination (Lee, 2001). There is no widely recognised definition of a sustainable tourist destination since each destination has distinct qualities (Yüzba, Topsakal, and Celik, 2014), and sustainable development varies by location (Lee, 2001). According to Tavares (2011) and Lee (2013), community participation and attachment are significant components of community quality of life that

positively lead to sustainable development, as evidenced by Stylidis, Biran, Sit, and Szivas (2014) and Nunkoo and Ramkissoon (2012).

## **RESEARCH METHODOLOGY**

This study employed a descriptive research design using a cross-sectional approach. Researchers were able to acquire quantitative data using the survey technique, which they were able to analyse using descriptive and inferential statistics. As a result, the primary data collection approach for this study was a structured questionnaire disseminated to the local population. A total of 322 respondents in this research were members of the Cameron Highlands community. Cameron Highlands boasts the largest and most comprehensive network of townships among Malaysia's highland attractions.

Cluster sampling was utilised to approach the sample in this study since it is more accurate in representing subgroups in samples and purposeful in terms of generalizability. Clusters are formed through this sort of sampling and can be based on any naturally occurring grouping. Data sets, for example, are divided into geographical regions. When clusters reflect geographical subdivisions, the sampling method is known as area sampling. In this study, the region was separated into three clusters based on Cameron Highlands sub-districts (*mukim*), which are Ulu Telum, Tanah Rata, and Ringlet. Then, a subsample was drawn at random from each sub-district.

## **FINDINGS**

### **Descriptive Analysis**

The descriptive statistical analysis was carried out in order to characterise and summarise the key characteristics of the data set on each component of responsible tourism, namely Economic Responsibility, Environmental Responsibility, Social Responsibility, and Cultural Responsibility.

Table 1 displays the maximum mean value for each component. The highest scoring in mean values are cultural responsibility (mean=4.193, standard deviation=0.523), social responsibility (mean=4.287, standard deviation=0.491), economic responsibility (mean=4.366, standard deviation=0.478), and environmental responsibility (mean=4.469, standard deviation=0.469). Environmental responsibility receives the greatest mean score than any other criteria. It suggests that respondents believe environmental stewardship is important to their overall well-being. According to Costa (2019), the environment is concerned with the planet's natural resources and how society, communities, and companies use them. Because the Cameron Highlands had so many environmental challenges, environmental stewardship may be considered a necessary component of responsible tourism.

**Table 1:** Descriptive Statistics for Responsible Tourism

<b>Variables</b>	<b>No of Items</b>	<b>Mean</b>	<b>Std. Deviation</b>
Economic Responsibility	8	4.3661	.47807
Environmental Responsibility	8	4.4686	.46940
Social Responsibility	8	4.2873	.49083
Cultural Responsibility	7	4.1925	.52341

Note: N=331

Measurement scale: 1- Strongly Disagree to 5- Strongly Agree

Measurement level: 1.00 – 2.49: Low; 2.50 – 3.49: Moderate; 3.50- 5.00: High

Table 2 summarises the degree of economic responsibility's items. It stated that the item "employment opportunities" received the highest score, with a mean score of 4.45. It is significant that all respondents believed that economic responsibility must increase employment possibilities for the local population in Cameron Highlands. The item "benefits are acquired by local people" receives the lowest rating, 4.27, when compared to the other items. The means of the remaining elements, however, ranged from 4.34 to 4.44.

**Table 2:** Mean Value of Economic Responsibility Attributes

<b>No</b>	<b>Items</b>	<b>Mean</b>
1	employment opportunities	4.45
2	developing high quality products	4.44
3	purchasing local product	4.39
4	support to local enterprise	4.36
5	skill development	4.34
6	local people involve in entrepreneurial	4.34
7	economic benefits of local people	4.34
8	benefits are gained by local people	4.27

Table 3 lists the mean level for each item under environmental responsibility. The item "environmental conservation" received the highest score. This indicates that respondents mostly concurred that environmental responsibility must enhance environmental conservation at their destination. The item that receives the lowest mean score, 4.38, is "promote education and awareness about sustainable." The mean score for the remaining items ranged from 4.39 to 4.55.

**Table 3: Mean Value of Environmental Responsibility Attributes**

No	Items	Mean
1	environmental conservation	4.63
	respect the existing ecosystems and protected areas	4.55
2	effective waste management	4.50
3	assess environmental impacts	4.44
4	ensure that sensitive areas are managed in a way	4.43
5	natural diversity sustainability	4.43
6	use resources sustainably	4.39
7	promote education and awareness about sustainable	4.38

The item "increase local communities' knowledge" received the highest mean score for social responsibility (mean=4.37), as shown in Table 4. It implies respondents' unanimous agreement that social responsibility must raise local communities' awareness of sustainable tourism development. The item "inclusive social experience" receives the lowest rating, 4.20, when compared to the other items. The mean range for the other items, on the other hand, was 4.24 to 4.31.

**Table 4: Mean Value of Social Responsibility Attributes**

No	Items	Mean
1	increase local communities' knowledge	4.37
2	engagement in planning and decision making	4.31
3	local community participates and promotes RT	4.31
4	local community responsible and alert towards the development changes	4.31
5	contributes to improvements in education	4.28
6	contributes to improvements in health	4.27
7	assess social impacts	4.24
8	as an inclusive social experience	4.20

Table 5 lists the level for each item under cultural responsibility qualities. The item "improve the preservation of cultural, history, and tradition" received the highest score overall, with a mean of 4.30, according to the data. It indicates that respondents genuinely believe that cultural responsibility must increase the preservation of the destination's culture, legacy, and traditions. The item "increase residents' pride in the local culture through their participation" had the lowest mean score, 4.12, in contrast. The average score on other items ranged from 4.13 to 4.23.

**Table 5: Mean Value of Culture Responsibility Attributes**

No	Items	Mean
1	improve the preservation of cultural, heritage and tradition	4.30
2	preservation of traditional rural landscapes	4.23
3	encourage a variety of cultural activities for local residents through community involvement	4.21
4	development is appropriate to local tradition	4.18
5	keep local culture alive and maintain cultural identity	4.17
6	tourism activities are maintained with the local tradition, local cultural and local heritage	4.13
7	increase residents' pride in the local culture through their participation	4.12

Table 6 displays the degree of dependent variable, destination sustainability, with the item 'raise the standard of living' received the highest mean score of 4.20. This indicates that the majority of respondents thought tourism improved the quality of life in local areas. Meanwhile, the item 'increased environmental protection' earned the lowest mean score of 3.90. The means of other items ranged between 3.93 and 4.16.

**Table 6: Mean Value of Destination Sustainability**

No	Items	Mean
1	improve the standard of living	4.20
2	improved the development of infrastructure	4.16
3	improved empowerment of local communities	4.12
4	brought consistent and reliable income	4.11
5	improved the social program and schemes	4.07
6	increased the quality of landscapes and environment	4.06
7	improved the management and conservation of heritage sites	4.04
8	increased the conservation of natural areas	3.93
9	increased environmental protection	3.90

Table 7 shows the Pearson correlation analysis between the independent variable (Responsible Tourism) and the dependent variable (Destination Sustainability). According to the data, there is a positive relationship between responsible tourism and destination sustainability ( $r=0.204$ ). The strength of this association, however, is low because the value falls between 0.21 and 0.40. Konting (2000) Responsible tourism and destination sustainability have

a beneficial link. According to the results of Sariskumar and Bhavan (2018), there is a strong positive relationship between local citizens' positive attitudes toward responsible tourism activities and destination's sustainability.

**Table 7: Correlation between Responsible Tourism and Destination Sustainability**

		TRT	TDS
TRT	Pearson Correlation	1	.204**
	Sig. (2-tailed)		.000
	N	322	322
TDS	Pearson Correlation	.204**	1
	Sig. (2-tailed)	.000	
	N	322	322

\*\* . Correlation is significant at the 0.01 level (2-tailed).

According to Table 8, regression coefficient of responsible tourism is 0.33, and this indicates that the level of destination sustainability will increase 0.33 units when responsible tourism increased one unit while others remain. Meanwhile, its standardized beta coefficient is equal to 0.204.

**Table 8: Coefficients for Responsible Tourism Predicting Destination Sustainability**

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.628	.385		6.831	.000
	TRT	.330	.088	.204	3.730	.000

a. Dependent Variable: TDS

## DISCUSSION AND CONCLUSION

The result of this study is consistent with result from Sariskumar and Bhavan's (2018) who asserted that, local residents' positive opinion about responsible tourism practices have a significant positive relation with the destination sustainability perceived by the local community. It is also supported by Mathew and Sreejesh (2017) who found that, individual's perceptions regarding responsible tourism has a significant impact on their perception of sustainability of the tourism destination.



In terms of long-term sustainability, tourism development is anticipated to be able to meet the demands of both current and future guests, as well as host communities (Nadalipour, 2019). A destination utilises its natural resources and potentials in a sustainable and effective manner, while also taking into account society's economic and social well-being. The findings reveal a link between responsible tourism and destination sustainability; the item with the greatest mean value for destination sustainability was "I believe tourist activities have enhanced my level of life". It is critical to balance economic growth that incorporates visitor experiences while also safeguarding the environment and improving the well-being of local populations.

According to the findings of this study, destination developers and marketers should be aware of how communities perceive responsible tourism activities and how they might improve their quality of life through destination sustainability. For example, while there is no association between responsible tourism and quality of life, there is a significant relationship between responsible tourism and the quality of life of local communities when destination sustainability works as a complete mediator. From the results, tourism developers should devise ways to guarantee that the destination is maintained sustainably, as it is critical to provide a high quality of life for the Cameron Highlands people.

To contribute significantly to long-term destination management, a stronger emphasis on the development of sustainable livelihoods, community engagement, and environmental awareness is required. While tourism destinations strive to find a balance between sustainability and development, responsible tourism practices may assist them in accomplishing their objectives. This is pertinent as Cameron Highlands has already exhibited several attributes of overtourism that may jeopardise the tourism industry in the long term. Thus, the tourist sector should concentrate on increasing its destination sustainability to continuously improve the well-being and quality of life of the local populations.

## **ACKNOWLEDGEMENT**

This research was supported by Ministry of Higher Education (MOHE) through Fundamental Research Grant Scheme FRGS/1/2019/WAB12/UNISZA/01/1, titled 'Developing Typology and Institutional Framework of Overtourism to Enhance Destination Sustainability in Malaysia'.

## **DISCLOSURE STATEMENT**

Following international publication policy and our ethical obligation as a researcher, we report that we have no conflict of interest.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**  
*Journal of the Malaysian Institute of Planners*  
**VOLUME 20 ISSUE 3 (2022), Page 270 – 281**

## **HUMAN NEEDS FULFILLMENT: THE CONTRIBUTING FACTORS OF HUMAN FLOURISHING**

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### **Abstract**

Human Flourishing (HF) and Maslow's hierarchy of human needs are examined in this paper. *Issue:* The human needs hierarchy is not a zero-sum concept. The hierarchy of needs does not necessitate that people have to fully fulfil one need before moving on to the subsequent need. Recognizing human needs that are meaningful in promoting SWB, in this instance human flourishing, is crucial to comprehending the hierarchy's relevance. *Purpose:* This article seeks to examine the degree of human flourishing in Malaysia in relation to the difficulty and convenience of meeting human needs. *Approach:* Using Mann Whitney U-Tests, the median of HF across the difficulty and convenience of satisfying 24 human needs was determined. These human needs are the necessities and life conditions for which people typically and substantially strive for. *Findings:* The ease at which the majority of human needs may be satisfied substantially raises HF. In addition, the findings revealed that satisfying four human needs for which HF did not vary was unlikely to affect HF. Maslow's Hierarchy of Needs classified these four needs as biological and physiological needs, safety and security needs, belonging and love needs and self-actualization needs.

**Keywords:** hierarchy of human needs, flourishing scale, Malaysia

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## INTRODUCTION

Urban planning integrates physical and psychological human activities to promote growth. Meeting human needs to encourage human flourishing improves social sustainability in cities. Human flourishing requires internal and external conditions to be satisfied. Among the internal prerequisites are mental and physical wellness. External preconditions include safety, liberty, respect, a free democracy, and a supportive environment. This article is part of a bigger collection of study on the fulfilment of human needs across dimensions of wellbeing. (Abu Bakar & Osman, 2021). This study intends to assess the statistical interaction between human flourishing as the internal precondition and human needs fulfilment, as the external precondition in Malaysia.

## LITERATURE REVIEW

The field of Subjective Wellbeing (SWB) is complex and ever-changing. SWB is a multifaceted concept that attempts to describe an individual's emotional, judgmental, and psychological wellbeing as a representative of a larger sample. The basic structure and examples of SWB are delivered in Figure 1.

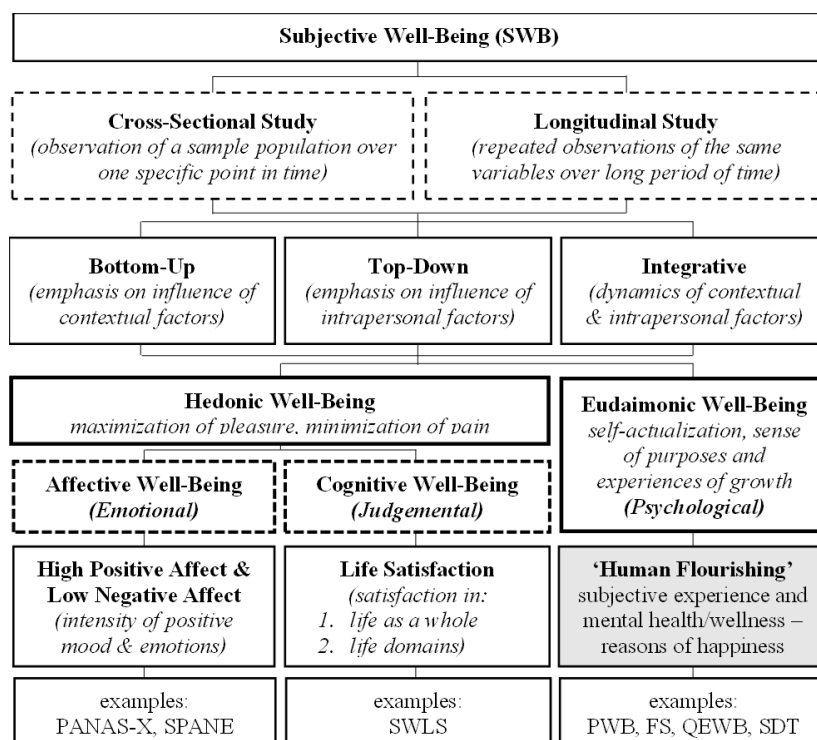


Figure 1: Basic Structure and Examples of Subjective Wellbeing

The eudaimonic approaches of SWB, also known as psychological wellbeing, is the attainment of expressive and self-aligned objectives via the enhancement of a person's finest potentials that are associated with his quality of life (Biswas-Diener, 2011; Biswas-Diener et al., 2009; Diener et al., 2012; Tay & Diener, 2011). The approaches focus on why people are happy as opposed to what makes them happy. The approaches have been acknowledged to be well-related to self-actualization and transcendence in Maslow Hierarchy of Needs (HON). Among the notable examples is the Flourishing Scale, a theoretically based tool that measures human functioning (Diener et al., 2009).

The Flourishing Scale is a brief, eight-item evaluation of a person's self-perceived success in significant areas such as relationships, self-esteem, purpose, and optimism. The scale has excellent psychometric qualities and is significantly correlated with other psychological well-being measures. To flourish is to develop oneself during the course of one's life in connection with other individuals and the world in order to live well and flourish. Humans must be able to grow and act upon certain potentials in order to be considered flourishing, but they also have their own opinions, preferences, and wishes for how they might best develop and act upon their potential. (Rump, 2015).

Several key internal and environmental preconditions must be satisfied for human flourishing to occur. Intrinsic preconditions include psychological and physical health; extrinsic preconditions include safety, freedom, respect, being part of a democratic society, and a healthy surrounding environment. Preconditions like these are distinguished by the fact that they are not totally within the control of a single individual. It is also critical that preconditions should not just be recognized linearly. While the environment may provide opportunity, accessibility, or be seen as enabling, it is the dialectic between the person and the world that leads to the ongoing growth of one's potential. Dialectic examples include how a person finds meaning by leading a healthy existence and how he flourishes by advocating for the recognition of a minority in a discriminating society.

Maslow's 1943 HON initially outlined human development in a pyramid of five motivational needs. The five needs are divided into two categories: basic needs and growth needs. Basic needs represent the biological and physiological needs, safety needs, love and belonging needs. While self-actualization drives the growth needs. Maslow (1943) believes that basic needs must be met to proceed up the HON. The longer the basic needs are unmet, the more urgent it is to resolve them. After meeting the basic needs, people may go on to self-actualization. In the 1960s and 1970s three new human need levels were introduced. Cognitive and Aesthetic Needs were slotted between deficiency and growth needs. Later, Maslow (1970) added transcendence needs as the top stage of the HON.

Although Maslow established needs in hierarchical arrangement, he recognised that meeting any need is not an all-or-nothing proposition. Individuals are not required to completely satisfy one need in order for the next need to emerge in the hierarchy. According to Maslow, most individuals seem to have partly met each of their needs at any one time—and the needs that are lowest in the hierarchy are generally the ones that individuals have made the greatest progress against (Wahba & Bridwell, 1976).

**Table 1:** Understanding of HON Stages

#	Stage	Understanding
1	Biological and Physiological Needs	The biological need for homeostasis, or maintaining constant levels in various body systems. The drive stems from survival instincts, such as the desire for shelter, water, food, warmth, rest, and health. All other requirements are secondary until this one is met.
2	Safety and Security Needs	The desire to be safe and secure in one's life and surroundings. In order to survive and develop in contemporary society, people must seek protection from violent or hazardous situations, health hazards, disease, and economic constraints.
3	Belonging and Love Needs	The desire to give and receive love, as well as to have a feeling of belonging, via supportive and communicative friendship, family, and intimate relationships. When these requirements are not met, a person may suffer low extraversion values.
4	Esteem Needs	The need for self-assurance and recognition. These requirements are met by good sentiments of self-worth gained via effort, accomplishment, praise, and acknowledgment. Feelings of inadequacy are developed when this need is not met.
5	Cognitive Needs	The need to know and comprehend, satisfied by a desire for information and improved intellect. To have a greater grasp of the world around us, one must study, explore, discover, and create. Its absence may result in uncertainty and an identity crisis.
6	Aesthetic Needs	The desire to renew oneself in nature's presence and beauty while attentively absorbing and studying their surroundings in order to extract the beauty that the earth has to offer. They find fulfilment via appreciation and the pursuit of beauty and harmony.
7	Self-Actualization	The inherent desire to maximise one's talents and aspire to be the best. When this need is met, it gives rise to a sense of generativity - the desire to vote, form, volunteer, nurture, and guide others for the benefit of the future generation or to outlive oneself.
8	Transcendence Needs	The desire to connect beyond the ego and personal self, or to assist others in discovering self-fulfilment and realising their potential. Also known as spiritual desires.

The basic premises on HON highlight important discoveries in the SWB literatures. Two diametrically opposed viewpoints can be derived from the notion. First off, it is understood that needs must be met to attain wellbeing. That is, SWB cannot be reached without human needs being met. Second, certain needs can be shallow. For example, wealth can sometimes bring unhappiness, which ultimately results in dissatisfaction and illbeing. Hence, partially fulfilled and unfulfilled needs can be meaningful and improve wellbeing (Maslow, 1943, 1954, 1962, 1970, 1987)

This study classifies the stages of human needs into (i) Basic Necessities, (ii) Complementary Needs, and (iii) Desired Opportunities (refer to Table 2). Without the Basic Needs, life would be disrupted. Complementary Needs would not disrupt the living system, but make life challenging. Without Desired Opportunities, neither the living system nor lives would be disrupted.



**Table 2: Human Needs Classifications**

Human Needs Stages	Hierarchy of Needs	No.	Human Needs Fulfilment
<i>Without it, living system is disrupted</i>	Biological & Physiological Needs	1	Nutritious Food
		2	Medical Treatment
		3	Clean Water (for Wash & Drink)
		4	Clean Air
		5	Well-Function Toilet
	Safety & Security Needs	6	Adequate Electricity
		7	Affordable Houses and Amenities
		8	Financial Stability
		9	Personal Security
		10	Health Assurance
<i>Without it, living system is not disrupted, and lives would be difficult</i>	Belonging and Love Needs	11	Balance in Work and Personal Time
		12	Social Tolerance
		13	Communication Line
		14	Internet Connection
	Esteem Needs	15	Primary School Accomplishment
		16	Secondary School Accomplishment
		17	Tertiary School Accomplishment
		18	Job Opportunity
<i>Without it, living system is not disrupted, and lives would not be difficult</i>	Cognitive Needs	19	Well-Maintained Recreational Park
		20	Diversity of Flora and Fauna
	Aesthetic Needs	21	Rights to Choose Leaders
		22	Freedom of Speech
	Self-Actualization	23	Corruption Free Opportunities
		24	Freedom to Express Arts & Diversity

Extensive studies derived to 24 factors of human needs, commonly and widely struggled for which are later employed empirically (Abu Bakar et al., 2015; Abu Bakar, Mohamed Osman, Bachok, Ibrahim, et al., 2017; Abu Bakar, Mohamed Osman, Bachok, Zen, & Faris Abdullah, 2017; Abu Bakar, Mohamed Osman, Bachok, Zen, Abdullah, et al., 2017; Abu Bakar, Mohamed Osman, et al., 2020; Abu Bakar, Mohamed Osman, Mariana Bachok, et al., 2017; Abu Bakar, Osman, et al., 2020; Abu Bakar et al., 2018, 2019c, 2019a, 2019b; Abu Bakar, Mohamed Osman, Bachok, & Abdullah, 2017; Abu Bakar, Mohamed Osman, Bachok, & Ibrahim, 2016, 2017; Abu Bakar, Mohamed Osman, Bachok, Ibrahim, et al., 2016; Abu Bakar & Osman, 2021; Bakar et al., 2019, 2020; Ibrahim et al., 2019; Mohamed Osman et al., 2017)

## METHOD

A total of 4,315 samples was screened. Malaysian respondents used an 11-point Likert scale to rate the Flourishing Scale. The respondents were also inquired whether they found each of the 24 human need difficult or convenient to meet.

## RESULTS

The tabulations below show (i) the mean distribution of HF items, (ii) normality results for HF items across human needs difficulties and conveniences, and (iii) Mann Whitney U-Test outputs and interpretation.

**Table 3: Mean Distribution of HF Items**

Indicators	Code	$\bar{x}$	$\bar{x}_{HF}$
I lead a purposeful and meaningful life	HF 1	8.30	8.30
My social relationships are supportive and rewarding	HF 2	8.34	
I am engaged and interested in my daily activities	HF 3	8.35	
I actively contribute to the happiness and wellbeing of others	HF 4	8.21	
I am competent and capable in the activities that are important to me	HF 5	8.35	
I am a good person and live a good life	HF 6	8.31	
I am optimistic about my future	HF 7	8.37	
People respect me	HF 8	8.11	

Note. Mean Distribution of HF Items ( $\bar{x}$ ) and Overall Mean of PR ( $\bar{x}_{HF}$ )

**Table 4: Normality Test-Results**

HUMAN NEEDS (HF)	Normality Test					
	Difficult			Convenient		
	Statistic	df	p	Statistic	df	p
Nutritious Food	.061	336	.004	.051	3979	.000
Medical Treatment	.079	423	.000	.049	3892	.000
Clean Water (for Wash & Drink)	.076	392	.000	.049	3923	.000
Clean Air	.057	805	.000	.052	3510	.000
Well-Function Toilet	.073	428	.000	.051	3887	.000
Adequate Electricity	.068	1114	.000	.047	3201	.000
Affordable Houses and Amenities	.057	1861	.000	.049	2454	.000
Financial Stability	.053	1578	.000	.052	2737	.000
Personal Security	.056	1330	.000	.056	2985	.000
Health Assurance	.058	1325	.000	.054	2990	.000
Balance in Work and Personal Time	.055	1582	.000	.054	2733	.000
Social Tolerance	.067	1310	.000	.046	3005	.000
Communication Line	.063	328	.003	.051	3987	.000
Internet Connection	.075	923	.000	.047	3392	.000
Primary School Accomplishment	.090	313	.000	.048	4002	.000
Secondary School Accomplishment	.059	390	.003	.051	3925	.000
Tertiary School Accomplishment	.055	836	.000	.051	3479	.000
Job Opportunity	.052	1678	.000	.054	2637	.000
Well-Maintained Recreational Park	.056	1430	.000	.055	2885	.000
Diversity of Flora and Fauna	.057	1453	.000	.061	2862	.000
Rights to Choose Leaders	.051	1823	.000	.056	2492	.000
Freedom of Speech	.058	1957	.000	.053	2358	.000
Corruption Free Opportunities	.055	2247	.000	.053	2068	.000
Freedom to Express Arts & Diversity	.063	1531	.000	.051	2784	.000

Note. Kolmogorov-Smirnova Test-Results of  $\bar{x}\Sigma$  HF across Difficult and Convenient.

The HF scale produced a single psychological HF score. The HF assesses respondents' self-perceived achievement in key dimensions such as relationships, self-esteem, purpose, and optimism.

The normality tests indicated that the data was not normally distributed, based on Kolmogorov-Smirnova. Therefore, the median was substituted for the mean. The median is less susceptible to outliers and skewed data than the mean, making it the ideal measure of central tendency when the distribution is not symmetrical. Mann Whitney U-Tests were executed to determine the difference of HF between convenience and difficulties across the 24 human needs.

**Table 5: Mann Whitney U-Test Results**

HUMAN NEEDS (HF)	Difficult			Convenient			U	z	p
	N	$\bar{x}R$	$\tilde{x}$	N	$\bar{x}R$	$\tilde{x}$			
Nutritious Food	336	2029.45	8.3	3979	<b>2168.86</b>	8.4	625279.5	-1.971	.049
Medical Treatment	423	1907.43	8.1	3892	<b>2185.23</b>	8.4	717167.5	-4.358	.000
Clean Water (for Wash & Drink)	392	2125.21	8.4	3923	2161.28	8.4	756053.5	-0.547	.584
Clean Air	805	1980.39	8.3	3510	<b>2198.73</b>	8.4	1269795.5	-4.487	.000
Well-Function Toilet	428	1909.99	8.1	3887	<b>2185.31</b>	8.4	725671.0	-4.341	.000
Adequate Electricity	1114	2178.41	8.4	3201	2150.90	8.4	1760225.5	-0.635	.525
Affordable Houses and Amenities	1861	2075.49	8.3	2454	<b>2220.57</b>	8.5	2129896.5	-3.790	.000
Financial Stability	1578	1971.59	8.3	2737	<b>2265.47</b>	8.5	1865338.5	-7.467	.000
Personal Security	1330	1949.75	8.1	2985	<b>2250.79</b>	8.5	1708059.0	-7.333	.000
Health Assurance	1325	1935.15	8.1	2990	<b>2256.75</b>	8.5	1685599.0	-7.826	.000
Balance in Work and Personal Time	1582	1986.06	8.3	2733	<b>2257.53</b>	8.5	1889800.0	-6.901	.000
Social Tolerance	1310	1986.21	8.3	3005	<b>2232.89</b>	8.5	1743225.0	-5.984	.000
Communication Line	328	1995.33	8.3	3987	<b>2171.38</b>	8.4	600513.0	-2.461	.014
Internet Line	923	2180.72	8.4	3392	2151.82	8.4	1544440.5	-0.625	.532
Primary School Accomplishment	313	1961.84	8.3	4002	<b>2173.34</b>	8.4	564915.5	-2.894	.004
Secondary School Accomplishment	390	1863.27	8.1	3925	<b>2187.28</b>	8.4	650431.5	-4.901	.000
Tertiary School Accomplishment	836	1952.94	8.1	3479	<b>2207.27</b>	8.4	1282796.0	-5.303	.000
Job Opportunity	1678	2081.12	8.3	2637	<b>2206.92</b>	8.4	2083436.0	-3.235	.001
Well-Maintained Recreational Park	1430	1971.93	8.3	2885	<b>2250.23</b>	8.5	1796688.5	-6.911	.000
Diversity of Flora and Fauna	1453	1978.95	8.1	2862	<b>2248.90</b>	8.5	1819082.0	-6.730	.000
Rights to Choose Leaders	1823	2031.94	8.3	2492	<b>2250.22</b>	8.5	2041657.5	-5.688	.000
Freedom of Speech	1957	2095.21	8.4	2358	<b>2210.11</b>	8.4	2184419.5	-3.018	.003
Corruption Free Opportunities	2247	2144.92	8.4	2068	2172.21	8.4	2294001.5	-0.719	.472
Freedom to Express Arts & Diversity	1531	1929.21	8.1	2784	<b>2283.82</b>	8.5	1780879.0	-8.950	.000

Note. Mean Rank of  $\bar{x}\Sigma$  HF across Difficult and Convenient; **Bold** shows higher mean rank.

**Table 6: Mann Whitney U-Test Results Interpretation**

HUMAN NEEDS (HF)	INTERPRETATION
Biological and Physiological Needs	<b>Nutritious Food</b> Claimants of convenience had higher mean rank (N = 3979, $\bar{x}R$ = 2168.86) than claimants of difficult (N = 336, $\bar{x}R$ = 2029.45). There was a statistically significant difference discovered (U = 625279.5, p = .049).
	<b>Medical Treatment</b> Convenient claimants had higher mean rank (N = 3892, $\bar{x}R$ = 2185.23) than claimants of difficult (N = 423, $\bar{x}R$ = 1907.43). There was a statistically significant difference discovered (U = 717167.5, p = .000).
	Clean Water (for Wash & Drink) Convenient claimants had higher mean rank (N = 3923, $\bar{x}R$ = 2161.28) than claimants of difficult (N = 392, $\bar{x}R$ = 2125.21), but the difference was not statistically significant (U = 756053.5, p = .584).
	<b>Clean Air</b> Convenient claimants had higher mean rank (N = 3510, $\bar{x}R$ = 2198.73) than claimants of difficult (N = 805, $\bar{x}R$ = 1980.39). There was a statistically significant difference discovered (U = 1269795.5, p = .000).
	<b>Well-Function Toilet</b> Convenient claimants had higher mean rank (N = 3887, $\bar{x}R$ = 2185.31) than claimants of difficult (N = 428, $\bar{x}R$ = 1909.99). There was a statistically significant difference discovered (U = 725671.0, p = .000).
Safety and Security Needs	Adequate Electricity Claimants of difficulties had higher mean rank (N = 3201, $\bar{x}R$ = 2150.90) than claimants of convenient (N = 1114, $\bar{x}R$ = 2178.41), but the difference was not statistically significant (U = 1760225.5, p = .525).
	<b>Affordable Houses and Amenities</b> Convenient claimants had higher mean rank (N = 2454, $\bar{x}R$ = 2220.57) than claimants of difficult (N = 1861, $\bar{x}R$ = 2075.49). There was a statistically significant difference discovered (U = 2129896.5, p = .000).
	<b>Financial Stability</b> Convenient claimants had higher mean rank (N = 2737, $\bar{x}R$ = 2265.47) than claimants of difficult (N = 1578, $\bar{x}R$ = 1971.59). There was a statistically significant difference discovered (U = 1865338.5, p = .000).

**Table 6: Mann Whitney U-Test Results Interpretation (Continued)**

HUMAN NEEDS (HF)		INTERPRETATION
Safety and Security Needs	<b>Personal Security</b>	Convenient claimants had higher mean rank (N = 2985, $\bar{x}R = 2250.79$ ) than claimants of difficult (N = 1330, $\bar{x}R = 1949.75$ ). There was a statistically significant difference discovered (U = 1708059.0, p = .000).
	<b>Health Assurance</b>	Convenient claimants had higher mean rank (N = 2990, $\bar{x}R = 2256.75$ ) than claimants of difficult (N = 1325, $\bar{x}R = 1935.15$ ). There was a statistically significant difference discovered (U = 1685599.0, p = .000).
Belonging and Love Needs	<b>Balance in Work and Personal Time</b>	Convenient claimants had higher mean rank (N = 2733, $\bar{x}R = 2257.53$ ) than claimants of difficult (N = 1582, $\bar{x}R = 1986.06$ ). There was a statistically significant difference discovered (U = 1889800.0, p = .000).
	<b>Social Tolerance</b>	Convenient claimants had higher mean rank (N = 3005, $\bar{x}R = 2232.89$ ) than claimants of difficult (N = 1310, $\bar{x}R = 1986.21$ ). There was a statistically significant difference discovered (U = 1743225.0, p = .000).
	<b>Communication Line</b>	Convenient claimants had higher mean rank (N = 3987, $\bar{x}R = 2171.38$ ) than claimants of difficult (N = 328, $\bar{x}R = 1995.33$ ). There was a statistically significant difference discovered (U = 600513.0, p = .014).
	Internet Connection	Claimants of difficulties had higher mean rank (N = 3392, $\bar{x}R = 2151.82$ ) than claimants of convenient (N = 923, $\bar{x}R = 2180.72$ , but the difference was not statistically significant (U = 1544440.5, p = .532).
Esteem Needs	<b>Primary School Accomplishment</b>	Convenient claimants had higher mean rank (N = 4002, $\bar{x}R = 2173.34$ ) than claimants of difficult (N = 313, $\bar{x}R = 1961.84$ ). There was a statistically significant difference discovered (U = 564915.5, p = .004).
	<b>Secondary School Accomplishment</b>	Convenient claimants had higher mean rank (N = 3925, $\bar{x}R = 2187.28$ ) than claimants of difficult (N = 390, $\bar{x}R = 1863.27$ ). There was a statistically significant difference discovered (U = 650431.5, p = .000).
Cognitive Needs	<b>Tertiary School Accomplishment</b>	Convenient claimants had higher mean rank (N = 3479, $\bar{x}R = 2207.27$ ) than claimants of difficult (N = 836, $\bar{x}R = 1952.94$ ). There was a statistically significant difference discovered (U = 1282796.0, p = .000).
	<b>Job Opportunity</b>	Convenient claimants had higher mean rank (N = 2637, $\bar{x}R = 2206.92$ ) than claimants of difficult (N = 1678, $\bar{x}R = 2081.12$ ). There was a statistically significant difference discovered (U = 2083436.0, p = .001).
Aesthetic Needs	<b>Well-Maintained Recreational Park</b>	Convenient claimants had higher mean rank (N = 2885, $\bar{x}R = 2250.23$ ) than claimants of difficult (N = 1430, $\bar{x}R = 1971.93$ ). There was a statistically significant difference discovered (U = 1796688.5, p = .000).
	<b>Diversity of Flora and Fauna</b>	Convenient claimants had higher mean rank (N = 2862, $\bar{x}R = 2248.90$ ) than claimants of difficult (N = 1453, $\bar{x}R = 1978.95$ ). There was a statistically significant difference discovered (U = 1819082.0, p = .000).
Self-Actualization Needs	<b>Rights to Choose Leaders</b>	Convenient claimants had higher mean rank (N = 2492, $\bar{x}R = 2250.22$ ) than claimants of difficult (N = 1823, $\bar{x}R = 2031.94$ ). There was a statistically significant difference discovered (U = 2041657.5, p = .000).
	<b>Freedom of Speech</b>	Convenient claimants had higher mean rank (N = 2358, $\bar{x}R = 2210.11$ ) than claimants of difficult (N = 1957, $\bar{x}R = 2095.21$ ). There was a statistically significant difference discovered (U = 2184419.5, p = .003).
	Corruption Free Opportunities	Convenient claimants had higher mean rank (N = 2068, $\bar{x}R = 2172.21$ ) than claimants of difficult (N = 2247, $\bar{x}R = 2144.92$ , but the difference was not statistically significant (U = 2294001.5, p = .472).
	<b>Freedom to Express Arts &amp; Diversity</b>	Convenient claimants had higher mean rank (N = 2784, $\bar{x}R = 2283.82$ ) than claimants of difficult (N = 1531, $\bar{x}R = 1929.21$ ). There was a statistically significant difference discovered (U = 1780879.0, p = .000).

Note. Bold & Highlighted shows statistically significant output.

22 out of 24 test-results were statistically significant, indicating that HF was statistically higher in terms of convenience in meeting all of the identified human needs (refer to Table 6).

## DISCUSSION

The data imply that HF rises when nearly all human needs are easily met. As a result, the ease with which these human needs may be met helps boost human flourishing. However, the HF did not substantially improve across difficulty or convenience of fulfilment for some human needs, including (i) clean water, (ii) adequate electricity, (iii) internet connection, and (iv) corruption-free opportunities.

**Table 7: Summary of Findings**

Condition 1: Difficulty	Condition 2: Convenient	Condition 3: Neither
The difficulty to meet the human need increases HF	The convenience to meet the human need increases HF	Neither convenience or difficulty to meet the human need increases HF
HF is greater with difficulty to meet the human need.	HF is greater with convenience to meet the human need.	HF does not change with convenience nor difficulty to meet the human need.

Hierarchy of Needs	No. Human Needs	Findings/Condition
Basic Necessities	1 Nutritious Food	HF increases with Convenience
	2 Medical Treatment	HF increases with Convenience
	3 Clean Water (for Wash & Drink)	HF does not change
	4 Clean Air	HF increases with Convenience
	5 Well-Function Toilet	HF increases with Convenience
	6 Adequate Electricity	HF does not change
	7 Affordable Houses and Amenities	HF increases with Convenience
	8 Financial Stability	HF increases with Convenience
	9 Personal Security	HF increases with Convenience
	10 Health Assurance	HF increases with Convenience
Complementary Needs	11 Balance in Work and Personal Time	HF increases with Convenience
	12 Social Tolerance	HF increases with Convenience
	13 Communication Line	HF increases with Convenience
	14 Internet Connection	HF does not change
Desired Opportunity	15 Primary School Accomplishment	HF increases with Convenience
	16 Secondary School Accomplishment	HF increases with Convenience
	17 Tertiary School Accomplishment	HF increases with Convenience
	18 Job Opportunity	HF increases with Convenience
	19 Well-Maintained Recreational Park	HF increases with Convenience
	20 Diversity of Flora and Fauna	HF increases with Convenience
	21 Rights to Choose Leaders	HF increases with Convenience
	22 Freedom of Speech	HF increases with Convenience
	23 Corruption Free Opportunities	HF does not change
	24 Freedom to Express Arts & Diversity	HF increases with Convenience

The statistical results require a revision of the top-down and bottom-up theories of SWB. According to the bottom-up theories, wellbeing is the result of contextual human needs fulfilment. While the top-down theories argue that satisfying basic human needs determine domain-specific wellbeing. While a multitude of elements contribute to human needs fulfilment, attaining wellbeing is not always reliant on the parameters that researchers consider relevant, but rather on the areas that respondents believe most essential, based on cognitive evaluations.

In this case, the respondents believed that the majority of the human needs are crucial in order to flourish. However, human flourishing does not depend on (i) clean water, (ii) adequate electricity, (iii) internet connection, and (iv) corruption free opportunities. In other words, the respondents do not perceive the four (4) mentioned human needs as meaningful in order for them to flourish. On the other hand, the respondents found the 20 human needs meaningful in aiding their flourishing.

## CONCLUSION

This article is part of a wider body of research that reveals the significance of human needs fulfilment across various wellbeing domains. This study explores the level of human flourishing across difficulty and convenience of human needs. The findings indicate that human flourishing improves dramatically when the majority of human needs can be met with ease. However, few of the human needs which this research considered important did not significantly and statistically influence human flourishing. Further research should concentrate on the appropriate portrayal of human needs across the HON stages. The depiction of human needs should also reflect Malaysia's culture and social development.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022





## **HUMAN NEEDS FULFILLMENT: CONTRIBUTING FACTORS OF EUDAIMONIC WELLBEING**

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### **Abstract**

The Maslow hierarchy of needs and Eudaimonic Wellbeing (EWB), which falls under the Subjective Wellbeing (SWB) discipline, are the two concepts that are covered in the study. Issue: The hierarchy of needs does not require that people have to completely fulfil one need before moving up to the succeeding need. Recognizing human needs that are meaningful in promoting SWB, in this instance eudaimonia, is crucial to comprehending the hierarchy's relevance. Purpose: The purpose of this research is to look at the degree of EWB in connection to the difficulty and convenience of meeting human needs in Malaysia. Approach: Mann Whitney U-Tests were employed to determine the median of HF across the difficulty and convenience of meeting 24 human needs. These human needs are the essentials and living conditions for which people strive for. Findings: EWB is considerably increased by the convenience with which the majority of human needs can be met. The research also suggested that satisfying eight human needs for which EWB did not vary considerably was unlikely to impact EWB. These eight requirements were categorised by Maslow's Hierarchy of Needs as biological and physiological needs, safety and security needs, belonging and love needs, and self-actualization needs.

**Keywords:** hierarchy of human needs, eudaimonic wellbeing, Malaysia

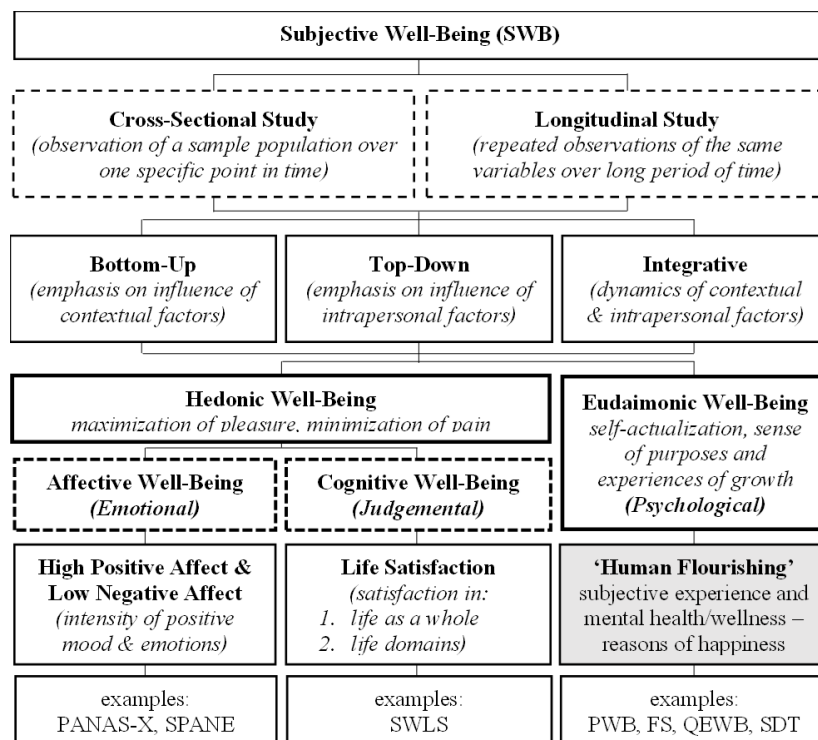
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## INTRODUCTION

The capacity to monitor human well-being to assess policy outcomes and the link between ecosystem and human well-being is essential to achieving sustainable development objectives. The utilisation of human needs is of special relevance when determining the limits for well-being. This article is part of a larger body of research on human needs fulfilment across wellbeing domains (Abu Bakar & Osman, 2021). This study examines the statistical interaction between human needs fulfilment and eudaimonic wellbeing.

## LITERATURE REVIEW

Subjective Wellbeing (SWB) was the first well-being concept to attract empirical and theoretical attention. SWB does not distinguish well-being causes but evaluates the entire level of pleasure or satisfaction, hedonic or eudaimonic. Hedonia is obtaining what human desire, together with its pleasurable outcome. Eudaimonia was predicated on performing a variety of distinct attributes representing how one should to live (McMahan & Estes, 2011). The structure and examples of SWB are delivered in Figure 1.



**Figure 1: Basic Structure and Examples of Subjective Wellbeing**

Eudaimonic wellbeing (EWB) is used to describe a person's quality of life as it results from the realization of their uppermost potentials and the use of those potentials to achieve individually expressive and self-concordant objectives. Eudaimonic behaviour is motivated by the value of the activity itself, not by the subjective feelings it elicits. EWB, like SWB, is a construct that has both objective and subjective essentials. As discussed in philosophy, EWB has two types of referents: (i) subjective essentials pertain to what people feel when they are committed to excellence in personal fulfilment and (ii) objective essentials refer to behaviours that facilitate or are otherwise linked with the pursuit of eudaimonic objectives (Schutte et al., 2013; Waterman et al., 2010)

The Questionnaire for Eudaimonic Well-Being (QEWB) was developed to examine wellbeing in relation to eudaimonic philosophy. The QEWB assesses multiple aspects of eudaimonic well-being, including self-discovery, the perception of one's greatest potentials being realised, the meaning and purpose in life, strong participation in activities, substantial effort expended, and enjoyment of activities. (Waterman et al., 2010). Eudaimonia may be acquired in four ways: via virtue-based prosperity, independence, a peaceful and secure life, or a flourishing state of wealth and body with the ability to sustain and utilise it. Numerous and quality friends, money, healthy and many children, a happy later life, and physical benefits like as health, good beauty, athletic talents, reputation, renown, large fortune, and morality are all components of eudaimonia (Schutte et al., 2013). Maslow's Hierarchy of Needs (HON), which advocates a eudaimonic view of human well-being and flourishing, is an example of this idea.

The first version of Maslow's 1943 HON was a pyramid of five motivational needs. There were two categories of the five needs: basic needs and growth needs. The biological and physiological needs, the need for safety, the need to love and be loved, and the need to belong are all under basic needs. Growth needs are driven by self-actualization. Maslow (1943) states that in order to move up the HON, basic needs must be met. The longer people go without their basic needs being met, the more important it is to resolve them. People may move on to self-actualization after they have met their basic needs. In the 1960s and 1970s, there were three new human need levels. Cognitive and Aesthetic Needs were put between Growth and Deficiency Needs. Later, Maslow (1970) added a final stage to the HON called transcendence

Transcendence is the devotion and dedication to something or someone other than oneself. However, this meaning inevitably involves transcending the individuals for the sake of something greater than themselves. Consequently, transcendence contributes to the external usefulness of one's life, whether via objective life outcomes or ethical behaviour. Transcendence is a eudaimonic path to wellbeing independent of human advancement, although both may co-exist (Koltko-rivera, 2015).

Although Maslow organized the needs into a hierarchy, he acknowledged that meeting any of the needs is not an all-or-nothing proposition. People may not fully accomplish all of their lower needs before the next one arises in the hierarchy. According to Maslow, the majority of individuals have only met a portion of their basic human needs at any given moment, with the needs at the bottom of the hierarchy often being the ones that have seen the greatest progress (Wahba & Bridwell, 1976).

**Table 1: Understanding of HON Stages**

Hierarchy	Understanding
Biological and Physiological Needs	The body needs homeostasis. The drive comes from instincts to stay alive, such as the need for a safe place to live, water, food, warmth, rest, and good health. Until this need is met, everything else is less important.
Safety and Security Needs	The need to feel safe and secure in life and in one's surroundings. These are the things people do to protect themselves from dangerous or dangerous situations, health threats, illness, and economic pressures so they can live and do well in modern societies.
Belonging and Love Needs	The need to give and receive love and a sense of belonging through relationships with friends, family, and close others who support and talk to each other. When these needs aren't met, a person may feel guilty, lonely, depressed, or have low extraversion values.
Esteem Needs	The need to feel good about yourself and to be noticed. These needs are met when people feel good about themselves by achieving, accomplishing, being appreciated, and being recognised. If this need isn't met, people feel like they're not good enough.
Cognitive Needs	The need to know and understand, which is met by wanting to learn and be smart. To understand the world better, you need to learn, explore, find out, and make things. Without it, you might feel confused and lose your sense of who you are.
Aesthetic Needs	The need to be refreshed by the beauty of nature while carefully taking in and observing their surroundings to find the beauty in the world. They find happiness when they appreciate beauty and try to find balance.
Self-Actualization	The instinctual needs to do the best they can with what they have and try to be the best. When this need is met, it makes a person feel like they are a part of the next generation or that they want to live longer than themselves.
Transcendence Needs	The need to connect beyond ego and personal self or to help others find self-fulfillment and realise their potential. Also called spiritual needs, they can be met on many different levels and lead to a sense of integrity that lets you take things to the next level.

Two competing viewpoints exists in literature. First and foremost, it is widely accepted that human needs must be met in order to achieve satisfaction. That is, it is impossible to achieve satisfaction until one's basic needs are met. Second, it is possible that only a partial range of human needs should be met. For instance, having money does not determine happiness. Therefore, it is possible that meeting too much of a certain need can lead to illbeing and dissatisfaction in life. Partially met or unmet needs might provide significance to one's life and hence elevate SWB (Maslow, 1943, 1954, 1962, 1970, 1987).

This study classifies HON into Basic Necessities, Complementary Needs, and Desired Opportunities. If Basic Needs are unmet, the living system is disturbed. If Complementary Needs are unmet, the living system won't be interrupted, but life will be hard. If Desired Opportunities needs are unmet, neither the living system nor lifestyles are disrupted.

**Table 2: Human Needs Classifications**

Human Needs Stages	Hierarchy of Needs	No.	Human Needs Fulfilment
Basic Necessities  <i>Without it, living system is disrupted</i>	Biological & Physiological Needs	1	Nutritious Food
		2	Medical Treatment
		3	Clean Water (for Wash & Drink)
		4	Clean Air
		5	Well-Function Toilet
	Safety & Security Needs	6	Adequate Electricity
		7	Affordable Houses and Amenities
		8	Financial Stability
		9	Personal Security
		10	Health Assurance
Complementary Needs  <i>Without it, living system is not disrupted, and lives would be difficult</i>	Belonging and Love Needs	11	Balance in Work and Personal Time
		12	Social Tolerance
		13	Communication Line
		14	Internet Connection
	Esteem Needs	15	Primary School Accomplishment
		16	Secondary School Accomplishment
		17	Tertiary School Accomplishment
		18	Job Opportunity
Desired Opportunity  <i>Without it, living system is not disrupted, and lives would not be difficult</i>	Cognitive Needs	19	Well-Maintained Recreational Park
		20	Diversity of Flora and Fauna
	Aesthetic Needs	21	Rights to Choose Leaders
		22	Freedom of Speech
		23	Corruption Free Opportunities
		24	Freedom to Express Arts & Diversity

Detailed research led to the identification of 24 human needs that are commonly and highly sought for which are later used empirically (refer to Table 2) (Abu Bakar et al., 2015; Abu Bakar, Mohamed Osman, Bachok, Ibrahim, et al., 2017; Abu Bakar, Mohamed Osman, Bachok, Zen, & Faris Abdullah, 2017; Abu Bakar, Mohamed Osman, Bachok, Zen, Abdullah, et al., 2017; Abu Bakar, Mohamed Osman, et al., 2020; Abu Bakar, Mohamed Osman, Mariana Bachok, et al., 2017; Abu Bakar, Osman, et al., 2020; Abu Bakar et al., 2018, 2019c, 2019a, 2019b; Abu Bakar, Mohamed Osman, Bachok, & Abdullah, 2017; Abu Bakar, Mohamed Osman, Bachok, & Ibrahim, 2016, 2017; Abu Bakar, Mohamed Osman, Bachok, Ibrahim, et al., 2016; Abu Bakar & Osman, 2021; Bakar et al., 2019, 2020; Ibrahim et al., 2019; Mohamed Osman et al., 2017)

## METHOD

A total of 4,315 samples were screened. Malaysians scored the EWB items (based on QEWB) on an 11-point Likert scale. Respondents were also asked whether satisfying each of the 24 demands was convenient or difficult.

## RESULTS

Table 3 below show the mean distribution of EWB items, the results of the normality test, and the results of the Mann Whitney U-Test.

**Table 3: Mean Distribution of EWB Items**

Indicators	Code	$\bar{x}$	$\bar{x}EWB$
It is important to know what I am doing fits with purposes worth pursuing	EWB 1	8.61	
My life is centered around a set of core beliefs that give meaning to my life	EWB 2	8.56	
I know my best potentials and I make an effort to develop those potentials	EWB 3	8.40	
I know more of what is best for me to do in my life than anyone else	EWB 4	8.36	
I have a clear direction and understanding of where my life is going	EWB 5	8.38	
When I engage in activities that involve my best potentials, I feel really alive	EWB 6	8.32	
It is important to me that I feel fulfilled by the activities that I engage in	EWB 7	8.45	
The adversities faced in doing something are valuable life experiences	EWB 8	8.49	
I can easily invest in the work that I do	EWB 9	8.19	
I believe I have discovered who I really am	EWB10	8.44	

Note. Mean Distribution of EWB Items ( $\bar{x}$ ) and Overall Mean of EWB ( $\bar{x}EWB$ )

**Table 4: Normality Test-Results**

HUMAN NEEDS (EWB)	Normality Test					
	Difficult			Convenient		
	Statistic	df	p	Statistic	df	p
Nutritious Food	.058	336	.009	.060	3979	.000
Medical Treatment	.098	423	.000	.060	3892	.000
Clean Water (for Wash & Drink)	.075	392	.000	.059	3923	.000
Clean Air	.064	805	.000	.064	3510	.000
Well-Function Toilet	.066	428	.000	.062	3887	.000
Adequate Electricity	.068	1114	.000	.057	3201	.000
Affordable Houses and Amenities	.066	1861	.000	.059	2454	.000
Financial Stability	.059	1578	.000	.061	2737	.000
Personal Security	.048	1330	.000	.066	2985	.000
Health Assurance	.052	1325	.000	.066	2990	.000
Balance in Work and Personal Time	.049	1582	.000	.068	2733	.000
Social Tolerance	.058	1310	.000	.062	3005	.000
Communication Line	.075	328	.000	.060	3987	.000
Internet Connection	.066	923	.000	.058	3392	.000
Primary School Accomplishment	.095	313	.000	.060	4002	.000
Secondary School Accomplishment	.104	390	.000	.058	3925	.000
Tertiary School Accomplishment	.059	836	.000	.061	3479	.000
Job Opportunity	.058	1678	.000	.061	2637	.000
Well-Maintained Recreational Park	.056	1430	.000	.072	2885	.000
Diversity of Flora and Fauna	.050	1453	.000	.072	2862	.000
Rights to Choose Leaders	.049	1823	.000	.067	2492	.000
Freedom of Speech	.058	1957	.000	.061	2358	.000
Corruption Free Opportunities	.057	2247	.000	.062	2068	.000
Freedom to Express Arts & Diversity	.058	1531	.000	.078	2784	.000

Note. Kolmogorov-Smirnova Test-Results of  $\bar{x}\Sigma$  EWB across Difficult and Convenient.

The scale of EWB provided a single-psychological EWB score. The normality tests indicated that the data was not normally distributed, based on Kolmogorov-Smirnova. Hence the median was substituted for the mean. The median is less susceptible to outliers and skewed data than the mean, making it the ideal measure of central tendency when the distribution is not symmetrical. Mann Whitney U-Tests were executed to determine the difference of EWB between convenience and difficulties of the 24 human needs.

**Table 5: Mann Whitney U-Test Results**

HUMAN NEEDS (EWB)	Difficult			Convenient			U	z	p
	N	$\bar{x}R$	$\tilde{x}$	N	$\bar{x}R$	$\tilde{x}$			
Nutritious Food	336	2093.63	8.5	3979	2163.44	8.6	646845.0	-0.987	.324
Medical Treatment	423	1917.21	8.3	3892	<b>2184.17</b>	8.6	721302.5	-4.187	.000
Clean Water (for Wash & Drink)	392	2085.55	8.5	3923	2165.24	8.6	740507.5	-1.208	.227
Clean Air	805	2031.64	8.4	3510	<b>2186.98</b>	8.6	1311056.0	-3.192	.001
Well-Function Toilet	428	1852.05	8.2	3887	<b>2191.69</b>	8.6	700872.0	-5.355	.000
Adequate Electricity	1114	2193.85	8.6	3201	2145.52	8.6	1743015.0	-1.116	.265
Affordable Houses and Amenities	1861	2120.31	8.6	2454	2186.58	8.6	2213302.0	-1.731	.083
Financial Stability	1578	2042.35	8.5	2737	<b>2224.68</b>	8.7	1976992.0	-4.632	.000
Personal Security	1330	2024.10	8.4	2985	<b>2217.66</b>	8.7	1806942.5	-4.714	.000
Health Assurance	1325	2010.08	8.3	2990	<b>2223.55</b>	8.7	1784877.5	-5.194	.000
Balance in Work and Personal Time	1582	2059.76	8.4	2733	<b>2214.87</b>	8.7	2006390.5	-3.942	.000
Social Tolerance	1310	2058.57	8.4	3005	<b>2201.35</b>	8.6	1838021.5	-3.463	.001
Communication Line	328	1910.22	8.4	3987	<b>2178.38</b>	8.6	572596.5	-3.748	.000
Internet Line	923	2226.79	8.7	3392	2139.28	8.6	1501916.5	-1.893	.058
Primary School Accomplishment	313	1812.10	8.2	4002	<b>2185.05</b>	8.6	518047.5	-5.102	.000
Secondary School Accomplishment	390	1862.55	8.3	3925	<b>2187.36</b>	8.6	650150.5	-4.912	.000
Tertiary School Accomplishment	836	1962.94	8.3	3479	<b>2204.87</b>	8.6	1291149.0	-5.043	.000
Job Opportunity	1678	2139.17	8.6	2637	2169.98	8.6	2180847.5	-0.792	.428
Well-Maintained Recreational Park	1430	2008.94	8.4	2885	<b>2231.88</b>	8.7	1849626.0	-5.535	.000
Diversity of Flora and Fauna	1453	2000.76	8.4	2862	<b>2237.83</b>	8.7	1850780.0	-5.909	.000
Rights to Choose Leaders	1823	2086.28	8.5	2492	<b>2210.47</b>	8.7	2140705.5	-3.236	.001
Freedom of Speech	1957	2131.89	8.6	2358	2179.67	8.6	2256203.0	-1.255	.210
Corruption Free Opportunities	2247	2184.51	8.6	2068	2129.20	8.6	2263835.5	-1.457	.145
Freedom to Express Arts & Diversity	1531	1949.61	8.3	2784	<b>2272.60</b>	8.7	1812101.5	-8.151	.000

Note. Mean Rank of  $\bar{x}\Sigma$  EWB across Difficult and Convenient; **Bold** shows higher mean rank.

**Table 6: Mann Whitney U-Test Results Interpretation**

HUMAN NEEDS (EWB)	INTERPRETATION	
Biological and Physiological Needs	Nutritious Food	Claimants of convenience had higher mean rank (N = 3979, $\bar{x}R$ = 2163.44) than claimants of difficult (N = 336, $\bar{x}R$ = 2093.63, but the difference was not statistically significant (U = 646845.0, p = .324).
	Medical Treatment	Claimants of convenience had higher mean rank (N = 3892, $\bar{x}R$ = 2184.17) than claimants of difficult (N = 423, $\bar{x}R$ = 1917.21). There was a statistically significant difference discovered. (U = 721302.5, p = .000).
	Clean Water (for Wash & Drink)	Claimants of convenience had higher mean rank (N = 3923, $\bar{x}R$ = 2165.24) than claimants of difficult (N = 392, $\bar{x}R$ = 2085.55, but the difference was not statistically significant (U = 740507.5, p = .227).
	Clean Air	Claimants of convenience had higher mean rank (N = 3510, $\bar{x}R$ = 2186.98) than claimants of difficult (N = 805, $\bar{x}R$ = 2031.64). There was a statistically significant difference discovered. (U = 1311056.0, p = .001).
Safety and Security Needs	Well-Function Toilet	Claimants of convenience had higher mean rank (N = 3887, $\bar{x}R$ = 2191.69) than claimants of difficult (N = 428, $\bar{x}R$ = 1852.05). There was a statistically significant difference discovered. (U = 700872.0, p = .000).
	Adequate Electricity	Claimants of difficult had higher mean rank (N = 3201, $\bar{x}R$ = 2145.52) than claimants of convenience (N = 1114, $\bar{x}R$ = 2193.85, but the difference was not statistically significant (U = 1743015.0, p = .265).
	Affordable Houses and Amenities	Claimants of convenience had higher mean rank (N = 2454, $\bar{x}R$ = 2186.58) than claimants of difficult (N = 1861, $\bar{x}R$ = 2120.31, but the difference was not statistically significant (U = 2213302.0, p = .083).
Financial Stability	Claimants of convenience had higher mean rank (N = 2737, $\bar{x}R$ = 2224.68) than claimants of difficult (N = 1578, $\bar{x}R$ = 2042.35). There was a statistically significant difference discovered. (U = 1976992.0, p = .000).	

**Table 6: Mann Whitney U-Test Results Interpretation (continued)**

HUMAN NEEDS (EWB)		INTERPRETATION
Safety and Security Needs	<b>Personal Security</b>	Claimants of convenience had higher mean rank (N = 2985, $\bar{x}R = 2217.66$ ) than claimants of difficult (N = 1330, $\bar{x}R = 2024.10$ ). There was a statistically significant difference discovered. (U = 1806942.5, p = .000).
	<b>Health Assurance</b>	Claimants of convenience had higher mean rank (N = 2990, $\bar{x}R = 2223.55$ ) than claimants of difficult (N = 1325, $\bar{x}R = 2010.08$ ). There was a statistically significant difference discovered. (U = 1784877.5, p = .000).
Belonging and Love Needs	<b>Balance in Work and Personal Time</b>	Claimants of convenience had higher mean rank (N = 2733, $\bar{x}R = 2214.87$ ) than claimants of difficult (N = 1582, $\bar{x}R = 2059.76$ ). There was a statistically significant difference discovered. (U = 2006390.5, p = .000).
	<b>Social Tolerance</b>	Claimants of convenience had higher mean rank (N = 3005, $\bar{x}R = 2201.35$ ) than claimants of difficult (N = 1310, $\bar{x}R = 2058.57$ ). There was a statistically significant difference discovered. (U = 1838021.5, p = .001).
	<b>Communication Line</b>	Claimants of convenience had higher mean rank (N = 3987, $\bar{x}R = 2178.38$ ) than claimants of difficult (N = 328, $\bar{x}R = 1910.22$ ). There was a statistically significant difference discovered. (U = 572596.5, p = .000).
	Internet Connection	Claimants of difficult had higher mean rank (N = 3392, $\bar{x}R = 2139.28$ ) than claimants of convenience (N = 923, $\bar{x}R = 2226.79$ , but the difference was not statistically significant (U = 1501916.5, p = .058).
Esteem Needs	<b>Primary School Accomplishment</b>	Claimants of convenience had higher mean rank (N = 4002, $\bar{x}R = 2185.05$ ) than claimants of difficult (N = 313, $\bar{x}R = 1812.10$ ). There was a statistically significant difference discovered. (U = 518047.5, p = .000).
	<b>Secondary School Accomplishment</b>	Claimants of convenience had higher mean rank (N = 3925, $\bar{x}R = 2187.36$ ) than claimants of difficult (N = 390, $\bar{x}R = 1862.55$ ). There was a statistically significant difference discovered. (U = 650150.5, p = .000).
Cognitive Needs	<b>Tertiary School Accomplishment</b>	Claimants of convenience had higher mean rank (N = 3479, $\bar{x}R = 2204.87$ ) than claimants of difficult (N = 836, $\bar{x}R = 1962.94$ ). There was a statistically significant difference discovered. (U = 1291149.0, p = .000).
	Job Opportunity	Claimants of convenience had higher mean rank (N = 2637, $\bar{x}R = 2169.98$ ) than claimants of difficult (N = 1678, $\bar{x}R = 2139.17$ , but the difference was not statistically significant (U = 2180847.5, p = .428).
Aesthetic Needs	<b>Well-Maintained Recreational Park</b>	Claimants of convenience had higher mean rank (N = 2885, $\bar{x}R = 2231.88$ ) than claimants of difficult (N = 1430, $\bar{x}R = 2008.94$ ). There was a statistically significant difference discovered. (U = 1849626.0, p = .000).
	<b>Diversity of Flora and Fauna</b>	Claimants of convenience had higher mean rank (N = 2862, $\bar{x}R = 2237.83$ ) than claimants of difficult (N = 1453, $\bar{x}R = 2000.76$ ). There was a statistically significant difference discovered. (U = 1850780.0, p = .000).
Self-Actualization Needs	<b>Rights to Choose Leaders</b>	Claimants of convenience had higher mean rank (N = 2492, $\bar{x}R = 2210.47$ ) than claimants of difficult (N = 1823, $\bar{x}R = 2086.28$ ). There was a statistically significant difference discovered. (U = 2140705.5, p = .001).
	Freedom of Speech	Claimants of convenience had higher mean rank (N = 2358, $\bar{x}R = 2179.67$ ) than claimants of difficult (N = 1957, $\bar{x}R = 2131.89$ , but the difference was not statistically significant (U = 2256203.0, p = .210).
	Corruption Free Opportunities	Claimants of difficult had higher mean rank (N = 2068, $\bar{x}R = 2129.20$ ) than claimants of convenience (N = 2247, $\bar{x}R = 2184.51$ , but the difference was not statistically significant (U = 2263835.5, p = .145).
	<b>Freedom to Express Arts &amp; Diversity</b>	Claimants of convenience had higher mean rank (N = 2784, $\bar{x}R = 2272.60$ ) than claimants of difficult (N = 1531, $\bar{x}R = 1949.61$ ). There was a statistically significant difference discovered. (U = 1812101.5, p = .000).

Note. Bold & Highlighted shows statistically significant output.

16 of 24 test-results were statistically significant, indicating that EWB was statistically greater with convenience of satisfying all of the identified human needs (refer to Table 7).



## DISCUSSION

Findings reveal that EWB improves when almost all human needs are easily satisfied. Therefore, indicating that the convenience of fulfilling these human needs would improve human flourishing as a whole. However, for some human needs, specifically (i) nutritious food, (ii) clean water, (iii) adequate electricity, (iv) affordable houses, (v) internet connection, (vi) job opportunity, (vii) freedom of speech, (viii) corruption free opportunities; the EWB did not significantly rise across difficulty nor convenience of fulfilment.

**Table 7: Summary of Findings**

Condition 1: Difficulty	Condition 2: Convenient	Condition 3: Neither
The difficulty to meet the human need increases EWB	The convenience to meet the human need increases EWB	Neither convenience or difficulty to meet the human need increases EWB
EWB is greater with difficulty to meet the human need.	EWB is greater with convenience to meet the human need.	EWB does not change with convenience nor difficulty to meet the human need.

Hierarchy of Needs	No.	Human Needs	Findings/Condition
Basic Necessities	1	Nutritious Food	EWB does not change
	2	Medical Treatment	EWB increases with Convenience
	3	Clean Water (for Wash & Drink)	EWB does not change
	4	Clean Air	EWB increases with Convenience
	5	Well-Function Toilet	EWB increases with Convenience
	6	Adequate Electricity	EWB does not change
	7	Affordable Houses and Amenities	EWB does not change
	8	Financial Stability	EWB increases with Convenience
	9	Personal Security	EWB increases with Convenience
	10	Health Assurance	EWB increases with Convenience
Complementary Needs	11	Balance in Work and Personal Time	EWB increases with Convenience
	12	Social Tolerance	EWB increases with Convenience
	13	Communication Line	EWB increases with Convenience
	14	Internet Connection	EWB does not change
Desired Opportunity	15	Primary School Accomplishment	EWB increases with Convenience
	16	Secondary School Accomplishment	EWB increases with Convenience
	17	Tertiary School Accomplishment	EWB increases with Convenience
	18	Job Opportunity	EWB does not change
	19	Well-Maintained Recreational Park	EWB increases with Convenience
	20	Diversity of Flora and Fauna	EWB increases with Convenience
	21	Rights to Choose Leaders	EWB increases with Convenience
	22	Freedom of Speech	EWB increases with Convenience
Self-Actualization	23	Corruption Free Opportunities	EWB does not change
	24	Freedom to Express Arts & Diversity	EWB increases with Convenience

The statistical findings necessitate a revision of top-down and bottom-up theories of SWB. According to bottom-up theory, wellbeing is the fulfilment of contextual human needs. While top-down theories contend that fundamental human needs dictate domain-specific wellbeing. While a multitude of elements contribute to human needs fulfilment, obtaining wellbeing is not always reliant on the parameters that researchers consider relevant, but rather on the areas that respondents believe most essential, based on cognitive evaluations.

According to Aristotle, moral behaviour and a joyful state of mind are the hallmarks of a successful existence. Eudaimonia is sometimes described as a greater good that is self-sufficient, and it is the ultimate goal of all endeavour. Eudaimonia is not only a product of external circumstances, but rather a result of one's own morality. (Waterman et al., 2010). As recognized by Maslow, fulfilling too much of a certain need can bring illbeing, but partly satisfied or unmet needs might provide meaning to one's life and hence enhance SWB (Maslow, 1943, 1954, 1962, 1970, 1987).

In this case, the respondents believed that the majority of the human needs are crucial in order to attain eudaimonia. However, EWB does not depend on (i) nutritious food, (ii) clean water, (iii) adequate electricity, (iv) affordable houses, (v) internet connection, (vi) job opportunity, (vii) freedom of speech, (viii) corruption free opportunities. In other words, the respondents do not perceive the eight (8) mentioned human needs as meaningful to achieve EWB. Then again, the respondents found the 16 human needs meaningful in reaching eudaimonia.

## CONCLUSION

This article is a piece of a larger body of research that demonstrates the value of meeting human needs in a variety of domains related to wellbeing. This research examines the degree of eudaimonic wellbeing in relation to the convenience and difficulty of meeting human needs. The results show that EWB significantly improves when the majority of human needs can be conveniently fulfilled. Few of the key human needs identified in this study, meanwhile, had no statistically significant impact on EWB. The proper representation of human requirements across the HON phases should be the main focus of future study. Human needs representations should also take into account Malaysia's culture and socioeconomic progress.

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



**PLANNING MALAYSIA:**

*Journal of the Malaysian Institute of Planners*

**VOLUME 20 ISSUE 3 (2022), Page 295 – 305**

## **THE DEVELOPMENT OF POLICY AND LEGAL FRAMEWORK FOR SOCIAL IMPACT ASSESSMENT IN MALAYSIA**

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### **Abstract**

Social Impact Assessment (SIA) is an assessment tool that assess the social effects of infrastructure and major projects and is conducted in many countries, including the United States, Australia, Canada, India, South Africa, New Zealand, and Japan. Malaysia requires such form of assessment for projects deemed to have social implications prior to obtaining planning permission from the local planning authorities. The requirement of the submission of SIA report as part of planning permission requirement necessitates from section 20B (2) of the Town and Country Planning Act 1976. Based on several studies, there are several legal issues arises from the SIA approval process, affecting various stakeholders. As such, this research aims to analyse the implementation of SIA from the Malaysia' s policy and legal perspective using qualitative method of systematic literature review and content analysis. Analysis of literatures show that the SIA framework in Malaysia can be improved as to make the process of SIA approval to be more effective.

**Keywords:** Social Impact Assessment, Development, Malaysia, Legal Framework

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## **INTRODUCTION**

SIA is one of the assessments to measure the social impact of major development to the community. The SIA assessment is a decision-making tool for the development control process as the impact of the proposed development could affect the quality of life of individual and the community. It is expected that the mitigation proposed in the SIA report would be able to reduce adverse effect affecting the community and create balance between social and physical changes resulting from the proposed development project. Vanclay (2003) defines SIA as an assessment that involves analysis, monitoring, and management of social effects, intended or unintended and either positive or negative impacts arise from a proposed development to the surrounding communities. This assessment not only aims to identify positive effects but also to reduce the negative impacts of the proposed development.

According to Burdge and Vanclay (1995), SIA is one of the essential documents that can assist the local authorities in their decision-making process in approving or refusing planning permission in the development control process. Its implementation of SIA framework, its analysis and scientific process is not merely a matter of legal and procedural compliance but can assist in identifying and measure various social benefits and adverse effects of a new physical development. In other words, apart from legal compliance, SIA can improve the benefits of a project from the social perspective, reducing costs and optimising mitigation measures.

In Malaysia, the approval process of the SIA report is under the purview of the Town and Country Planning Department (PlanMalaysia) at the Federal and State Authorities level. PlanMalaysia at Federal and State level would set up a committee to assess the SIA report and these agencies are the considered as the approving authorities of SIA reports depending on the categories of SIA report.

## **METHODOLOGY**

This research employed a qualitative method, using library research and content analysis of books, articles, related laws, manuals, and reports that are relevant to the study. In term of SIA legal framework, table 1 lists the relevant documents which were analysed in this research: policies, plans, Acts, manuals, and guidelines that contribute to the development of SIA.

**Table 1: Type of policies and legal framework**

Level	Policies and Legal Framework
National	5 <sup>th</sup> Malaysia Plan, 11 <sup>th</sup> Malaysia Plan, National Social Policy, National Community Policy
Local Plans	Local Plan Cyberjaya, Sungai Merab, Salak Tinggi & Dengkil
Manual & Guidelines	Manual Preparation SIA for Development Project 2012 & 2018
Acts	Town and Country Planning Act 1976 (Act 172)

*Source: Policies and Frameworks in Malaysia*

## DISCUSSION

### SIA POLICY & MANUAL

Given that the implementation of government policies would affect the general public in the long run, its formation and drafting of the Manual must take into account various social consideration and implications in determining the outcome and effects of the policies to the general public. As such, public interest and sustainable development objectives must be considered during the preparation of the policy and manual as to ensure social needs and the interests of various stakeholders are considered in the policy-making process.

The incorporation of social aspects in drafting policies related to land use can be seen through the execution of the social-economic surveys during the development plan provided by PLANMalaysia Federal (5<sup>th</sup> Malaysian Plan, 1986-1990). Consequently, SIA was adopted by PLANMalaysia in several local plans in 1998 such as Local Plan Hulu Langat and Local Plan Sepang (Dahlia Rosly, 2009).

The inclusion of SIA in local plans demonstrates the importance of this assessment for proper town planning. As local plans affect society, the amalgamation of SIA is an excellent alternative to avoid and reduce the damaging impact of proposed development projects on the surrounding community.

PLANMalaysia is consistent in continuing the effort to spread information and awareness on SIA to various government agencies via workshops, seminars, and



meetings. PLANMalaysia has also actively collaborated with local universities and development institutions to prepare and present working papers related to SIA (Dahlia Rosly,2009).

In addition, issues concerning these social components have been identified and discussed. It is agreed that the requirement for a social policy is crucial in developing a united and stable society (Department of Welfare). Subsequently, the Cabinet gazetted a social-based policy called the National Social Policy (NSP) on 19 February 2003 (National Social Policy, 2003). NSP is a social development policy founded on the central principles of nurturing high moral values and human capacity building. It seeks to achieve unity as well as social stability while strengthening national fortitude. The strategic plan to achieve these objectives is through the imposition of the condition of SIA implementation for all planning programs and public and private development (National Social Policy, 2003).

Another policy aligned with the NSP is the National Community Policy (NCP), approved by the Cabinet on 23rd November 2018. The primary goal of the NCP is to empower and encourage resident communities to take an active role in managing and maintaining public and common properties that form part of their residential area (National Community Policy, 2018) resulting in harmony and conducive living.

In 2015, Malaysia and 192 other countries adopted the 2030 Agenda for Sustainable Development. The agenda is a global commitment toward more sustainable, resilient and inclusive development, with 17 Sustainable Development Goals (SDG) (UN, 2015). Chief Statistician Malaysia, Dato 'Seri Dr Mohd Uzir Mahidin, agreed that Malaysia is committed to executing the SDG agenda (Berita Harian, 2019) as it is in line with the 11<sup>th</sup> Malaysia Plan (Department of Statistics, 2020).

The 11<sup>th</sup> SDG relates to sustainable cities and community development. Its mission is to make cities and human settlements inclusive, safe, resilient, and sustainable. Based on the SDG Indicator Report 2019, the level of air pollution around the community area in Malaysia improved between 2017 and 2018 (DOE). These precautions are essential in guaranteeing continuity between society and development, per the United Nations 'goals.

Before the global involvement of Malaysia in social policy, Malaysia has committed to considering economic, social, and environmental aspects in its national development plan. This practise did not only start in 1990 but has since been in place since its independence in 1957 (Department of Statistics,2020). Sustainability and inclusivity have been the main thrust of development in Malaysia.

Besides the national policies, the preparation and implementation of SIA are based on references and manuals providing guidance for project

proponents and SIA consultants in preparing quality SIA reports, which will aid in the decision-making process of the proposed development. The first reference was First SIA Manual published by the Prime Minister's Office in 2000 (SIA International Symposium, 2022). For the next two years, the SIA Handbook of Malaysia 2022 was released by the Ministry of Women, Family, and Community Development and the United Nations Development Program. According to Gaim James Lunkapis, the first draft was completed that year, remains as is today, and has not been officially adopted by PLANMalaysia. Nonetheless, SIA practitioners in Malaysia have used this book as a guide to undertake SIA works in Malaysia.

The following manual, named SIA Manual for Project Development, was published by the Social Institute of Malaysia under the same ministry (Social Institute of Malaysia, 2021). According to Dato' Seri Najib, this manual is one of the government's alternatives to propagate the SIA practice through planning and development matters in Malaysia (SIA Manual, 2012).

Prior to the amendment of the Town and Country Planning Act 1976 (Act 172) in 2017, there was no legal requirement to prepare and submit any SIA report prior to seeking planning approval from state authorities. As such, no comprehensive book or guideline about preparing an SIA report was released by the government. The previous manual only described certain things regarding SIA in Malaysia. In the past, however, several agencies have produced guidelines and procedures which required the inclusion of a certain degree of social impact assessment. For example, the Malaysian Criteria and Indicators for Forest Management Certification (MC&I) have required the Forest Management Unit (FMU) to refer to the Social Impact Assessment Guidelines for the Malaysian Sustainable Palm Oil (MSPO) for SIA and monitoring forest management operations in Peninsular Malaysia. The social impact of forest management is a significant consideration in the forest management standard (UPM, 2012).

In 2018, PLANMalaysia issued the second edition of the SIA Manual. Compared to the previous edition, the latest manual included more comprehensive information and guidelines on the background and preparation of the SIA report. For instance, the 2<sup>nd</sup> edition SIA Manual explains the SIA categorisation, implementation processes as well as the report evaluation process. Stakeholders are provided with a clearer view on the preparation of the SIA report.

The manual further distinguishes between the three development categories requiring an SIA report: SIA Category 1, SIA Category 2, and SIA Category 3. It is observed that the legal requirements for an SIA report for developments under SIA Categories 1 and 2 are stated under Act 172, but similar conditions are not found for SIA Category 3. The SIA Manual (2018) merely lists the examples of development projects under that category, such as night club,

cemetery areas, mining, main industry area, aquaculture project, plant, oil and gas filtration centre, and solid waste disposal sites.

Furthermore, if the local government and PLANMalaysia@State have identified any development project to be under SIA Category 3, it will be included under this category. This can be seen through the implementation of the state manual. PLANMalaysia@Selangor produced the first edition of its manual in 2019 (Selangor SIA Manual, 2019) while the second edition was published in 2020 (Selangor SIA Manual, 2020).

The manual explicitly lists the development projects under the SIA Category 3, such as worker placement centres, rental lines or reserve utilities, and railroads. It will give flexibility to the state authority in determining the SIA application from time to time.

Other states like Negeri Sembilan, Kedah and Malacca also have their own SIA manual. The one for Negeri Sembilan was approved by the State Planning Committee No. 3/2020 on 9 June 2020 (SIA Manual Negeri Sembilan, 2020) Kedah used the SIA manual beginning July 2020 (SIA Manual Kedah, 2020) and Malacca used the SIA manual beginning July 2021 (SIA Manual Malacca, 2021). Several states, such as Terengganu, Perak, and others, are still in the process of finalising their manuals. Although the manuals from these states are aligned with the SIA Manual (2018), there are differences, particularly for development under SIA Category 3, as it depends on the state's condition and demography.

Although the SIA Manual (2018) lists the category of projects, specific categories of projects are excluded from the Manual. For instance, a particular guideline relating to the palm oil industry for the Malaysian Sustainable Palm Oil (MSPO) prevails over the Manual (MSPO Guidelines, 2021).

## **LEGAL PROVISIONS (ACT 172)**

The Town and Country Planning Act 1976 (Act 172) is the law which controls and regulates town and country planning in Peninsular Malaysia. Act 172 gained royal assent on 18 March 1976 and gazetted on 25 March 1976 (Act 172,2021). Act 172 has gone through several amendments. In 2001, Act 172 was amended through Act A1129 which inserted the provisions on the requirement on the publicity of the draft local plan. For instance, section 12A states that the local planning authority must ensure that publicity is given in its area to the draft local plan that will be prepared, its objectives and the purpose for its preparation (Act A1129, 2001).

Publicity is an approach through consultation with the community in preparing the SIA report. The role of the SIA is not merely for the approval of the state authority but will also assist to impart understanding and acceptance of the proposed project to the surrounding community.

It is believed that the SIA process contributes added value to the project planning, whereby the project will be deemed to be more social friendly as it has considered public opinion and will reduce the negative social impact on the community. Even though section 12A does not explicitly mention SIA, the publicity procedure through this provision can be used as input in the preparation process of the SIA report input (SIA Manual, 2018).

In the case of *Mohamad Yusof bin A Bakar & Anor v Datuk Bandar Kuala Lumpur* (2019), the court allowed the appeal of the appellant, a member of the public, to obtain technical reports such as the development proposal report, traffic assessment report, SIA report and others for a specific development project in Kuala Lumpur.

The respondent applied for planning permission for a development project around Taman Tiara Titiwangsa, but the surrounding community were not granted access to the reports involving the development. This case indicates that the public should have the right to be involved in the development process and to provide input for the proposed project through a publicity process.

In the context of the legality and implementation of the SIA, Act 172 was again amended through Act A1522 in 2017, making SIA reports mandatory for SIA categories 1 and 2. This amendment applies to Peninsular Malaysia and the Federal Territory of Labuan. However, it comes into operation in a State on a date to be appointed by the State Authority, with the concurrence of the Minister, by notification in the State Gazette (Act A1522, 2017).

To date, eight states; Selangor, Penang, Malacca, Pahang, Negeri Sembilan, Terengganu, Kedah and Perak have gazetted and implemented Act A1522 (Act A1522 Gazettement Status, 2021). As observed, the implementation is reflected in the SIA state manuals, as discussed above.

Section 20B (2) states:

“For the purpose of seeking the advice from the Council under subsection (1), the Federal Government and State Government department or agency shall submit to the Council the development proposal together with a social impact assessment report and other reports as determined by the Council.”

Therefore, in line with the amendment above, any developer or project proponent will be required to prepare the SIA report with other relevant reports for purposes of development approval. Act A1129 further covers SIA Category 2 development projects but does not mention the requirement of the SIA report. Table 2 lists the project developments according to the category of SIA.

**Table 2: List of Development Projects**

SIA Category	Provision	Type of development
1	Act A1522: Section 20B (1)	<ul style="list-style-type: none"> <li>• Any coastal reclamation, excluding reclamation for the construction of a jetty or beach rehabilitation.</li> <li>• Any construction of a major national infrastructure, including—                             <ul style="list-style-type: none"> <li>(i) airports, seaports, inland ports, railway transportation networks, highways, power stations, dams and toxic waste disposal sites; and</li> <li>(ii) other infrastructure of national interest as determined by the Council.</li> </ul> </li> </ul>
2	Act A1129: Section 22(2A)	<ul style="list-style-type: none"> <li>• The development of a new township for a population exceeding ten thousand or covering an area of more than one hundred hectares, or both.</li> <li>• Development for the construction of any significant infrastructure or utility; or</li> <li>• Development affecting hilltops or hill slopes in an area designated as environmentally sensitive in a development plan.</li> </ul>

*Source: Act 172*

## RECOMMENDATION AND CONCLUSION

It is observed that even though the SIA legal framework in Malaysia is still lacking in certain aspects, it has the potential to develop with necessary political will and the demand by the public. Improvements can still be done to improve the legal framework and policy to ensure the SIA process can be implemented successfully.

In comparison to environmental impact assessment (EIA), which was only made mandatory in 1986 (Act A636,1986), the level of awareness of the SIA is still at the outset. The Department of the Environment (DOE) had also, in the beginning, struggled to develop and implement the EIA; however, through time, its reception and legal framework have greatly improved. It is hoped that if the

implementation of EIA can be replicated for SIA, it also may develop through the enforcement of Act 172.

Among the weaknesses identified thus far is that the absence of explicit provisions on SIA in Act 172 has inadvertently resulted in non-uniformity of SIA implementation by the states. It is recommended for this Act to provide an explicit provision to standardise the SIA implementation in Malaysia. Another issue is that Act 172 requires preparing SIA for categories 1 and 2 but does not regulate the approval, implementation, and monitoring process. It is also silent on the requirement of SIA for category 3. Thus, Act 172 needs to stipulate the requirement of SIA for category 3, as well as approval of the Manual, implementation, and monitoring. It is also observed there are no comprehensive guidelines in terms of SIA implementation in the current Manual, specifically on the approval process, enforcement after submission of report and criteria for the qualification of persons to prepare the SIA. Consequently, this can lead to confusion among the relevant stakeholders in preparing this report. To assist the stakeholders, the Manual should include a comprehensible process, beginning from preparation to the enforcement stage of SIA.

Besides that, the procedures under the Manual are only persuasive in nature. Non-compliance to the guidelines as proposed in the Manual will not render the SIA report void for the purpose under Act 172. The Manual is only regarded as soft law and is not binding on the project proponents. Therefore, to ensure the SIA is thoroughly implemented, parts of it must be included through the amendment of the Act. The manual or the Act does not list who is qualified to prepare the SIA. It is also recommended to include the criteria of qualified persons in the Act or manual.

It is further proposed that further analysis needs to be done to study the legal issues and gaps in SIA implementation, particularly in the monitoring process, to ensure that more recommendations by the public are adhered to by the project proponents. Henk Becker (2003) stated that SIA usually deals with multi-stage studies to explore the future social consequences of the projects. The impact of these studies will ensure a proactive stance on development outcomes. Therefore, the implementation of SIA needs to be enforced critically for an inclusive, safe, resilient, and sustainable environment, in line with Malaysia's commitment to the 2030 Agenda for sustainable development.

## **ACKNOWLEDGEMENT**

The authors take this opportunity to acknowledge with much appreciation the financial support provided through the project that has been registered with IIUM Research Management Centre (Ref no: IIUM/504/RES/G/14/3/2/1/SPP21-072-0072).

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Received: 30<sup>th</sup> June 2022. Accepted: 12<sup>th</sup> September 2022



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ISSN 16756215



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