JOURNAL OF THE MALAYSIAN INSTITUTE OF PLANNERS

PLANNING MALAYSIA

MALAYSIA INSTITUTE OF PLANNERS
PLANNING MALAYSIA VOLUME 18 ISSUE 3 (2020)
[ISSN 1675-6215] e-ISSN 0128-0945]
www.planningmalaysia.org

PLANNING MALAYSIA

Journal of the Malaysian Institute of Planners

Editorial & Business Correspondence
PLANNING MALAYSIA
Journal of the Malaysian Institute of Planners
B-01-02, Jalan SS7/13B, Aman Seri, Kelana Jaya
47301, Petaling Jaya, Selangor Darul Ehsan, MALAYSIA
Tel: +603 78770637 Fax: +603 78779636 Email: mip@mip.org.my
www.planningmalaysia.org

Published By
Malaysian Institute of Planners

ISSN Number
1675-6215
e-ISSN
0128-0945

Date Published: 21st July 2020

CONTENTS

MIP Council Members
2019 - 2021 Session

President
TPr. Hj Ihsan Zainal Mokhtar (305/94)

Immediate Past President
TPr. Hj Md Nazri Mohd Noordin (301/94)

Vice President
TPr. Mohd Zamri Husin (430/01)
Datin TPr. Hjh Mazrina Dato' Abdul Khalid (559/09)

Honorary Secretary
Datin TPr. Hjh Noraida Saludin (468/02)

Honorary Treasury
TPr. Hj. Abdul Hamid Akub (450/01)

Council Members
TPr. Mohamad Nazri Jaafar (168/86)
TPr. Fathuddin Kamaruddin (656/16)
TPr. Wan Andery Wan Mahmood (572/10)
TPr. Mohammad Fauzi Ahmad (418/99)
Prof. TPr. Dr. Mariana Mohamed Osman (581/11)
TPr. Juwairiyah Ho Abdullah (453/02)
TPr. Hj Nik Mohd Ruiz Ahmad Fakhrul Razy (570/10)
TPr. Fu Swee Yun (553/99)
TPr. Abdul Halim Ali Hassan (407/98)
TPr. Saiful Azman Abd Rashid (474/03)

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 1 – 13

WORKING COMMUNITIES' SIGNIFICANT HERITAGE URBAN RIVER CORRIDOR LANDSCAPE OF MELAKA CITY

Nor Arbina Zainal Abidin[1], Debra Flanders Cushing[2], Gillian Lawson[3]

[1]*School of Housing, Building and Planning,*
UNIVERSITI SAINS MALAYSIA
[2]*School of Design,*
QUEENSLAND UNIVERSITY OF TECHNOLOGY
[3]*Faculty of Environment, Society and Design,*
LINCOLN UNIVERSITY

Abstract

The existing landscape characters of urban river corridor of Melaka City have eroded due to unsustainable design outcomes due to inadequate policies and guidelines, indiscriminate decision in design and it lacks of community consultation. In addition, political intervention and climate change have made it worse to the present urban river corridor of the city. These issues have raised concerns among the local community, particularly those workers whose livelihood depend on resources in that area. This paper reveals the distribution patterns and landscape settings of the urban river corridor of Melaka City which are significant among working communities. It also describes each landscape setting within the identified territory. The findings are determined via thematic coding analysis and overlay mapping technique based on the experiential landscape theory established by Thwaites and Simkins (2007). The combination of experiential landscapes from different individuals via overlay mapping analysis also provides insight into the communities' urban river corridor boundary of the city, which is important in heritage-related policy.

Keywords: Landscape Character, Urban River Corridor, Working Communities of Urban River Corridor, Experiential Landscape, Melaka City

[1] Corresponding Author & Lecturer at Universiti Sains Malaysia. Email: arbina@usm.my

INTRODUCTION

The landscape character of *Sungai Melaka* is significant to the livelihood of the urban river corridor working communities, thus the state government strives to improve this area to serve their needs, encompassing the working, living and recreational aspects (Rustam, 2007, 2008; Salim, Othman, Mohamed, & Ismail, 2012; SMHB, 2010). The status as the "Historic City of the Straits of Malacca" UNESCO on 7 July 2008 has stimulated regional growth in this Malaysian heritage river city (Rustam, 2008). This recognition has encouraged the state government of Melaka to build more tourist attractions within the river corridor territory to generate employment opportunities and improve the quality of the area with *Sungai Melaka* as the main attraction. Often, the local urban design teams face difficulty in developing a suitable yet sustainable design within the city's river corridor due to inadequate development policies and guidelines pertaining to river corridor, coupled with the issue of climate change. There are more challenges for the teams due to political intervention and inconsistent resolution during the design process.

Recently, there are feedbacks from the public in the local mainstream media, of the development of the modern urban landscape attractions and infrastructure has overshadowed the natural and existing heritage landscape and historical artefacts in Melaka City and its surrounding river corridor. The studies on the feasibility of the urban river corridor development in Melaka City are limited, particularly in the context of landscape design (Mohamad, Toriman, Aiyub, & Jaafar, 2005; Nordin, 1998; SMHB, 2010). Also, there are limitations to the current approaches in finding the core users whose livelihood and working routines are dependent on the resources around the urban river corridor of Melaka City. These core users have a unique experience and understanding of working and/or living in the urban river corridor settings, this can aid the urban design teams to make decision in the development projects undertaken for this place. Indeed, these processes are essential in the sustainability of the development and to maintain the highly regarded and valued existing landscape character.

RESEARCH BACKGROUND

According to the Riverfront Development Guidelines outlined by the Department of Irrigation and Drainage Malaysia (DID), a river corridor is defined as, "the river, including the area extending fifty (50) meters beyond the river reserve on both sides" (Refer Figure 1). This sets out the basic form and position of river corridor, overlooking the ecological and dynamic characteristics, which are essential in defining the territory of the strips of land along river channels.

A river corridor boundary is complex and difficult to determine, as the territory does include diverse landscape settings and living systems that rely on and connected to the river (Forman, 1995). Yet, the perception of river corridor boundary among the urban design teams in Malaysia from 1990s to early 2000s

remains the same. Therefore, similar designs and approaches applied in most of the urban river corridors and riverfront property developments in the country. The disregard of the dynamic and complex ecological characteristics of river corridors in designing process and limited enforcement of design outcomes have rendered urban river corridor developments in Malaysia unsustainable and of poor quality.

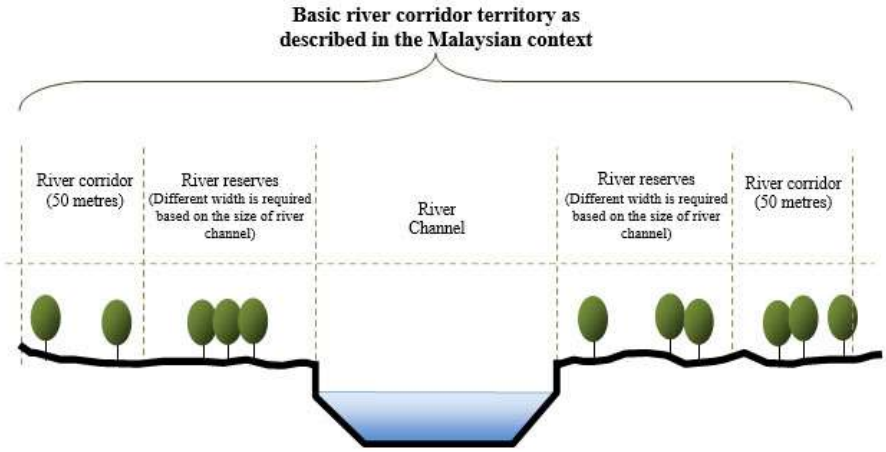


Figure 1: Urban river corridor territory according to the Department of Irrigation Malaysia (DID).
Source adapted from DID Malaysia (2006)

There are also limitations to the current approaches used to aid the process of finding core users whose livelihoods and working routines are much dependent on the values offered by their urban river corridors. Yet, their long and unique experience and understanding about the settings can aid urban design teams' decision making in development and improvement projects undertaken for these particular settings. Therefore, this study argues that it is important to access the knowledge, experience and viewpoints of these types of stakeholders, who can potentially influence the quality and sustainability of landscape design outcomes, particularly that need to be established on a dynamic yet fragile area in our heritage urban area such as on urban river corridor of Melaka City. It is also essential for urban design teams in Malaysia to strengthen their current landscape design process to gain more comprehensive and holistic design solutions that are influenced by meaningful community consultation.

This paper attempts to reveal the findings of the distribution patterns of working communities' important yet significant landscape settings of heritage urban river corridor in Melaka City context. All these crucial experiential landscape settings are categorized using the spatial components of Experiential

Landscape, which defined by Thwaites and Simkins (2007b) as Centre, Direction, Transition, and Area. The study has also led to the identification of urban river corridor territory that is meaningful to a diverse range of working communities for Melaka City.

METHODS

This study applied qualitative research approach. It involved exploring landscape experience from a diverse range of local people representing working communities from casual workers to professional people. This study has also selected from a diverse range of socio-economic backgrounds and which their scope of work and working routines are connected and depend on resources offered by urban river corridor of Melaka City. Specifically, this study identifies various occupations practiced by insiders in the urban river corridor of Melaka City as shown in Figure 1. The selection of the urban river corridor of Melaka City as a case study was based on the following existing characteristics:

- The river corridor is significant in historical, ecological, physical and cultural development contexts;
- The river corridor is a living niche for their local communities who came from diverse socio-cultural and socio-economic backgrounds;
- The river of the city is significant in influencing the physical development, socio-economic and living culture of the people; and,
- It located at the estuary area, within the jurisdiction of established city council management, experienced rapid urbanization, possess distinctive tourism and cultural-based development orientation; and, experienced active urban landscape design and development activities.

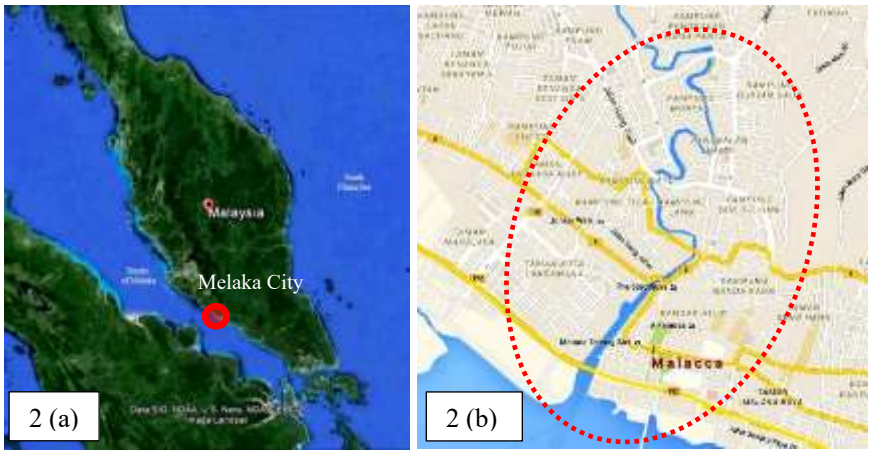


Figure 2 (a): The location of Melaka City in Peninsular Malaysia (left).

Figure 2 (b): The study area of the urban river corridor in Melaka City (right).
Source: Google Earth (2017)

This study has undertaken the three significant processes for assessing the important landscape character settings of urban river corridors via human experience, as shown in Figure 3. These processes including:

i) Defining preliminary boundaries for research areas;
ii) Focusing on tracking the workplace for selected occupations that depended on urban river corridor resources as well as finding relevant individuals representing the selected occupations with working routine and experience within the setting; and,
iii) Identifying and assessing important settings perceived by these selected individuals representing working communities of the studied area.

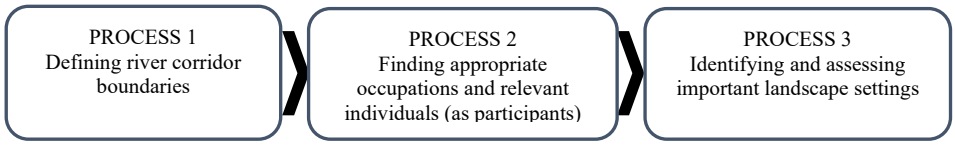


Figure 3: The flow of the three major processes for this research

Defining the preliminary boundary of urban river corridor of Melaka City that was done in Process 1 is crucial. It is essential to support the identification of key people among insiders of the place who further will be invited as a research participant for this study which this identification activity will be undertaken in Process 2. This study had used abundance information from the Internet in discovering distinct areas within the heritage urban river corridors that are potentially significant and valuable to insider communities. Specifically, it led the researcher towards preparing specific approaches to aid the first phase of fieldwork activities - to search which occupations and relevant individuals for research participants within the targeted groups – urban design team and special interest public. Process 1 was conducted earlier before the first stage of fieldwork activity take place. Process 1 involved exploring, collecting and gathering information about the research areas via the Internet and local publications. Online exploration and familiarization as part of analysis activities have been conducted at this stage. Several areas of significance were identified and the preliminary boundary for the urban river corridor of Melaka City was established.

Process 2 was conducted to identify possible occupations and relevant individuals as research participants via onsite exploration and familiarization

during the first stage of the fieldwork activities in Melaka City. There were four stages of activities in this Process 2 including:

i) Define purpose, scope & prepare for field study 1;
ii) Field first impression experience;
iii) Field exploration & familiarization to find appropriate occupations and,
iv) Identify relevant participants. This research has employed various transportation modes including walking, driving and riding popular public transport available at the site including river cruise boat and trishaw.

Table 1 shows the types of occupations representing working communities from the groups of urban design team and special interest public who have been identified through various tracking techniques during the first stage of site visit.

Table 1. Identified types of occupations.

Working communities	*Techniques used to track down relevant occupations and people Urban river corridor of Melaka City*
Urban Design Team	• Courtesy visit & casual conservation with urban manager team at Melaka City Council
Special Interest Public	• Review local publication • On-site exploration and observation • Experiencing the service offered by service providers • Casual conversation

Different groups of the working community of Melaka City have many reasons for depending on, appreciating and developing their sense of attachment to the studied urban river corridor landscape. In Process 3, the researcher thus undertook four stages of activities to search and assess the community's important urban river corridor landscape settings at Melaka City:

Stage 1: Strategize Experiential Landscape Survey (ELS) activities;
Stage 2: Create ELS brief and design tour;
Stage 3: Field study- administer ELS with participants; and
Stage 4: Classify and describe the important urban river corridor setting.

The above stages in Process 3 were vital for leading to the following findings:
i) the most to the least types of important landscape settings that are significant to the working insider community;
ii) the characteristics of the settings;
iii) the value and meanings of the landscape settings perceived by different groups of the working insider community; and
iv) the distribution of the settings within the studied urban river corridor landscape.

This research employed thematic coding analysis and map overlay to analyze the in-depth interview from ELS data for the identification of important settings that are based on the experiential landscape theory established by Thwaites and Simkins (2007a). The main spatial components of experiential landscape theory including center, direction, transition and area.

FINDINGS

Urban manager, city journalist, tourist guide, boat skipper, and rickshaw puller are the five (5) main occupations that were found significant to support the study. Five (5) individual insiders representing the five types of identified occupations were found to be the most relevant research participants based on the values that they have long developed with the studied area. These five individuals have been carried outstanding experiences and hold close connections with the studied urban river corridor, which they have developed through their working routine within the place. Most of them were verbally and highly recommended by their colleagues in their respective working communities.

The opinions, feelings, and perceptions from a non-Muslim participant are significant to gather in-depth information (regarding the research area) from different points of view and cultural/ethnic group. Also, it provides a variety of meanings and experiences about the studied urban river corridor. Moreover, non-Muslim community is also involved and contribute to the evolution and growth of the settings. Table 2 shows the difference regarding participants' occupation and profiles for the study area. All of them are local people who live for generations in this Melaka heritage city.

Table 2: Backgrounds of the participants in Melaka City

	**Experience*	*Age*	*Sex*	*Race*	*Religion*	*Nationality*
The urban manager	14 years	42 *y.o*	Male	Malay	Muslim	Malaysian / local people living for generation
The city journalist	3 years	26 *y.o*	Male	Malay	Muslim	
The tourist guide	44 years	54 *y.o*	Male	Eurasian	Christian	
The boat skipper	6 years	60 *y.o*	Male	Malay	Muslim	
The rickshaw puller	23 years	53 *y.o*	Male	Malay	Muslim	

**note: The durations of experience and the age of these participants were stated based on their statements to the researcher during the ELS activities that were conducted on-site in the year 2012.*

The findings in Figure 4 and Figure 5 reveals that the participants' movement expands beyond the preliminary boundary estimated prior to the ELS research via online and site exploration. It was found that the working communities' urban

river corridor territory includes all the natural and built water-related landscape settings that provide value and support for their working routines and personal needs. This research has discovered the characteristics of every important urban river corridor settings within the identified territory, including the natural, historical built and contemporary built settings. Table 3 summarizes the types of important settings of urban river corridors as perceived by working communities at Melaka City.

Table 3: Types of important settings within the working communities' urban river corridor territories

Working Communities' important urban river corridor setting	*Natural Setting*	*Historical Built Setting*	*Contemporary Built Setting*
Melaka City	Hills	Old Townships Kampung Historic Management and Civic Centre	Riverfront Landscape Artificial Peninsular Urban Retail Centre

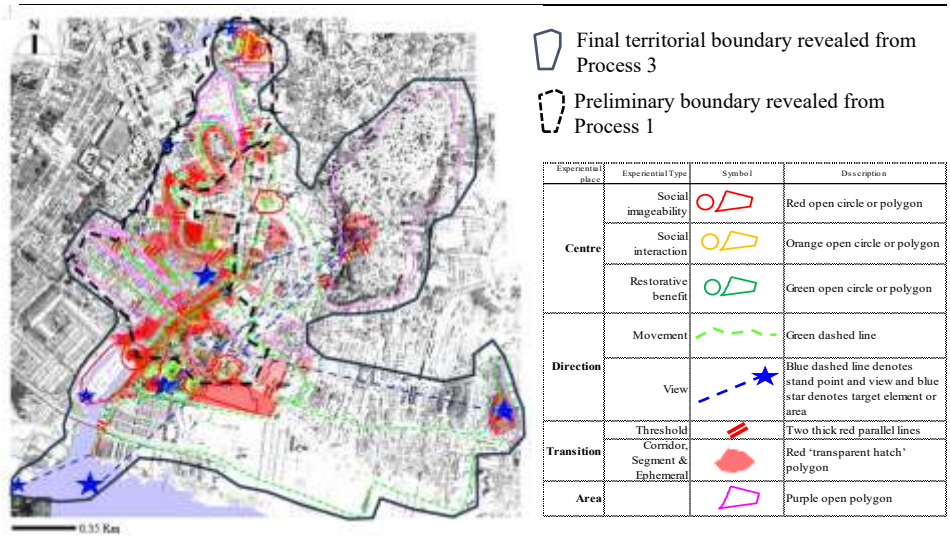


Figure 4: The boundary that defines the main territory of working communities' important urban river corridor landscape for Melaka City.

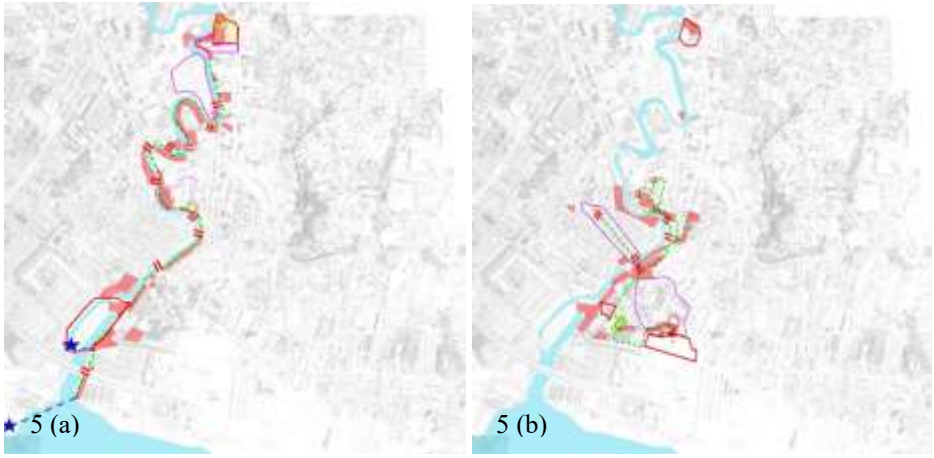


Figure 5 (a): The distribution patterns of important landscape settings that are individually significant to the urban manager.
Figure 5 (b): The distribution patterns of important landscape settings that are individually significant to the city journalist.

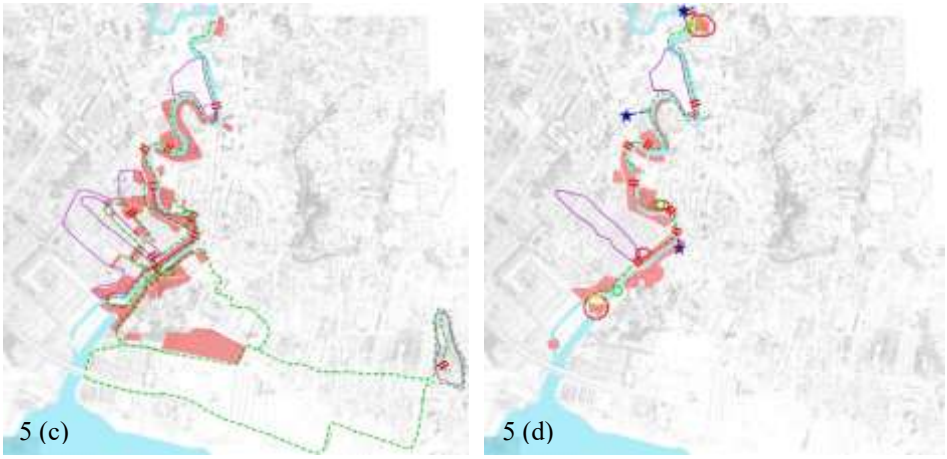


Figure 5 (c): The distribution patterns of important landscape settings that are individually significant to the tourist guide.
Figure 5 (d): The distribution patterns of important landscape settings that are individually significant to the boat skipper.

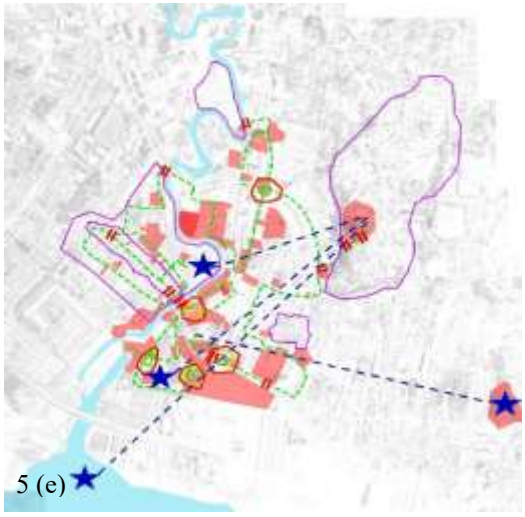


Figure 5 (e): The distribution patterns of important landscape settings that are individually significant to the rickshaw puller.

The findings show that the important urban river corridor territory perceived by the working communities in Melaka City includes various types of dominant natural settings as well as historical and contemporary built settings. Hills are a natural component in a natural setting that is found significant in providing sources of nature, culture, history and scenic attraction that are important to some of the working communities' working routines, particularly for those related to tourism activities, such as the city journalist, the tourist guide and the rickshaw puller. Old townships, kampung, and colonial management and civic center are the three historical developments that are found outstanding in the historical built setting in urban river corridor of Melaka City. This research also discovered that riverfront landscape, artificial peninsular and urban commercial center are the main types of developed settings in contemporary built settings of urban river corridor that are important to working communities of urban river corridor in Melaka City.

Figure 6 (a): St. Paul Hill is perceived as one of the important natural settings in the middle of the city by working communities.

Figure 6 (b): Kampung Morten is perceived as one of important built historical settings by the working communities.

Figure 6 (c): The historic management and religions buildings within the civic center zone of Melaka City is perceived as one of the important historical built settings by working communities in this city.

Figure 6 (d): The riverfront landscape area near to Sungai Melaka estuary is perceived as one of the important contemporary built settings by working communities.

The participants in Melaka City also have demonstrated their attachment and appreciation most to the historic management and civic center - Bandar Hilir area, due to its strong heritage significance. However, they are also had similar

perceptions about how kampung which this research classifies as a type of historical built setting have significant influences on their working routines. All these settings are found scattered throughout and beyond the preliminary boundary defined earlier in the research, which was based on the researcher's observations conducted during Stage 1. The core boundary that defines the genuine territory of working communities' important urban river corridor landscape for Melaka City is finally revealed from the ELS, in-depth interview and mapping activities.

DISCUSSION

The findings revealed that the urban river corridor in Melaka City possessed a form of urban river corridor boundary that is significant in influencing the working communities' routine and their living survival in the settings. Using the ELS approach, this research found that the working communities' movements and routine settings expand beyond the preliminary boundary determined during the preliminary research stages via on-line and on-site exploration (Refer Figure 3).

This research discovered that the working communities' important urban river corridor territory in Melaka City also includes all the natural and built water-related landscape settings that are perceived as valuable in supporting their working routines and personal needs in the settings. The findings also showed that a boundary of important the urban river corridor in Melaka City is unique in aspects of it physical and geographical forms, size and area coverage, as well as the complexity of their characteristics.

The identified boundary is also expanded beyond the federal's technical river corridor boundary as specified by the DID in the Riverfront Development Guideline 1996. These findings also reject the terminology used to specify the technical boundary of river corridors in the Malaysian context developed by the DID which is stated as: "the river, including the area extending fifty (50) meters beyond the river reserve on both sides". On the one hand, this terminology offers a clear understanding of the technical condition of urban river corridors in the Malaysian context that significantly assist the way urban river corridors in Malaysia are sustained and managed. On the other hand, this terminology has been widely referred to, and used, by local urban managers and design teams in their urban river corridor development decisions and activities that have rigidly influenced the way they design. Further, they have encouraged unsustainable responses to the places in question. As such, the boundaries of river corridors have been seen, and treated, as standard in form and design approach in the Malaysian context.

ACKNOWLEDGEMENTS

The author would like to thank the School of Housing, Building and Planning, Universiti Sains Malaysia (USM) and the Ministry of Higher Education Malaysia for sponsoring the research.

REFERENCES

Earth, G. (Cartographer). (2017). Melaka, Malaysia. Retrieved from http://maps.google.com/

Forman, R. T. T. (1995). Stream and river corridors Land Mosaic: *The Ecology of Landscapes and Region* (pp. 208-252). Cambridge: Cambridge University Press.

Malaysia, D. I. D. (2006). *Garis panduan Konsep Pembangunan Berhadapan Sungai*.

Mohamad, S., Toriman, M. E., Aiyub, K., & Jaafar, M. (2005). *Sungai & Pembangunan Tebing Sungai Bandar Malaysia (Rivers & The Development of Malaysian Urban River Corridors)*. Bangi, Selangor: Universiti Kebangsaan Malaysia.

Nordin, E. A. (1998). *Sungei Melaka: The past and present.* (Architecture), Institut Teknologi Mara, Shah Alam.

Rustam, M. A. (2007). Foreword YAB Datuk Seri Hj Mohd Ali Rustam Sungai Melaka: *The Rejuvenation of a National Cultural Heritage* (pp. 6). Melaka city: Pesona Metro Sdn Bhd.

Rustam, M. A. (2008). Livable Cities for Tomorrow: *City of Historic Melaka's Experience*. Malacca City Malaysia: Minister of Melaka, Malaysia.

Salim, N., Othman, A. G., Mohamed, B., & Ismail, H. N. (2012). Heritage Awareness Among Tour Operators in Heritage Sites: *A Case Study of Rickshaw Pullers in Melaka.* Paper presented at the 3rd International Conference on Business and Economic Research (3rd ICBER 2012) Proceeding, Bandung Indonesia.

SMHB. (2010). Sungai Melaka Rehabilitation and Beautification Project [Site photographs]. Melaka: SMHB.

Thwaites, K., & Simkins, I. (2007a). Reading the experiantial landscape. In K. Thwaites, S. Porta, O. Romice, & M. Greaves (Eds.), *Experiential Landscape: An approach to people, place and space* (pp. 79-108). New York: Routledge Taylor & Francis Group.

Thwaites, K., & Simkins, I. (2007b). *The Vocabulary of Experientiential Landscape Experiential Landscape:* An approach to people, place and space. Great Britain: Routledge Tylor and Francis Group.

Received: January 2020. Accepted: 22th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 14 – 24

VOLUNTEERISM ACTIVITIES TOWARDS PLACE MAKING: CASE STUDY PITT STREET, PENANG

Muhd Nadzmi Abd Rahim[1], Diana Mohamad[2]

[1,2]*School of Housing, Building & Planning*
UNIVERSITI SAINS MALAYSIA

Abstract

Through the World Giving Index 2014 Survey by the Charities Aid Foundation (CAF), Malaysia is ranked 76th out of 160 countries in terms of willingness to spend time to engage in volunteerism, provide financial assistance to others and be prepared to help non-Malaysian citizens (Lili Wang & Robert Ashcraft, 2014). Place making is a concept used in the planning, design and management of public-spaces in urban areas development; where it influences social development of a location. Volunteering activities should be determined by the type, place and time of a place where the activity is conducted. This study focuses on the UNESCO World Heritage Site in Penang (Malaysia) namely Street Pitt. Questionnaire survey was conducted in order to understand the sociability and volunteerism activity of the study area. The variables include types and frequency of volunteerism, level of involvement and factors influencing place making. The finding shows that Street Pitt manages to be one of the places that apply all elements contained in the concept of making place. In the social aspect, this area has become a popular volunteerism activity and also one of the most visited tourist spots.

Keywords: Volunteerism, Place making

[2] Lecturer at Universiti Sains Malaysia. Email: diana_mohamad@usm.my

INTRODUCTION

Willingness to undertake a service without needing to be assigned, ordered, or told can be derived as volunteerism. It is an act of taking the initiative on a task and responsibility without being requested to do so or even responses for the order. Volunteerism is an activity that is time-consuming, unpaid, doing something that aims to benefit the environment, individuals or groups other than (or in addition to) a close relative. According to Morris et. al (2013) and Jelena et al. (2018), current demographic, policy and management changes are a challenge to voluntary organisations to develop voluntary practice in their place. One of the aspects that can make society engagement more sustainable is through volunteerism. Volunteers are a powerful way to engage people in addressing development challenges where everyone can contribute for any development and betterment in social aspects and community themselves (UN Volunteers Myanmar, 2015).

Place making is a method that combines both an overarching idea and a hands-on tool. The purpose is to improve a neighborhood, city or region. The potential ideas can be used to transform the place where it can strengthen the connection between people and the places they share. Place making is one of the approaches used in the planning, design, and management of public spaces. Place making is a multi-dimensional approach of perspectives in the planning, design and management of public spaces in the area of public-space (public spaces). This approach is expected to make a built environment safe, comfortable, attractive and can be identified or associated with the community. Place making can create an environment that is capable of powering the next creatively for the community to be part of the identity of the local community. In light of this, this paper is aimed to determine the factors motivating community engagement in volunteerism activities, and the results will then be studied in order to assess its contribution to place making of Pitt Street.

LITERATURE REVIEW

Volunteerism Activities

According to Emmeline Widjaja (2010), the quote by Winston Churchill, “We make a living by what we get, but we make a life by what we give”, encapsulates the meaning that people derive to helping others. The desire to help appears to be an essential aspect for everyone because it is part of human nature. One particular type of helping behaviour is volunteerism. Volunteerism activities among community themselves will empower the spirit of the neighbourhood and enhance brotherhood and awareness in appreciating and assisting society in need through the volunteering works in the community area itself. In this way, volunteers can play a major role in bringing change in society and across the country. To Clary and Snyder (1999), there are six motives influence someone to do volunteerism:

2 Values: 1. Refers to the expression of values related to altruistic and humanitarian concerns, 2. Offer opportunities to meaningfully serve others
3 Understanding: 1. Motivations oriented to acquiring and/or improving knowledge, skills, experiences, etc; 2. Present professional in-service training with time for self-reflections
4 Enhancement: 1. Motivations centered on self-knowledge, self-development and, in general, feeling better about oneself, 2. Keep the experience positive and upbeat
5 Career: 1. Motivation to enhance knowledge in a specific area related to professional and academic development, 2. Provide specific skills development
6 Social: 1. Motivations related to what are called social adjustment and adaptation functions, 2. Facilitate team building and opportunities to socialize
7 Protective: 1. Motivations oriented to protecting the ego or escaping from problems.

Place Making Concept

According to Metropolitan Planning Council (2008), place making is a multi-faceted approach to planning, design and design public space management. It involves viewing, listening, and asking questions about people who live, work and play in something specific to meet their needs and aspirations. This information is then used to make the same vision for the place. Vision can grow immediately into the implementation strategy, starting with a small scale, capable of being done improvements that can benefit public space and people who use it. Creative spheres of place making bring layers to life and private space, rejuvenate structures and roads, improve the viability of local businesses and public safety, and bring various people together to celebrate, inspire, and inspire. Place making is not just the act of building or fixing up a space; it is a process that fosters the creation of vital public destinations – the kind of places where people feel a strong stake in their communities and commitment to making things better. Figure 1 shows the tool developed by Project Public Space (PPS) in order to help communities to evaluate places.

Figure 1: Developed tool for communities to evaluate places
(Source: Metropolitan Planning Council, 2008)

Place making concept for place evaluation is divided into the following:

7.2.1 Sociability:

Sociability can be defined as the quality of being sociable and feels of liking to meet and spend time with other people. It is a pleasurable and delightful experience as a result of society interaction. Sociability is important to make a good place making, yet it is one of the hardest qualities to be achieved (Project Public Space (PPS) (Metropolitan Planning Council, 2008). Through sociability (including feeling comfortable to interact with strangers), the society tends to feel a stronger sense of place or attachment to their community and to the place that fosters these types of social activities. According to Morris et al. (2017) it can be measured in terms of type of housings, security, privacy, volunteerism, and weekend use of the park to know what a place is all about.

7.2.2 Uses and Activities:

Activities are defined as the action of using something for the purpose of achieving place making, while activities are defined as the condition of something happening or done. Therefore, uses and activities are to find what volunteerism

activities could benefit a place. Activities are the basic building blocks of any place, so having something to do gives people a reason to come to a place and to return in the future. Therefore, a good place has more activities that are on-going and people have an opportunity to participate. According to Emmeline Widjaja (2010), the ultimate success of a space is how well it is managed.

7.2.3 Access and Linkages:

Access is defined as how easy a space can be reached or entered, while linkages are defined as linking different entities of the same place to a different place. A good place should have the accessibility that is connected to its surroundings, both visual and physical. A good place in addition should have a high parking availability and ideally convenient public transit in order for it to become a good place making (Clary & Snyder, 1999).

7.2.4 Comfort and Image:

Comfortability and image are about the feeling of people towards the place. A comfortable space presents itself well and it is obvious that a comfortable space has a good image. Comfort is defined as a sense of physical ease to carry out activities and social interaction. On the other hand, image is tangible and intangible things that represent the space (Angela et al., 2007). Comfort includes the perception of safety, cleanliness, and availability of places to gather, interact or enjoy the environment.

METHODOLOGY

In order to have a deeper understanding about the place making elements (Social quality, Uses and Activities, Access and Linkages and the comfort and image), observation approach was first employed. Based on the observation done at Pitt Street (included in the UNESCO World Heritage Site), more detailed information about volunteerism activities, participation level and the number of volunteers were obtained. Besides, data on the motivation factors influencing volunteerism activities were gained.

A total of 70 questionnaire surveys were conducted in one-month timeframe where respondents were selected using snowball sampling, as potential candidates were difficult to find due to limited information on registered volunteers that could be obtained from the appointed organizations. The questionnaire survey was utilized to gain insights on respondents' thoughts about volunteerism activities that have been conducted and their motivation to participate in the activities. This is important as ideas and thoughts can be shared given a creative place making is tailored by the ideas of the people. The questionnaire survey was designed into four sections, namely: 1) Respondent Background Information, 2) Type of Volunteering Activity, 3) Participation Level and 4) Factors Influencing Place making. Respondent's background

information gathered information on age, gender, ethnicity, marital status, academic level and respondent's work. Volunteer motivation was measured using the Volunteer Functions Inventory (VFI) instrument developed by Clary and Snyder (1999). The VFI was built to test the individual motives of choosing to volunteer by looking at the approach to Function Theory (Katz 1960). Place making was measured by using the element in the concept of place making by PPS. Located in a UNESCO World Heritage Site, Pitt Street has many distinctive features and a variety of uniqueness and influences various elements that mirror the sense of place (cultural and arts activities, as well as heritage values in terms of living heritage and architectural styles). Known as the Street of Harmony, it contains four religious centers of worship and this is used as a symbolical image of a harmony local community (Figure 2).

Kapitan Keling Mosque

St. George Church

Kuan Yin Teng Temple

Sri Mariamman Temple

Figure 2: Religious centers of worship in Pitt Street, George Town, Penang

RESULTS

Demographic profile results are as follows: 1. majority of the respondents were women (48 respondents, 68.6%), 2. Most of the respondents aged between 21 to 30 years (91.4%), 3. Majority of respondents are Malays (77.1%), 4. 55 respondents are students (78.6%), and 5. Most of the respondents are highly educated (97.1%). Table 1 presents data related to the types of volunteerism

activities and the timing of voluntary activities. The findings show that there are nine types of voluntary activities conducted at Pitt Street. For others, the type refers to affiliations or a mixture of volunteer activities at any one time. From Table 1, it was learned that respondents were actively engaged in most of the volunteerism types (M=3.26). This may be due to the fact that volunteers are free to engage in any volunteer activity and most of them tend to engage in any volunteer activity available at one time. The second highest mean (3.13) was recorded for Cultural, art and Heritage volunteerism activity. This result is directly influenced by the UNESCO World Heritage Site status and most of the event and volunteerism activity conducted were related to the cultural, art and heritage aspects. It appears that morning is the most active time for volunteerism activities, compared to night time.

Table 1: Type of Volunteerism and the Activity Time

Dimensions	Morning	Afternoon	Evening	Night	Mean
Culture, Art and Heritage	15	4	9	11	3.13
Education, Skills, Conventions, Conferences and Exhibitions	26	8	4	1	2.46
Health Treatment	31	1	5	-	2.37
Celebration of Eid or Religious	26	2	8	5	2.53
Natural Disaster	20	7	7	2	2.71
Sports or Tournaments Event	32	1	6	-	2.08
Tourism	27	3	6	3	2.36
Community Service	27	4	6	5	2.26
Environment	31	3	6	-	2.21
Others	15	2	13	-	3.26
Total	250	35	70	27	-

Table 2 presents results related to the frequency of the volunteerism activity. In relation to daily routine, the highest and the lowest frequencies were recorded for the environment (10 respondents) and sports or tournament events (2 respondents). In case of weekly routine, the highest and the lowest frequencies were observed for culture, art and heritage (16 respondents), and celebration of Eid or Religious and others (4 respondents respectively). Meanwhile, balance results were presented by monthly routine. For term and annual routine, it was learned that the lowest frequency displayed was 4 respondents (each for others, health treatment and tourism).

Table 2: Frequency of the Volunteerism Activity

Dimensions	Daily	Weekly	Monthly	Term	Annual
Culture, Art and Heritage	3	16	26	8	6
Education, Skills, Conventions, Conferences and Exhibitions	8	11	23	6	10
Health Treatment	7	12	25	7	4
Celebration of Eid or Religious	3	4	25	8	18
Natural Disaster	3	5	23	11	12
Sports or Tournaments Event	2	9	22	17	11
Tourism	7	6	27	4	14
Community Service	8	12	26	5	12
Environment	10	11	26	6	5
Others	6	4	20	9	4

From Table 3, level of community participation in Pitt Street was due to the community's high expectation in volunteerism activities could further improve themselves and enhance the environment. There are six involvement factors in the volunteerism activity, measured using Likert Scale. Overall, the most influential factor is related to volunteerism activity capability of enhancing noble values among society (M=3.71), while the least influential factor is followed by volunteerism has a positive impact on social development and volunteerism is volunteerism has had a positive impact on the development of community integration (M=3.61). Results directly present the importance of volunteerism activities as foundation and fundamental to development planning and management of an area, which will positively lead to a practical and pragmatic step of place making. This study also learned that these factors influenced the involvement of local communities and volunteers to participate in all types of volunteerism activities, where this further affirms sociability element in place making concept.

Table 3: Level of Community Participation in Volunteerism Activity

Level Participation	Strongly disagree	Disagreed	Agreed	Strongly Agree	Mean
Volunteerism is capable of enhancing noble values among society	1	-	17	52	3.71
Volunteerism is the best space to increase community	1	1	23	43	3.63

involvement in developing research areas					
Volunteerism has a positive impact on social development	1	-	21	48	3.66
Volunteerism has had a positive impact on the development of community integration	1	-	24	45	3.61
Volunteerism is able to improve the environment of an area	1	1	23	43	3.63
Volunteerism is able to enhance the image of an area	1	1	19	49	3.66

From Table 4, contribution factors for place making in Pitt Street was influenced by four important elements of place making concepts that are sociability, uses and activities, access and linkages and comfort and image. Classification of contributing factors consists of three categories, namely low, medium and high levels based on the mean value. The results show that the majority of respondents was influenced by the sociability element for volunteerism's ability to enhance the intimacy between local communities, volunteers and visitors with high involvement with a mean value of 3.60 (SD = 0.549). The second highest mean shows factors of contribution to place making is the diversity of volunteerism can enhance the image of an area which is also an element of sociability with mean value of 3.51 and SD (.503).

This study has proven that the place making of Pitt Street might be influenced by the sociability element where people desire for the integration and intimacy between local communities, volunteers and visitors / tourists. Besides, the following factors (volunteerism is able to attract a positive image, and volunteerism is able to guarantee the cleanliness of an area) are factors that also play an important role in place making of Pitt Street. The least contributing factors are as follows: volunteerism is able to enhance accessibility for information (M=3.36) and volunteerism facilitates a well-known and visited area (M=3.41). In conclusion, all factors of place making concept are well-suited for Pitt Street, which means, further research and events should prioritize Sociability elements.

Table 4: Factor of Contribution for Place Making

Place Making Elements	Factor of Contribution for Place Making	Mean	Std. Deviation
Sociability	The diversity of volunteerism can enhance the image of an area	3.51	.503
	Volunteerism can make the area more interactive and engaging	3.47	.583
	Volunteerism is capable of enhancing intimacy between local communities, volunteers and visitors / tourists	3.60	.549
Uses and activities	Volunteerism has made the area more virulent	3.41	.496
	Volunteerism is important for the development of an area	3.40	.575
	Volunteerism can be a privilege for an area	3.44	.528
Access and linkages	Volunteerism is able to enhance the security of an area	3.31	.671
	Volunteerism is able to guarantee the cleanliness of an area	3.46	.736
	Volunteerism is able to attract positive image for an area	3.50	.608
Comfort and image	Volunteerism is able to enhance accessibility for information	3.36	.660
	Volunteerism facilitates a well-known and visited area	3.41	.602

DISCUSSION AND CONCLUSION

Pitt Street is a very well-known area for tourism attraction and social activities. Located within the UNESCO World Heritage Site, the social activities are impressive in size where the objective of these activities is related to the development of surrounding areas and the notion of strengthening the Penang State as one of the friendly areas. In addition, Pitt Street is indirectly viewed as a place of comfort that promotes social interaction and encourages loyal community and loyal visitors. To the outside world, this portrays an attractive local community that is blessed with a viable and sustainable environment for living, working and socializing. Notwithstanding these incredible features, these potential points (especially the vibrant environment and the friendly local community) are often underutilized when it comes to place making. From results, it is evident that volunteerism activities can help to improve the overall quality of life of the local community and benefits the volunteers with the ease of sociability, uses and activities, access and linkages and comfort and image of Pitt Street. Thus, in order to enliven the sense of place which is driven by residents and volunteers (which then indirectly resulted in place making), the volunteerism

activities and programs should use a place-making strategy that emphasizes on community-based approach and perspective. More importantly, the activities and programs should be given additional attention towards the sociability elements and these elements should be constructed on the following pillars: social, cultural, environmental and economic benefits.

ACKNOWLEDGEMENT

This article is made possible by the Fundamental Research Grant Scheme under funding of the Ministry of Higher Education [FRGS Grant No: 203 / PPBGN / 6711707].

REFERENCES

Angela Ellis Paine, Steven Howlett, Joanna Machin, Cathy McBain, Nick Ockenden, Simon Teasdale & Meta Zimmeck (2007). Volunteering works: *Volunteering and social policy.* Retrieved on 18th July 2018 from http://www.kansalaisareena.fi/Vol_Works-IVR.pdf

Clary, E.G. and Snyder, M. (1999). The Motivations to Volunteer: Theoretical and Practical Considerations. *Current Directions in Psychological Society* 8(5), 156-159

Emmeline Widjaja (2010). *Motivation behind Volunteerism*. Retrieved on 18th February 2019 from https://pdfs.semanticscholar.org/

Jelena Culibrk, Milan Delic, Slavica mitrovic & Dubravko Culibrk (2018). Job satisfaction, organizational commitment and job involvement: the mediating role of job involvement. Retrieved on 18th February 2019 from https://www.ncbi.nlm.nih.gov/

Lili Wang & Robert Ashcraft (2014). *Organizational Commitment and Involvement*: Explaining the Decision to Give to Associations. Nonprofit and Voluntary Sector Quarterly 43(52). https://doi.org/10.1177/0899764013515755

Metropolitan Planning Council (2008). *A Guide to Neighborhood Placemaking in Chicago*. PPS Publisher.

Morris, S., Wilmot, A., Hill, M., Ockenden, N., & Payne, S. (2013). A narrative literature review of the contribution of volunteers in end-of-life care services. Palliat Med 23(5), 428-436

Morris, S., Payne, S., Ockenden, N., & Hill, M. (2017). Hospice volunteers: bridging the gap to the community? *Health Soc Care Community* 25(6), 1704-1713

UN Volunteers Myanmar (2015). A study on Urban Volunteerism in Myanmar. Retrieved on 18th February 2020 from https://www.cusointernational.org/

Received: January 2020. Accepted: 14th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 25 – 34

POST-CONSERVATION EVALUATION (PCE): FINANCIAL PERFORMANCE OF ADAPTIVE REUSE MUSEUMS IN GEORGE TOWN, MALAYSIA

Muhammad Firzan Abdul Aziz

School of Housing, Building and Planning
UNIVERSITI SAINS MALAYSIA

Abstract

Adaptive reuse of historic buildings has become a prominent trend in the scenario of built heritage conservation of Melaka and George Town, UNESCO World Heritage Sites of Malaysia. Such implementation however is questionable since there have been several dilemmas raised in relation to the local museum industry. Among them are stiff competition faced by museums as an attractive cultural product, not appealing to business funders, rarely favoured as a family holiday destination and being perceived as dull and old repositories by the younger generations. As adaptive reuse is known to revive the physical and functional facets of historic building which then contributes to its economic generation, this study attempts to understand the financial impact from such implementations. Post-conservation evaluation (PCE) focusing on financial performance was conducted on adaptive reuse museums in the Core Zone and Buffer Zone of George Town, involving Penang State Museum (PSM), Made in Penang Interactive Museum (MIPIM), Batik Painting Museum (BPM) and Dark Mansion-3D Glow in the Dark Museum (DM) which were shortlisted trough purposive sampling. Key informants' survey was then carried by engaging key person identified to be resourceful and knowledgeable with the respective museums' financial background and history. It is found that the adaptive reuse museums have yet to gain a stable return of investment, due to low-income generation from their ticketing sales in relation to higher operational and maintenance costs they require. By conducting PCE on the financial performance of adaptive reuse buildings that are of cultural and historical values, conservation stakeholders may be furnished with better information that aids better decision-making in the future.

Keywords: Adaptive reuse museum, financial performance, historic building, post-conservation evaluation (PCE), UNESCO World Heritage Site

[1] Corresponding author's email: firzan@usm.my

INTRODUCTION

Apparently, many cities nowadays opted for adaptive reuse as a means of urban revitalisation and conservation. Conservation of built heritage, through adaptive reuse of historic buildings within heritage sites has been long associated with the agenda of sustainability. Such implementation is deemed vital in meeting sustainable development through the trifold environmental, social and economic dimensions (Feilden, 2000; Bullen P., 2007; Godwin, 2011). In Malaysia, Melaka and George Town have been inscribed in the UNESCO World Heritage Sites on 7th July 2008. Under the cultural heritage category, Melaka and George Town have been revered as the Historic Cities of the Straits of Malacca for their Outstanding Universal Values (OUVs) comprising both tangible and intangible heritage. One of the significant conservation trends apparent in Melaka and George Town is the act of converting old buildings to museums.

The scenario however raised a question on the financial impacts of adaptive reuse museums since there have been several dilemmas raised in relation to the local museum industry. Years before the inscription date, Rowley (1999) already found that museums face a stiff competition in attracting tourists, by having to compete with other leisure and touristic destination spots. Former general director of the Department of Museums Malaysia, Dato' Dr Adi Taha meanwhile reported that Malaysian museums have always been unattractive by financial providers due to their poor capability in generating revenue to the nation (Taha, 2009). Later, another former general director, Datuk Ibrahim Ismail affirmed that Malaysian museums were rarely being listed as a favourable family destination trip compared to other holiday destinations (Abdul Razak, 2011). More recently, Datuk Seri Mohd Shafie Apdal, a local politician, observed that museums have been perceived as old and dull repositories which are not worth of attention for the younger generations (Mokhtar & Kasim, 2012).

The prevalence of adapting historic buildings to museums is testified as 44% (27 out of the total 61) of museum buildings in Melaka and George Town were found to be adaptive reuse museums (Abdul Aziz, 2018). Acknowledging that adaptive reuse implementation can bring positive physical, functional and financial outcomes to historic building, this paper presents the post-conservation evaluation (PCE) made in regard to financial performance of adaptive reuse museums in George Town. George Town is the capital city for the state of Penang which has the highest number of historic buildings in Malaysia (Kamaruzzaman & Zulkifli, 2014). As there is a paucity of studies made on private museums compared to public museums in Malaysia, this paper would further enlighten on the financial performance of adaptive reuse museums in George Town, which are mostly owned by private individuals and agencies.

RESEARCH BACKGROUND

Theoretically, adaptive reuse fosters rejuvenation and prolongation of physical and functional aspects of built heritage (Langston, Wong, Hui, & Shen, 2008; Bullen & Love, 2011; Kamal & Ab Wahab, 2014). The concept of adaptive reuse has been heavily linked with financial resiliency of historic buildings, as financial revenue is the by-product of the physical and functional revitalisation. Moreover, return of investment of historic building is an important indicator of conservation success, as indoctrinated in the local conservation philosophy comprising the twofold criteria of (Keromo, 2000):

- Safeguarding heritage; to retain the authenticity of materials (type, colour and texture), architecture (construction technique and workmanship) and original use (function or type).
- Developing heritage; to utilise and leverage heritage for economic gains without forsaking its preservation and conservation.

Imperatively, one of the components of sustainable development is economic factors. Hence, it is sensible that adaptive reuse aims to revitalise and sustain old buildings, by giving them a new life through their operational and economical facets (Langston, Wong, Hui, & Shen, 2008; Bullen & Love, 2011; Kamal & Ab Wahab, 2014). As generally discussed, the financial performance of a building arises from its physical and functional performances that includes the calculations of capital and recurrent (life-cycle) expenditures, depreciation, and efficiency of use etc. (Sapri & Pitt, 2005). In this regard, building performance can be evaluated by understanding how the building performs financially through its economic sense (value for money or return of investment) (Leaman, Stevenson, & Bordass, 2010). Acknowledging that efficiency refers to the extent of which activities or the desired effects are achieved with the lowest possible use of resources or inputs (National Centre of Sustainability, 2011), Abdul Aziz (2018) scrutinised on financial efficiency of conserved historic buildings in his post-conservation evaluation (PCE) studies.

Abdul Aziz's (2018) PCE attempted to understand the performance and impact of adaptive reuse implementation by reviewing Operating Expense Ratio (OER) that indicates the annual patterns of expenditure (focusing on their life-cycle costs of operational use and building maintenance) over income and revenue. Through the OER trends, building owners or investors can predict whether the property has been managed efficiently or profitable, by comparing the property's income coverage against its operational and maintenance costs. This is because, annual increment of the OER pattern signals that an investor may lose more money if he or she holds the property longer (Investopedia, LLC., 2014; DV, 2016).

Besides OER, an aspect of Contingency Valuation Method (CVM) commonly used to assess historic buildings known as willingness-to-pay (WTP), is also useful to assess the financial performance of conserved historic buildings. WTP is the theory used to understand the economic feasibility and sustainability of heritage sites. WTP is based on people's evaluation of cultural heritage, and their consumerism preference (Kim, Kevin, & Cho, 2008; Choi, Ritchie, Papandrea, & Bennett, 2010; Dong, Zhang, Zhi, Zong, & Li, 2011; Noor Fazamimah, Anuar, & Yahaya, 2015). WTP is meaningful in informing the return of investment for cultural heritage goods, typically valued through their consumption via entrance fees gained and conservation funds received (Beltran & Rojas, 1996).

Apart from OER and WTP, consideration on building's economic performance through its life-cycle costs (LCC) is essential to determine cost-effectiveness and later influence strategic, tactical and operational decisions (Dorasol, Mohammad, Mohammed, Hamadan, & Nik Lah, 2012). Blanchard, Verma and Peterson (1995) reported that 50% to 80% of the total LCC is spent during in-service life. In this sense, the building operation and maintenance phase of LCC is crucial and has a major impact on building performance. NIBS (2009) described cost-effective building as the one that renders the lowest operating and maintenance costs, has the longest lifespan, encourages productivity among users and offers the greatest return on investment. Dorasol, Mohammad, Mohammed, Hamadan and Nik Lah (2012) added specifically that an efficient building is one that uses energy and water efficiently.

METHODOLOGY

Initially, purposive sampling was adopted to shortlist buildings from the total 29 museum buildings found in George Town. The two criteria used were i. location (buildings within the Core Zone and Buffer Zone of George Town) and ii. conservation (buildings of cultural, historical or architectural importance which have gone through adaptive reuse implementation). Then, a key informants survey was conducted at the shortlisted buildings, by engaging a key person from each of the shortlisted buildings. They were basically those identified to be resourceful and knowledgeable with the financial background and history of their respective museum. Timeline for the financial archive sought was from year 2008 (in conjunction with the inscription year of UNESCO World Heritage) to 2016 (year of data collection). A survey feedback form which probed on museum income and expenditure was used to retrieve and yield the OER patterns as shown in Figure 1. During its issuance, the survey form was first explained to the respective museum key informants to foster a better clarity and accuracy of data input.

Museum's Financial Performance (Year & Month)		**Income (RM)**		**Expenditure (RM)**	
		Ticketing Revenue *(based on no. of visitors)*	**Heritage Conservation Fund Received** *(If any, please state the source)*	**Operational Costs** *(utility bills such as electricity, water etc.)*	**Building Maintenance Costs** *(If any, please state which building elements/areas)*
Year ____	January				
	February				
	March				
	April				
	May				
	June				
	July				
	August				
	September				
	October				
	November				
	December				
	(or Lump Sum Amount)				

Figure 1: Screenshot preview of the key informants' survey form used for acquiring financial performance data

The survey form used entails columns on year and months, as well as on income and expenditure. The income column was subdivided into two sections of: i. Ticketing revenue (based on visitations) and ii. Heritage conservation fund received (based on financial grants or other monetary assistance received in relation to building conservation, if any). The expenditure column meanwhile was also sub-divided into two sections consisting: i. Operational costs (based on utility bills such as electricity, water and other expenses required for building operation) and ii. Building maintenance costs (based on maintenance or remedial works required on the building elements or areas). Upon feedback completion, the survey forms were then recollected for data analysis purposes. In line with the standard OER calculation method, the sum of museum expenditure was divided with the sum of museum income for each operational year of the museums. In this manner, declining annual OER trend would conclude that the building attained higher income over expenditure (financially efficient) and vice versa (financially inefficient). Since this study involved sensitive information on museums' financial archives, confidentiality of discreet records and voluntary participation were two ethical matters seriously concerned by the current researcher. Thus, raw data on the financial performance were not provided as an appendix in respecting confidential policy.

ANALYSIS AND FINDINGS

Based on the purposive sampling with the two aforementioned criteria applied, 14 out of total 29 adaptive reuse museums were shortlisted. However, only four out of the 14 adaptive reuse museums were accessible (consent granted by their respective museum owners or managers) namely Penang State Museum (PSM), Made in Penang Interactive Museum (MIPIM), Batik Painting Museum (BPM) and Dark Mansion-3D Glow in the Dark Museum (DM). Table 1 shows the key informants involved during the data collection period:

Table 1: Key informants involved from the adaptive reuse museums of George Town

Museums	Key Informants' Position
PSM	Museum assistant
MIPIM	Museum co-owner and accounting staff
BPM	Museum staff
DM	Museum director

The four shortlisted adaptive reuse museums consisted of public and private museums based on their ownership. In the current study, the public museum involved was PSM which is government-owned operated by the Penang State Museum Board (PSMB). PSM's financial data were retrieved from the museum annual reports biennially published by PSMB, from year 2010 to 2014 which were available during the data collection period. Meanwhile, private museums involved in the current study consisted of those individually owned namely BPM and company-based ownership namely MIPIM and DM. Relatively, financial performance for the case of private museums were more difficult to be retrieved. This scenario was due to missing financial archives (for year 2013 and 2014 for BPM's case due to change of management) besides insufficient data to project OER pattern due to recent museum establishment (merely one-year financial data obtained for DM following its recent operational year). Table 2 summarises the individual results on OER of the adaptive reuse museums while Figure 2 projects their annual OER trends:

Table 2: Individual results on the Operating Expense Ratio (OER) of the adaptive reuse museums

		Year								
		2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Adaptive Reuse Museums	**PSM**	-	-	0.14	0.10	0.11	0.13	0.12	-	-
	MIPIM	-	-	-	-	-	0.13	0.02	0.11	0.11
	BPM	-	-	-	-	-	-	-	0.29	0.46
	DM	-	-	-	-	-	-	-	-	0.16

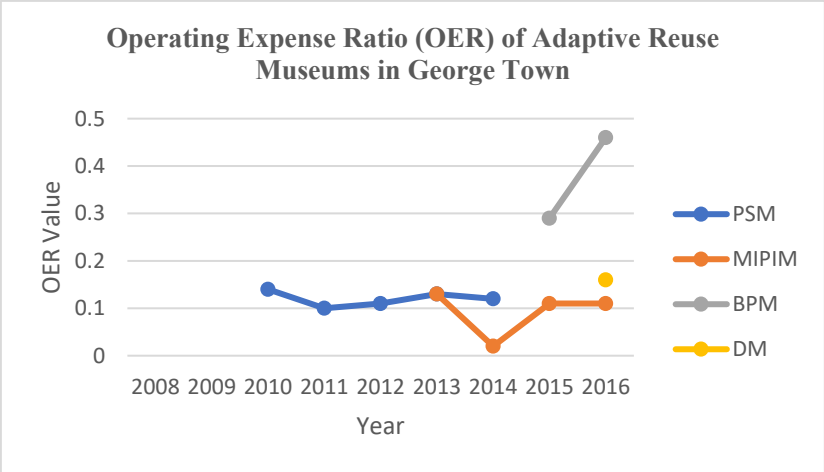


Figure 2: Annual trends on the Operating Expense Ratio (OER) of the adaptive reuse museums

Figure 2 depicts fluctuating OER trends for PSM and MIPIM, with an inclining OER trend for BPM. Implying from that, none of the four adaptive reuse museums shows a steadily declining OER trend throughout the years. It can be inferred that these historic buildings have yet to gain a stable return of investment

from their conversion to museums. They contradict the criterion of an efficient and profitable building which should have lesser coverage of revenue onto the operational and maintenance costs. Such scenarios can be associated with their low-income generation from ticketing sales in relation to the higher costs required for operating and maintaining the museum buildings. By forecast, the inclining OER trend of BPM signals that its investor may face financial loss for remaining the built property as a museum.

CONCLUSION

Summarily, the majority of the adaptive reuse museums have a steadily declining OER over the years. The trends generated however are deemed inadequate to conclude on the post-conservation impact of the adaptive reuse museums in George Town. This calls upon more comprehensive data on the museums' financial performance that span further annually in order to yield comprehensive OER trends. Since this study was limited by confidentiality and data inadequacy factors, future researchers are encouraged to expand and improve this study by retrieving more comprehensive data on financial performance from museum agencies. By conducting PCE focusing on financial performance of adaptive reuse buildings that are of cultural and historical values, conservation stakeholders such as the local authorities, building owners and conservators alike may be furnished with better information that aids better decision-making in the future. In this regard, PCE on financial performance as demonstrated in this paper, can be integrated with other impact evaluations to foster a more sustainable conservation planning and endeavours in protecting the Outstanding Universal Values of UNESCO World Heritage Sites.

ACKNOWLEDGEMENT

The author would like to appreciate the School of Housing, Building and Planning, Universiti Sains Malaysia (USM) for providing the financial support in publishing this article.

REFERENCES

Abdul Aziz, M. (2018). *Post-Conservation Evaluation* (PCE) Framework for Adaptive Reuse Museums: Case Studies of George Town, Malaysia (Doctoral dissertation). Kuala Lumpur, Malaysia: Universiti Malaya.

Abdul Razak, N. (2011). Cabaran 'hidupkan' muzium. Utusan Online. Retrieved from http://ww1.utusan.com.my/utusan/info.asp?y=2011&dt=0524&pub=Utusan_Malaysia&sec=Keluarga&pg=ke_02.htm

Beltran, E., & Rojas, M. (1996). Diversified funding methods in Mexican archeology. *Annals of Tourism Research*, 23(02), 463-478.

Blanchard, B., Verma, D., & Peterson, E. (1995). Maintainability: A key to effective serviceability and maintenance management. New York: Wiley.

Bullen, P. (2007). Adaptive reuse and sustainability of commercial building. Facilities,

25(1/2), 20-31.

Bullen, P., & Love, P. (2011). Adaptive reuse of heritage buildings: Sustaining an icon or eyesore. *COBRA 2011 Proceedings of RICS Construction and Property Conference* (pp. 1652-1662). University of Salford.

Choi, A., Ritchie, B., Papandrea, F., & Bennett, J. (2010). Economic valuation of cultural heritage sites: A choice modeling approach. *Tourism Management*, 31, 213–220.

Dong, X., Zhang, J., Zhi, R., Zong, S., & Li, M. (2011). Measuring recreational value of World Heritage sites based on contingent valuation method: A case study of Jiuzhaigou. *Chinese Geographical Science*, 21(01), 119-128.

Dorasol, N., Mohammad, I., Mohammed, A., Hamadan, N., & Nik Lah, N. (2012). Post occupancy evaluation performance criteria and parameters for hospital building in Malaysia. *The 3rd International Conference on Business and Economic Research* (ICBER), (pp. 2650-2667). Bandung, Indonesia.

DV. (2016). Financial ratio analysis. Retrieved from Demonstrating Value: https://www.demonstratingvalue.org/resources/financial-ratio-analysis

Feilden, B. (2000). *Conservation of historic buildings*. Oxford: Architectural Press.

Godwin, P. (2011). Building conservation and sustainability in the United Kingdom. *Procedia Engineering*, 20, 12–21.

Investopedia, LLC. (2014). Operating Expense Ratio - OER. Retrieved from Investopedia: http://www.investopedia.com/terms/o/operating-expense-ratio.asp

Kamal, K., & Ab Wahab, L. (2014). Bangunan bersejarah: Kerosakan dan penyataan kaedah kerja pemuliharaan. Shah Alam: Penerbit UiTM.

Kamaruzzaman, S., & Zulkifli, N. (2014). Measures for building lighting performance in Malaysian historical buildings: A systematic review. *Journal of Surveying, Construction and Property (JSCP)*, 05(01), 1-15.

Keromo, P. (2000). Piawaian dan pelaksanaan konservasi monumen dan tapak tanah bersejarah. Bengkel Konservasi Monumen dan Tapak Tanah Bersejarah. Pulau Pinang.

Kim, S., Kevin, K., & Cho, M. (2008). Assessing the economic value of a World Heritage site and willingness-to-pay determinants: A case of Changdeok Palace. *Tourism Management*, 28(01), 317-322.

Langston, C., Wong, F., Hui, E., & Shen, L. (2008). Strategic assessment of building adaptive reuse opportunities in Hong Kong. Building and Environment, 43(10), 1709-1718.

Leaman, A., Stevenson, F., & Bordass, B. (2010). Building evaluation: *Practice and principles*. *Building Research and Information*, 05, 564–577.

Mokhtar, M., & Kasim, A. (2012). Motivations for visiting and not visiting museums among young adults: A case study on UUM students. *Journal of Global Management*, 03(01), 43-58.

National Centre of Sustainability. (2011). A short guide to monitoring & evaluation. Retrieved from Evaluation Toolbox: http://www.evaluationtoolbox.net.au/index.php?option=com_rubberdoc&view=doc&id=29&format=raw

NIBS. (2009). Whole building design guide. Plan for fire protection. National Institute of Building Sciences.

Noor Fazamimah, M., Anuar, A., & Yahaya, A. (2015). Role of cultural heritage in

sustainable historic urban development: Economic perceptions of stakeholders (perceived value). *Jurnal Teknologi*, 75(09), 51-55.

Rowley, J. (1999). Measuring total customer experience in museums. *International Journal of Contemporary Hospitality Management*, 11(06), 303-308.

Sapri, M., & Pitt, M. (2005). Performance measurement in facilities management; State of knowledge. In F. Khosrowshahi (Ed.), 21st Annual ARCOM Conference, 7-9 September. 01, pp. 431-440. SOAS, University of London: Association of Researchers in Construction Management.

Taha, A. (2009). Museums in Malaysia: *Challenges and development*. In L. Noi, & T. Eng (Ed.), ASEAN Museum Directors' Symposium, ASEAN Civilizations Museum. Singapore.

Received: January 2020. Accepted: 14th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 35 – 50

TRANSPORTATION AND QUALITY OF LIFE

Abdul Ghapar Othman[1] & Kausar Hj Ali[2]

[1,2]*School of Housing, Building and Planning*
UNIVERSITI SAINS MALAYSIA

Abstract

Transportation is one of the key indicators used to measure the Quality of Life of people especially those living in the urban area. Many aspects of transportation are very significant as they have the power to directly influence our way of life in search for a better Quality of Life. Many Malaysians depend on private vehicle transportations to cater their daily travel needs which inevitably leads to an over infiltration of vehicles into the urban area. Automobile dependency has always been viewed as a potential threat to Malaysia's urban areas, as it contributes to the increase in traffic congestion, higher accidents rate, inefficient usage of urban land, environmental pollution, adverse economic impacts, urban sprawling and reduces the overall quality of public transportation. All these negative impacts deteriorate the quality of life of urban dwellers. This chapter will discuss Malaysia's urban transportation in general, focusing on the struggle between private and public transportation usage and the impacts of automobile dependency towards the urban dwellers' Quality of Life; as well as putting forward possible strategies and measures in an attempt to provide a balanced urban transportation system.

***Keyword**:* Transportation, quality of life, auto dependency

[1] Senior lecturer at Universiti Sains Malaysia Email: ghapar@usm.my

INTRODUCTION

The usage of automobiles in Malaysia has increased drastically for the past few decades. It is revealed that the number of private cars and motorcycles per thousand population increased from 456 in 2000 to 698 in 2010 and reached a staggering 898 in 2017. The number of registered cars and motorcycles more than quadrupled from 4,067,457 in 1990 to 16,453,976 in 2008 to 26,308,952 in 2017 (JKJR, 2018). During this period, the road network system in the country undergoes significant development, where the total length and quality of the road network increases, translating into faster and safer travel.

Although many Malaysians viewed owning a private vehicle is an indicator of improvement in quality of life, the truth is that an increase in number of vehicles and its usage or in general term "automobile dependency", has caused various problems to the urban area, such as traffic congestion, high road accidents rate, environmental pollutions, urban sprawling, reduced efficiency of public transportation, economic impact, inefficient land use, etc (Kenworthy and Laube, 1996; Rodrigue, Comtois & Slack, 2017). All these problems generated from automobile dependency have deteriorated the Quality of Life of Malaysians, especially for those living in urban areas. Various strategies have been proposed and implemented to alleviate traffic problems in urban areas but the government's initiative of implementing these strategies are inadequate and often receive little support.

Many agreed that the current transportation system in Malaysia is in trouble of becoming over dependent on private vehicle usage while neglecting the importance of public transportation. The absence of a good public transportation system will have profound effects on the quality of life of urban dwellers especially those that are mobility impaired and underprivileged. This is because they cannot afford to own or use a private vehicle and the lack of traveling options may deprive their chances of improving their own quality of life.

The Quality of Life according to Kubani (2005) is very much associated with transportation. In our life, we all wish that we could walk or cycle to work in less than 10 minutes, living in a better environment and adequate infrastructure that allows us to travel around without the use of an automobile and spend more time with our family doing what we like. But the ugly truth is that in reality, we have to commute further and longer to work because we cannot afford to stay near our workplace because of the high housing cost. We inevitably spend more time in our car than with our family because we leave home to work early in the morning, clogged in the traffic jam and returning home late to see that the children are already asleep.

Indeed, access to affordable transport will not only enhance the quality of life of individuals but also is a mark of well-managed cities. The challenge is to strike a balance between public and private transportation. In the following sections, urban transportation will be briefly discussed with a focus on private transportation, specifically on car usage, and to review the linkages between automobile dependency

and quality of life, the competition between public and private transportation as a mode of transportation in an urban area and finally, possible strategies for a balanced urban transportation system.

TRANSPORTATION

Transportation is a generic term which refers to the ability of movement between various points of origin and destinations transitory through a single or multiple point of interchange via a network in space for people, goods and information. Every single movement is connected with activities related to human social interaction such as education, employment, recreational, sports, shopping, etc. Transportation has been considered as one of the key bolsters for economic activity in modern societies (Rodrigue, Comtois & Slack, 2017).

Today, motorized transportation has dominated almost all kinds of trips made regardless of the distances of the trip, whether it is a short trip or a long-distance trip. However, some form of non-motorized transportation such as walking, cycling and pedicabs are still considered well worthy for making short distance trips. As the role of transportation becomes more significant in our daily life, it has become a necessity for the proper functioning of our modern societies that operates at a much higher pace.

Accessibility can be defined as mobility for opportunities which allows an individual the mobility to get to their desired destinations. This is why accessibility is not just about the ability of overcoming space but instead focused on the ease of how a person reaches his desired destination. On the contrary, as many trips nowadays are inevitable and many of them are just too far for walking or cycling, motorized transportation is the only practical solution. The technological transformation in the late nineteenth century had a profound impact on the transportation sector and has inevitably contributed to the changes of human lifestyles and has also become a significant influence in enhancing the quality of life (Litman, 2018).

Modes of transportation or transport modes are general terms for the different kinds of transport facilities, vehicle, infrastructure and operation that are the means by which people and freight achieve mobility. The transportation of people and freight to reach its destination may involve only a single mode or several modes, with the latter case being derived as intermodal or multimodal transport (Tsamboulas et. al. 2006). In this paper, human's mode of transportation will be given the emphasis and how it relates to quality of life. Modes of transportation are generally classified into three fundamental types, depending on the type of travel surface - land, air, and water. Land transportation comprises two major modes, roads and railways.

PRIVATE AND PUBLIC TRANSPORTATION IN MALAYSIA

Public transportation in the majority of the developing countries is a vital means of transport for making journeys consisting of mostly activities related to human social

interaction such as education, employment, recreational, sports, shopping and other daily activities. Good public transportation services and facilities are essential attributes of any urban area. Public transportation also provides a certain level of freedom, accessibility, opportunity and choice for the urban poor and those who cannot afford or use private vehicles. Public transportation systems are capable of moving a large number of passengers using lesser resources such as fuel, land and environmental costs. Most people nowadays have high automobile dependency on car travel. High car dependency not only creates and exacerbates traffic congestion on urban road networks, but it also seriously undermines the role of public transportation, which has become less cost effective and efficient due to reduced usage and increasing traffic congestion (Barter, 2001). This in some way influences and encourages more people switching to private transportation the moment they can afford to do so, hence contributing to the vicious circle of increasing congestion and environmental pollution, and further reducing the effectiveness of public transportation (Tseu, 2006).

The acceptance of private vehicles as a way of commuting is often claimed for the low patronage of public transportation and only a small percentage (10-20%) of current private vehicle users show interests in giving a consideration in using public transportation in the future for commuting purposes (Moller and Thogersen, 2008). As for the urban poor who cannot afford private vehicles and are desperately in need of properly accessible and reliable transportation, such scenarios are not beneficial (Steg, 2003; Mohamad & Kiggundu, 2007). Income also plays a key factor in private vehicle ownership which can also hamper the demand of public transportation (Paulley et. al., 2006). The Kuala Lumpur Structure Plan 2020 stated that 80% of the total passenger movements in Kuala Lumpur are by private transportation compared to only 20% by public transportation. These statistics shows that private transportation can exacerbate the performance, viability and efficiency of public transportation services.

The unhindered freedom of movement that users get from private vehicles is one of the main reasons why many people wish to possess their own private vehicle. Private vehicles give the user the perception of freedom, of being more in control and able to keep their personal schedule and thus enhance autonomy (Beirao, 2007; Mohamad & Kiggundu, 2007; Gardner & Abraham, 2007). Public transportation requires the sharing of services with strangers and might be crowded during peak hours; on the contrary the private vehicle provides much better privacy and comfort for its user. In addition, private transportation has become more prominent and prevailing than public transportation because it is always accessible when required and is capable of taking the user from door to door and is able to reach dispersed locations within the road network system. As compared to private vehicles, public transportation services are routed to existing route networks either cross-city or radial designed routes, where public transport users are often bound to the routes and designated stops provided by the public transportation provider. Owning a private vehicle allows the user to provide free lifts to others. Furthermore, owning a private car especially from exotic brands and

models are widely perceived as a symbol of affluence, position and wealth in society. (Vasconcellos, 1996; Steg, 2003; Mohamad & Kiggundu, 2007).

When using a private vehicle as a mode of travel, the user must search for a parking space once the user had arrived at the destination. Parking is often scarce and usually expensive especially in the city center. The advantage of getting on public transport is being able to "Pay and Ride" in order to avoid parking problems and having the responsibility of finding suitable parking space (Corpuz, 2007). Searching for a parking space can often add extra time to the driving journey. A study that was carried out on parking behavior has shown that looking for a parking space to park may take up to 25% of the average total travel time (Axhausen et. al. 1990).

Traveling cost should also be given emphasis when discussing issues relating to private and public transportation. This is particularly relevant in recent times when a car's running costs are rising due to high petrol prices, vehicle maintenance, insurance premiums and increasing congestion (Litman, 2006; Norhazlin and Muhammad, 2008). Clearly, traveling cost influences choice, however, lower public transportation cost will not in itself cause a shift from private transportation without the accompanying acceptable level of service and accessibility. Given the opportunity to choose, people will eventually choose the mode of traveling that best suited them, achieving an equilibrium whereby the drawbacks of the private vehicle transportation are equaled by the shortcoming of public transportation. (Kingham et al., 2001).

QUALITY OF LIFE AND URBAN TRANSPORTATION

In Malaysia, owning a personal transportation has become a necessity to meet daily needs, in order to sustain the quality of life. Based on statistical data from a major international comparison of transportation in developing Asian cities which included the Klang Valley, it is indicated that Malaysian cities have reached a point in their transportations system where the challenges associated with transportation are beginning to show signs in similarity with the wealthy and developed countries. These transportation challenges that Malaysian cities are facing now are not associated with the lack of mobility, but instead the problems are generated by too much mobility, particularly by the private motorized vehicles considered as the most damaging transportation modes (Kenworthy and Laube, 1996; Barter, 2001).
These challenges include:

i. Rapid growth in private vehicle ownership and use over other forms of transport. Increasing level of private vehicle dependency that resulted in increase of traffic volume on the road.
ii. Increasing traffic congestion due to the higher traffic volume, which impairs the economy and public transportation.
iii. Low level usage of public transportation.
iv. Unfriendly streets for non-motorized vehicles and pedestrians.

v. Local environmental impacts, for example air pollution, noise pollution and accidents.
vi. Urban transportation investments for road and parking, acquiring a large fee on investment and budgets on both governments and individuals.

From the challenges above, we are able to deduce a vicious cycle of urban transportation in Malaysia in the context of quality of life. Malaysia is experiencing a rapid growth of vehicle ownership with the Federal Territory (Kuala Lumpur, Putrajaya and Labuan) recorded the highest number of registered vehicles with 6,525,432 followed by Johor State with 3,680,533, and Selangor with 2,975,802 registered vehicles (CEIC, 2018). The Nielsen Global Survey of Automotive Demand reported that ownership of cars is relatively low across South-East Asia with 47% of Filipino households and 46% for Indonesian households do not own a car. Malaysia on the other hand, ranks third in the world with 93% car ownership and also has the highest rate of multiple car ownership globally with 54% of households having more than one car (Star Online, 2014). These figures show a high dependency on private vehicles among Malaysians. The term 'automobile dependence' refers to a condition where there are a very high number of private car usage in urban areas which has entrenched itself into the urban system of transportation and land use (Thomson, 1977; Kenworthy et. al., 1999). The levels of automobile dependency are in fact diverse between various cities depending on a range of factors. Automobile dependency in an urban area at its most extreme form will show characteristics such as private vehicles dominating as transportation mode choice, extreme dispersal locations of origins and destinations, high level of road capacity (highways) and low spatial densities (Barter, 2001).

In Malaysia, the urban area like Kuala Lumpur has already shown a substantial momentum towards automobile dependency. Other urban areas like Penang, Johor Bahru, Ipoh, Kuching and Kota Kinabalu have also shown considerable evidence which point toward similar trends of automobile dependence, perhaps even more since these urban areas have even lower supply and usage of public transportation compared to Kuala Lumpur. Levels of private vehicles usage in Kuala Lumpur are also considerably higher than might be anticipated on the basis of income. This is due to many external factors which include government promotion and protection initiatives on the national automobile industries, subsidized fuel pump prices and traffic management policies & strategies that are not successfully implemented.

Paralleling to the trend of automobile dependency is the observed increase in the figure of road accidents and fatalities (Nor Ghani et al., 2001). From 1997 to 2017, the annual number of road accidents had jumped more than double from 215,632 to over 533,875. A total of 6,740 people died, 3,310 seriously injured and 6,539 slightly injured in 2017 (JKJR, 2018). Fatality rates are considered much lower in developed countries than in developing countries due to many factors that include mixture of heavy traffic conditions coupled with inadequate maintenance of transportation infrastructure, urban design that emphasis on motorized vehicle usage and lack of

provision for pedestrians which resulted in the conflict between the users over the use of urban space (Tseu, 2006). Accidents are a cost to our society, for example, if the breadwinner of a family is killed or disabled in a road accident, without proper financial support or contingency plan, the poverty level of the family will be drastically increased. Although these scenarios may not be as drastic in countries equipped with legal and welfare systems that look after road accident victims but in most developing countries, fatalities resulted from road accidents on the low-income groups could inevitably correspond to an economic loss (Steg and Gifford, 2005; Tseu, 2006). Therefore, there have been signs of increasing awareness among policy makers attempting to curb the rising trend because improvement in road safety normally enhances the quality of life. However, policy makers are always confronted with the difficulty of assessing the benefits against the cost of safety improvements (Nor Ghani et al., 2001).

Traffic congestion and the lack of parking spaces also are seen progressively as the foremost transport problems that are affecting the quality of life of those living in the urban settlement. Many transportation experts attribute this to "automobile dependence" which is familiar in most urban areas today. Traffic congestion has always been characterized as an urban environmental problem, other than causing delays; it also produces noise, fumes that increase health risks of road users and surrounding residents (Tiwari, 1999). Because of the high road accidents rate and environmental pollution caused by the traffic congestion, the city became less pleasant to live in and this had resulted in the decline of many inner-city residential areas moving to the surrounding suburban area, which further increased the needs to travel.

As stated previously, high automobile dependency creates traffic congestion, undermining the role of public transportation, resulting in the deterioration of the quality of public transportation. High automobile dependency and poor public transportation have significant impacts on the economy of an urban area, mostly due to the many hours of productive time lost through traffic congestion. Many sources of urban employment are less accessible due to congestion and the lack of urban spaces which is caused by high vehicle dependency. The World Bank estimates that in many countries traffic congestion resulted in a loss of 1% to 3% in gross domestic product (GDP), and in some cases as much as twice for developing countries (Gwilliam, 2002). Many employment opportunities move from the city to the outskirts to avoid such problems, which indirectly leads to more vehicle usage by the employee to go to work. The disable people who could not drive and poorer people who could not afford a vehicle living in the urban area will not be able to benefit from these employment opportunities that will enable them to go to work and get better income to improve their quality of life. A good transport system is a determining factor in the competitiveness of the urban economy and in the quality of life of the people working within the urban areas (Davis et. al., 2009).

Demand for parking space especially in urban areas intended for private vehicles escalates with the rise of private vehicle usage. Effort to meet the demand of

parking space in the urban area has created a 'locking-in' effect of high levels of private vehicle usage into the urban fabric. Provision and integration of large parking infrastructure and higher levels of parking capacity in property developments, such as shopping complexes, residential and office building, are signs of the 'locking-in' effect from high level usage of private vehicles (Barter, 2001). The 'Locking-in' effect on the urban fabric to cater for the ever-increasing automobile dependency's "demand and supply" of roads and parking space has occupied precious urban space which otherwise can be used to improve quality of life. This is especially true in the context of providing non-motorized forms of transportation such as walking and cycling. Existing pedestrian walkways in Malaysia are of poor quality and design that do not offer the sufficient levels of safety, accessibility and comfort to promote pedestrian walking. Facilities such as bicycle lanes for cyclists are non-existent. The traveling needs for the mobility-impaired such as the elderly, physically disabled and young children have also been seriously neglected which blight their quality of life.

For the past three decades, Malaysia experienced rapid urban development in the context of major urban transport investments and spending for road and parking. All this transport infrastructure investments are translated into more roads and parking facilities construction to cope with the high automobile dependency. Expansion and improvement on congested roads are only able to provide short-term benefits because the additional road capacity will be immediately filled with latent demand and peak-period vehicle trips that motorists will make as soon as the roads are uncongested. On the other hand, if the roads remained congested, motorists might reschedule their trip to avoid peak-period traffic, shift to other alternative routes, choose different modes of transportation or destination in order to avoid congestion (Litman, 2018). The "predict and provide" approach to road expansion to cater for the increasing traffic demand by providing extra road capacity is an escalating and alarming progression. There is just too much emphasis given to highways and the rising threats of becoming "automobile dependence" and having high vehicle usage being incorporated into the urban fabric.

As shown in Figure 1, the vicious cycle of high levels of automobile dependency contribute to the increase of traffic volume thus contributing to an inevitable vicious circle of increasing traffic congestion, accident rate, inefficient urban land use and environmental pollution, and creating a cycle of diminishing public transport that directly interrelates with the urban dwellers' quality of life.

STRATEGIES - THE KEYS FOR A BALANCED TRAFFIC SYSTEM IN URBAN AREAS

The variety of measures that have been used to alleviate traffic problems in urban areas can generally be classified into 2 groups. The first is the integration of land use and transport planning and the second is the travel demand management instruments. The first group of measures is based on the close connection between land use activities and the number of trips generated, aimed at reducing the amount of travel such as trip lengths and trip generation. The second group of measures, on the other hand, aims to

reduce private vehicles dependency, and promote the usage of public transportation (Loo et. al., 2001).

The keys to a balanced traffic system in urban areas lies in its comprehensive and highly coordinated land transport policy, which combines strategies of integrating land use and transport planning together with travel demand management measures and promotion of public transportation usage. In this paper, land use planning, restricting private automobile and promotion of public transportation will be discussed to offer a vision of a balanced traffic system in urban areas that can directly be related to the quality of life of people living in urban areas.

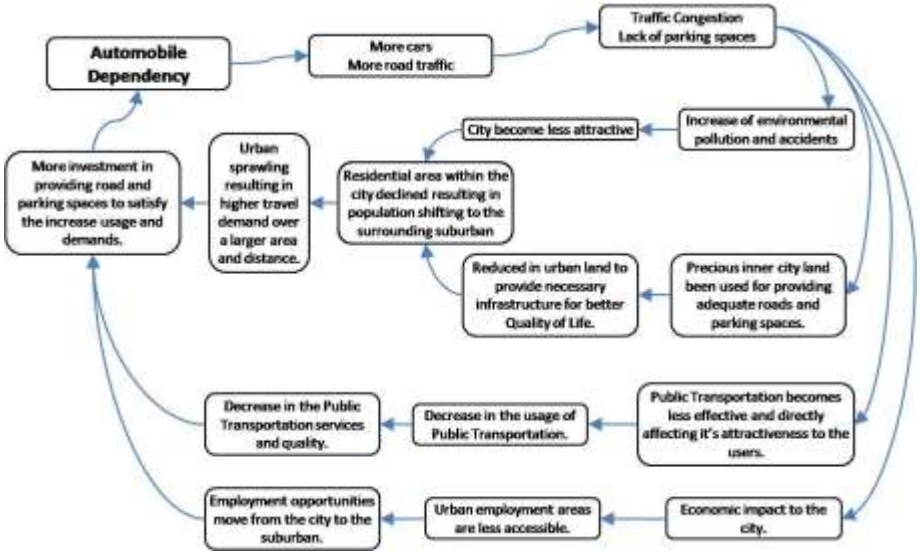


Figure 1: The Vicious Cycle of Urban Transportation in Malaysia
Adopted from (UITP, 2001)

i. Land Use Planning

Many urban areas throughout the world experience urban transportation issues which is due to the rapid growth of large cities in the developing world that has been accompanied by extreme dispersal locations of origins and destinations, which generates increase in vehicle ownership, travel distances and the number of trips. These have caused profound traffic movement within the urban area which has resulted in severe traffic congestion and other transport problems such as increased road accidents, high rate of fuel consumption, time consuming traveling, environmental pollution, low public transportation usage, etc (Vasconcellos, 1997; Loo et. al., 2001; Ghaffari and Zaly, 2008).

Therefore, in order to create a balanced traffic system in the urban area, the importance of land use planning is very apparent; this is because transportation is based on the movement of people and freight to reach the intended land use in order to satisfy our needs and objectives. As a result of that, having a holistic and comprehensive land use planning integrating with transportation planning can help solve many of the traffic problems within the urban areas (Ghaffari and Zaly, 2008).

In Malaysia, land use planning has generally been done at the local level while transportation planning has mostly been done at the regional and state levels. Transportation planning emphasizing on the automobile indicates that there is a lack of motive to have a well-coordinated land use plan as automobiles are able to create travel linkages to any development located anywhere. Transportation planning of this sort encouraged a low-density, sprawling urban development that promotes high automobile dependency and reduction in public transportation usage (Atash, 1996; Litman, 2009a; Barter, 2004; Kasipilai and Chan, 2008).

Urban land use planning policies and transportation planning ought to be restructured in order to provide for a balanced traffic system in urban areas by supporting alternative modes of transportation such as public transportation, car-sharing, walking and cycling. Transit Oriented Development (TOD) is one of the land use solutions that enhances accessibility by encouraging urban land use planning that promotes increased compactness and urban development of higher density districts within an urban area, a mixture of urban land uses and equilibrium between the locations of urban jobs and housing within an easy walk of a transit station, a radius of approximately between 400-800m (Rawal and Davadas, 2014).

In order to avoid urban sprawling and achieve good land use planning, 'Smart Growth' theory can also be applied to achieve the intended land uses within an urban area. Smart Growth is a general term for a collection of various techniques and strategies catering for land use practices intended to create a more resource efficient community that is designed to offer the most sought-after amenities economically, environmentally and socially, which is the fundamental element of better quality of life. The complementary techniques and strategies of smart growth vary depending on the needs and condition of a specific situation to improve mobility and other aspects of quality of life. The techniques and strategies of Smart Growth are mainly focused on creating a more self-contained community, encourages cluster and infill development that is both high in quality and adequate density, supporting mixed land use, diversifying transportation system that focus on reducing automobile dependency and promoting sustainable transportation and preserving valuable green area within the urban area. Smart Growth is an alternative solution towards urban sprawling; it provides a variety of benefits such as reduced per capita land consumption, reduced dispersal urban development and providing a more diversified transportation system (Litman, 2004).

Smart Growth strategies are implemented depending on each individual community's preferences and conditions. Although having the right land use planning like Smart Growth may help provide a good urban spatial dimension to help in providing a better transportation system, there is also a need to focus on restricting private vehicle usage within the urban area.

ii. Restricting Private Automobile

For the past few decades, urban areas in Malaysia have shown a clear movement towards automobile dependency, the negative effects of high-level vehicle usage and ownership has prevailed over the importance of both accessibility and mobility. As shown in the vicious cycle of urban transportation of Malaysia on the previous section, the negative effects of automobile dependency has prompted the Malaysia government to look at other alternative solutions that counter automobile dependency practiced in other places to be adopted and implemented in our country (Kenworthy and Laube et al. 1999; Kasipilai and Chan, 2008; Barter, 2004).

There are numerous plausible policy measures that can be utilized in order to reduce the negative effects of private vehicle traffic. It is important to alter the usage of private vehicles with respect to the travel behavior of people, the origins and destinations of travel and the conditions of existing road traffic conditions (Gärling & Loukopoulos 2007). Policies that seek to influence the demand and travel pattern of private vehicle usage are referred to as Transportation Demand Management (TDM, also called mobility management) measures, which can be defined as a comprehensive collection of various programs, policies and strategies seeking to reduce the negative effects of automobile usage, encouraging a more efficient usage of transportation resources such as road and parking space, modes of vehicle and their capacity, funding, energy, technology etc.. TDM includes strategies that help provision of other transportation alternatives, physical changes that create land use patterns that are more accessible, urban design that is devoted to non-motorized vehicle, encourage efficient transportation usage, economic measures providing incentives and taxation that help promote travelers to alter their travel behavior, reformation on congestion or road pricing, improvement in various urban planning regulatory, overall improvement on the services of public transportation and various supporting programs (Litman, 2003; Loukopoulos, 2007).

TDM if implemented successfully will be able to provide numerous benefits, including reduction in traffic congestion, cost savings on transportation infrastructures, consumer cost savings, overall improvement of mobility for non-drivers, reduced accidents and pollution to the urban area. The negative trends of urban sprawling and automobile dependency are encouraged by the vast consumption of land and under-priced vehicle travel. By having TDM strategies implemented in the early stage of urban development, it will be able to avoid the problems that are associated with urban sprawling and automobile dependency (Kasipilai and Chan, 2008).

Based on the background and characteristics of the transportation system in Malaysia, Kasipilai and Chan (2008), have suggested various recommendation such as amendments of charges on road taxes and vehicle insurance, abolition of fuel subsidies, imposition of fuel taxes and adjustments in the bases for car taxation, congestion charging especially for the Kuala Lumpur metropolitan area and national road pricing to target towards creating a sustainable transportation system which focused on reducing automobile dependency.

With the successful implementation of Smart Growth and TDM, good land use planning and private vehicle restriction within an urban area, the final piece of the puzzle in order to create a balanced traffic system is to incorporate good and reliable public transportation.

iii. Promoting Public Transportation

The incapability of public transportation in Malaysia to cope with the increase in traffic congestion in many urban areas has led to the decline of public transportation (Rasagam, 1999; Barter, 2004). A fundamental element to create a successful public transport system in the urban area is to allow public transportation to compete with the private transportation modes. Public transportation providers should adapt to a more service-led rather than a demand-led approach to attract passengers through better, more reliable service and not confined to only serving existing revealed demand but instead catering for a larger and more diverse demography. Successful public transportation systems aim to cater transportation services to the public from all social classes that include a wide variety of urban trips demanded at most times of the day. Many of the below par public transportation systems in Malaysian urban areas have clearly become a mode of last remaining option to captive passengers with no other option available (Barter, 2001).

Various strategies can be found that help promote the usage of public transportation. Experience gathered worldwide has provided public transportation planners with a collection of tried and tested strategies to improve the overall quality and performance of public transportation, which can encourage public transportation by reinstating confidence to the users.

Some of the possible strategies that can improve public transportation include setting up dedicated road space for public transportation (bus and taxi) to ramp up the traveling speed. Improving traveling speed can contribute to better reliability and more frequencies of the service especially during peak hour traffic. It also helps reduce overall traveling duration in conjunction with a shorter waiting period. Good public transportation information system is vital to provide passengers with easy to follow information regarding timetables, fares, routes, and services which unwaveringly makes public transportation more accessible.

The process of entering and exit for public transportation services can be speeded up by various ticketing methods, such as barrier-free ticketing systems, automatic fare collection systems and pre-paid smart cards that offer high performance

alternatives compared to the traditional ticketing. Implementation of "universal design" into the designs of stops, stations and public transportation vehicles which allows easy boarding for users will also help in speeding up the entering and exit process, especially for those that are mobility impaired. Good accessibility is essential especially for those with reduced mobility. Everyone will be able to benefit from the easier-to-access designs, such as low-floor buses offering near level-boarding.

Owen (2010) implied that,

> "…people assume that to decrease traffic congestion, we must increase the use of public transit. That much is True. But we also assume to increase the use of transit, we have only to improve services. That part is False. No matter how wonderful we make bus or rail service, people who can't get to it won't use it and we make it very difficult to get to it…."

The obstacles in promoting public transportation are often due to the lack of determination and willpower by the government rather than technical difficulties. It is the inadequate governance by the government that is the main hindrance towards promoting public transportation (Barter, 2001). In order for the promotional strategies to be successful, it should be further supported by the land use planning of "Smart Growth" that caters for compact and transit-oriented land use planning. Transportation Demand Management can also contribute by controlling the usage of private vehicles and channel the demand for mobility towards public transportation modes.

CONCLUSION

Importance of transportation is one of the key elements in the search for a "good" Quality of Life. Although there is no common definition that define what kind of transportation system will best suit the urban dwellers for them to have a better Quality of Life, it is generally accepted that it should imply good public transportation system, promote economic growth, encourage non-motorized mode of travel, better accessibility, environmentally friendly, enhance social interaction and overall better living condition.

As a developing country, Malaysia should put emphasis on the importance of how transportation can deeply influence the Quality of Life, by reducing the dependence on private vehicle usage, improving public transportation and redirecting the attention to create a better urban transportation system within the urban areas. There are already various proven strategies and measures that can be adopted into the current transportation system to help solve the transportation problems and improve the overall Quality of Life. All we need now is the united initiatives and support from both the government and public to really make it happen.

ACKNOWLEDGEMENT

We would like to thank Universiti Sains Malaysia for extending grant for this research, "Urbanization and Land Use Changes in Small Town, Northern Region, Malaysia" under grant number 1001/PPGBN/8016095.

REFERENCES

Atash, F. (1996). Reorienting metropolitan land use and transportation policies in the USA. *Land Use Policy,* 13(1), 37-49.

Axhausen, K.W., Polak, J.W., Boltze, M. and Puzicha, J. (1994). Effectiveness of the parking guidance information system in Frankfurt am Main. *Traffic Engineering and Control,* 35, 304–309.

Barter, Paul (2001) Transport Choices for Malaysian Cities and Towns. *Consumers' Association of Penang National Seminar on "Changing Direction – Towards Sustainable Transport in Malaysia",* 7 –10 September 2001.

Barter, Paul (2004). Transport, urban structure and 'lock-in' in the Kuala Lumpur Metropolitan Area. *International Development Planning Review,* 26 (1), 1-24.

Beirao, G. and Sarsfield Cabral, J.A. (2007). Understanding attitudes towards public transport and private car: A qualitative study. *Transport Policy,* 14, 478–489.

Corpuz, G. (2007). Public Transport or Private Vehicle: Factors That Impact on Mode Choice. *30th Australasian Transport Research Forum.* 27 September 2007.

CEIC. At https://www.ceicdata.com/en/malaysia/motor-vehicles-registration (accessed February 2019)

Davis, Amelie Y., Pijanowski, Bryan C., Robinson, Kimberly, Engel, Bernard (2009). The environmental and economic costs of sprawling parking lots in the United States. *Land Use Policy*. 27(2), 255-261

Gardner, B. and Abraham, C. (2007). What drives car use? A grounded theory analysis of commuters' reasons for driving. *Transportation Research Part F,* 10, 187–200.

Gärling, T. and Loukopoulos, P. (2007). *Effectiveness, Public Acceptance, and Political Feasibility of Coercive Measures for Reducing Car Traffic. "Threats from Car Traffic to The Quality of Urban Life: Problems, Causes, and Solutions".* Elsevier Ltd, Oxford, United Kingdom.

Ghaffari, Amirmahmood and Shah, Muhammad Zaly (2008). Relocating Land Use to Decrease the Numbers of Trips. *Easts International Symposium on Sustainable Transportation incorporating Malaysian Universities Transport Research Forum Conference 2008 (MUTRFC08).* Universiti Teknologi Malaysia. 12-13 August 2008.

Gwilliam, K. (2002). *Cities on the Move: A World Bank Urban Transport Strategy Review.* World Bank, Washington, D.C.

JKJR, Jabatan Keselamatan Jalan Raya. At www.jkjr.gov.my (accessed December 2018)

Kasipillai, J. and Chan, P. (2008). Travel Demand management: Lessons for Malaysia. *Journal of Public Transportation,* 11(3), 41-55.

Kenworthy J.R. and Laube F.B. (1996). Automobile Dependence in Cities: An International Comparison or Urban Transport and Land Use Patterns with Implications for Sustainability. *Environmental Impact Assessment Review,* 16(4-6), 279-308.

Kenworthy, J.R., Laube, F.B., Newman, P., Barter, P., Raad, T., Poboon, C., and Guia Jr., B., (1999). *An International Sourcebook of Automobile Dependence in Cities 1960-1990*. Boulder: Colorado University Press.

Kingham, S., Dickinson, J. and Copsey, S. (2001). Travelling to Work: Will People Move Out of their Cars. *Transport Policy,* 8(2), 151-160.

Kubani, D. (2005). Transportation and Quality of Life in L.A. *Los Angeles Business Journal,* Cengage Learning, 3-5

Litman, T. (2003). The online TDM Encyclopedia: Mobility Management Information Gateway. *Transport Policy* 10(3), 245-249.

Litman, T. (2004). *Understanding Smart Growth Savings- What We Know About Public Infrastructure and Service Cost Savings, And How They are Misrepresented by Critics.* Victoria Transport Policy Institute.

Litman, T. (2006). Changing Travel Demand: Implications for Transport Planning. Institute of Transportation Engineers. *ITE Journal,* 76(9), 27-33.

Litman, T. (2018). *Evaluating Accessibility for Transport Planning: Measuring People's Ability to Reach Desired Goods and Activities.* Victoria Transport Policy Institute.

Loo Lee Sim, Lai Choo Malone-Lee, Kein Hoong Lawrence Chin (2001). Integrating land use and transport planning to reduce work-related travel: a case study of Tampines Regional Centre in Singapore. *Habitat International,* 25, 399-414.

Loukopoulos, P. (2007). A Classification of Travel Demand Management Measures. "Threats from Car Traffic to the Quality of Urban Life: Problems, Causes, and Solutions". Elsevier Ltd, Oxford, United Kingdom. Chapter, 15, 275-292.

Mohamand, J. and Kiggundu, A.T. (2007). The Rise of the Private Car in Kuala Lumpur, Malaysia: Assessing the Policy Options. *IATSS Research* 31(1), 69-77.

Moller, B. and Thogersen, J. (2008). Car Use Habits: An Obstacle to the Use of Public Transportation? in Road Pricing, the Economy and the Environment. *Springer Berlin Heidelberg,* 301-313.

Nor Ghani Md. Nor et al. (2001). Placing Dollar Value (On Life) for A Better Quality of Life: A Contingent Valuation Study of Malaysian Motorists. Paper presented at the SEAGA 6, 2001, *International Conference, UKM, Bangi,* 12 – 15 November 2001.

Norhazlin Mohd Shariff and Muhammad Zaly Shah, (2008). Factors Influencing Travel Behavior and Their potential Solution: A review of Current Literatures. *Jurnal Alam Bina*, 11(2), 19-28.

Owen, Jack (2010). Cities in the Balance: Creating the Transit-Friendly Environment. At https://www.youtube.com (accessed February 2019)

Paulley, N., Balcombe, R., Mackett, R., Titheridge, H.; Preston, J., Wardman, M., Shires, J. and White, P. (2006). The Demand for Public Transport: The Effects of Fares, Quality of Service, Income and Car Ownership. *Transport Policy* 13, 295–306.

Rasagam, Ganesh (1999). A "STEP" Towards Sustainable Transport: A Case Study of Penang, Malaysia. – Transport and Communications Bulletin for Asia and the Pacific, No.68, 33-48. United Nations Publication.

Rawal, Tejas and Devadas, Veruval (2014). Transit Oriented Development and Neighborhoods. *National Conference on Sustainable Neighbourhoods,* Jaipur, India, 21-22 February 2014

Rodrigue, Jean-Paul, Comtois, C. And Slack, B. (2017). The Geography of Transport Systems, Routledge, New York.

Steg, L. (2003). Can Public Transport Compete with the Private Car? *IATSS Research,* 27(2), 27-35.

Steg, L. and Gifford, R. (2005). Sustainable Transportation and Quality of Life. *Journal of Transport Geography*. 13, 59-69.

Star Online (2014). At https://www.thestar.com.my/business/business-news/2014/04/16/car-ownership-in-msia-third-highest-in-the-world/#aMV38rSuVAEO3YCG.99(accessed February 2019)

Thomson, J.M. (1977*). Great Cities and their Traffic,* Penguin Books.

Tiwari, G. (1999). Towards A Sustainable Urban Transport System: Planning for Non-Motorized Vehicles in Cities. *Transport and Communications Bulletin for Asia and the Pacific*, 68, 49-66. United Nations Publication.

Tsamboulas, D., Vrenken, H. and Lekka, Anna-Maria (2006). Assessment of a Transport Policy Potential for Intermodal Mode Shift on a European Scale. *Transportation Research Part A* 41, 715–733.

Tseu, Lawrence (2006). Urban Transport Growth: The Challenges Ahead – The New Realism and Institutional Changes. *(Fourth Sabah-Sarawak Environmental Convention 2006).*

UITP, Union Internationale des Transports Publics (International Association of Public Transport) (2001). Better Mobility in Urban Areas- *Problems - Solutions - Good Practices.*

Vasconcellos, Eduardo A. (1997). The Demand for Cars in Developing Countries. *Transportation Research Part A – Policy and Practice,* 31(3), 245-258.

Yap, S.H. (2005). Malaysian Quality of Life. *Sambutan Hari Perancangan Bandar Sedunia 2005,* Planning Towards Liveable Cities, Kuala Lumpur, Malaysia.

Received: January 2020. Accepted: 14th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 51 – 70

THE ENTITY – IDENTITY RELATIONSHIPS OF OLD SHOP HOUSES IN PERAK THROUGH FACADE DESIGN

Mohd Jaki Mamat[1] & Muhammad Firzan Abdul Aziz[2]

[1,2]*School of Housing, Building and Planning*
UNIVERSITI SAINS MALAYSIA

Abstract

Since the 19th century, old shop houses remaining in Malaysia have been a primary indicator of the country's physical landscape which can inform significant historical background of early cities and towns. The old shop houses testify in the uniqueness and diversity of the nation's architectural gems, which were shaped by the Malay, Chinese and British entities. The current study attempts to understand the influence of varying entities towards the architectural identities that the old shop houses' facade bear. Purposive sampling of 16 towns in the state of Perak was made to gauge information on the earliest row of shop houses at each of the towns. Both secondary and primary data were then leveraged based on documents analysis, interviews and measured drawings to explore the relationship link between the entities and identities through the old shop houses' facade design. The findings suggest that there is a relationship between the entities and identities, in the sense that the early entities were influential in determining the identities of the old shop houses' facade design. Interestingly, the Malay style was found to be the most dominant identity depicted by the facade design of the old shophouses from the 16 towns of Perak.

Keywords: Shophouses, facade, entity & identity

[1] Corresponding author's email: mohdjaki@usm.my

INTRODUCTION

Construction project is not simply restricted to the new buildings only but it also includes restoration and maintenance of existing building. Heritage can be one of the whys and wherefores. The National Heritage Department (2016) defined heritage as a valuable inheritance that can be categorized under tangible and intangible components.

A construction project can be considered successful or not through project management triangle; time, cost and quality. Roy and Kalidindi (2017) has unfortunately reported that for conservation project, the performance in terms of time, quality and especially cost is far from satisfactory. Bowen et al. (2002) claimed that neglecting any one factor would affect other two factors. This shows that factor of cost for conservation project is important to be highlighted in order to prevent delay and low quality of the conservation project. Currently, the industry is facing several issues that have caused cost and time overruns and also contractual disputes during post-contract stage (Lee & Lim, 2010; Hisham & Hassan, 2015). Surprisingly there are actually many countries facing the same difficulties when dealing with heritage building. Roy and Kalidindi (2017) said that Canada, Italy, Australia and India are some of the countries that reported frequent failures in meeting the delivery goals of time, quality, scope and budget.

One of the factors of failing to reach the budget of conservation project is because of limited research on costing aspect of conservation project (Hisham & Hassan, 2015; Wee & Lim, 2010). Kamal et al. as cited in Wee and Lim (2010) explained reason for limited research on costing aspect of conservation works is because building conservation practice in Malaysia is relatively new compared to some other countries. This is supported by Lim (2017) where he claimed that conservation processes may be broadly studied by researcher, however, the same cannot be said for the cost management aspect, namely cost control, cost budgeting and cost estimating. This shows that more research on costing of conservation project must be performed so that issues on cost overrun that often occur in the project can be successfully prevented and solved.

During the 19th century, shophouses were the dominant architectural feature that can be seen in the early major cities and townships of Malaysia. Apparently, most of the shop house buildings remain intact until today (Wan Hashimah, 2015). The significance of heritage shop houses is embedded in their cultural fabric and design, which bears strong relationship with and influence from the early communities and societal groups occupying them (Nur Farhana, 2014). Despite the introduction and implementation of planning policy by the British administration at that time, the design of shop house buildings has nevertheless remained unique due to the influence of early communities and societal groups onto them (Shahrul, 2016).

The tin mining industry was central in shaping the formation of Perak's early towns and cities. In fact, the construction of shop houses has long been

rooted to the tin mining activities by the British colonists and Chinese immigrants (Lees, 2017). This has resulted in the architectural amalgamation of the two influences, as mainly apparent in the facade design of shop house buildings. Yet so, traditional design features from the Malay architectural styles can still be seen on the shop houses, particularly at several building elements such as the roof, window and ornaments (Han, 2016).

In realising such scenario, this paper attempts to understand the entity-identity relationships of early shop houses' in Perak through the buildings' facade design. There were 16 early towns in Perak researched namely Pengkalan Hulu, Lenggong, Kuala Kurau, Kuala Sepetang (Port Weld), Padang Rengas, Manong, Tanjung Rambutan, Papan, Pusing, Klian Intan, Lumut, Malim Nawar, Chenderiang, Parit, Sungkai and Bagan Datuk. In order to analyse the entity-identity relationships, the earliest shop house building has been sampled each from the 16 localities aforementioned.

In this paper, the operational definition of entity refers to the builders and owners involved during the built year of the old shop houses. Meanwhile, identity refers to the architectural styles, design, characteristics and cultural images potrayed at the facade of the old shop houses.

LITERATURE REVIEW

Construction of shop houses

The urban morphology and building typology in Southeast Asia's landscape have much been influenced by the flourish of the trading industry during the 18th century. The earliest and grandest trading centre of Southeast Asia circa 15th century, Melaka, was an unwalled suburb divided into commercial, residential and administrative zones (Han, 2016). Back then, the typical Malay traditional built structures catering business activities were simply made of wooden walls (some were also found without the walls) and roofed (Zulkifli, 2012; Siti, 2014). However, Melaka was later divided merely into commercial and administrative zones (resided by European officials and merchants) upon the conquest by the Dutch from the Portuguese in 1641. Consequently, multi-function premises that combine residential and business purposes were built by the Dutch colonists within the fort of Melaka. Although the premises were scattered in position, this event is significantly believed to be the starting point of shop house construction therein (Han, 2016). Moreover, there is no evidence found in attributing the construction of business premises with the Chinese traders in spite of their early arrival in Melaka prior to the Portuguese take over in 1511.

By the 18th century, emergence of Melaka as an international trading port has resulted in the rapid construction of shop houses, which were mainly owned by the Chinese traders. The Dutch's policy in segregating settlement zones based on races has apparently influenced the merging of residential and commercial purposes within a premise. The rapid urban development occurred

has also influenced the positioning of the shop house buildings, arranged in long rows with multi-layers, similar to the grid system that is common for town planning (Han, 2016; Mohd Jaki, 2018). The residential cum commercial premises can also be found in Indonesia, which nation was historically under the Dutch's ruling (Rizal, 2017).

Shop houses are built to fulfil commercial purposes. In this sense, its construction plays a vital role in the economic and morphological developments of a locality (Shahrul, 2016; Mohd Jaki, 2018). By characteristics, shop house buildings combined both residential and commercial functions. Shop houses can be found to exist in the early development of almost all historic commercial cities in Malaysia especially in Melaka and Penang (Han, 2016). In Perak's case, construction of shop houses became rampant upon the British's arrival in the 19th century, in conjunction with the existence of main cities such as Ipoh, Taiping and Teluk Intan (Mohd Jaki, 2018). Theoretically, the shop houses were built by the Chinese immigrants to carry on their business activities (Rashiwala, 2018). In turn, such constructions have affected the physical landscape of major cities and towns that remain until today (Nur Farhana, 2014; Rashiwala, 2018).

Shop houses' facade design

Exploring and studying Malaysian heritage sites are imperative to deepen the understanding of physical features of the past, in particular from the Malay sultanate to the colonialist's eras (Shahrul, 2016). It is apparent that most facade designs of Malaysian shop houses were influenced by the Chinese in the 19th century, the British in the 20th century as well as the two combinations. Built materials used meanwhile were mostly resourced locally. The British was influential to the design of shop houses in major cities as they were involved in appointing and recognising their native architects. On the other hand, the locals being involved were merely craftsmen and master-builders whose scopes were limited to drafting plans- hence the diminished indigenous features in the shop houses design (Tan, 2014). Nevertheless, shop houses which design adapts the traditional Malay architecture style can still be found, using common building elements and local materials (Han, 2016).

Although climate is a crucial factor in architecture, it can be observed that building elements of the shop houses such as doors, windows, wind lattices and gable ends were much influenced by the local culture and ethnicities (Omar, 2011). Shop houses were also designed to cater business activities in the sense of having a facade with wide openings and having a five-foot way (Nurlisa, 2015; Harding, 2018). It is important to note that the five-foot way is an important design feature of shop houses' facade, believed to be originated from the Dutch's commercial premise and those of southern China specifically brought by the immigrants from Fujian and Guangzhou (Harding, 2018).

The facade design of Malaysian old shop houses generally were maneuvered to respond to the commercial activities intended. Other relevant factors that have contributed to their design characteristics include shape and form, built material, colour and texture, decorative ornament and embellishment as well as scale and proportion (Mostafa, 2018). In addition, existence of linear rows of shop houses with road systems in between can be associated with the urban morphology factor which is typically based on linear and grid planning systems (Taylor, 2010; Mohd Jaki, 2018).

The entity-identity relationship through facade design

In the realm of the built environment, there is a significant link found between certain ethnicities and their visual preferences. Historically, each era has shown particular adaptation of functional and aesthetical characteristics into their very design (Dheyaa, 2018). Such characteristics signify the impact of human creativity towards design, driven by cultural influence (Dobson, 2012; Wan Hashimah, 2015). Such characteristics then generated local identities, which are unique due to varying climatic, geographical and cultural factors. In turn, identities created became common trends which then adapted to architectural design. Architectural identities are imperative in indicating the wisdom and progression of local people within a locality (Rizal, 2017; Noorfadhilah, 2012; Norsidah, 2012). Architectural identities are arguably more dominant than physical characteristics especially when it comes to building of heritage values (Wan Hashimah, 2015).

Besides the local communities, the immigrants and colonialists were also influential in shaping the identity of a place. Implying from that, the builders involved during the construction phase were considerably the key person in influencing the architectural design and building characteristics (Rizal, 2017). The British, in this sense, was highly influential in the local architectural scene (which include the shop houses style) in relation to the Portuguese (no influence towards shop house design found) and the Dutch colonists (merely influential to certain areas in Melaka) (Noorfadhilah, 2012). Several architectural styles such as the Moorish, Tudor, Neoclassical, Neo-Gothic etc. were actively introduced locally during the British occupation period in the 20th century (Kamaruzzaman, 2006).

Meanwhile, the influence by southern China immigrants came earlier during the 19th century which can be seen through ornamental carvings and at the uses of doors and windows that were similar to those available in China (Noorfadhilah, 2012). As a result, the indigenous image and identity brought by the Chinese immigrants then can be seen through the early shop houses design (Aidatul, 2014). They resided within their own community and carried out business activities, which led to the creation of unique architectural typology, design language or style, interior design, color scheme as well as signage.

In the case of Malay traditional architecture, it is apparent that the architectural identity was oriented towards the dominant usage of local material especially timber. Most of the main building elements, structural aspects and jointing methods were based on the use of timber. The image of Malay traditional architecture was then assimilated with the buildings built after the British arrival, as can be seen at shop houses, institutional buildings and the British officials' residences (Umi Kalsom, 2015).

Theoretically, cultural aspects are derived from certain communities (Samkin, 2010; George, 2010). In this regard, it is important to understand the genesis of shop houses identities, through the underlying entities involved in the past (Noorfadhilah, 2012). In understanding heritage sites, it is imperative to note that certain community groups are highly associated with the place they inhabited. Hence, by assessing the entity-identity relationships of the facade design of old shop houses' available within Perak's townships, the current study would further assist in the understanding of Perak's heritage at large.

METHODOLOGY

To understand the historical genesis of Perak's early shop houses, the study focused on the scope of entity-identity relationships of old shop houses in Perak. Due to limited resources available at the expense of the current researchers, this study excluded other influential aspects of architecture such as the detailed analysis of the facade elements, costing, era, technology and local knowledge. In doing so, the facade design of old shop houses during their built years were analysed by making references to secondary data available. In particular, existing records and inventories on facade design for buildings of either Malay, Chinese or British were scrutinised in line with Natthakid's (2017) method that suggests the utilisation of reliable and valid studies, writings and records to understand buildings under study. Among the key secondary sources leveraged in this study include:

1. A handbook of Features & Materials – Penang Shophouses by Tan Yeow Wooi (2015);
2. *Pemeliharaan Rupa Bandar – Panduan Mengenali Warisan Rupa Bandar berasaskan inventori bangunan warisan di Malaysia* by Syed Zainol Abidin Idid (1995);
3. Kutai House – Documentation of memories by Mohd Sabrizaa Abd. Rashid (2017) and;
4. Traditional Malay House of Northern Perak by Mohd Jaki Mamat (2017).

The information from those sources were then synthesised into an inventory of facade design identity as tabulated in Table 1 as well as Figure 1 to Figure 7:

Table 1; Identity of old shop houses' facade design based on the 3 main entities.

European	Chinese	Malay
Bricks, Marseille roof tiles, frame or architrave, classical architecture (arch window, key stone, column order, cornice), Art Deco style (coloured glass, steel, clean surface, geometrics line), reccess panel, iron grilles.	Bricks, U or V shape terracotta roof tiles, chinese column head (chi-tou), ceramic air vent, granite corbel brackets, comb door, stuccoworks (chinese caligraphy, carving and motive), gable end design, sunken panel with ceramic vent tiles	Tatched roof, timber plank wall (tindih kasih), decorated panel or louvre, louvers window, jack roof (double roof), wood carving with floral motive, gable ventilation (tebar layar), timber corbles

Figure 1-4, from left; Early style (1790s – 1850s), Southern Chinese Eclectic (1840s – 1910s), Straits Eclectic (1890s – 1920s) & Art Deco (1930s – early 1960s) style of shophouses (Wooi, 2015)

Figure 5 & 6; Traditional Malay House in Lenggong, Perak (Mohd Jaki, 2017).

Figure 7; Traditional Malay House (Kutai House) in Perak (Sabrizaa, 2017)

Based on purposive sampling, 16 towns in the state of Perak were researched namely Pengkalan Hulu, Lenggong, Kuala Kurau, Kuala Sepetang (Port Weld), Padang Rengas, Manong, Tanjung Rambutan, Papan, Pusing, Klian Intan, Lumut, Malim Nawar, Chenderiang, Parit, Sungkai and Bagan Datuk. These towns are scattered throughout the northern, central and southern regions of Perak. Interviews with the chief villagers, head communities, local historians as well as building owners and local communities were conducted to identify the earliest row of shop houses in each of the aforementioned towns. The interviews also covered topics on the shop houses' building background such as built history, original design, former use and function, construction cost etc. Reference to early manuscripts, old writings and seminal studies were also made yet such sources were sparse in quantity due to the fact that the 16 towns were not main cities of Perak hence the limited studies covered by the academia.

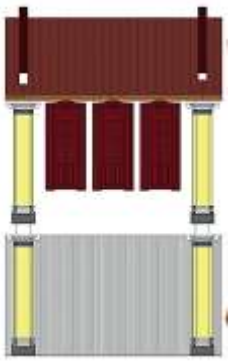
Primary data were then acquired upon the identification of early shop houses row from the interviews conducted. Measured drawings were done using measuring tape and laser devices. Facade sketches made on-site were then digitally redrawn with the aid of AutoCAD and Sketchup softwares to obtain technical accuracy. The measured drawing outputs were based on the original design of the shop houses. For instance, in the case where a building with masonry columns was found to be made of wooden timber previously, the latter material was used in the measured drawing output to ensure accurate representation of the building original design. Such recording is deemed to bear future importance when it comes to gauging the authenticity criterion of a building. However, there were problematic issues faced during the data collection process where some of the building elements have been heavily deteriorated to the extent of diminishing the building original characteristics, as well as, accessibility factor where some building owners in Pusing, Lumut, Kuala Kurau and Padang Rengas did not grant consent for the research to be carried out at their premises.

ANALYSIS

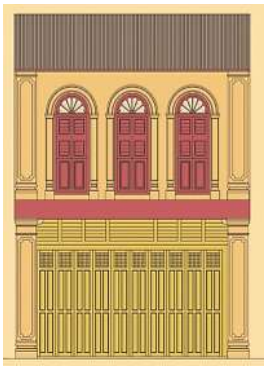
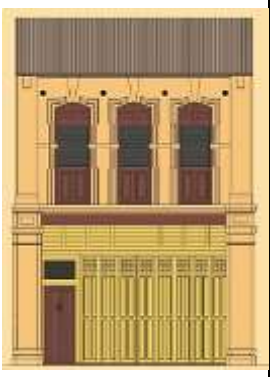
During the interview sessions, none of written evidence was being provided by the interviewees to support their oral claims hence resulting in some missing information. Nevertheless, two variables managed to be completely and consistently acquired from varying interviewees namely on the builder's information and building/land ownerships. This information solidifies the relationship of entity-identity relationships of old shop houses sought through the building facade design, by informing whether there is direct, indirect or no relationship between the two aspects. The inventory made is tabulated in Table 2.

Table 2; Inventory of old shop houses' facade design in 16 small towns of Perak

Small town & year built	**Visual (Front facade)**	**Identity**	**Entity**
Papan (1880s)	   	European; Calassical & Palladian – keystone, architrave, window, column order Chinese; ceramic air vent, comb door, sunken panel, chinese caligraphy Malay; wood carving fascia board	Builder; Chinese & Mandailing* Land owner; Maindailing / British plots
Kuala Sepetang (1890)	 	Malay; lourves window, louvers lattice, timber wall plank. European; column capital	Builder; British Land owner; British plot

Pusing (1890s)	 	Malay; wood carving fascia board, timber lattice, timber panel, window panel Chinese; column head	Builder; Local Malay and *Maindailing / Chinese Land owner; Local Malay / Mandailing
Sungkai (1900)	 	Chinese; column & column head Malay; louvers window	Builder; Local Malay & Chinese Land owner; Unknown
Padang Rengas (1900s)		Malay; wood carving fascia board, louvers window, timber beam, paneled window European; architrave, classical style window	Builder; Local Malay Land owner; Local Malay
Kuala Kurau (1900s)		Chinese; sunken panel	Builder; Chinese Land owner; Chinese

			
Lenggong (1915)		Malay; timber column (existing), louvers window, louvers wall, wall plank, jack roof (double layer roof)	Builder; Chinese Land owner; Local Malay
Klian Intan (1909)	 	Malay; sun motive for *kerawang* (lattice above window) popular in Northen Malay State & Pattani, timber column, louvers and panel window, wall plank. Chinese; air vent.	Builder; British Land owner; British plots
Lumut (1920s)	 	European; Palladian dan Classical styles – architrave, window, column capital Malay; jack roof, wood carving fascia board	Builder; British Land owner; British plots

Tanjung Rambutan (1922)	  	European; Palladian & Classical style – window, architrave, window frame with keystone, frame on column	Builder; British Land owner; British plots
Chenderiang (1920s)	 	European; Palladian & Classical style – window, architrave, window frame with keystone, frame on column	Builder; Chinese Land owner; Chinese

Manong (1920s)	 	Malay; Lourver window, wall plank, timber column	Builder; Chinese Land owner; British plots
Pengkalan Hulu (1920s)	 	Malay; jack roof, lourver window, lattice, wall plank, timber column	Builder; Chinese & Malay Land owner; Malay
Malim Nawar (1920s)	 	Malay; lourver lattice, wall plank, timber column	Builder; Malay Land owner; Malay

Parit (1928)	 	European; Palladian – window, architrave, window frame with keystone, cornice, stucco works	Builder; Chinese Land owner; British plots
Bagan Datoh (1931)	   	European; Art Deco & Palladian styles – Palladian column & window frame, Art Deco line, cornice and window, plain surface.	Builder; Chinese Land owner; British plot

*Maindailing is one of the Malay ethnics originated from Sumatera, Indonesia.

Table 2 are indications that the Malay identity is the most influential as reflected by the shop houses' facade design from the 10 out of the 16 towns being studied. The architectural characteristics of the Malays traditional style were adopted to the entire shop houses where the Malays were either builders or owners back then. It is obvious that at Malim Nawar and Pusing, the shop houses' facade design was totally reflecting traditional Malay identity due to the ownership and construction by the Malays. However, despite having a similar historical scenario with the two towns, shop houses' facade at Padang Rengas showed the existence of European architectural influences, although they were not really dominant. This can be associated with the location of Padang Rengas (which is in close proximity about 12 km) to Kuala Kangsar, which is a royal town that possesses numerous buildings built by the British.

For the cases of towns where shop houses were built by the Malay and Chinese entities, it was found that the Malay identity was fully dominant in regard to the facade design at Pengkalan Hulu and Lenggong. Merely Sungkai was found

to be the town in Perak that has the fusion of Malay and Chinese identities on their shop houses' facade design.

Other than that, the dominant identity found on the shop houses' facade design at Kuala Sepetang was the Malay traditional style. Ironically, constructions of early shop houses at Kuala Sepetang involved the British. Meanwhile in Klian Intan, the identity found was based on the fusion of Malay and Chinese styles. In contrast, the dominant identity found at Lumut was European style with minor adaptation of the Malay characteristics. Merely Tanjung Rambutan showed the full dominance of the European style throughout their shophouses' facade design, resulting from the British involvement in building the early shop houses at the town.

In a different scenario, the existence of the British and Chinese entities at Parit and Bagan Datuk showed the dominance of European style in their old shop houses' facade design. Interestingly, this finding is not consistent in the case of Manong. Despite the British and Chinese being the main entities at Manong, its old shop houses' facade design were found to be characterising the Malay traditional style. This finding can be attributed to the rationale that the Chinese immigrants at that time were given designated land by the British to build their premises, which was located within the core of trading areas of the Malays. The Malays' business premises at Manong during that time was based on simple architecture (wall-less structure with *rumbia* leaves as roof) with easily sourced local materials. This inferentially has influenced the Chinese merchants to adopt the style, especially when they merely run small-scale business. Besides, Manong was not an industrial tin-mining spot that was attractive to big investors and traders, rather it was just an agricultural-based town.

Kuala Kurau and Chenderiang were found to be the towns which old shop houses were of Chinese entities. However, only the facade design of old shop houses at Kuala Kurau were found to be fully dominated with Chinese identity whereas those at Chenderiang were found to have European influence. Papan meanwhile is the only town having old shop houses that were historically linked to the three entities namely the Malay, British and Chinese. In consistent with that finding, its old shop houses' facade design showed the fusion of the three styles. Table 3 summarises the overall findings:

Table 3; Summary of the entity-identity relationships of old shop houses' facade design in 16 small towns of Perak

No.	**Town**	**Entity**	**Identity**
1	Malim Nawar	Malay	Malay
2	Pusing	Malay	Malay
3	Padang Rengas	Malay	Malay & European
4	Pengkalan Hulu	Malay & Chinese	Malay
5	Lenggong	Malay & Chinese	Malay

6	Sungkai	Malay & Chinese	Malay & Chinese
7	Klian Intan	British	Malay & Chinese
8	Kuala Sepetang	British	Malay
9	Lumut	British	Malay & European
10	Tanjung Rambutan	British	European
11	Manong	British & Chinese	Malay
12	Parit	British & Chinese	European
13	Bagan Datoh	British & Chinese	European
14	Chenderiang	Chinese	European
15	Kuala Kurau	Chinese	Chinese
16	Papan	British, Malay & Chinese	European, Malay & Chinese

FINDINGS

The current study suggests that there is a direct relationship between entity and identity of shop houses, based on analysis made on their facade design. Merely two cases of Klian Intan and Kuala Sepetang are contradictory to claim, in which the British did not make any adaptation of European style (rather more to Malay traditional features complemented with Chinese style). However, the majority of the localities have proven that entities involved in the construction of shop houses were influential towards the built identity, visible through the facade design.

On the other facet, the Malay identity has been found as the most prominent style displayed throughout the 16 localities. Indigenous materials, local climate and the existence of Malay traditional settlement existed earlier in time were among the contributing factors. The British meanwhile placed greater attention to major cities such as Ipoh, Taiping, Teluk Intan and Kuala Kangsar in relation to small townships. Hence, instead of shop houses, adaptation of European style can be found mostly at administrative buildings, officials' residences, schools, churches, railway stations etc.

CONCLUSION

The current study found there is a significant relationship in between the entity and identity of old shop houses in Perak by analysing their facade design. The Malay identity has been found to be the most prominent style for shop houses located in small towns of Perak. Complementing the Malay identity, it has also been found that the Chinese and European styles were also adapted to the facade design of shop houses at the localities studied. It is believed that more interpretations and conclusions on the architectural, economic and sociological aspects can be generated based on the data gathered. Further research can be conducted to advance the body of knowledge on architectural heritage by integrating variables important to the current study contexts such as climate, built

materials, construction skills and technology, construction costs, as well as, building functions and business types.

ACKNOWLEDGEMENTS

The author would like to express gratitude to Perak Town and Country Planning Department who had funded this study as well as other various parties contributing to the success of the current study especially Universiti Sains Malaysia, Ungku Omar Polytechnic, Perak Heritage Society and several individuals who were directly or indirectly involved.

REFERENCES

Aidatul Fadzlin Bakri, Nurulhusna Qamaruz Zaman, Hikmah Kamarudin, Nakiah Md Amin, (2014). Reviving the Physical and Cultural Attributes of Ethnic Enclave: A conservation approach, Procedia - *Social and Behavioral Sciences* 153, 341 – 348.

Andrew James Harding (2018). Five-foot ways as public and private domain in Singapore and beyond, *Journal of Property, Planning and Environmental Law*, Vol.10, No.1, pp. 36-55

Chee Siang Tan & Kaori Fujita (2014). Building Construction of Pre-war Shophouses in George Town Observed Through a Renovation Case Study, *Journal of Asian Architecture and Building Engineering*, 13:1, 195-202.

Dheyaa Hussein, Somwrita Sarkar and Peter Armstrong (2018). Mapping preferences for the number of built elements, *Smart and Sustainable Built Environment*, Vol. 7, No. 1, pp. 53-67.

E. Wanda George (2010). Intangible cultural heritage, ownership, copyrights, and tourism, *International Journal of Culture, Tourism and Hospitality Research*, Volume: 4 Issue: 4.

Grant Samkin, Annika Schneider (2010). Accountability, narrative reporting and legitimation the case of a New Zealand public benefit entity, *Accounting, Auditing & Accountability Journal*, Vol. 23 No. 2, pp. 256-289

Hideo Izumida (2003). A Study on British Architects in East and Southeast Asia: 1830 – 1940, *Journal of Asian Architecture and Building Engineering*, 2:2, b131-b136.

Lynn Hollen Lees (2017). Planting empire, cultivating subjects; British Malaya, 1786 – 1941, Cambridge University Press, United Kingdom.

Mohd Jaki Mamat & Muhammad Firzan Abdul Aziz (2018). Early town planning system of small town in Perak, Planning Malaysia, Vol. 16, Issue 4, Page 55 – 67.

Mohd Jaki Mamat, Rumah Melayu Tradisional Hulu Perak, Lembaga Muzium Negeri Perak, Ipoh.

Mostafa Sadeghifar, Mahdieh Pazhouhanfar and Mohammad Farrokhzad (2018). An exploration of the relationships between urban building façade visual elements and people's preferences in the city of Gorgan, Iran, *Architectural Engineering and Design Management*, DOI: 10.1080/17452007. 2018.1548340

N.A.M. Omar, S.F. Syed-Fadzil (2011). Assessment of Passive Thermal Performance for a Penang Heritage Shop house, *Procedia Engineering* 20, 203 – 212.

Natthakit Phetsuriya (2017). Formal language of Lanna Shop House's Façade in Lampang Old city, Thailand, IOP Conf. Series: *Materials Science and Engineering* 245 052015.

Nigel Taylor (2010). Commentary; what is this thing called spatial planning? An analysis of the British government's view, TPR, 81 (2).

Noorfadhilah Mohd Baroldin and Shamzani Affendy Mohd Din (2012). Documentation and Conservation Guidelines of Melaka Heritage Shophouses, *Procedia - Social and Behavioral Sciences* 50 192 – 203.

Norsidah Ujang (2012). Place Attachment and Continuity of Urban Place Identity, *Procedia - Social and Behavioral Sciences* 49, 156 – 167

Nur Farhana Azmi, Faizah Ahmad, Azlan Shah Ali (2014). Place Identity: A Theoretical Reflection, *Open House International*, Vol.39 No.4.

Nurlisa Gintinga, Julaihi Wahid (2015). Exploring Identity's Aspect of Continuity of Urban Heritage Tourism, *Procedia - Social and Behavioral Sciences* 202, 234 – 241.

Rashiwala, Kalpana (2018). Prime heritage play, The Business Times, Singapore, ProQuest 2034676637

Mohd Sabrizaa Abd. Rashid (2017). Rumah Kutai: Documentation of memories, Institut Darul Ridzuan, Ipoh.

Siti Norlizaiha Harun and Rusamah Abdul Jalil (2014). The History and Characteristics of Malay Early Towns in Peninsular Malaysia, *Asian Journal of Humanities and Social Studies*, Volume 02, Issue 03.

Shahrul Yani Said, Zalina Samadi (2016). The Evolution of Historic Streetscape in Adapting Modern Demand in Achieving the Quality of Life, *Procedia - Social and Behavioral Sciences* 234, pp 488 – 497.

S.N. Kamaruzzaman and R.E. Edwards (2006). Evaluating performance characteristics of electricity use of British historic buildings in Malaysia, Facilities, Vol. 24 No. 3/4, pp. 141-152.

Stephen Dobson (2012). Characterizing the evolution of commercial organizational spaces, *International Journal of Organizational Analysis*, Vol. 20, No. 3, pp. 309-322.

Tan Yeow Wooi (2015). Penang Shophouses: A handbook of Features & Materials, Tan Yeow Wooi & Heritage Research Studio, Penang.

Umi Kalsum Zolkafli, Zahiriah Yahya, Norhanim Zakaria, Farid Wajdi Akashah and Azlan Shah Ali, (2015). Restoration of historical timber building: a Malaysian case study, *Structural Survey* Vol. 33 No. 4/5, pp. 309-321.

Yose Rizal, Rika Cheris & Repi (2017). Approach of Urban Design Elements in Preservation Area Kampung Bandar Senapelan Towards Pekanbaru Metropolitan City, IOP Conf. Series: *Earth and Environmental Science* 97 012022.

Wan Hashimah Wan Ismail (2015). Contemporary Uses of Buildings on a Heritage Street, *Procedia - Social and Behavioral Sciences* 170, 633 – 641.

Wang Han & Dr. Jia Beisi (2016), Urban Morphology of Commercial Port Cities and Shophouses in Southeast Asia, *Procedia Engineering* 142, 190 – 197.

Syed Zainol Abidin Idid (1995). Pemeliharaan Rupa Bandar: Panduan Mengenali Warisan Rupa Bandar berasaskan inventori bangunan warisan di Malaysia, Badan Warisan Malaysia, Kuala Lumpur.

Zulkefle Ayob, Siti Norlizaiha Harun (2012). The Legibility of Urban Square in Shaping City Image of Historical City in Peninsular Malaysia, Proceeding; Ist International Conference on Innovation and Technology for Sustainable Built Environment, page 911-917, Univeriti Teknologi MARA (Perak).

Received: January 2020. Accepted: 14th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 71 – 81

STAKEHOLDER MANAGEMENT OF CONSERVATION IN LOWER KINABATANGAN SABAH

Marcela Pimid[1], Normah Abdul Latip[2], Azizan Marzuki[3], Mohd Umzarulazijo Umar[4], and Kumara Thevan Krishnan[5]

[1,2,3,4] *School of Housing, Building, and Planning*
UNIVERSITI SAINS MALAYSIA
[5]*Faculty of Agro Based Industry*
UNIVERSITI SAINS MALAYSIA

Abstract

Effective conservation measures are essential to protect nature and wildlife which act as flagship attraction for ecotourism to flourish. The study focuses on conservation management of natural forests and wildlife by multiple stakeholders in Lower Kinabatangan Sabah. Rare and endangered wildlife species is the main attraction for ecotourism development in this area. The study employed a mixed method research by integrating quantitative and qualitative approaches. Analyses revealed contradictory findings whereby local indigenous communities were unaware about progress of established Lower Kinabatangan Wildlife Sanctuary and thereby requested for enhancing current conservation management. However, other stakeholders reported that the sanctuary fulfilled its objectives. The study further proposed solutions to improve current conservation by considering the viewpoints of all stakeholders involved in conservation initiatives in the Lower Kinabatangan Sabah.

Keywords: Multiple stakeholders, Conservation, Kinabatangan Sabah, Mixed method research

[2] Senior lecturer at Universiti Sains Malaysia. E-mail: norma_abdlatip@usm.my

INTRODUCTION

In general, conservation is defined as the protection and/or sustainable use of species or ecosystem to ensure their long-term survival and viability (Kothari et al., 2000). Borgström (2015, p.70) defines conservation as "*a series of measures required to maintain or restore the natural habitats and the populations of species of wild fauna and flora at favorable conservation status*." The World Commission on Environment and Development (1987, p.15) defines sustainable as "*development which meets the needs of the present without compromising the ability of future generations to meet their own needs*." In this regard, the conservation of natural resources is essential element of sustainable development. Furthermore, conservation provides several significances for sustainable development, namely ecosystem services, amenity and recreational values, and an opportunity to use them for socioeconomic benefits, as well as to maintain intergenerational equity (Coffey & Major, 2005; Robert et al., 2005).

Developing countries establish protected areas in order to provide ecosystem protection, environmental and landscape conservation, including its roles in social and economic aspects (Somarriba-Chang & Gunnarsdotter, 2012). For instance, protected areas provide multiple environmental services to human beings such as to control soil erosion, recycle nutrients, and act as a water catchment system (Somarriba-Chang & Gunnarsdotter, 2012). More importantly, it is used for human occupancy in many developing countries, particularly local indigenous people (Coria & Calfucura, 2012). This is because a protected area gives them a crucial protection, a sense of belonging and essential spaces to continually practice traditional activities that are now often impossible elsewhere (Ami & Hamzah, 2013). Nevertheless, the establishment of protected area in developing countries does not guarantee the main objective of protecting nature (Ami & Hamzah, 2013). Many cases relate failures in managing protected areas with social and economic conflicts due to local people being excluded from decision-making and management, including a reason that different groups have varying perspectives on using the same natural resources (Hussain et al., 2016).

RESEARCH BACKGROUND

The Lower Kinabatangan is located in Sabah state (east Peninsular Malaysia), with a GPS coordinate of 5.5884° N and 117.8460° E. Sabah is a well-known state as 'the land below the wind.' There are 25 districts in Sabah including the Kinabatangan. The capital town and center of Sabah is Kota Kinabalu, but the biggest district in Sabah is the Kinabatangan with an approximate size of 600 hectares. The Kinabatangan district is divided into upper and lower Kinabatangan wherein the upper Kinabatangan is severely disrupted by excessive logging and land clearing for plantations (Agama et al., 2015). Meanwhile, the Lower Kinabatangan survives due to growing efforts on conservation. Sandakan is the nearest town from Kinabatangan whereby it is located approximately 68.9 km

from Kinabatangan town, and 110 km from the Lower Kinabatangan (Ghasemi & Hamzah, 2014; Goh, 2015). It takes around 50 minutes flight from Kota Kinabalu to go to Sandakan airport, and another 1 hour 50 minutes of drive to reach the Lower Kinabatangan. Alternatively, tourists can drive or rent a taxi for approximately six hours of drive from Kota Kinabalu to the Lower Kinabatangan (Goh, 2015).

The Lower Kinabatangan Sabah is an urgent priority for conservation because it contains large expanses of biodiversity species and threatened ecosystems such as virgin tropical rainforests, freshwater swamp forest, limestone outcrop, secondary dry land, and lakes (WWF, 2004). The forests in this area support 129 species of mammal, 314 species of birds, 101 species of reptiles, and 33 species of amphibians (Lackman-Ancrenaz & Manokaran, 2008). Based on the red list species of International Union for Conservation of Nature (IUCN), many species are threatened such as Bornean elephant, Bornean orangutan, and proboscis monkey (Sha et al., 2008; Estes et al., 2012). The forests provide natural habitat for the wildlife, connect fragmented areas, and facilitate multiple ecological processes needed for the ecosystem to function. At present, many forests are fragmented and subjected to an extensive conversion to make ways for development and lucrative agricultural sectors (WWF, 2004; Estes et al., 2012). Likewise, both wildlife species and their habitats located inside and outside protected areas in the Lower Kinabatangan are at increasing risk of ongoing over-exploitation and habitat loss (Estes et al., 2012; Goossens & Ambu, 2012).

Efforts to safeguard remaining forests has led to the establishment of Lower Kinabatangan Wildlife Sanctuary (LKWS) with an approximate size of 26 103 hectares in 2005 (Ancrenaz et al., 2007; Sabah Wildlife Department, 2017a). Besides the LKWS, there are other types of protected areas (Doney et al., 2009) such as mangrove forest reserves and commercial forest reserves. Sadly, important areas of unprotected forests are located outside the protected areas, on the Sabah state land or alienated land. According to the Sabah Land Ordinance (2010), an alienated land is a leased state land and thereby granted for specific purposes of development such as oil palm cultivation. The LKWS is a strategy applied to strengthen the conservation initiatives in this area. According to the Sabah Wildlife Department (2017a), there are three purposes of the LKWS, namely (1) to protect the environment, habitat, and natural ecological process in an undisturbed manner, (2) to ensure maintenance of valuable biodiversity, and (3) to carry out necessary actions to conserve rare and endangered species of flora and fauna, biotic, as well as sources of biodiversity genetic.

In addition, Wildlife Conservation Enactment 1997 is introduced by Sabah government which categorize three types of protected areas, namely wildlife hunting area, conservation area, and sanctuary (Sabah Wildlife Department, 2017a). The purpose of the conservation area is to provide fast and

flexible protection of wildlife and habitats, whereas wildlife hunting area is intended for managing animal population through regulated hunting. The strongest category of conservation is the sanctuary which wholly protects flora and fauna in this area. Therefore, an admission to the LKWS as a totally protected area is prohibited except for an officer in charge of the sanctuary, possess a valid permit of conducting research or a visiting permit to enter any sanctuary area for public (Sabah Wildlife Department, 2017a).

METHODOLOGY

The study aims to evaluate the stakeholders' opinions on the management of conservation in the Lower Kinabatangan Sabah based on two objectives. First, the study examines stakeholders' views on established Lower Kinabatangan Wildlife Sanctuary (LKWS) based on four aspects, namely awareness, effectiveness, community involvement, and overall opinion on its progress. Second, it assesses stakeholders' opinions in improving the conservation in this area. Multiple stakeholders involved in this study were local indigenous communities, community leaders, local authority, non-government organizations (NGOs), private companies, local and private sector ecotourism. There were four villages in the Lower Kinabatangan Sabah known as Sukau, Batu Puteh, Bilit, and Abai, but the study chose Sukau and Batu Puteh villages as study sites. Both villages were chosen based on historical background, geographical and financial constraints. This was because both villages had well established ecotourism programs and most conservation activities started in these villages. In addition, both villages were well connected with pave and gravel roads compared to Bilit and Abai. Consequently, it reduced financial burden in conducting this research.

In order to fulfil the research objectives, this study applied concurrent mixed method approach by integrating quantitative and qualitative approaches. Quantitative data collection was carried out by distributing 404 questionnaire surveys to each house in Sukau and Batu Puteh villages. Demographically, the number of distributed questionnaires corresponded to the total houses (N= 404 houses) with a total of 1560 males and 1433 females stayed in both villages. The survey was conducted by requesting a leader from each house and in case he or she was unavailable, a researcher requested a representative of the house. Two local villagers were hired and trained to facilitate in distributing the surveys in both villages. The questionnaires were measured using a 5-point Likert scale and consisted of three sections, namely socio demographic of respondents, opinions on the LKWS, and suggestions to improve the management of conservation in the Lower Kinabatangan Sabah. Data obtained from the questionnaires were subjected to frequency analysis and analyzed using Statistical Packages for the Social Sciences (IBM SPSS version 22). Since the quantitative data was limited to frequency test, the current findings were discussed by comparing it with existing research in similar study area.

Qualitative data collection was conducted using in-depth semi-structure interviews to community leaders, local authorities, NGOs, private companies, local and private sector ecotourism in both Sukau and Batu Puteh villages. A purposive sampling was employed to select key informants wherein the interviewees were chosen based on their expertise and experiences in conservation in the Lower Kinabatangan Sabah. A total of forty respondents of interview were selected which comprised eleven local authorities, eight private companies, three NGOs, thirteen ecotourism operators, and five community leaders. Qualitative data were analyzed using content analysis, specifically manifest analysis whereby a researcher "describes what the informants actually say, stays very close to the text, uses the words themselves, and describes the visible and obvious in the text" (Bengtsson, 2016, p.3). A triangulation method was applied by integrating quantitative findings with interviews, reviews on published reports and articles, and notes written during field sampling.

RESULTS AND DISCUSSION

Sociodemographic of respondents

The study collected 328 valid questionnaires out of 404 distributed surveys, which indicated 81 % of response rate. Valid questionnaires meant they had been checked and clean from errors such as missing values and outliers. Out of 328 surveys, 60.7% of respondents were males whereas 39.3 % were females. Most respondents (75.9 %) were local Sungai known as 'River people,' while 24.1 % of respondents were a mixed ethnic of Bugis, Kadazan Dusun, and Malay. In term of educational level, most respondents accomplished secondary school (59.2 %), followed by primary school (21.6 %), tertiary education (10.1 %) while other respondents did not attend school at all (9.1 %). Regarding job employment, 25.6 % of respondents engaged in subsistence livelihoods such as farmers, fishermen, and logging workers, 25.3 % worked as in conservation sector, 14.3 % established personal business, 6.1 % worked as government staffs, 5.2 % worked in ecotourism sector, while 23.5 % of the respondents were not working at all. The results implied the Lower Kinabatangan was dominated by Sungai people and very few involved in ecotourism activities despite broad opportunities in ecotourism venture in this area.

Furthermore, in term of salary, 60.9 % of respondents received monthly income below RM 1000, 26.6 % of respondents received revenue above RM 1000, whereas 12.5 % did not have income. In comparison to guidelines of monthly house income of the Sabah state (Daily News, 2015), most respondents (60.9 %) were living below poverty level because their monthly income were less than RM 1050. Overall, for conservation purpose, only 25.3 % of respondents worked in conservation sector which indicated low participation among the communities in this area.

Lower Kinabatangan Wildlife Sanctuary

The opinions of local communities on the LKWS were sought in order to evaluate current management of LKWS (Figure 1). The results showed that most respondents slightly knew about agenda of the LKWS (50.9 %). They were unsure about its effectiveness to protect the biodiversity and wildlife in the Lower Kinabatangan (53.4 %), as well as they uncertain whether the local communities were involved in conservation activities (43.6 %). In addition, they recommended to improve the current management of LKWS (46 %).

Figure 1: Respondents' opinions on current management of Lower Kinabatangan Wildlife Sanctuary.

Contrary to the questionnaire findings, key informants of qualitative interview explained that the LKWS focused on protecting endangered wildlife species in the Lower Kinabatangan and concurred that its objectives were achieved. In this view, manager of private lodge stated "*last time, there were many forests here, but nowadays the forests have become smaller in size. I think if they really protect the wildlife, it should meet the objectives. So far, I think no new approach of sanctuary, but I know the authority continues to monitor the sanctuary and wildlife here*." Likewise, owner of Balai Kito Homestay stated "*the wildlife sanctuary ensures that the wildlife species and forests are well protected. I am not sure about other villages, but for Sukau village, yes, the objectives are met. It is because there are many wildlife species that are protected well since the initiation of the sanctuary*."

The questionnaire findings indicated 46 % of respondents stated that the current management of LKWS required improvement. Corresponding to the survey findings, a local authority reported that the objectives of LKWS subjected to continuous planning and monitoring: "*Regarding the safety of wildlife species in their natural habitats, it is still ongoing. Many efforts are made to promote protected areas, or gazette any related areas for wildlife habitat and other purposes*" (Deputy director of Wildlife Department). Another local authority

highlighted that management plans for LKWS were incomplete and wildlife officers executed its functions at present: "*If we talk about the progress of the Lower Kinabatangan Wildlife Sanctuary – whether we achieve the objectives or not, we need the timeline of management plan. Unfortunately, we have not finished outlining the management plans. For now, we execute the sanctuary's functions, such as to increase the wildlife corridor, carry out frequent monitoring, and replant trees along the riparian reserve*" (Wildlife senior officer).

Contrary to the questionnaire findings, published reports revealed four positive impacts after the establishment of the LKWS (Sabah Wildlife Department, 2017a; Sabah Wildlife Department, 2017b). First, offenses which violated the Wildlife Conservation Enactment 1997 reduced. Second, illegal encroachments in the protected areas also reduced. Third, applications for licenses and permits for hunting according to the Wildlife Conservation Enactment 1997 increased. Finally, NGOs and estate companies contributed and participated in conservation efforts (Sabah Wildlife Department, 2017a; Sabah Wildlife Department, 2017b). When compared to the questionnaire findings, this result implied that the survey respondents were unaware about the LKWS performances particularly its management, progress, and effectiveness in protecting wildlife and habitats in the Lower Kinabatangan. Similarly, Hussin and Som (2008) reported that the views of local people in Sabah were seldom taken into a serious consideration when it came to a decision-making and implementation of policy in conservation aspect.

Previous studies showed that other stakeholders engaged in various activities to conserve the wildlife species and habitats in this area. For instances, WWF-Malaysia conducted capacity building and environmental education to promote conservation awareness among the local communities, whereas another NGOs known as HUTAN-KOCP carried out Kinabatangan Orangutan Conservation Project to protect the orangutan in the Lower Kinabatangan Sabah (Majail & Webber, 2006; Latip et al., 2015a). The efforts undertaken by such organizations could improve conservation work in the Lower Kinabatangan, but all stakeholders involved in conservation activities need to mutually collaborate in order to enhance the management of LKWS (Latip et al., 2015b).

Based on the current findings, the management of LKWS could be improved by getting input from all stakeholders such as NGOs, community, private companies, local and private sector ecotourism in the Lower Kinabatangan, especially on how they could contribute positively towards achieving the goals of LKWS. More importantly, the local communities should be informed properly regarding the roles and progress of the sanctuary in their areas.

Strategies to enhance conservation measures

Five aspects of conservation were evaluated in order to improve the current conservation measures (Figure 2). Most respondents agreed that more financial

aids should be allocated for conservation (44.2 %), more local communities should be trained to be self-independent to contribute positively in conservation, not merely attending a conservation awareness (51.5 %), their participation could be encouraged by offering monetary incentives (41.8 %), they should participate more in decision-making on conservation (52.4 %), and current rules of conserving wildlife and forest should be tightened (43.6 %). Furthermore, 28.7 % of respondents strongly agreed that the rules should be strengthened, indicating that the current rules were inadequate to prevent illegal hunting and deforestation. Notably, questionnaire respondents reported that illegal poaching was mostly committed by outsiders and suggested local authorities to enforce a strict penalty for offenders.

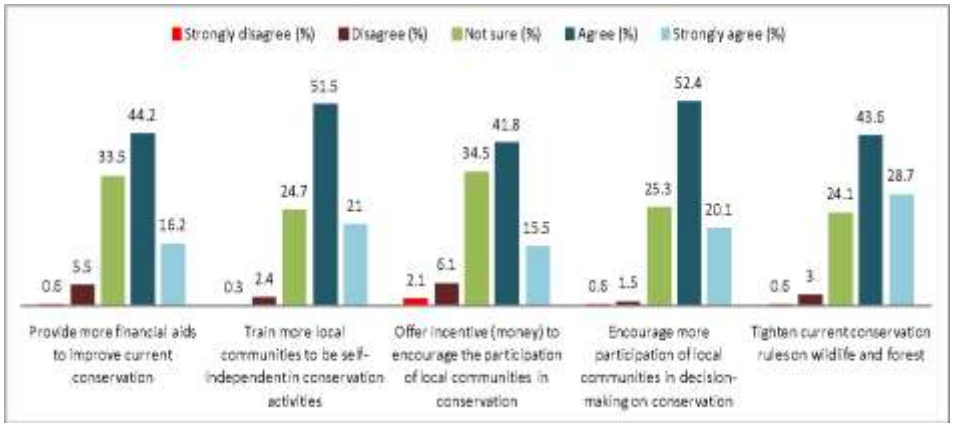


Figure 2: Respondents' opinions on future management of conservation in Lower Kinabatangan.

In comparison to the survey findings, key informants of interview revealed that it would be difficult to gazette other areas in the Lower Kinabatangan as sanctuary. At present, local authorities focused more on preserving the sanctuary and reconnecting fragmented areas between corridors: "Personally, I think it is difficult to gazette more areas, as the remaining areas are limited, but we are focusing more on preserving the one already being gazette, to try reconnecting fragmented areas and the corridors. The challenge is not all lands are reserved areas for conservation, other lands or lots belong to native lands or private owners. If they don't open their lands and remain as forest is okay, but if one day, they decide to open or sell it to other companies, it becomes a huge problem" (Wildlife senior officer).

In addition, extra efforts were made to request support from palm oil companies to make a passage enough for animals to pass through and build electrical fences along the route: "We request support from the palm oil companies to give us a route for wildlife to pass through and they build a territory

using electrical fences along the route. The meaning of route is to a make a clear way for the wildlife to pass through without any restrictions. We are waiting for more plantation company to offer small area of their plantation for wildlife corridor" (Wildlife deputy officer).

Besides the suggestions provided by respondents of survey and interview, previous studies emphasized threat of increased illegal hunting activities, which were exacerbated in habitat fragments due to relative ease of accessing the forest in the Lower Kinabatangan (Latip et al., 2015b; Evans et al., 2016). Despite the establishment of LKWS since 2005, evidences showed illegal encroachment and hunting within the sanctuary (Evans et al., 2016). Therefore, significant effort must be invested to curb illegal activities so as to preserve rich wildlife species in this area.

CONCLUSION

Overall, both research objectives are fulfilled in understanding the stakeholder management on conservation of natural resources in Lower Kinabatangan Sabah. The natural resources especially rare wildlife species act as main attraction for ecotourism development in this area. Local government establishes the Lower Kinabatangan Wildlife Sanctuary in order to protect natural forests, flora, and fauna. However, the success of conservation highly depends on effective conservation management by various stakeholders in this area, including support and participation of local community. The results show conflicting findings whereby local communities are not aware about the progress of LKWS and propose to improve conservation measures, but other stakeholders state the objectives of LKWS are achieved. Therefore, recommendations are proposed by the stakeholders to improve the conservation measures in this area. Policy makers, academic institutional, government, and conservationists could apply the proposed strategies in improving conservation measures in rural areas which encounter similar conservation constraints.

ACKNOWLEDGEMENT

We acknowledge Universiti Sains Malaysia and Ministry of Education Malaysia for funding this project through Research University Grant, RUI (Grant No: 1001/PPBGN/8016051).

We extent our appreciation to all stakeholders involved in this study particularly the Sabah Wildlife Department, Sabah Forestry Department, District Office of Kinabatangan, and local communities from Sukau and Batu Puteh villages for their support and cooperation throughout the study.

REFERENCES

Ancrenaz, M., Dabek, L., & O'Neil, S. (2007). The costs of exclusion: recognizing a role for local communities in biodiversity conservation. *PLoS Biology* 5(11), e289.

Agama, A., Crowe, M., Hase, A. V., Kate, K. T., & Lim, T. (2015). Policy and regulations assessment for implementing no net loss / net gain of biodiversity in sustainable multiple-use forest landscape, Sabah, Malaysia. Sabah Forestry Department: UNDP/GEF Project, pp 99.

Ami, J., & Hamzah, A. (2013). Incorporating sacred places and traditional values in the management of protected areas for conservation and ecotourism. *TEAM Journal of Hospitality and Tourism* 10(1), 53-64.

Bengtsson, M. (2016). How to plan and perform a qualitative study using content analysis. NursingPlus Open 2, 8-14.

Borgström, S. (2015). Assessing the capacity of nature conservation law to help
biodiversity adapts to climate change: The case of Finland. Review of European, *Comparative & International Environmental Law* 24(1), 69-82.

Coffey, B., & Major, A. (2005). Towards more integrated natural resource management in Victoria: possible elements of an integrated state-wide policy framework. *Australasian Journal of Environmental Management* 12(sup1), 29-38.

Coria, J., & Calfucura, E. (2012). Ecotourism and the development of indigenous communities: The good, the bad, and the ugly. *Ecological Economics* 73, 47-55.

Daily News (2015). Poverty level and ETP program, Accessed on May 19, 2015, pp 4.

Doney, S. C., Fabry, V. J., Feely, R. A., & Kleypas, J. A. (2009). Ocean acidification: the other CO2 problem. Marine Science 1, 169-192.

Estes, J. G., Othman, N., Ismail, S., Ancrenaz, M., Goossens, B., Ambu, L. N., & Palmiotto, P. A. (2012). Quantity and configuration of available elephant habitat and related conservation concerns in the Lower Kinabatangan floodplain of Sabah, Malaysia. PloS One 7(10), e44601.

Evans M. N., Vickers, S. H., Abu-Bakar, M. S., & Goossens, B. (2016). Small Carnivores of the Lower Kinabatangan Wildlife Sanctuary, Sabah, Borneo, including a new locality for the Otter Civet Cynogale bennettii. Small Carnivore Conservation 54, 26-38.

Kothari, A., Pathak, N., & Vania, F. (2000). Where communities care: community-based wildlife and ecosystem management in South Asia. *International Institute for Environment and Development*, pp 222.

Ghasemi, M., & Hamzah, A. (2014). An investigation of the appropriateness of tourism development paradigm in rural areas from main tourism stakeholders' point of view. Fifth Asia Euro Conference. *Procedia-Social and Behavioral Sciences* 144, 15-24.

Goh, H. C. (2015). Nature and community-based tourism (CBT) for poverty alleviation: a case study of Lower Kinabatangan, East Malaysia. *Malaysian Journal of Society and Space* 11(3), 42-52.

Goossens, B., & Ambu, L. N. (2012). Sabah Wildlife Department and 10 years of research: towards a better conservation of Sabah's wildlife. *Journal of Oil Palm & the Environment* 3, 38-51.

Hussain, A., Dasgupta, S., & Bargali, H. S. (2016). Conservation perceptions and attitudes of semi-nomadic pastoralist towards relocation and biodiversity

management: a case study of Van Gujjars residing in and around Corbett Tiger Reserve, India. *Environment, Development and Sustainability* 18(1), 57-72.

Hussin, R., & Som, A. P. M. (2008). Ecotourism, conservation programme, and local community participation: conflict of interests in Sukau village of Sabah, Malaysia. Sosiohumanika 1(1), 115-140.

Lackman-Ancrenaz I, & Manokaran K. (2008). Kinabatangan biosphere reserve nomination Dossier. HUTAN.

Latip, N. A., Marzuki, A., Marcela, P., & Umar, M. U. (2015a). Indigenous people, conservation and sustainable tourism at Lower Kinabatangan, Sabah: SWOT analysis. *Australian Journal of Basic and Applied Sciences* 9(7), 331-334.

Latip, N. A., Marzuki, A., Marcela, P., & Umar, M. U. (2015b). The involvement of indigenous peoples in promoting conservation and sustainable tourism at Lower Kinabatangan Sabah: common issues and challenges. *Australian Journal of Basic and Applied Science* 9(7), 323-325.

Majail, J. & Webber, D.A. (2006). Human dimension in conservation works in the Lower Kinabatangan: sharing PFW‟s experience. *Fourth Sabah-Sarawak Environmental Convention*, pp 9.

Robert, K. W., Parris, T. M., & Leiserowitz, A. A. (2005). What is sustainable development? Goals, indicators, values, and practice. *Environment: Science and Policy for Sustainable Development* 47(3), 8-21.

Sabah Land Ordinance (2010). State of Sabah Land Ordinance (Sabah Cap. 68). Land Ordinance.

Sabah Wildlife Department (2017a). Lower Kinabatangan Wildlife Sanctuary: Purposes, protected species, and locations. Reports by the Sabah Wildlife Department, Kinabatangan office, pp 7.

Sabah Wildlife Department (2017b). Management and conservation: protected areas. Accessed 12 April 2017 at http://www.wildlife.sabah.gov.my/?q=en/content/protected-areas.

Sha, J. C. M, Henry B., & Nathan S. (2008). Status and conservation of proboscis monkeys (Nasalis larvatus) in Sabah, East Malaysia. Primate Conservation 23, 107-120.

Somarriba-Chang, M. d. l. A., & Gunnarsdotter, Y. (2012). Local community participation in ecotourism and conservation issues in two nature reserves in Nicaragua. *Journal of Sustainable Tourism* 20(8), 1025-1043.

World Commission on Environment and Development. (1987). Our common
future. World Commission on Environment and Development (WCED). New York: Oxford University Press, pp 8.

WWF (2004). Poverty and conservation: ecotourism in the Lower Kinabatangan, Sabah, pp 2.

Received: January 2020. Accepted: 20th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 2 (2020), Page 82 – 103

SURVEILLANCE AND GUARDIANSHIP ATTITUDES: ROLE OF MULTIPLE MEDIATORS

Massoomeh Hedayati Marzbali[1], Aldrin Abdullah[2], Mohammad Javad Maghsoodi Tilaki[3]

[1,2] *School of Housing, Building and Planning*
[3] *School of Humanities*
UNIVERSITI SAINS MALAYSIA

Abstract

Urban design researchers and environmental criminologists believe that personal and situational characteristics influence how and when residents act as guardians over where they live. However, little is known about the individual factors that explain residential guardianship behaviours. This study focuses on sociophysical factors in explaining residents' willingness to act as guardians to control criminal behaviour through multiple mediators. A sample of 247 residents in Penang, Malaysia was analysed via structural equation modelling. Results demonstrated that although no significant direct association exists between natural surveillance and guardianship, this relationship was mediated via territorial identity and increases in social cohesion. Findings also indicated the significant role of territorial identity, perceived risk and social cohesion in explaining the amount of guardianship attitude. Furthermore, surveillance helps reduce perceived risk among residents. Social cohesion is the most influential factor in shaping the opportunity for capable guardianship in the study area. It is concluded that organising community-based activities will help strengthen community ties, thereby creating substantial willingness among residents to intervene for the common good and building safer communities. Using extensive survey data from a multi-ethnic community in Malaysia, this study brings to the fore the ways in which the sociophysical factors help foster guardianship attitudes within residential contexts using multiple mediators.

***Keywords**:* Guardianship attitude, multiple mediators, perceived risk, social cohesion, surveillance

[1] Senior Lecturer at University Sains Malaysia. Email: hedayati@usm.my

INTRODUCTION

A focal point of recent research on criminology is to understand how crime evolves and the means to curb it, as safety and security are components of sustainability. A wide range of variables are influential in understanding crime. These variables may include, but are not limited to, socioeconomic status (Shaw & McKay, 1942), areas with a high level of physical disorder (Moley, 2008), absence of stability and social networks (Comstocka et al., 2010), as well as physical design, ranging from neighbourhood-level factors to micro-level features of individual properties, such as the orientation of neighbouring properties and the height of boundary fencing (Armitage & Joyce, 2017; Marzbali et al., 2012; Sohn, 2016). Felson stated that "crime seeks times and places that are largely unsupervised" (Felson, 2006, p. 79). That one of the key factors that discourages offenders from committing crime in residential settings is the risk of being seen has been well established within criminology research (MacDonald & Gifford, 1989). This claim has been supported by several studies in which high levels of supervision and natural surveillance opportunities within the neighbourhood environment are associated with low levels of crime (Hollis-Peel & Welsh, 2014; Reynald, 2011).

The concept of guardianship is central to routine activities approach, which posits that opportunities for crime arise when potential offenders and suitable targets converge in the absence of capable guardians. On the basis of Cohen and Felson's model, capable guardians can serve as key actors in the crime event model (Cohen & Felson, 1979). However, the extent to which residents carry out supervision in their neighbourhood and which factors regulate the amount of supervisions and interventions are largely unknown (Reynald & Moir, 2018).

Evidence of opportunities for and motivations behind guardianship is limited (Moir et al., 2018), thereby warranting additional research. An interview study suggests that physical design, sense of responsibility, perceptions of crime and relationships with neighbours facilitate residential monitoring (Reynald, 2010). Only a few studies focused on measuring opportunities for natural surveillance that are generated by the physical environment as an indicator of supervision (for example, Wilcox et al., (2007)). Reynald (2011) is one of the few studies to date that explicitly identify both spatio-physical and social factors that influence monitoring and intervention in residential areas in the Netherlands. In a similar vein, Reynald and Elffers (2009) integrated defensible space and routine activities theories. However, they neglected the mediational effects in their proposed model, which will be addressed by this study. Rather than the direct relationship, the current study proposes a model to examine which variables clarify the nature of the relationship between surveillance and guardianship attitudes. To date, no such study has been conducted in a Malaysian context. To fill this gap, the current study was undertaken to investigate the role that physical design and social environment play in facilitating intervention among potential residential guardians through multiple mediation effects in a multi-ethnic society.

The model in this study tests the link between surveillance and guardianship attitudes and expands the defensible space concept, routine activities approach and social disorganisation model in two ways. Firstly, drawing on an environmental psychology perspective, we argue that aside from social cohesion, perceived risk can relate to guardianship attitudes. Secondly, from an ecological perspective, crime and fear of crime are related to social and physical environment. Thus, territorial identity may play a significant role in residents' perceptions and their intervention experiences. In doing so, this study sought to answer the following research question: what factors influence intervention by potential guardians in residential areas? This paper focuses on Penang, Malaysia, as possibly one of the most ethnically diverse conurbation areas, thereby serving as a particularly suitable testbed for theories about the effects of influencing factors on prosocial behaviour. Before presenting the answer to the research question, a review of the relevant literature is discussed.

LITERATURE REVIEW

Several researchers advocate the integration of a combination of several theories to explain crime–space relationship. Most theories include routine activities approach, defensible space, social disorganisation theory, vulnerability hypothesis and incivilities thesis. As the focus of this study is on guardianship attitudes that explain why several residential spaces are more defensive than others, this study attempted to partly integrate defensible space, social disorganisation and routine activities approach. Studies show that crime decreases as active guardianship behaviour increases (Reynald, 2009). Research has also found that the physical design of houses, relationships with neighbours, prior victimisation and daily routine activities are crucial factors to facilitate monitoring in residential areas (Moir et al., 2018).

Routine activities approach is a macro-scale theory, which posits that three factors must come together for criminal activity to occur (Cohen & Felson, 1979). These factors include a suitable target, the absence of capable guardians and a motivated offender. Therefore, a high probability of crime occurs when all three factors occur simultaneously. Ekblom (2019) highlighted the spatial dimension of the routine activities approach and stated that this approach "explains (changing) patterns of crime in terms of (changing) patterns of day-to-day activity that happen to *bring offenders and victims or targets together* in the absence of capable guardians; the offenders then seize the opportunities presented". Reynald (2009) stated that the mechanism of supervision is at the heart of the concept of guardianship, which inherently implies control through surveillance. Reynald and Mihinjac (2019) also explicated the role of a guardian as a crime controller or preventer based on the routine activities approach. Natural surveillance refers to the way in which design can maximise the ability of formal

and informal users (social eyes) to monitor surrounding environment (Armitage & Pascoe, 2016). The primary aim of natural surveillance is to maintain potential criminals under observation of the legitimate users (Abdullah et al., 2013; Marzukhi et al., 2018; Sohn, 2016). Improved lighting is one way that provides positive psychological impacts to users by ensuring good visibility and increasing surveillance (Cho et al., 2019).

Criminological research on community crime rates reflects Shaw and McKay's (1942) influential theory of social disorganisation. In their classic work, Shaw and McKay posited that certain sociostructural factors of a neighbourhood leads to disruption of community social organisation. Social disorganisation refers to the inability of communities to realise common goals, thereby focusing on the effects of crime opportunities in communities (Kubrin & Weitzer, 2003). The theory assumes that the basis of criminal behaviour depends on a neighbourhood's structural and cultural factors, such that neighbourhoods with a high sense of social cohesion are able to control their surrounding area and experience less crime and fear as a consequence (Frimpong et al., 2018; Rukus & Warner, 2013; Steenbeek & Hipp, 2011). Recent Taiwanese research found that social-cultural characteristics of the living environment are related to older adults' behaviour patterns and their physical activities, in which high perceptions of crime may lead not only to increase the time spent on indoor but also to reduce the time spent on outdoor (Lin et al., 2019).

Reynald (2011) asserts that research on residents' willingness to intervene directly in crime prevention can be subsumed within the social disorganisation model, which underscores collective processes that determine levels of informal social control and the users' willingness to intervene on behalf of a common good. As such, the theory focuses on the mediating role of social processes, such as social cohesion and informal social control, on the relationship between neighbourhood structure and crime rates.

According to Newman (Newman, 1972), "defensible space is a model for residential environments which inhibits crime by creating the physical expression of a social fabric that defends itself.... an environment in which latent territoriality and the sense of community in the inhabitants can be translated into responsibility for ensuring a safe, productive and well-maintained living space". On the basis of the theory, territorial functioning can be seen as the critical intervening factor that mediates the relationship between the social and physical environment and the level of criminal activity. Territorial reinforcement assumes that physical design can enhance a sense of proprietorship over a territory. Consequently, users will exert several means of control over these spaces from unwanted intrusion, which in turn result in less crime and fear of crime.

The focus of this study is not the impact of guardianship attitudes on actual crime rate; this study seeks to investigate the most influencing factors that

enhance the potential for guardianship. Advancing the state of knowledge in this area requires innovation in undertaking a highly complete theoretical exploration. The theoretical framework helps in understanding the ways in which factors interact to create enabling conditions for capable guardians. Nonetheless, alerting to the role of perceived risk and social ties as mediators, the function of surveillance on guardianship attitudes when adjusting for the mediating effect remain untested.

A recent study provides a critical overview of the concepts of informal social control and guardianship as these two concepts are usually used interchangeably in the literature (Reynald & Moir, 2018). Reynald and Moir (2018) argued that although the concept of guardianship bears close resemblance to aspects of informal social control, one core distinction is that informal social control is dependent on neighbourhood social ties, whereas guardianship can be strengthened by social ties at the macro-level. In this way, social cohesion can be considered a mediator in the association between physical design and guardianship.

THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESES

The current study aims to address the lack of research on contextual factors and guardianship by presenting a unique exploratory empirical investigation of the impact of surveillance and social factors on sense of responsibility for guarding by residents in a multi-ethnic society. Numerous variables treated as contextual factors for the purposes of this study have been used in prior research as indicators of guardianship. Previous empirical studies used target-hardening variables as indicators of guardianship (Miethe & Meier, 1990; Tewksbury & Mustaine, 2003). Furthermore, Wilcox et al. (2007) used defensible space variables and social cohesion as measures of physical and social guardianship.

The current study did not focus on guardianship intensity. The survey measured a range of variables that are related to a sense of responsibility for guardianship. The data related to residential guardianship includes guardianship attitudes, perceived risk, social cohesion, surveillance and territorial identity. To date, we are unaware of any research that examines the direct relationship between physical characteristics of the residential environment and guardianship attitudes in a Malaysian context.

Guardianship attitudes are related to people's perception of their relationship to a particular delimited location or their perception of conditions in such a locus, which may involve caretaking and surveillance behaviour. The practical nucleus of the concept of supervision refers to natural surveillance as a cornerstone of Newman's (1972) defensible space concept. Newman (1972) defines defensible space as "a model for residential environments which inhibits

crime by creating the physical expression of a social fabric that defends itself". According to Newman (1972), latent territoriality and sense of responsibility can be translated into residents' responsibility for ensuring a safe and well-maintained living space. This finding explains how surveillance is critical in creating a highly defensive environment. In this way, natural surveillance complements the concept of guardianship from routine activity theory (Reynald, 2011; Reynald & Moir, 2018).

The current study did not focus on guardianship intensity. The survey measured a range of variables that previous research has shown to be related to sense of responsibility for guardianship, with an emphasis on physical factors related to survivability. The current study seeks to uncover factors that motivate residents to guard their residential spaces. The study model is composed five main constructs: (1) natural surveillance, (2) territorial identity, (3) perceived risk, (4) social cohesion and (5) guardianship attitudes. Table 1 provides the definition of each dimension. The model has two distinguishing characteristics. Firstly, the model is constructed from positive and negative perspectives. Although perceived risk may negatively affect guardianship attitudes, the presence of high levels of surveillance, territorial identity and social contact among residents can buffer this negative effect. Secondly, the model integrates multiple contextual factors (e.g. territorial identity, perceived risk and social cohesion as multiple mediators) to establish the key drivers of guardianship attitudes.

Table 1. Operationalization of the latent variables

Dimensions	**Definitions**
Natural surveillance	The way in which design can maximise the ability of both formal and informal users to monitor surrounding environment.
Territorial identity	The degree to which the neighbourhood is viewed as a distinct social and territorial unit.
Perceived risk	To what extent respondents felt safe in their neighbourhood.
Social cohesion	The extent to which respondents know their neighbours, share similar interests and take part to prevent crime.
Guardianship attitudes	To what extent respondents respond to crime in different circumstances through direct and indirect interventions.

In light of modelling limitation, the intervening effects of territorial identity, social cohesion and perceived risk are usually tested individually as separate mediators, without considering their possible covariation (Kubrin & Weitzer, 2003). To overcome this limitation, a structural equation modelling approach is employed to examine simultaneously the mediating effects of these three variables by using survey data on the relationship between physical design and

guardianship attitudes in Penang, Malaysia. This study represents the first use of a combination of defensible space and routine activity theory in the literature in a non-Western, multi-ethnic population at the individual level. Furthermore, considering separate mediators is important in social work practice as they provide practitioners with additional targets for intervention. On the basis of defensible space concept and routine activity theory, as well as the discussions, the following research hypotheses were drawn.

H1 *Natural surveillance is positively associated with territorial identity.*
H2 *Natural surveillance is negatively associated with perceived risk.*
H3 *Natural surveillance is positively associated with social cohesion.*
H4 *Natural surveillance is positively associated with guardianship attitudes.*
H5 *Territorial identity is positively associated with guardianship attitudes.*
H6 *Perceived risk is negatively associated with guardianship attitudes.*
H7 *Social cohesion is positively associated with guardianship attitudes.*
H8 *Territorial identity mediates the relationship between natural surveillance and guardianship attitudes*.
H9 *Perceived risk mediates the relationship between natural surveillance and guardianship attitudes*.
H10 *Social cohesion mediates the relationship between natural surveillance and guardianship attitudes*.

MATERIALS AND METHODS

SITE SELECTION

Malaysia is a unique country with a multi-ethnic, multi-religious and multilingual population. Addressing the guardianship attitudes to foster social control is especially important for countries such as Malaysia because of the diverse religious and cultural background of its population. This study constitutes a portion of a large study, which examined the physical characteristics of neighbourhoods and the wellbeing of residents. This study was conducted in Penang, Malaysia, specifically in the Island Glades area, which covered a sample of 247 residents from a systematic sampling method in a homogeneous neighbourhood. As research posits that low social integration exists in multiracial communities (Putnam, 2007), to control differences among three major ethnic groups in Malaysia, a homogenous neighbourhood was selected.

Island Glades, a typical medium class neighbourhood, was formerly a plantation land in the 1960s, which was rapidly transformed into the residential neighbourhood as it is now. Hence, Island Glades stands as one of the oldest developments on the island of Penang and is still popular to this day for its central location, with new developments rising on its outskirt. Houses located within

Island Glades are typically double-storey, with several single-storey houses. The area consists of approximately 1,700 dwelling units.

To capture the information on neighbourhood social and physical environments, on-site observation was conducted, followed by a questionnaire survey. Direct observations enable obtaining a comprehensive and objective representation of physical characteristics of neighbourhoods (Paquet et al., 2010). This study utilises a systematic sampling method to select samples from the population. The surveys were conducted in English and Malay based on the respondent's preference, and they required approximately 15 minutes to complete. To ensure inter-rater reliability, a pair of observers gathered observations from a small number of randomly-selected residents. An analysis of inter-rater reliability was performed to assess the degree to which observers consistently assigned the levels of indicators. The resulting kappa indicated substantial agreement and therefore the ratings were deemed as adequate for use to test the hypotheses in the present study. The study focused on residents of landed properties, as these were the predominant type of dwelling in the study area. Table 2 depicts the demographic characteristics of the respondents.

Table 2. Respondents' demographic characteristics

Demographic variables	**Categories**	**Island Glades (n=247)**
Ownership	Owner	215 (87.0%)
	Tenant	19 (7.7%)
	Others	13 (5.3%)
Gender	Male	123 (49.8%)
	Female	124 (50.2%)
Marital status	Single, widowed or separated	57 (23.1%)
	Married or living as married	190 (76.9%)
Main wage earner	Yes	99 (40.1%)
	No	137 (55.5%)
	Not applicable	11 (4.5%)
Education	University/college	125 (50.6%)
	Secondary education	102 (41.3%)
	Primary education	14 (5.7%)
	Non formal education	6 (2.4%)
Occupation	Self-employed	43 (17.4%)
	Private sector employee	73 (29.6%)
	Public sector employee	16 (6.5%)
	Retiree	52 (21.1%)

Demographic variables	Categories	Island Glades (n=247)
	Unemployed	4 (1.6%)
	Others	59 (23.9%)
Length of residence	Less than 5 years	30 (12.1%)
	5-9 years	35 (14.2%)
	10 years and over	182 (73.7%)
Ethnicity	Malay	9 (3.6%)
	Chinese	229 (92.7%)
	Indian	9 (3.6%)
Household income	Less than RM 3000	37 (15.0%)
	From RM 3001-RM 5000	69 (27.9%)
	From RM 5001-RM 7000	65 (26.3%)
	From RM 7001-RM 9000	50 (20.2%)
	RM 9001 and above	26 (10.5%)

SURVEY INSTRUMENT

The study is quantitative in nature, thereby prompting residents to respond to a set of self-administered questionnaires. Apart from providing their demographic information, participants responded to 21 statements that reflect territorial identity, perceived risk, social cohesion and guardianship attitudes. Table 3 presents the study variables with respective indicators. Items were adapted based on the work of Greenberg et al. (1982). Social cohesion items were adapted from the work of Hedayati et al. (2015), Reynald (2011), and Sampson et al. (1997) on a seven-pint Likert scale (1=strongly disagree, 7=strongly agree). Items of perceived risk were adapted from Abdullah et al. (2016), Franklin et al. (2008) and Mason et al. (2013) on a five-point Likert scale (1=very safe, 5=very unsafe). Guardianship attitude was measured on seven-point Likert scale (1=strongly disagree, 7=strongly agree) and was adapted based on the work of Reynald (2011). Surveillance is classified into two categories: lighting and visibility (Abdullah et al., 2013; Marzbali et al., 2019). Lighting was measured on a five-point Likert scale (1=extremely not satisfied, 5=extremely satisfied) and referred to the quality of lighting at house level. Four statements were employed to measure the level of visibility, referring to the degree of possibility of places being overlooked by residents and outsiders based on a five-point Likert scale (1= very poor, 5= very good).

Table 3. Study variables with respective indicators

Construct	Item	Description
Territorial Identity	TI1	I know the name of my neighbourhood.
	TI2	I can easily draw the boundary of my neighbourhood on the map.
	TI3	There is natural surveillance by people or activities through various land uses (e.g., neighbourhood watch).
	TI4	There is formal surveillance in my neighbourhood (e.g., CCTV, police patrol).
Social cohesion	SC1	I know my neighbours on my street.
	SC2	I interact with my neighbours fairly often.
	SC3	I will try to assist my neighbours if I see them in trouble.
	SC4	I am confident that my neighbours will assist me if I need help.
	SC5	I do my part to prevent crime and disorder on my street.
	SC6	My neighbours do their part to prevent crime and disorder on this neighbourhood.
Perceived risk	PR1	How safe do you feel walking alone in your street during the day?
	PR2	How safe do you feel walking alone in your street after dark?
	PR3	How safe do you feel walking alone in this neighbourhood during the day?
	PR4	How safe do you feel walking alone in this neighbourhood after dark?
	PR5	How safe do you feel when you are in home alone at night?
	PR6	How safe do you feel when you are in a park or playground in your neighbourhood during the day?
Guardianship attitudes	GA1	If I see a crime in progress, I would take some action.
	GA2	Dealing with crimes is the responsibility of ordinary citizens.
	GA3	I will do what I can to protect my neighbours from crime.
	GA4	I believe I have a role to play in preventing crime.
	GA5	I keep an eye on what occurs in front of my house daily.

Construct	Item	Description
Visibility	Vis1	1. All doors and windows at the front façade are visible from the street.
	Vis2	2. No places are concealed by fences in the yard from the main entrance.
	Vis3	3. All spaces between houses are visible.
	Vis4	4. Shrubs are kept to a maximum of 90 cm in height.
Lighting		1. Lighting facilities at the main entrance
		2. Lighting around the building
		3. The level of lighting in the yard area

STATISTICAL ANALYSIS

The proposed model and hypothesis testing are conducted by using Partial Least Squares (PLS) analysis with the SmartPLS 3 software (Ringle et al., 2015). PLS was chosen because of its appropriateness to the use of hierarchical variable model and the exploratory nature of this study. Likewise, PLS is highly appropriate when a research model is at its infancy, and it avoids the limitations of covariance-based SEM, such as sample size and restrictions stemming from modelling complexity (Wetzels et al., 2009). Nonparametric bootstrapping was applied to test the significance of the path coefficient among latent variables as well as between the latent variables and respective manifest variables. The study tested the measurement model (validity and reliability) and structural model (testing the relationship among variables) to finalise the outcome. Wetzels et al. (2009) suggested that the manifest variables will be used twice, for the first-order latent variables and second-order latent variable (known as 'secondary loadings', i.e. natural surveillance). Hedayati-Marzbali et al. (2016) suggested that natural surveillance is a second-order latent construct which consists of visibility and lighting as first-order constructs. In addition to the assessment of the path coefficient, there are four criteria that need to be tested to examine the structural model: coefficient of determination (R^2), effect size (f^2), variance inflation factor (VIF) and predictive relevance (Q^2).

RESULTS AND FINDINGS

MEASUREMENT MODEL RESULTS

The measurement model evaluation requires outer loadings, convergent validity, composite reliability and discriminant validity (Tables 4 and 5). The threshold value of composite reliability for a given construct is 0.7 (Bagozzi & Yi, 1988). Table 4 posits that all the constructs have composite reliability value more than 0.70. The measure of convergent validity is the average variance extracted for which the threshold value is 0.5 (Fornell & Larcker, 1981). Consequently, all the constructs possess convergent validity (Table 4).

Table 4. The measurement model results for the latent constructs

Construct	Items	Loadings	Composite reliability (CR)	*t* value	Average variance extracted (AVE)
Lighting	Lit1	0.929	0.952	15.489***	0.869
	Lit3	0.968		15.774***	
	Lit4	0.900		14.815***	
Visibility	Vis2	0.953	0.947	142.132***	0.818
	Vis3	0.954		167.297***	
	Vis4	0.968		243.565***	
	Vis5	0.717		20.330***	
Territorial identity	TI1	0.530	0.835	5.947***	0.565
	TI2	0.755		12.290***	
	TI3	0.853		33.576***	
	TI4	0.826		16.590***	
Perceived risk	PR1	0.847	0.910	8.655***	0.630
	PR2	0.683		4.507***	
	PR3	0.839		7.955***	
	PR4	0.703		4.748***	
	PR5	0.786		11.298***	
	PR6	0.883		12.638***	
Social cohesion	SC1	0.893	0.946	62.756***	0.747
	SC2	0.919		56.915***	
	SC3	0.936		105.827***	
	SC4	0.852		41.441***	
	SC5	0.806		26.820***	
	SC6	0.769		20.097***	
Guardianship attitudes	GA1	0.883	0.912	37.258***	0.677
	GA2	0.864		28.711***	
	GA3	0.847		29.401***	
	GA4	0.838		23.586***	
	GA5	0.660		14.177***	

Note. *** $p<.01$

The SmartPLS 3 software offers a unique measure to establish the discriminant validity for a pair of two constructs: heterotrait–monotrait (HTMT) ratio and confidence interval up. The liberal threshold values for the HTMT ratio and corresponding confidence interval up are less than 0.85 and 1, respectively

(Henseler et al., 2015). Consequently, HTMT ratios and the corresponding confidence intervals up for each pair are less than 0.85 and 1, respectively (Table 5). Hence, the model possesses discriminant validity.

Table 5. Heterotrait-Monotrait (HTMT)

	Guardianship attitudes	Lighting	Perceived risk	Social cohesion	Territorial identity
Lighting	0.313 **CI.90** (0.200, 0.422)				
Perceived risk	0.116 **CI.90** (0.090, 0.218)	0.073 **CI.90** (0.055, 0.165)			
Social cohesion	0.584 **CI.90** (0.474, 0.692)	0.266 **CI.90** (0.146, 0.400)	0.255 **CI.90** (0.184, 0.376)		
Territorial identity	0.400 **CI.90** (0.264, 0.550)	0.361 **CI.90** (0.217, 0.489)	0.196 **CI.90** (0.132, 0.312)	0.338 **CI.90** (0.213, 0.468)	
Visibility	0.084 **CI.90** (0.062, 0.198)	0.161 **CI.90** (0.054, 0.284)	0.199 **CI.90** (0.095, 0.326)	0.193 **CI.90** (0.087, 0.317)	0.132 **CI.90** (0.067, 0.283)

Additionally, the possibility of common method variance was examined by using Harman's one-factor test (Podsakoff et al., 2003). According to these authors, common method variance occurs when only one factor emerges from a factor analysis or when the first factor explains more than 50% of the variance. In this light, all the items for the constructs were introduced into a factor analysis and the unrotated matrix indicates that the first factor explains 24% of the variance. As such, common method variance is not an issue in this study.

AN ASSESSMENT OF THE HIERARCHICAL SURVEILLANCE CONSTRUCT

This study specifies natural surveillance as a second-order construct, which is composed of two first-order reflective constructs (lighting and visibility) representing seven items. The degree of explained variance of this hierarchical construct is reflected in its components: lighting (R^2 = 46.8%) and visibility (R^2 = 67.9%). The entire path coefficient from natural surveillance to its dimensions is significant at $p < 0.01$.

AN ASSESSMENT OF THE STRUCTURAL MODEL

Direct Effects

Table 6 depicts the results of path analysis used to test the hypothesis of direct effects among latent variables. The results indicated that the impacts of natural surveillance on territorial identity ($\beta = 0.259$, $p < 0.01$) and social cohesion ($\beta = 0.231$, $p < 0.01$) are positive and significant. In line with previous studies, the results suggest that additional opportunities for surveillance are associated with a great sense of territorial identity and social cohesion. Moreover, in line with previous studies, the results also indicated a negative and significant association between natural surveillance and perceived risk ($\beta = -0.181$, $p < 0.01$), where high levels of surveillance are associated with low levels of risk perceptions. However, the direct association between natural surveillance and guardianship attitudes is not significant ($\beta = 0.031$, $p > 0.05$). Hence, the results support H1, H2 and H3, but not H4.

Moreover, territorial identity has a positive and significant impact on guardianship attitudes ($\beta = 0.197$, $p < 0.01$) and social cohesion also has a positive and significant impact on guardianship attitudes ($\beta = 0.590$, $p < 0.01$). Surprisingly, although we hypothesised a negative association between perceived risk and guardianship attitudes, the results show a positive and significant association between these two variables ($\beta = 0.124$, $p < 0.01$), which demonstrates that people who perceive high levels of risk are likely to rate their guardianship attitudes positively. The results support H5 and H7, but not H6. Although not hypothesised, the result indicates that high perceived risk is associated with low social cohesion. The R^2 value for guardianship attitudes is 0.433.

Table 6. Path coefficient and hypothesis testing (direct effects)

Hs	Relationship	*β*	*t* value	Decision	f^2	*VIF*
H1	NS→TI	0.259	4.053***	Supported	0.072 (Small)	1.000
H2	NS→PR	-0.181	2.940***	Supported	0.034 (Small)	1.000
H3	NS→SC	0.231	3.923***	Supported	0.060 (Small)	1.034
H4	NS→GA	0.031	0.605	Not supported	0.001	1.141
H5	TI→GA	0.197	3.631***	Supported	0.060 (Small)	1.138
H6	PR→GA	0.124	1.989***	Supported	0.024 (Small)	1.106
H7	SC→GA	0.590	12.292***	Supported	0.505 (Substantial)	1.217

Beta = regression weight, *t* values are computed through bootstrapping procedure with 247 cases and 1,000 samples; *** $p<0.001$

Indirect Effects

This study estimates three mediating relationships as shown in Figure 1. Table 7 depicts the results of path analysis used to test the hypothesis of indirect effects. The *t* values were computed through a bootstrapping procedure suggested by Hayes (2009) with 1,000 samples. To estimate the significance of the indirect effect, numerous researchers employed the Sobel test. One limitation of the Sobel test is that it requires a normal sampling distribution of the indirect effect (Hayes, 2009), whereas the indirect effect (*ab*) sampling distribution tends to be asymmetric with non-zero values for skewness and kurtosis (Stone & Sobel, 1990). According to Hayes (2009), tests that assume normality of the sampling distribution should not be used to assess indirect effects and suggests the use of a bootstrapping procedure as an alternative approach to test indirect effects. The *t* values for direct and indirect effects were computed through a bootstrapping procedure with 1,000 samples. The *t* values for indirect effects are obtained by dividing the *ab* by the standard error (SE) of the indirect effect. The SE is the standard deviation of the repeated bootstrap estimates of the indirect effect. Table 7 shows that the *t* values of two indirect effects (H8 and H10) are significant at the 0.05 level. Therefore, the results support H8 and H10m but not H9.

Table 7. Hypothesis testing (indirect effects)

Hs	Relationship	Predictor-criterion(*β*)	Predictor-mediator (*β*)	Mediator-criterion (*β*)	*t* value	Decision	VAF (%)
H8	NS→TI→GA	0.031	0.259***	0.197***	2.673***	Supported	22.98
H9	NS→PR→GA	0.031	-0.181***	0.124**	1.401	Not Supported	--
H10	NS→SC→GA	0.031	0.231***	0.590***	4.542***	Supported	61.39

** p<0.05, *** p<0.001, VAF (variance accounted for) = indirect effect/total effect

The variance accounted for (VAF) was calculated to estimate the size of the indirect effect by dividing the indirect effect by the total effect (Shrout & Bolger, 2002). Table 7 shows that the territorial identity explained approximately 23% of the variance in mediating the relationship between natural surveillance and guardianship attitude and the magnitude is considered partial (Hair et al., 2013). The VAF value indicates that approximately 61% of the total effect of natural surveillance on guardianship attitude is explained by the partial mediating effect of social cohesion.

On the basis of the R^2 values, result reveals that approximately 7% and 3% of the variance in territorial identity and perceived risk are explained by natural surveillance, whereas natural surveillance and perceived risk explain approximately 14% of the variance in social cohesion. However, natural surveillance (indirectly), territorial identity, perceived risk and social cohesion reasonably explain 43% of the variance in guardianship attitude. The purpose of

calculating the effect size (f^2) is to estimate the extent of the influence of an independent latent variable on the dependent variable. Effect size is based on the change in the coefficient of determination (R^2). According to Chin (1998), the values of 0.02, 0.15 and 0.35 represent the level of effect size as small, moderate and substantial, respectively. Table 6 shows that the f^2 for territorial identity, perceived risk and social cohesion on guardianship attitudes were 0.060, 0.024 and 0.505, respectively. Thus, social cohesion has a substantial impact on guardianship attitude.

Multicollinearity among the variables was also evaluated in the model and did not find any cause for concern by using the criteria of variance inflation factor, which were (Table 6) all below the suggested threshold of 5.00 (Hair et al., 2013). Hair et al. (2017) suggest that the predictive relevance of the model through the blindfolding procedure be examined. The Q^2 values for territorial identity (Q^2 = 0.031), perceived risk (Q^2 = 0.014), social cohesion (Q^2 = 0.094) and guardianship attitude (Q^2=0.214) are >0, suggesting that the model has sufficient predictive relevance.

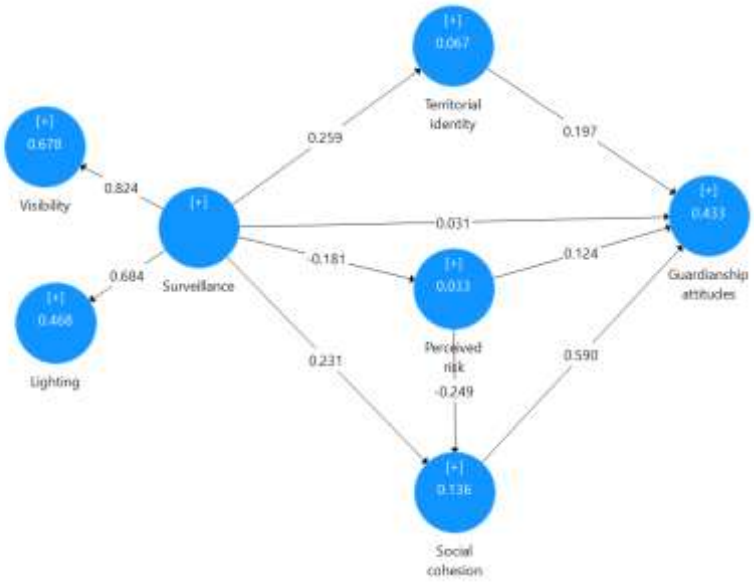


Figure 1. The parameter estimates of the PLS analysis

CONCLUSIONS

The current study aims at investigating the impact of surveillance and social factors on sense of responsibility for guardianship by residents in a multi-ethnic

society. This study investigates the role that spatio-physical and social factors play in facilitating monitoring and intervention among potential guardians against criminal behaviour in residential areas in Malaysia. Although surveillance was theoretically developed to predict guardianship attitude, mediating roles of territorial identity, perceived risk and social cohesion on the path between surveillance and guardianship attitude were also examined in an exploratory sense. The results reveal that the direct effects for natural surveillance on guardianship attitude may not be as straightforward as presumed in the literature and this relationship was mediated through territorial identity, and an increase in social cohesion.

Conceptually, the current study extends this line of research by assessing the effect of natural surveillance, territorial identity, perceived risk and social cohesion on guardianship attitude in a multi-ethnic urban society. Furthermore, surveillance helps to reduce perceived risk among residents, whereas high levels of surveillance are related to high levels of territorial identity and social cohesion. Furthermore, surveillance helps to reduce perceived risk among residents and consequently, to enhance social cohesion among residents. This effect can contribute to an increase in health and well-being, as research found that social cohesion enhances optimism towards health (Marzbali et al., 2016).

Turning our attention away from the traditional focus on the role of the environment in creating opportunities for supervision, this study attempted to examine the most influential factors in explaining guardianship attitude. Although supervision is a fundamental dimension of residential guardianship that is critically affected by opportunities provided by environmental design and layout, research shows that even when available residential guardians have the opportunity to monitor their surroundings, supervision is not guaranteed (Barr & Pease, 1992; Reynald, 2010). These findings provide several interesting insights into social disorganisation theory at the individual level. Consistent with a large body of research (e.g. (Hedayati-Marzbali et al., 2016; Sampson et al., 1997)), the findings reveal that residents with strong social ties and territorial identity are likely to engage in guardianship attitudes. Contrary to expectations, a positive relationship exists between perceived risk and guardianship attitudes. The results also indicated that although guardianship attitudes can be strengthened by social ties and territorial identity, it does not necessarily require low perceptions of risk to function effectively. Although only a few studies attempted to measure actual supervision by residents when they are at home as a form of guardianship (Reynald, 2011; Reynald & Elffers, 2009), limited studies have focused on guardianship attitudes and its association with risk perceptions and social ties (Reynald, 2018).

This research has important implications for crime prevention in residential contexts as it illustrates the individual factors that predict guardianship attitudes. The findings of the current study can be used by planners and those who are involved in community policies to design crime prevention strategies aimed at creating safe communities by increasing the likelihood of guardianship attitudes among residents. The implication is that opportunities for natural surveillance provided by the physical environment contribute to enhance territorial identity and social cohesion, and consequently the likelihood of guardianship attitudes. Social cohesion is the most influential factor in shaping opportunities for capable guardianship in the study area. This finding brings to focus the importance of high social cohesion among residents to their overall willingness and intention to intervene in disorderly situations.

RECOMMENDATIONS FOR FUTURE RESEARCH

Although our findings are generally consistent across neighbourhoods, several points can be improved. As the results reveal that no direct association exists between natural surveillance and guardianship attitudes, it is a call for further research to understand the dynamics of surveillance and guardianship attitudes better in neighbourhoods. The second limitation refers to the ethnic composition of the study context. Ethnic composition contributes to the ability of a community to control the neighbourhood environment (Sampson & Groves, 1989), and variations in ethnic heterogeneity will increase disorderly conduct by weakening informal control (Hedayati et al., 2015). Similarly, Steenbeek and Hipp (2011) found that high ethnic heterogeneity leads to increased disorder and decreased cohesion, which in turn affect the potential for social control. Likewise, empirical research in a Malaysian context found that residents from different cultures perceive social environment differently, given that perceived neighbouring behaviour, territorial attitudes and perceived risk vary across cultures (Hedayati et al., 2015). As the study was conducted in a homogenous neighbourhood, future research may bring new insights to the body of knowledge by focusing on homogenous and heterogeneous neighbourhoods. It also anticipates that future research will continue to explore this complex question by examining ethnic relations. It is concluded that organising community-based activities will help strengthen community ties, thereby creating substantial willingness among residents to intervene for the common good.

ACKNOWLEDGEMENTS

The authors would like to thank Universiti Sains Malaysia for financially supporting this research under Research University Grant (RUI, NO. 1001/PPBGN/8016079).

REFERENCES

Abdullah, A., Hedayati Marzbali, M., & Maghsoodi Tilaki, M. J. (2013). Predicting the Influence of CPTED on Perceived Neighbourhood Cohesion: Considering Differences across Age. *Journal of Environmental Psychology, 36*(4), 54-64.

Abdullah, A., Hedayati Marzbali, M., Ramayah, T., Bahauddin, A., & Maghsoodi Tilaki, M. J. (2016). Territorial functioning and fear of crime: Testing for mediation in structural equation modeling. *Security Journal, 29*(3), 461–484. doi:10.1057/sj.2013.40

Armitage, R., & Joyce, C. (2017). "Why my house?" – Exploring the influence of residential housing design on burglar decision-making. In R. Armitage & P. Ekblom (Eds.), *Re-building Crime Prevention through Environmental Design (CPTED)*: Taylor & Francis.

Armitage, R., & Pascoe, T. (2016). Crime Prevention through Environmental Design. In *Handbook of Crime Prevention and Citizen Security For Latin America*. Arévalo: Ediciones Didot.

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science, 16*(1), 74-94.

Barr, R., & Pease, K. (1992). A place for every crime and every crime in its place: An alternative perspective on crime displacement. In D. J. Evans, N. F. Fyfe, & D. T. Herbert (Eds.), *Crime Policing and Place: Essays in Environmental Criminology*. London: Routledge.

Chin, W. W. (1998). The partial least squares approach for structural equation modeling. In G. A. Marcoulides (Ed.), *Modern methods for business research* (pp. 295–336). Mahwah, New Jersey, USA: Lawrence Erlbaum.

Cho, Y., Jeong, H., Choi, A., & Sung, M. (2019). Design of a Connected Security Lighting System for Pedestrian Safety in Smart Cities. *Sustainability, 11*(5), 1308.

Cohen, L. E., & Felson, M. (1979). Social change and crime rate trends: A routine activity approach. *American Sociological Review, 44*(4), 588-608.

Comstocka, N., Dickinsonb, L. M., Marshallc, J. A., Soobaderd, M.-J., Turbine, M. S., Buchenauf, M., & Litt, J. S. (2010). Neighborhood attachment and its correlates: Exploring neighborhood conditions, collective efficacy and gardening. *Journal of Environmental Psychology, 30*(4), 435-442.

Ekblom, P. (2019). Sharpening up CPTED – towards an ontology based on crime science and ecology. In R. Armitage & P. Ekblom (Eds.), *Rebuilding Crime Prevention Through Environmental Design: Strengthening the Links with Crime Science* (pp. 75-108). Oxan, UK: Routledge.

Felson, M. (2006). *Crime and nature*. Thousand Oaks, CA: Sage.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing research, 18*(1), 39-50.

Franklin, T. W., Franklin, C. A., & Fearn, N. E. (2008). A multilevel analysis of the vulnerability, disorder, and social integration models of fear of crime. *Social Justice Research, 21*(2), 204-227.

Frimpong, L. K., Oteng-Ababio, M., Owusu, G., & Wrigley-Asante, C. (2018). Collective efficacy and fear of crime in urban neighbourhoods in Ghana. *Safer Communities, 17*(3), 167-181.

Greenberg, S. W., Rohe, W. M., & Williams, J. R. (1982). Safety in urban neighborhoods: A comparison of physical characteristics and informal territorial control in high and low crime neighborhoods. *Population & Environment, 5*(3), 141-165.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2013). Partial least squares structural equation modeling: Rigorous applications, better results and higher acceptance.

Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (Second ed.). United States of America: Sage publications.

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs, 76*(4), 408-420.

Hedayati-Marzbali, M., Abdullah, A., Ignatius, J., & Tilaki, M. J. M. (2016). Examining the effects of crime prevention through environmental design (CPTED) on Residential Burglary. *International Journal of Law, Crime and Justice, 46*(3), 86-102.

Hedayati, M., Abdullah, A., & Maghsoodi Tilaki, M. J. (2015). Neighbouring behaviour, ethnic relations and informal control: a multigroup analysis. *Safer Communities, 14*(2), 80 - 94.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science, 43*(1), 115-135.

Hollis-Peel, M. E., & Welsh, B. C. (2014). What makes a guardian capable? A test of guardianship in action. *Security Journal, 27*(3), 320-337.

Kubrin, C. E., & Weitzer, R. (2003). New directions in social disorganization theory. *Journal of Research in Crime and Delinquency, 40*(4), 374-402.

Lin, C.-Y., Park, J.-H., Hsueh, M.-C., Lai, T.-F., & Liao, Y. (2019). Are Area-Level Crimes Associated with Older Adults' Physical Activity and Sedentary Behavior? *Sustainability, 11*(9), 2454.

MacDonald, J. E., & Gifford, R. (1989). Territorial cues and defensible space theory: The burglar's point of view. *Journal of Environmental Psychology, 9*(3), 193-205.

Marzbali, M. H., Abdullah, A., Razak, N. A., & Tilaki, M. J. M. (2012). The Influence of Crime Prevention Through Environmental Design on Victimisation and Fear of Crime. *Journal of Environmental Psychology, 32*(2), 79-88. doi:10.1016/j.jenvp.2011.12.005

Marzbali, M. H., Abdullah, A., & Tilaki, M. J. M. (2016). The effectiveness of interventions in the built environment for improving health by addressing fear of crime. *International Journal of Law, Crime and Justice, 45*(2), 120-140. doi:10.1016/j.ijlcj.2015.12.002

Marzbali, M. H., Abdullah, A., & Tilaki, M. J. M. (2019). Crime Prevention Through Environmental Design (CPTED) in Malaysia: development of a tool to measure CPTED implementation in residential settings. In R. Armitage & P. Ekblom (Eds.), *Rebuilding Crime Prevention Through Environmental Design: Strengthening the Links with Crime Science* (pp. 153-183). Oxan, UK: Routledge.

Marzukhi, M. A., Afiq, M. A., Leh, O. L. H., & Abdullah, Y. A. (2018). THE DEFENSIBLE SPACE CONCEPT IN NEIGHBOURHOOD PARK CASE STUDY: TAMAN TASIK PUCHONG PERDANA, SELANGOR, MALAYSIA. *PLANNING MALAYSIA, 16*(7), 274-284.

Mason, P., Kearns, A., & Livingston, M. (2013). "Safe Going": The influence of crime rates and perceived crime and safety on walking in deprived neighbourhoods. *Social Science & Medicine, 91*, 15-24.

Miethe, T. D., & Meier, R. F. (1990). Opportunity, choice, and criminal victimization: A test of a theoretical model. *Journal of Research in Crime and Delinquency, 27*(3), 243-266.

Moir, E., Hart, T. C., Reynald, D. M., & Stewart, A. (2018). Typologies of suburban guardians: understanding the role of responsibility, opportunities, and routine activities in facilitating surveillance. *Crime Prevention and Community Safety*, 1-21.

Moley, S. (2008). Public perceptions. In C. Kershaw, S. Nicholas, & A. Walker (Eds.), *The British Crime Survey*. London: Home Office Statistical Bulletin.

Newman, O. (1972). *Defensible space; crime prevention through urban design* New York: Macmillan.

Paquet, C., Cargo, M., Kestens, Y., & Daniel, M. (2010). Reliability of an instrument for direct observation of urban neighbourhoods. *Landscape and Urban Planning, 97*(3), 194–201.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of applied psychology, 88*(5), 879-903.

Putnam, R. D. (2007). E pluribus unum: Diversity and community in the twenty-first century the 2006 Johan Skytte Prize Lecture. *Scandinavian political studies, 30*(2), 137-174.

Reynald, D. M. (2009). Guardianship in action: Developing a new tool for measurement. *Crime Prevention & Community Safety, 11*(1), 1-20.

Reynald, D. M. (2010). Guardians on guardianship: Factors affecting the willingness to supervise, the ability to detect potential offenders, and the willingness to intervene. *Journal of Research in Crime and Delinquency, 47*(3), 358-390.

Reynald, D. M. (2011). Factors Associated with the Guardianship of Places: Assessing the Relative Importance of the Spatio-Physical and Sociodemographic Contexts in Generating Opportunities for Capable Guardianship. *Journal of Research in Crime and Delinquency, 48*(1), 110-142.

Reynald, D. M. (2018). Guardianship and Informal Social Control. *Criminology and Criminal Justice*. doi:10.1093/acrefore/9780190264079.013.315

Reynald, D. M., & Elffers, H. (2009). The Future of Newman's Defensible Space Theory: Linking Defensible Space and the Routine Activities of Place. *European Journal of Criminology, 6*(1), 25-46.

Reynald, D. M., & Mihinjac, M. (2019). Using guardianship and Situational Crime Prevention (SCP) to strengthen Crime Prevention Through Environmental Design (CPTED). In R. Armitage & P. Ekblom (Eds.), *Rebuilding Crime Prevention Through Environmental Design: Strengthening the Links with Crime Science* (pp. 58-74). Oxan, UK: Routledge.

Reynald, D. M., & Moir, E. (2018). Who is watching: exploring individual factors that explain supervision patterns among residential guardians. *European Journal on Criminal Policy and Research*, 1-20.

Ringle, C. M., Wende, S., & Becker, J.-M. (2015). SmartPLS 3. *Boenningstedt: SmartPLS GmbH, http://www.smartpls.com*.

Rukus, J., & Warner, M. E. (2013). Crime rates and collective efficacy: The role of family friendly planning. *Cities, 31*, 37–46.

Sampson, R. J., & Groves, W. B. (1989). Community structure and crime: Testing social-disorganization theory. *American Journal of Sociology, 94*(4), 774-802.

Sampson, R. J., Raudenbush, S. W., & Earls, F. (1997). Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science, 277*(5328), 918-924.

Shaw, C., & McKay, H. H. (1942). *Juvenile delinquency and urban areas: A study of delinquents in relation to differential characteristics of local communities in American cities*: University of Chicago Press.

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: new procedures and recommendations. *Psychological Methods; Psychological Methods, 7*(4), 422-445.

Sohn, D.-W. (2016). Residential crimes and neighbourhood built environment: Assessing the effectiveness of crime prevention through environmental design (CPTED). *Cities, 52*, 86-93.

Steenbeek, W., & Hipp, J. R. (2011). A Longitudinal Test of Social Disorganization Theory: Feedback Effects among Cohesion, Social Control, and Disorder. *Criminology, 49*(3), 833-871.

Stone, C. A., & Sobel, M. E. (1990). The robustness of estimates of total indirect effects in covariance structure models estimated by maximum. *Psychometrika, 55*(2), 337-352.

Tewksbury, R., & Mustaine, E. E. (2003). College students' lifestyles and self-protective behaviors: Further considerations of the guardianship concept in routine activity theory. *Criminal Justice and Behavior, 30*(3), 302-327.

Wetzels, M., Odekerken-Schröder, G., & van Oppen, C. (2009). Using PLS path modeling for assessing hierarchical construct models: Guidelines and empirical illustration. *Mis Quarterly, 33*(1), 177-195.

Wilcox, P., Madensen, T. D., & Tillyer, M. S. (2007). Guardianship in Context: Implications for Burglary Victimization Risk and Prevention. *Criminology, 45*(4), 771-803.

Received: January 2020. Accepted: 14th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 104 – 117

EVOLUTION OF WATERFRONT DEVELOPMENT IN LUMUT CITY, PERAK, MALAYSIA

Mohd Ismail Isa[1]

School of Housing, Building and Planning,
UNIVERSITI SAINS MALAYSIA

Abstract

This study on the evolution of waterfront development in Lumut through physical improvement serves as one component in the formation of a city from the economic, social and environmental aspects. The current study aims to review the elements of urban design that offer an alternative to the revitalisation of the waterfront city in Lumut, Malaysia, particularly to upgrade the physical environment quality and economic vibrancy of cities. The objectives of this study are as follows: (1) examine the consideration and perceptions of urban design aspects given by the respondents related to the evolution of a Lumut waterfront city, and (2) identify urban design elements that have evidence of significant contributions to the revitalisation of the aforementioned city. This research comprises two components. The first component explains the analysis based on observation and the obtained secondary information. The second component is the inventory study and analysis related to the city design in the study area. The theoretical study involves city image enhancement concepts, basic methods and principles in improving the structure of city elements. It also elaborates that any improvement or modification that should be done in any of the city elements must proceed through a proper channel and adhere to improvement or modification steps that have been proposed by design experts. The reason is to create harmony between the city elements with their surroundings to form an image that has identity, structure and meaning. With effective consideration, the proposed development must be closely assessed for its use and function before any project is endorsed and enforced. Issues discovered by this study will facilitate the formulation of strategies and suitable proposals, and automatically ensures improvement of the economic, social and environmental conditions.

***Keywords**:* Urban design, Urban waterfront revitalisation, Planning, Lumut.

[1] Lecturer at University Sains Malaysia Email: mohdismail.isa@usm.my

INTRODUCTION

One of the elements dominant in the conservation areas (urban conservation) is the notion of 'revitalisation'. Revitalisation is an effort to revive an area or town that has previously lived for a time (vital), but eventually gone into regression. One of the revitalisation elements was through visualisation and through reconstruction of the image of cities. Revitalisation is not something that is oriented on physical beauty alone but must be complemented with an economic improvement of society and cultural identity. The revitalisation approach must be able to identify and harness the potential of environmental resources, such as history, meaning and uniqueness of location and image of the place. This approach is not merely a physical improvement or had tapped portions of the city. Revitalisation is a continuous program from the early stages up to a long-term program, which involves the management of the area. The image generally refers to a picture or an idea, which serves as a resultant through observation by individuals or the public. The town image may constitute things that can be seen and heard, and which are appreciable or something that becomes the town's main activity or attraction. The image of a city can be produced through designing the city with proper town elements, such as by providing building, road, street furniture and landscaping. To form an image of a town, the structure and design for each town element, such as the building, road and landscape furniture, needs to be repaired from time to time to ensure that the town's image can be maintained continuously. In this case, the study of Lumut City in Perak focuses on the image enhancement study and the aspect of town elements used. The city has two places of attraction, namely, Lumut Jetty and Lumut Bus/Taxi Terminal. They appear to be the first destinations after one enters the city of Lumut. Lumut Jetty is the main entrance to Pangkor Island. Lumut Jetty is one of the accesses for visitors to cross the sea by boarding the ferries provided and paying a certain amount for the ticket price. The latest icon developed in the city of Lumut is the Lumut Waterfront. This area was developed as a tourist attraction, which provides facilities for the visitors. The Lumut Waterfront is divided into four elements, namely, Maritime Wing, Jetty Wing, Esplanade Wing and Marina Wing. Every element carries its concept, but the basis stands out as solely maritime-based. This development project was constructed to attract numerous tourists and improve the local economic scenario. Accordingly, the following questions should be answered. How does this situation affect city change through urban design elements? Will they continue to redevelop using attractions in the vicinity? What is the physical or visual impact if development continues? These questions are important and should be considered if a redevelopment project was undertaken. However, people will constantly approach it as long as the water element exists. This situation is sufficient to withstand waterfront development in the years ahead.

REVIEW OF RELATED LITERATURE

Dong (2004) indicated that the meaning of the waterfront development has various understandings. The aforementioned study emphasised that the content of waterfront development varies substantially, and concerns the characteristics of sites and cities. For example, urban waterfront development in Japan is one of the interrelated three water-related development concepts. The location is between waterside and coastal development. These development levels have come up in different fields. Waterfront development was evaluated as an urban planning field. Morena (2011) explained that 'the urban waterfront development was widely regarded as a frontier on contemporary urban development, attracting investment and publicity. Sydney, London, Amsterdam, Hong Kong, Tokyo, Toronto, Osaka, Kobe, and Dublin are examples of cities developed through the waterfront development process'. Yasin, Bond and McDonagh (2012) defined ideally as 'a development directly fronting on the water for any purposes and the water components can include river delta, coastal plains, wetlands, beaches and dunes, lagoons, and other water features. The boundary of where the water and land would meet is difficult to determine, and this boundary often differs by the laws and the administration of the countries. Waterfront development can include any combination of various land uses and waterfront projects can be new projects or redevelopments of existing waterfronts into new places. Some waterfront projects focused on industrial uses, such as industrial ports, whilst others focused on considerably recreational and tourism-oriented uses. A diversity of uses should occur along a waterfront, bringing in as many interests as possible to the waterfront. However, a diversity of uses does not need to occur within each project. Waterfronts are places to live, work and where we enjoy recreating. In recent years, managing water has become a major political and social topic because of climatic events that have caught plenty of media attention. People have been questioning whether waterfront properties should be promoted as a place to live, or whether giant walls should be built to protect people from advancing water levels anticipated by climate change experts. Wrenn, Casazza and Smart (1983) stated that waterfront development stimulated modern development in the cities. Therefore, the historical milestone of waterfront development should be understood (Yasin, Bond and McDonagh, 2010).

RESEARCH METHODOLOGY

This research comprises two components of the study, where each component of the study has its purpose of understanding and identifying the actual issues that may occur in the study area. The first component explains the analysis based on observation, together with the secondary information which has been obtained. The analysis seeks to explain the information gathered on the site ready to be analysed, to know the development potential for the study area. This section displays its concentration on a few major sectors, namely, the sectors of land use,

city design, landscape and recreational sector, facilities and utilities, tourism and business sectors. For the image enhancement of a city, the element of redevelopment the city is worth considering, which leans on the existing development theme that has been decided by the Lumut-Seri Manjung District Local Planning. The image enhancement of cities with heritage elements must be sustained because the new surroundings created in the future will not tarnish the identity and uniqueness of this wonderful city of Lumut.

The second component is the inventory study and analysis related to the city design in the study area. The perception from the respondent should be able to determine the level of satisfaction and opinion of the respondents towards the city design element in the study area using a Likert scale. As a subset of the entire sample, as many as 100 respondents were selected to represent the researcher sample. They are chosen randomly without considering the status of their citizenship, whether they reside in Lumut. The researcher only requires the opinion and perception of Lumut waterfront from the perspective of city design. Questions would concentrate more on the components of the city design, such as infrastructural facilities, services offered, strength of place and visual and image of the surroundings. Through these basic components, the city element can be formed and progress would be created towards the city. Amongst the elements studied are old or new buildings, road furniture and landscape. These elements are analysed to show the significant improvement needed to enhance the image and productivity of Lumut waterfronts in particular. Automatically, it serves as a yardstick to the concept of revitalisation that needs to be done at Lumut waterfronts, regardless of whether the concept is fruitful or otherwise.

ANALYSIS AND FINDINGS

i. First Component: Analysis of Survey (Urban Design Element)

The perception questionnaire indicated that as much as 34% of the respondents who come to tour or vacation. The reason is that the Lumut Jetty serves as the only entrance to Pangkor Island. This situation was followed by the purpose of working in the place, which is represented by 22% because various types of development done by the Manjung City Council for the sake of improving the productivity and job opportunities of the residents have emerged. Meanwhile, the visitors that would arrive to sample the food there constitute 20%. Plenty of food stalls have been provided on the basis of this observation. A total of 4% of visitors come for another purpose, which is for recreation. ***Refer to Figure 1(a)***

Figure 1: (a) The main purposes and activities of the visitors come to the area of study; (b) The perceptions of the respondents towards the building design in the area of study.

Figure 1(b) shows the perception of the visitors towards the building design in the study area, in which 78% of the respondents have stated that the design in the area is satisfactory. The observation indicated that the buildings in this area have undergone some renovations for the sake of improving the image of Lumut City as a maritime city. A total of 17% stated that the design of the buildings in the area stays at a satisfactory level, and only 5% stated otherwise. The reason is that the respondents have given the opinion that the Waterfront Lumut Stretch is the only place that has shown the maritime concept, whereas the element was not shown in other areas. The height of the building is also not uniform and has negatively affected the view. The landmark monument is important to highlight the image of a city. The questionnaire analysis indicated that 38% of the respondents have stated that the landmark in this area is satisfactory, and only 27% have informed that they are satisfied with the landmark monument in this area. Meanwhile, as much as 35% claimed that they are not happy with the landmark available in the area because they believe that the landmark should be erected at the entrance of Lumut City. ***Refer to Figure 2(a)*** Concerning ***Figure 2(b)***, which shows the perceptions of the respondents on the pedestrian space in the study area, 57% from the total number of respondents have stated that they are satisfied with the pedestrian space provided, whilst 38% of the respondents stated that they are simply satisfactory. Only 5% are in the opinion that the pedestrian space is unsatisfactory in this area. An interview with the Manjung City Council indicated that the MPM has taken a good step in repairing and maintaining the pedestrian space in this area. The maritime theme was frequently found in the pedestrian space to brighten up the surroundings.

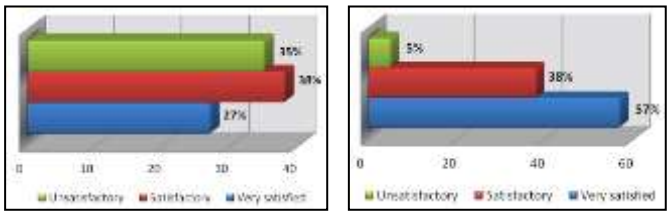


Figure 2: (a) Perception of respondents on the landmark in the study area; (b) Percentage of the perception of respondents towards the pedestrian space in the area of study.

The rest area serves as an important asset for an area to attract the public to come for recreational purposes. Yielded from the questionnaire analysis of the respondents' perception of the public rest area in the study area, as much as 49% from the total number of respondents are satisfied with the public rest area available in the city. ***Refer to Figure 3(a).*** A total of 37% stated that the public rest area was satisfactory. Evidently, the rest area for the public has been provided by the city council (MPM) for the visitors to rest and have some recreational activities. Meanwhile, the other 14% from the total number of respondents are dissatisfied with the facility of the rest area in the place because the public rest area provided lacks the proper shading and the provision of the place is an evidence of waste. ***Figure 3(b)*** shows that the respondents' perception of the landscape design in the study area. A total of 54% stated that they are extremely satisfied with the landscape design in this area. Thereafter, 43% stated that the landscape design in this area stays at a satisfactory level. In turn, only 3% determined that the landscape design was dissatisfactory. Consequently, the element of the landscape was prioritised in this area to brighten up the place with greeneries and to provide more shade to the visitors. Moreover, the arch/inflexible landscape element was also adopted to brighten up the place, other than being used as the seats provided for the visitors.

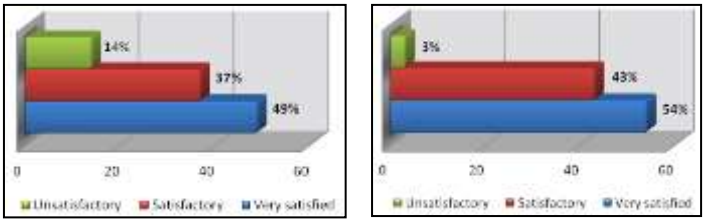


Figure 3: (a) Percentage of the perception of respondents towards the public rest area in the area of study; (b) Perception of respondents towards the landscape design in the area of study.

The outcome of the questionnaire analysis indicated that 53% stated that the conservation and preservation of old buildings are far from satisfactory. This situation is sequenced from the old buildings, mostly which were built in the 1940s that had not been given care properly. The study area does not have any building height control because the background of the sky amongst the buildings are not uniform. Meanwhile, as much as 32% agreed that it is satisfactory, whilst 15% stated that it is at a satisfactory level. ***Figure 4(a)*** shows that the attractive spot for the area in the district of Manjung is Lumut Jetty because it is the access to Pangkor Island. ***Figure 4(b)*** demonstrates the view of the respondents towards the city space and attractive spots in the study area. As high as 53% of the total number of respondents have stated that the city space and attractive spots in this area are at a satisfactory level. A total of 34% expressed that it is satisfactory. This was explained by the fact that there is plenty of development which emphasises the economic aspect of seeking to attract visitors. Thus, plenty of commercial centres have emerged for those who serve as tourist attractions when it comes to shopping. Only 8% stated that it falls short from being satisfactory and 5% have given another opinion that there has been excessive development implemented in this area, in which the effect of the development has been overlooked. Therefore, some flaws have been observed on the arrival of visitors to an area, even though the development investment has been costly.

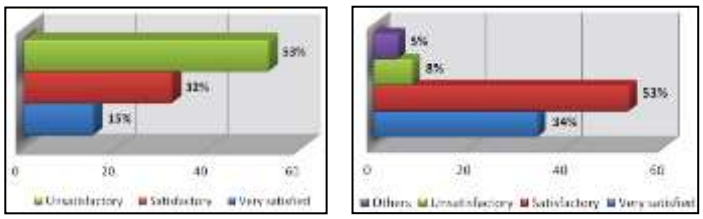


Figure 4: (a) Percentage of the perception of respondents towards the preservation and conservation of old buildings in the area of study; (b) Perception of respondents towards city area and attraction centres in the area of study.

Figure 5 shows the perception of respondents on the image of the study area. A total of 67% of the total number of respondents stated that the study area has a satisfactory image. Meanwhile, 24% stated that the image was satisfactory. Evidently, the maritime concept was instilled in the Lumut Waterfront Stretch in the development surrounding Lumut City. The concept automatically improves the image and attracts more tourists to come and visit. A systematically arranged planning and infrastructure would help to improve the image of this area. In turn, only 3% are unhappy with the image in the area. Meanwhile, the remaining 6% have a different perception.

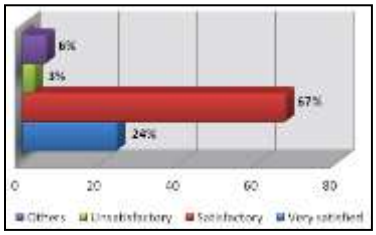


Figure 5: Perception of respondents towards the image in the area of study.

ii. Second Component (Observation Analysis)

The planning and development of the whole Lumut Waterfront project are divided into four main segments. The four main segments are the Maritime Wing, Jetty Wing, Esplanade Wing and Marina Wing. Every one of the segments was developed with various marina approaches and concepts, but were similar regarding the activities and designs to create a sequence. These areas accommodated various facilities and activities, whether for the tourists or the locals. Construction and detailing concentrate on the maritime concept, in which the approach of the living entities and sea environment are also human activities with the sea itself being introduced, with the adoption of modern architecture. The maritime concept has been included in four segments of the development and planning of Lumut Waterfront. This area progresses with a different approach and concept regarding the activity and design to create the sequence amongst all four areas. The *'Water-friendly'* concept or water-based development is the main attraction and emphasised the development of Lumut Waterfront. ***Figure 6*** shows all four areas, namely, Maritime Wing, Jetty Wing, Esplanade Wing and Marina Wing, and their functions to the City of Lumut. Given the maritime-based concept and development, it has altered the perspective and image of the City of Lumut. This situation automatically leaves an impact on the economic and social activities in this area.

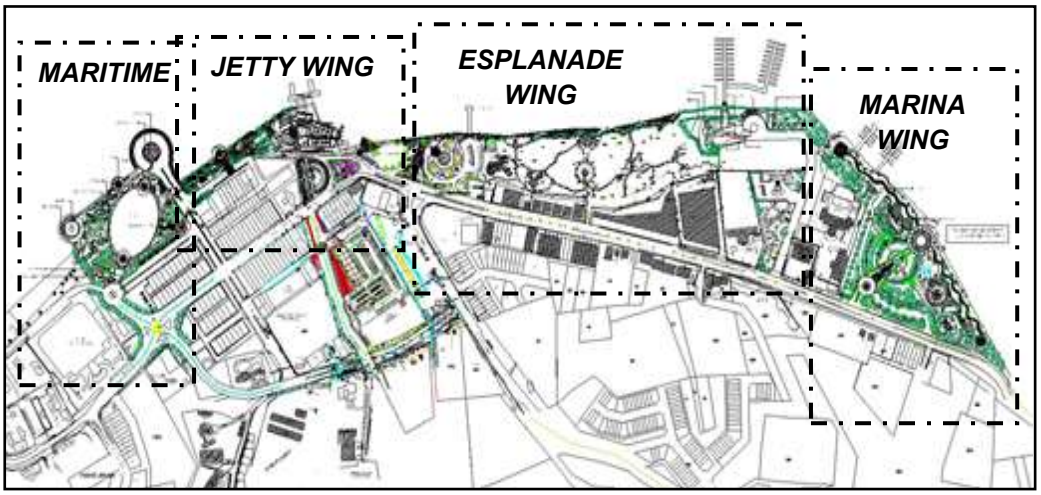


Figure 6: Lumut Waterfront Stretch, The City of Lumut.
Source: Adapted from City and Rural Planning Office, Manjung City Council (MPM)

a. Maritime Wing

Maritime Wing is an open area for the public for various recreational activities with their families. Public amenities, such as the mosque, public toilets, fishing platforms and other facilities, are provided. This area is suitable as a place for fairs or expos. Maritime Wing covers an area of 6.78 acres and the development cost has an expected worth of approximately RM40 million, where it covers a component of the Floating Circle Pathway that can be used as a performing stage. Moreover, the construction of the Maritime Plain, which can accommodate 40,000 people at one time. Such components as plazas and pedestrian facilities, kiosks and business spaces create additional job opportunities for residents. From the observations at the Maritime Wing, the buildings and facilities provided such functions as recreational places and places for them to have and enjoy their meals. This area is equipped with the shore restaurant, which emphasises the refreshing sea view, making this place crowded and cheerful at night. The peaceful and comfortable feelings towards the sea have further elevated the status of the place. Evidently, the design of the Maritime Wing, which is eco-friendly, has made it a location that is constantly frequented by the public. The inculcation of the eco-friendly concept into the building design has been a good and effective idea. In this positive integration, the function of the building associated with the surrounding design can improve the status of the building. The use of this space was more focused on public space and incorporates landscape features that may provide a balance between softscape and hardscape. ***(Refer to Picture 1)***

Picture 1: Maritime Wing

b. 'Jetty Wing' Lumut Jetty

Lumut Jetty covers an area of 3.8 acres and the development cost estimated was worth RM13 million, which includes the jetty plaza, equipped with various facilities, such as the restaurant, handicraft stalls, sea products, ticket counter, public toilet and operation offices. The Lumut Jetty Terminal (Jetty Wing) is a tourist's transit place to Pangkor Island ***(Refer to Picture 2(a))***. This jetty is a great landmark to the city of Lumut. The design, which adopts the attributes of a

marina, illustrated a new image that suits the theme. The construction materials used are concrete and glass, which highlighted the beauty of the architecture. The shading roof for the pedestrians was designed with the sea wave element, making the architectural work in the area unique and interesting. The provision of the Lumut Bazaar in front of the jetty makes it easy for visitors to do their shopping.

Picture 2: (a) Jetty Wing; (b) Hardscape landscape.

The element of the soft, arch-based landscape, which uses the maritime concept, is also adopted in the surrounding area of the jetty. ***Picture 2(b)*** shows the preparation of the landscape element with the water concept, such as the water fountain in the middle part of the jetty entrance, makes the area more beautiful. It provides a positive visual effect and comfort to the visitors. The Jetty Wing is also complete with the Plaza Promenade, which has 2 units of fast food restaurants, 10 units of sea product stalls and 3 units of kiosks known as the Medan Dato' Ishak. The terminal plain has a landscaped area with the maritime concept, which is suitable for relaxing activities. The tourism centre building serves as the key element in terms of the function of the area. The Lumut Development and Management Unit, Lumut Tourism Information Centre, Manjung City Council (MPM) has been established to manage and implement management duties related to tourism in the District of Manjung.

c. Esplanade Wing

The Esplanade Wing has an area of 18.99 acres with a development cost of RM26 million. This property is privately owned, although the establishment of the International Sailing Club will enable it to diversify the functions of the area and offers another added advantage to the public. This area also plays its role as the entrance to the sailors from within the country and outside of the city of Lumut. This factor indirectly contributes to the advancement of the industry in the city of Lumut. The Esplanade Park is open to the public on the 15th of August, 1996 and to attract the visitors to come to Pangkor Island. Other than its location, which was near the jetty, the beautiful landscape factor also tends to call the visitors' attention. The Manjung City Council provides various facilities at this park. Amongst them are the handicraft centre, food stalls and information centre ***(see Picture 3)***. The design of the passenger jetty provided in this area was built based

on the concept of the sea waves, and this is evident on the roof of the pedestrians' pathways. The construction structure used was metal and concrete, and this indirectly will make the maritime design prominent in this area. Featured images in this area have a blend of heritage and modern architecture. Buildings in the jetty area focused more on modern infrastructure by featuring maritime concepts. The administrative centre building in the area focused on the traditional concepts and preservation of heritage features.

Picture 3: Esplanade Wing.

d. Marina Wing

The Lumut Waterfront Public Park has an area of 7.4 acres with the development cost reaching RM6 million. It is located in front of the Dinding Strait. The park was officiated on 29 November 2004 or 16 Syawal 1425H by the D.Y.T.M Crown Prince of Perak, Raja Nazrin Shah Ibni Sultan Azlan Muhibbudin Shah. Facilities available in this park include a restaurant, kiosk, six units of food stalls, the 'Marina Plaza', 'Marina Wall' and a children's playground. Some suggestions include reclaiming the river area up to Ng Kok Tai Factory, thereby enabling the place to be made extended by 3 acres with a reclamation cost of approximately RM5 million. Marina Wing has a building design that is luxurious in terms of interior design. The reason is that a marina of this type has a function of attracting the rich in this region to transit and conduct their businesses. The architectural concept of the Marina Wing originated from the ship. The combination used in this architecture produces an interesting design ***(see Picture 4)***. The use of unique construction materials along the pathways, such as gravel, pebble, granite, cellular or crib paving, terrazzo, sandstone, limestone and slate, as the view by the seashore becomes considerably eye-catching. This condition has attracted people to visit the place to enjoy the comfortable and peaceful ambience of the area. Furthermore, with the provision of the restaurants by the seashore, the turnout of visitors will improve. The combination of activities related to food, drinks and recreational activities served as the common development by the shore. Moreover, the building design appeals to the people. This area was also equipped with recreational and resting places by the seashore, complete with an interesting landscape. The elements of architecture and exclusive detailing in this area should be able to improve the status of an activity, particularly at the

seashore. The Marina Wing is also surrounded by shaded trees, thereby rendering this area as a peaceful 'forest city'. This area provides a children's playground and sufficient rest area for visitors.

Picture 4: Marina Wing.

DISCUSSION AND CONCLUSION

Maritime-based development can provide a positive image to visitors on the basis of visual analysis through the observation method. The design adopted in the study area centralised on the marine concept has made it interesting and unique. Nevertheless, some shortcomings in this type of development have been observed. Particularly, the height of the buildings in the study area does not demonstrate consistency, thereby providing strong evidence of a lack of height control implemented on the majority of the buildings. The local authority should embark on judicial supervision before any approval of development is made, thereby ensuring that the image of the city will not be affected negatively. The city design is the outcome of the best collaborative art. Such a design stresses the change of the environment and the idea of the environmental change that will benefit the general public as intended. However, city design is an ongoing process in shaping the image and identity of the city, its surroundings and the community environment. The influence of waterfront development will increase the assets and land around it. For example, when a development area was provided with various facilities, accessibility, comfort, safety and infrastructure, it can attract the arrival of the local community to settle down and live in. The demand and surrounding attractions will indirectly attract investors within and outside the country to invest in and boost its economic development. Land value will also increase, and waterfront development will open additional opportunities for residents to improve their quality of life. Before the development of the waterfront, dealers or traders conducted their business activities on the road shoulders. However, everything changed when development was realised. Businesses were centrally located within the facility and were substantially better than before. This type of development will also enable visitors to easily buy their products. Apart from business activities, development has also created a range of activities in the surrounding waterfront area. For example, buildings and facilities

at the Maritime Wing have provided function spaces as recreational places, where visitors can enjoy their meals. This area is equipped with the shore restaurant, which emphasises the refreshing sea view, making this place crowded and cheerful at night. The peaceful and comfortable feelings towards the sea have further elevated the status of the place. Lumut Jetty Terminal (Jetty Wing) is the transit place of tourists to Pangkor Island. This jetty is an important landmark of the city of Lumut. The design adopts the attributes of a marina, which illustrated a new image which suits the theme. The Jetty Wing is also complete with the plaza promenade, which has 2 units of fast food restaurants, 10 units of sea product stalls and 3 units of kiosks known as the Medan Dato' Ishak. The terminal plain has a landscaped area with the maritime concept, which is suitable for relaxing activities. The Esplanade Wing is a privately owned area, and the establishment of the International Sailing Club will enable this area to diversify its functions and offer another added advantage to the public. Moreover, this area serves as entrance to sailors from within the country and outside of the city of Lumut. This factor indirectly contributes to the advancement of the industry in the city of Lumut. The Marina Wing has a building design that is luxurious in terms of the interior design. The reason is that a marina of this type attracts the rich people in this region to transit and conduct their businesses. The architectural concept of the Marina Wing originated from a ship. The combination of activities in terms of food, drinks and recreational activities serves as the common development by the shore. Moreover, the building design appeals to the people. This area is also equipped with recreational and resting places by the seashore, complete with an interesting landscape.

The data analysis through the questionnaire method indicated that the respondents provided some positive responses to the image and design of the city of Lumut. The feedback of the respondents indicate that they were satisfied with the improvements to the image and infrastructure of the study area. The project cost for the Waterfront Lumut Stretch, which is RM43, 353,090.00, has left such a lasting impact on the direction of the area's current development and that for the future. The measure of MPM in improving the design elements of the city of Lumut has been a fruitful venture. The inventory indicated that the existing shophouse buildings with an interesting facade should be encouraged and maintained. Even the walkway in front of the shops is uniform in terms of height, width and the level of walkway and ceiling. The distance between the streetscape at the walkway is coordinated to create a breathtaking view. However, every element adopted should prioritise the architectural design of the state of Perak. The same principle applies to the housing development in this area. Every design should fulfil the criteria and mirror the culture of Malaysia, particularly the culture of Perak. Amongst the types of housing development introduced are the terrace houses, low-cost flats and medium-cost flats. Moreover, the houses must be constructed to fit the local criteria.

The study outcome reached the research purpose and objectives. This research should be continued and expanded by studying other related aspects, and the outcomes can be considered points of reference in determining an efficient and effective development for the benefit of every party involved.

ACKNOWLEDGEMENTS

The authors would like to thank the School of Housing, Building and Planning, Universiti Sains Malaysia and the Ministry of Education under the Fundamental Research Grant Scheme (FRGS) 203/PPBGN/6711668 for providing financial support to this research.

REFERENCES

Dong, L. (2004). Waterfront Development: A case of Dalian. Unpublished master's thesis, University of Waterloo, Canada.

Jabatan Perancangan Bandar dan Desa. (2010). *Rancangan Struktur Negeri Perak 2015-2020*. Perak Darul Ridzuan: Perak Goverment Printing Office.

Malaysia. Kementerian Perumahan dan Kerajaan Tempatan. (2003). Garis Panduan Dan Piawaian Perancangan Reka Bentuk Imej Bandar. Kuala Lumpur: Jabatan Perancangan Bandar dan Desa.

Manjung City Council. (2007). Pelan Jaluran Lumut Waterfront 2007 – 2020. Perak: Manjung City Council Printing Office.

Morena, M. (2011). Morphological, Technological and Functional characteristics of infrastructures as a vital sector for the competitiveness of a country system, Milano, pp. 195.

Pelan Induk Landskap 2005-2015. Perak Darul Ridzuan: Majlis Perbandaran Manjung.

Wrenn, D. M., Casazza, J. A., & Smart, J. E. (1983). Urban waterfront development. Washington: Urban Land Institute.

Yasin, A. B., Bond, S., & Mc Donagh, J. (2012). Principles for sustainable riverfront development for Malaysia. *Journal of Techno-Social*, 4, 21–36.

Yasin, A. B., Even, C., & McDonagh, J. (2010). *An Evolution of waterfront development in Malaysia*. Paper presented at Pacific Rim Real Estate Society Conference Wellington.

Received: January 2020. Accepted: 14th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 118 – 127

SOCIO-ECONOMIC CARRYING CAPACITY ASSESSMENT FOR BUKIT TINGGI

Diana Mohamad[1], Mastura Jaafar[2] and Mohd Muzzammil Ismail[3]

[1,2] *School of Housing, Building & Planning*
UNIVERSITI SAINS MALAYSIA
[3] *School of Government*
UNIVERSITI UTARA MALAYSIA

Abstract

This paper discusses an assessment of social and economic carrying capacity (CC) in Bukit Tinggi. Bukit Tinggi is a new and emerging highland tourism destination located in Malaysia, thus assessing the present CC level is imperative to ascertain the sustainability of destination competitiveness. The economics of socio CC has been a growing area. The fundamental concept of CC revolves around the analysis of behavioural dynamics, succession, and establishing a dynamic balance of natural ecosystems. This paper, hence, looked into the present socio-economic CC level in Bukit Tinggi in order to understand the extent of tourism developments enabled in Bukit Tinggi without affecting tourists' tourism experience. The CC data on social (tourist arrival, safety and well-being, place identity, tourism experience) and economic (employment demand/supply, business growth/supply demand, tourism income) aspects were gathered from visitors via self-administered questionnaire survey approach. The findings revealed that more efforts and immediate attention should be given to the socio-economic CC in Bukit Tinggi mainly because all the studied variables displayed moderate CC level values.

Keywords: Bukit Tinggi, economic carrying capacity, social carrying capacity

[1] Lecturer at Universiti Sains Malaysia. Email: diana_mohamad@usm.my

INTRODUCTION

The fundamental concept of carrying capacity (CC) is related to the analysis of behavioural dynamics, succession, and establishing dynamic balance of natural ecosystems (Zelenka & Kacetl, 2014). Initially coined in the fields of wildlife and the management spectrum (Liu & Borthwick, 2011), Canestrelli and Costa (1991, p. 296) defined CC as *'...the maximum number of visitors that can be accommodated by a given destination under conditions of maximum stress'*. Clarke (2002, p. 410), in agreement with Canestrelli and Costa (1991), asserted CC as '*...the role that social institutions and technologies play in determining the impact of human numbers on the supporting environment'.* Comprehending CC is crucial in planning and managing tourism development, as well as its activity, particularly for destinations that operate on architecture- and nature-based resources. Unlike other types of tourism resources (e.g., entertainment, sports, and businesses), architecture- and nature-based resources are often linked with specific image of a destination that should be protected for authenticity purpose. Having mentioned that, CC plays an integral role in visitor management and destination sustainability. Bukit Tinggi is a new and emerging highland tourism destination in Malaysia, thus assessing the present CC level is imminent to ascertain the sustainability of destination competitiveness.

LITERATURE REVIEW

Socio-economic status reflects one's standing in referral to education, income, and occupation. In precise, socio-economic status has been vastly applied to measure one's financial situation that is often associated with the ability to enjoy privilege, power, and control. Assessing both social and economic CC has dated back to the 1980s, whereas the interconnectedness of these two dimensions has been proven to contribute to the comprehensiveness of the CC framework (Vanessa et al. 2018).

Socio and ecological CC are distinct and widely used to understand visitors' perceptions of and behaviour towards a certain destination (Leujak & Ormond, 2007). In line with this notion, Mauerhofer (2010, p. 14) elaborated socio CC as *'...the limit of growth or development of each and all hierarchical levels of human or social integration within a certain spatial range, shaped by unilateral, multilateral, and /or interdependent processes within an individual and between individuals or groups of individuals'.* Subash Joshi and Rajiv Dahal (2019) asserted that the concept is inclined towards maximising the utilisation of an area without jeopardising tourist satisfaction, as well as the ability for the locals to uplift their socio-economic status.

By and large, economic CC refers to the degree to which an area can be changed prior to monetary exercises that occur in a region and are influenced antagonistically. The economic CC, according to Saleem (1994), signifies the threshold point that offers the highest level of benefit or earning retention to the

system. Gibbs (2007) outlined economic CC in the tourism context as the amount of money investors are willing to invest, as well as the monetary value linked with sellable products and ecosystem services. At a greater level, economic CC for a tourism destination relies on both the sort and the measure of fiscal resources that the destination can use to develop its tourism industry without the destination being adversely affected.

METHODOLOGY

A total of 300 self-administered questionnaire survey forms were randomly distributed to domestic and international tourists who visited Bukit Tinggi. The respondents should satisfy the selection criteria (age 18 and above, and visiting Bukit Tinggi for more than 24 hours). Assistance was provided to the respondents while they completed the questionnaire survey to ensure that the answers were indeed valid. The survey forms were re-checked to ascertain completion in order to avoid missing data. The gathered data were complemented with secondary data obtained from the readily available reports and statistics. The level of CC was assessed using a 5-point Likert Scale. The answers were categorised into three satisfaction levels (mean values): exceeding 3.27 is classified as excellent (green), values between 3.26 and 1.70 are categorised as moderate (yellow), and below 1.70 is considered as poor (red).

RESULTS

The economic carrying capacity assessment

Overall, the economic CC indicators displayed a moderate level of CC with a mean value of 2.39 (yellow). Table 1 tabulates the results of economic CC in Bukit Tinggi.

Table 1: Results of economic carrying capacity in Bukit Tinggi

INDICATORS	Mean	M	C
Indicator 1: Employment Demand/ Supply			
Increase in tourists' arrival has contributed to foreign workers influx.	2.44	2	
There are enough workers to serve the tourists.	2.19	2	
Tourism development has created job opportunities for the young locals.	2.55	2	
Local community is involved actively in tourism industry.	2.34	2	
Indicator 2: Real Estate Value			
Increase in tourists' arrival has contributed to increase in real estate value.	2.54	**2**	
There is a need to build more shops and stalls.	2.56	**2**	

INDICATORS	Mean	M	C
Indicator 3: Business Growth/ Supply Demand			
The number of rooms is insufficient during peak season.	2.35	2	
Tourism in this location has high potential to flourish.	2.71	2	
Indicator 4: Tourism Income			
High demand for accommodation has contributed to increase in accommodation price.	2.54	2	
Tourist visit is contributed by accommodation price affordability.	2.02	2	
Tourists are satisfied with the souvenir product price.	2.08	2	

EMPLOYMENT DEMAND AND SUPPLY

The data analysis had led to the following results: [1] increase in tourists arrival at Bukit Tinggi has contributed to the influx of foreign workers (mean value of 2.44), [2] there are sufficient workers to serve the tourists (mean value of 2.19), [3] tourism development has created job opportunities for the young locals (mean values of 2.55), and [4] local community is actively involved in tourism industry (mean value of 2.34). Most of the employment supply in Bukit Tinggi had been directly involved with tourism, such as tourist shuttle drivers, hotel accommodation workers, restaurant workers, as well as hotel management and entertainment service workers.

Result of [1] could be translated into an altered landscape in workforce status, whereby this unexpected change has become vivid over the years. Results of [3] and [4] support finding [1], in which the situation raised concerns over the domination of foreign workers that had led to questionable benefits gained by the local community. More importantly, it was interesting to observe a perceptible variance between results [1] and [2]. In this paper, the scenario reflected the high number of foreign workers occupied in the agriculture industry and logging activity. Having said this, it is of this study interest to raise a significant issue to be pondered upon: to what extent will the tourism industry be expanded, and how will the setbacks of the development be equalised with the monetary benefits gained?

Real Estate Value

Two items were employed to measure the CC of real estate value in Bukit Tinggi: [1] increase in tourist arrival has contributed to increase in real estate value (mean value of 2.54), and [2] there is a need to build more shops and stalls (mean value of 2.56). These outcomes were more inclined towards moderate levels of CC. In this paper, the results served as a competitive edge, both positively and negatively. The positive aspect involved the probable expansion on both

residential and infrastructure developments, as these two are in line with the empowerment of MM2H (Malaysia My Second Home) Program (to retain loyal tourists and expatriate), as well as in line with the notion of providing user-friendly and world-class infrastructures (to build the foundation for place making). Residential development may be triggered through conversion of some traditional village houses located in Bukit Tinggi Village into shop lots. On the contrary, the negative aspect denotes the gravity of environmental deterioration stemming from massive construction activities, of which in 2014, turned to be the cause of eight earthquake-like occurrences.

BUSINESS GROWTH

In correspondence to the objective, strategic business system and business survival criteria, as prescribed by Jones (2016), were utilised in this study. The former criterion was incorporated into the accommodation sector as 'the number of rooms is insufficient during peak season' (mean value of 2.35). Meanwhile the latter criterion was linked with tourism development as 'tourism in this location has high potential of growth' (mean value of 2.71). The resulting moderate level for room availability during peak season reflected the adequate number of accommodations provided in Bukit Tinggi. In light of growth potential, the result indicates involvement of tourism-related bodies in planning strategic and pragmatic business framework, whereby more importantly, the stakeholders are to develop the framework by prioritising environmental sustainability and sustainability of business practice (from the stance of the global tourism market).

TOURISM INCOME

Three items were utilised for measurement: [1] high demand for accommodation has contributed to an increase in accommodation price (mean value of 2.54), [2] tourist visit is contributed by the accommodation price affordability (mean value of 2.02), and [3] tourists are satisfied with the souvenir price (mean value of 2.08). Business logic with demand and supply works in a complementary cycle, both positively and negatively. In this paper, the result of [1] appeared to be strongly influenced by Business Growth results (see previous section). In detail, notwithstanding the sufficient number of room available, the accommodation supply could have experienced the escalating pattern when the tourism sector in Bukit Tinggi is acknowledged by the global tourism market. Of which, in return, would exert influence on item [2]. In regard to souvenir price, the observed mean value should receive immediate attention from the service providers. Result of [3] explicitly disclosed the issue of over-priced merchandise that signified unsuccessful business plans.

The social carrying capacity assessment

Overall, social CC indicators exhibited a moderate level of CC with a mean value of 2.76 (yellow). Table 2 presents the outcomes of economic CC in Bukit Tinggi.

Table 2: Results of social carrying capacity in Bukit Tinggi

INDICATORS	Mean	Colour
Indicator 1: Tourists arrival		
There is an increase in tourists' arrival.	2.50	
Tourists are welcomed by local community.	2.57	
Indicator 2: QOL Safety & Well-Being		
High number of tourists negatively contributes to safety issue.	3.50	
Visitation motivation is influenced by tourism products comfortability.	2.51	
Indicator 3: Place identity		
Tourism negatively affects local values and traditional customs.	2.74	
Locals practice traditional customs.	2.34	
Increase in tourists' arrival influences preservation of traditional customs.	2.53	
Indicator 4: Tourism experience		
Local community is cold towards tourists.	3.60	
Increase in tourists' arrival decreases tourism experience.	3.42	
Increase in tourists' arrival does not affect quality of services.	2.37	

Tourist arrival

It is evident that the tourism industry has changed the landscape of Bukit Tinggi from a thickly and lush green rainforest to a splendid design small town, which has attracted the interest of people to come and enjoy what it has to offer. The 80.8% growth rate clearly indicates that the tourism industry has emerged as a financial lifeline for the local residents of Bukit Tinggi. More importantly, Bukit Tinggi has earned international recognition as one of the top tourism destinations in Malaysia only after seven years of operation. In line with the objective of this paper that aims to evaluate the impact of tourist arrival on local residents, the CC assessment items were set as follows: [1] there is an increase in tourist arrival (mean value of 2.50), and [2] tourists are welcomed by local community (mean value of 2.57). In reference to the mean values, the results showed that the local residents would welcome more tourism activities in Bukit Tinggi (to empower financial lifeline). Of more importance, the results signified a slightly earthbound response in terms of tourist population size. As such, more attention should be directed towards the influx of tourists in order to maintain the favourable acceptance level.

Safety and Well Being

Safety and well-being are two aspects that have been paid attention to across all types of fields, including health, workplace, sports, construction, entertainment, nursing, education, and tourism. These two aspects are incontestably significant within both tourism and travel domains, whereby in this rapidly changing landscape of the tourism industry, safety and well-being have become indispensable for CC. In precise, safety and well-being have gained much interest as they are interconnected with tourism experience, tourist perception, good rapport of tourists-locals, and destination image. In this paper, safety and well-being were measured using two items: [1] high number of tourists negatively contributes to safety issues (mean value of 3.50), and [2] visitation motivation is influenced by tourism products comfortability (mean value of 2.51).

The result for item [1] could be translated into two perspectives; first, tourists are not perpetrators, as suggested by conventional knowledge; and second, the raised concerns over non-tourists who take advantage to commit crimes that tarnish Malaysia's tourism industry reputation. Despite the range of efforts undertaken by the appointed organisations in handling safety and security issues, more need to be done as a non-friendly and crime-laden destination is bound to leave an unfavourable impression that unquestionably puts pressure on the tourism industry.

Place Identity

Halmi and Severovice (2016, p 77) claimed that '*destination management can be identified as a strategic approach to the coordinated management of all elements ...such as amenities, access, marketing ...with the aim of a better management [for the purpose of] ...building a strong and vibrant brand identity*'. From the stance of academic research, local festivals and historical heritage are the tourism identities in Bukit Tinggi.

Place identity of Bukit Tinggi was measured by collecting data based on the following three items: [1] tourism negatively affects local values and traditional customs (mean value of 2.74), [2] locals practice traditional customs (mean value of 2.34), and [3] increase in tourist arrival influences preservation of traditional customs (mean value of 2.53). The mean values suggest that the tourism activity in Bukit Tinggi no longer prioritises traditional customs. Such outcome may derive from the fact that the small town of Bukit Tinggi is not fundamentally designed or operated based on the locals' traditional concept. Rather, it is a destination that sells European-styled and Japanese-tailored attractions.

Nevertheless, the results could be an indicator that, despite the nature of a tourism destination, local values and traditional customs are aspects sought by tourists. Hence, the moderate level of satisfaction (CC) was noted for item [3]. Given the fact that preserving the local values has been exhausted (e.g., cultural

events and educational awareness), considerable efforts are still needed to enhance the vibrant identity of Bukit Tinggi. Figures 1 and 2 illustrate the international culture performance and the identity showcased at Bukit Tinggi.

Figure 1 Cultural performance in Bukit Tinggi

Figure 2 Japanese culture in Bukit Tinggi

Tourist experience

The IGI Global (2018) has defined tourism experience as *'...a set of activities in which individuals engage on their personal terms, such as pleasant and memorable places, allowing each tourist to build his or her own travel experiences so that these satisfy a wide range of personal needs*'. In meeting the study objective, tourist experience was assessed using three items: [1] local community is cold towards tourists (mean value of 3.60), [2] increase in tourist arrival decreases tourism experience (mean value of 3.42), and [3] increase in tourist arrival did not affect quality of services (mean value of 2.37).

Similar to the outcomes for tourist arrival, an increase in tourist population size displayed nil or no negative impact on the local residents' acceptance level. Put simply, local residents do enjoy the presence of tourists in Bukit Tinggi. Within the context of tourist experience, although the high number of tourists did not affect the quality of experience (density is in corroborative as a cause of facilities/amenities ineffectiveness), it was learned that density did exert intangible force on the quality of service. Overall, the CC of place identity for Bukit Tinggi was at a moderate level (mean score of 3.13).

DISCUSSION AND CONCLUSION

The tourism development in Bukit Tinggi has led to socio cultural change in local values. Originally, the Bukit Tinggi resort was designed to capture the international identity while taking advantage of the highland climate. Upon offering a nice and cold environment, coupled with varying culture values, an interesting attraction is offered for both the local and international people. Nonetheless, an issue seemed to emerge when the management of Colmar

Tropicale only provided international cultural dance performances for visitors' entertainment. This undoubtedly can erode the value of local identity.

Due to the high number of staff turn-over due to job vacancy in other sectors, it is relatively difficult to maintain competent staff to entertain clients to their highest level of satisfaction. The respondents had voiced their disappointment towards front desk service, delay in response, staff attitude, and lack of supporting knowledge that may aid information sharing. Apart from the aforementioned issue, the accommodation service provider in Bukit Tinggi seemed to be struggling to address the following: types of service provided, sufficient number of personnel to provide assistance to visitors, maintenance cost for equipment (especially sports and leisure equipment), and maintenance cost for safety (in reference to wild animals, insects, and pests).

The environmental issues reported in Bukit Tinggi included illegal acts of land encroachment detected in Janda Baik, illegal land clearing activities in Lentang Forest Reserve and Kelawai, as well as illegal land expansion by foreign immigrants (to expand agricultural activities and for residential need).

Concerns were also raised by the respondents in terms of price of goods. Regardless being the highland destination that is often associated with higher price and influenced by growing demand, accessibility, distance, number of service providers, and destination image/branding; the business strategy should weigh in the competitiveness edge from other tourism destinations (local and international) that might offer the same attractions, aside from giving a serious thought to the mass production and/or high accessibility to goods. For instance, a wide range of French- and European-based eateries could also be found in Kuala Lumpur, and merchandise (e.g., t-shirts and keychain) is easily purchased from other places.

Tourism is indeed a fast-growing industry and a valuable sector, as it contributes significantly to the regional and local economic development, albeit the adverse impacts on both environment and social contexts. In precise, uncontrolled tourism development has caused massive land exploitation that has further resulted in environmental deterioration, as well as ineffective tourism planning and management, which influenced overexploitation of cultural and social resources, while unsuccessful business strategy that leads to unequal economic activity of the area.

The very Concept of Tourism CC stems from the notion that overcrowding tourists is a harmful scenario that may be detrimental to the resources found in a destination. As a new tourist attraction, the establishment of CC (model, framework, and assessment) for Bukit Tinggi is vital to ascertain the sustainability and longevity of the tourism sector. The urgent need is not only triggered by the growing number of visitations, but the importance is also flagged by issues of environmental education, environmental awareness, climate change, global warming, environmental footprint, and nature-based resources footprint.

ACKNOWLEDGEMENT

This reported research outcome is the result of work carried out by Long-Term Research Grant researchers under funding of the Ministry of Higher Education, (Long Term Research Grant Scheme 2011) [LRGS Grant No: 304 / PPBGN / 650,571].

REFERENCES

Canestrelli, E., & Costa, P. (1991). Tourist carrying capacity: a fuzzy approach. *Annals of Tourism Research* 18, 295-311

Clarke, A. L. (2002). Assessing the carrying capacity of the Florida Keys. *Population and Environment* 23(4), 405-418.

Gibbs, M. T., 2007. *Sustainability Performance Indicators for Suspended Bivalve Aquaculture Activitie*s. Ecological Indicators 7: 94-107.

Halmi, L. & Severovic, K. (2016). Strategic approach to tourism destination management. The Malopolska School of Economics in Tarnow Research Paper Collection 32(4), 77-86

IGI Global (2018). What is tourism experience. Retrieved on 18th July 2018 from https://www.igi-global.com/

Jones, R (2016). Measuring the business success of enterprise system projects. Retrieved on 18th July 2018 from http://openaccess.city.ac.uk/

Leujak, W. & Ormond, R. F. G. (2007). Visitor perceptions and the shifting social carrying capacity of South Sinai's Coral Reefs. *Environmental Management* 39, 472-489

Liu, R., & Borthwick, A. G. L. (2011). Measurement and assessment of carrying capacity of the environment in Ningbo, China. *Journal of environmental management*, 92(8), 2047-2053.

Mauerhofer, V. (2010). Social capital, capacity and carrying capacity" exploring basics of 'socially sustainable economic degrowth'. Conference proceedings 2nd Conference on Economic Degrowth for Ecological Sustainability and Social Equity, Barcelona

Saleem, N. (1994). In Seaton, A., (Ed), The Destination Capacity Index: A Measurement the Tourism Carrying Capacity. Tourism: The State of the Art. Pp. 144-155.

Subash Joshi & Rajiv Dahal (2019). Relationship between social carrying capacity and tourism carrying capacity: a case of Annapurna Conservation Area, Nepal. *Journal of Tourism & Hospitality Education* 9, 9-29

Vanessa Muler Gonzalez, Lluis Coromina & Nuria Gali (2018). Overtourism: residents' perceptions of tourism impact as an indicator of resident social carrying capacity – case study of a Spanish heritage town. Tourism Review 73(3), 277-296

Zelenka, J and Kacetl, J (2014). The concept of carrying capacity in tourism. *Economic Interferences*, Vol. XVI (36), 241-254

Received: January 2020. Accepted: 14th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 128 – 141

E-HAILING SERVICES IN MALAYSIA: CURRENT PRACTICES AND FUTURE OUTLOOK

Ahmad Sahir Jais[1], Azizan Marzuki[2]

[1,2] *School of Housing, Building and Planning*
UNIVERSITI SAINS MALAYSIA

Abstract

E-hailing services are known to be on-demand vehicle acquisition that relies on network dependency and use of a specific digital application through the Internet. The objectives of this study were to investigate the adoption of e-hailing services from the initial inception, issues in adoption and the direction of e-hailing services within the context of Malaysia. A Systematic Literature Review (SLR) related to the e-hailing industry was used by employing the inclusion criteria of keywords generated from the literature data pool. The legalisation of e-hailing services in Malaysia had spurred the growth of the industry. With the establishment of the Transportation Network Company, which was a positive sign for e-hailing to continue to flourish, the industry was considered as a complement to the existing public transportation system. The growth projection showed that e-hailing services will continue to be part of the Malaysian transportation sectors and would remain competitive in contributing to the domestic economy. However, some barriers would deter the progress of e-hailing services, such as over-regulation by the government.

***Keywords**:* Adoption, E-hailing, future outlook, Malaysia, Transport Network Companies (TNCs)

[1] Ph.D. Student at Universiti Sains Malaysia. Email: sahirjais@student.usm.my

INTRODUCTION

The use of the Internet of Things (*IoT*) and technology has become an indispensable feature in the business structure of commercial trade within the sharing economy in recent years (John, 2013). Technological applications that utilise the Internet, such as smartphones, have changed the way society conducts business and individual daily lifestyles. Users and adopters of these technologies are able to share unused property, extra resources, time and skills across online platforms (Wosskow, 2014) which is an economic system that fosters the sharing economy. Physical shops are no longer needed as traders and buyers shift the marketplace to online platforms, which reduces physical interaction altogether. In hindsight of these changes, business resources, stocks and capitals are revealed to be better allocated and managed, which create efficiency that could be demanded through the traditional means of business. One of the significant sub-classification of the sharing economy that emerged within the transportation industry is the "Shared Mobility" (Shaheen, Chan, Bansal, & Cohen, 2015). The concept of shared mobility is distinguished from the conventional methods of public transportation, whereby e-hailing, ride-sourcing, ridesharing and carpooling services are provided to complement the needs of designated customers. The use of a private vehicle to transport a paying passenger that is facilitated by the uses of technology and apps are known as "*E-Hailing*" in Malaysia, while in North America and Europe, these services are known as "*Ride-Sourcing*" or "*Ride-Hailing*" (Shaheen et al., 2015). This form of sharing economy is undeniably thriving as shared mobility services have become an essential part of the transportation industry of today (Todd, Amirullah, & Hui Xing, 2018). This popularity could be due to the adeptness of the service in addressing several factors that can influence the choices made by customers of taking either the private or the public mode of transportation. These factors include the characteristics of (i) The Traveller (*background, household structure and income, vehicle ownership, and availability of vehicle choice*); (ii) The Trips (*purpose, time, and distance*) and (iii) The Transport Facility (*travel duration, costs, quality of service, availability of transportation and parking space*) (Chiu Chuen, Karim, & Yusoff, 2014). Hence, these shared mobility services can provide a smooth and pleasant means of transportation, which can either be impartial or integrated with another form of the transportation system (Nielsen, 2015; Public Land Transport Commission, 2013).

Moreover, e-hailing services offer on-demand services at an affordable price in comparison with other modes of transportation, such as taxis, which is sometimes below the market rates. Although this below the belt approach is unregulated, the e-hailing services continue to progress as a favourite mode of transportation among urban commuters (Frost & Sullivan, 2016). As a result, most shared mobility services are seen as disruptive to the existing transportation model (Audouin & Neves, 2018).

In Malaysia, the e-hailing service has been exclusively used to describe the shared mobility service facilitated by apps (Government of Malaysia, 2017). The service is initiated due to the inefficiency and gaps found in the traditional transportation systems within the first and last-mile connectivity. Anthony Tan, the co-founder of Grab, has explained that the introduction of Grab is because of the complicated systems of the taxi service in Malaysia between 2012 and 2013 (Freischlad N., 2015). The service enables travellers with an alternative transportation solution, which is convenient and affordable. People begin to prefer this form of transportation as a direct result of high motorisation rate on the road, massive traffic congestions, parking problems, and inadequate infrastructure for public transport (Frost & Sullivan, 2016). Numerous e-hailing users have since been using the services available to exploit the connectivity of the transportation networks further in getting to their destinations at a timely and cost-saving manner (Frost & Sullivan, 2016). Hence, the objectives of this paper are to investigate the adoption of e-hailing services from the initial inception, issues and the direction of e-hailing services within the Malaysian context.

RESEARCH BACKGROUND

As the concept of e-hailing service was related to shared-mobility, the unique characteristics of e-hailing were discussed extensively. The root of e-hailing services was based on the concept of sharing economy (Hawlitschek, Teubner, & Gimpel, 2016), whereby traditional marketplaces of business were replaced progressively by more innovative, dynamic and intuitive platforms. This gradual change was caused by the rapid enhancement of the information technology and the Internet, which fueled the convergence and progression further. Most of the platforms within this sharing economy were developed and managed by a third-party (Li, Hong, & Zhang, 2017). These platforms usually brought the extra resources of the owners together to match the demands by the users. Figure 1 showed the consumption model of a digital market in the sharing economy, where goods and services were offered, transacted, and completed, with legal documentation and finalisation in the handover of ownership. Constant communications by respective seekers and owners adjusted accordingly and extensively to ensure the transaction was successful.

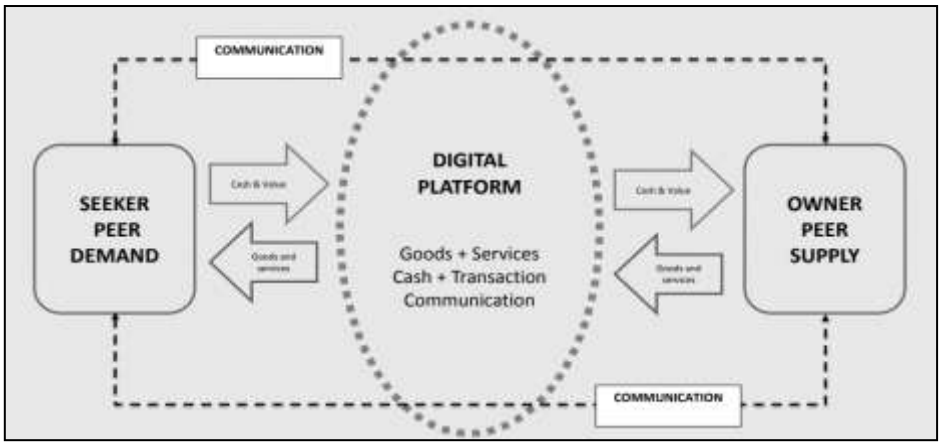


Figure 1: The Sharing Economy Consumption Model
*S*ource: Synthesized from Forno & Garibaldi (2015); Hamari, Sjoklint, & Ukkonen (2016); Horton & Zeckhauser (2016); Juul (2017); Wosskow (2014)

Shared mobility was conceptualised from the sharing economy, which can be summarised as shared use of a vehicle, bicycle, or other modes (Shared-Use Mobility Centre; SUMC, 2016). This innovative transportation approach enabled users to gain short-term access to numerous methods of transportation on an as-needed basis (Shaheen, Cohen, & Zohdy, 2016). E-hailing service was acknowledged to be within this approach of transportation, which had steadily altered the way urban commuters interact and move around (Santi & Ratti, 2017). Previous research has defined some essential terminologies associated with shared mobility, mainly the e-hailing services. For starters, *Ride-sourcing / E-hailing / Ride-Hailing* was described as a provision of planned and on-demand transportation services for compensation, connecting drivers of personal vehicles with passengers. Smartphone mobile applications facilitated the booking, ratings (for both drivers and passengers), and electronic payment (Shaheen et al., 2016). Entities that operate the services were identified as *Transportation Network Companies (TNCs)* or also known as *E-Hailing Operators* (also known as ride-hailing operators) offered arranged and on-demand transportation services for a return, which linked drivers of personally owned cars with passengers. Smartphone mobile applications were used for reservation, ratings (for both drivers and passengers), and electronic payment (Azevedo & Maciejewski, 2015; Hughes & MacKenzie, 2016; Ngo, 2015). In Malaysia, TNCs are also known by their legal term, "*Intermediation Business"* which is construed as a business of facilitating arrangements, bookings or transactions of an e-hailing vehicle whether, for any valuable consideration, money's worth or otherwise (Government of Malaysia, 2017). The medium of transaction, or application or "*E-hailing Apps*", uses smartphone that connected licensed taxis or private-

vehicle for-hire drivers, with passengers (Rayle, Shaheen, Chan, Dai, & Cervero, 2014; Shaheen et al., 2015)

Table 1: Summary of E-Hailing Definition

Definition Of E-Hailing	Author/ Research/Statute
App-based, On-demand ride service, Third-party services (TNCs)	Rayle et al. (2014)
Pre-arranged on-demand transportation services, Smartphone-based mobile application	Shaheen et al. (2016)
The vehicle consisted of 4 passenger seats and not more than 11 passenger seats (inclusive driver), used for transporting a passenger in return for a fare, facilitated by an electronic application, furnished by intermediaries' business operators.	Government of Malaysia (2017)
On-demand ride/for hire service, using mobile smartphone-based apps, from a pool of private passenger vehicles, driven by non-professional drivers.	(Ngo, 2015)
Use of smartphone apps to connect passengers with drivers.	(Shaheen et al., 2015)
Ride-sourcing connected passengers to vehicles-for-hire through the use of a mobile smartphone app, passengers catalogued their location through GPS positioning, matched with the nearest driver, estimation cost (ride, drivers ratings, time) were given, using a private vehicle.	Fassbender (2016)
A platform where individuals can hail and pay for a ride from a professional or part-time driver through an app.	Clewlow & Mishra (2017)

The definitions of e-hailing services from the literature were listed in Table 1. Using technology to access any mode of transportation that was rendered by the company and privateers had resulted in numerous interpretations of the terms. Most academicians in North America and Europe had used and *accepted ride-sourcing* as the term to describe these types of services in the context of sharing transportation, which was commonly found in publications. The US Department of Transport (DOT) used the term "ride-sourcing" exclusively in the notary and legal matters (Shaheen et al., 2015). In Malaysia, the term "*E-Hailing*" was used by the government and had been instituted in the revised Land Public Transportation Act 2017 (Government of Malaysia, 2017). The term had since been widely used in the media and previous literature in Malaysia. Since the discussion of transport sharing using technology in this study was within the Malaysian context, the term "*E-Hailing*" was used to describe these types of services throughout this paper.

METHODOLOGY

A qualitative approach using comprehensive document analysis was employed in this study. A systematic literature review, with an analysis of related works associated with the e-hailing industry, were scrutinised. The inclusion criteria for the selection of literature used keywords such as "*ride-sourcing*" "*e-hailing*" and "*e-hailing issues*" to generate a data pool. Pieces of literature from various sources through Google search and Google Scholar, as well as online databases such as Taylor & Francis and Thomson Reuters, were collected using online data mining techniques. The keywords for the search and inclusion criteria for literature mining such as *Type of Databases* (Academic Journals, Newspaper Articles, Research Report, Working Paper, Trade Report, Financial Report, Online Publication Articles, Organization Bulletin and Newsletter, Statute and Legislation); *Source of Databases* **(**Internet, Published and printed materials); *Keywords* **(**E-Hailing, Malaysia, Shared Mobility, Transport Network Company (TNC), Ride-sourcing, Ride-Hailing, Public Transport Malaysia, Market Report Malaysia); and *Time Frame* **(**Published within the past five years, 2014-2019). The initial process of data mining had resulted in 180 studies related to the e-hailing industry within Malaysia and around the world. The data pool was then screened for relevance using the Key-Word-In-Context (KWIC) (Luhn, 1966) technique before being coded using ATLAS. Ti 8 software to create linkages among the emerging themes. The number of articles that were was deemed useful to be coded after utilising the KWIC technique with the application of word-cloud visualisation (Tessem, Bjørnestad, Chen, & Nyre, 2015) was 103. Keywords in the articles were isolated and filtered, with only those relevant to the discussion remained. By using thematic analysis, the data were arranged in a discussion narrative which includes the inception of e-hailing services in Malaysia, which transcended the boundaries of discipline and professional perspectives and included related viewpoints of transportation, consumer behaviour and regulatory framework. There were several constraints, and limitations to this study, such as data on the e-hailing services within the Malaysian context were scarce. The academic publication, in the Malaysian context, was almost non-existent. Data on operators of e-hailing services in Malaysia were also limited, except for a few brief reports since the companies would consider certain information to be confidential.

FINDINGS

The discussion on e-hailing services in Malaysia was divided into three central themes, which were the Adoption of E-Hailing Services, Issues on the E-Hailing Services and a Future Outlook on E-Hailing Services.

Adoption of E-Hailing Services in Malaysia

MyTeksi was a forerunner and a brand name for Grab created by a start-up company in Malaysia. Managed by Anthony Tan and Hooi Ling Tan in 2012, the company pioneered and introduced the concepts of e-hailing service, which initially focused on utilising the existing taxi fleet, rather than private vehicles, to the Malaysian consumers. As of June 2013, the service had on average of one booking per every eight seconds, or almost 10,000 bookings per day (Cosseboom, 2015). Meanwhile, Uber was introduced in Kuala Lumpur, with a soft-launching in October 2013 (Gabey Goh, 2014). However, only the premium services, Uber Black, were offered. The services also differed from the concept of *MyTeksi*, as privately-owned vehicles were used as the main transportation fleet. This form of service caused Uber to be deemed illegal as the specifications did not meet with transportation laws of Malaysia at that time (Fatimah Zahirah, 2017). Hence, Uber had to withdraw the investments made in Southeast Asia by April 2018 and was quoted with enormous losses due to the hasty exit.

This turn of events made Grab the single largest e-hailing service company and most significant market shareholder in e-hailing services with operations in almost every major city in Southeast Asia. The success of Grab saw the company having a network of 2.7 million drivers across South East Asia, operating in eight countries and servicing over 196 cities (Grab Malaysia, 2019). Rebranded as Grabcar in 2016, the company offered not only e-hailing services but also other mobility services currently such as Grab Food and mobile payment. The e-hailing service market had since been saturated with new e-hailing start-up companies that tried to gain some share of profit in the market.

What made e-hailing services desirable as an alternative mode of transportation in Malaysia, may be found within the state of existing public transportation systems, which was published by Frost and Sullivan (2016) that illustrated the preferences and behaviours associated with e-hailing services by consumers. Poor public transport infrastructure, as well as the presence of better vehicles at lower fares compared to local taxis and public transport systems, were among the reasons for the growing interests in e-hailing services (Frost & Sullivan, 2016). The report was based on Uber, an e-hailing company before the service left the Malaysian e-hailing market also revealed that inaccessibility to parking spaces had also contributed to the uptake of e-hailing services instead using personal vehicles. This was further highlighted through the increase in the frequency of the e-hailing service being used during weekdays and involved routes between home-office and meetings-home. The same report also indicated that 30% of the respondents chose e-hailing service as the primary mode of transportation, with 14% of owned personal vehicles (n = 140).

Issues in E-Hailing

Regulators found the sharing economy to be disruptive (Mae, Adriano, Chadwick, & Su, 2017) due to the nature of the sharing economy that sometimes

operated above the regulation stipulated (Clewlow & Mishra, 2017) to the traditional economy. The complexity of the transactions involved was also reduced by connecting demands with supplies (Vallat, 2016). Hence, regulatory concerns (Fassbender, 2016; Ngo, 2015) on the application of e-hailing services became a significant obstacle that needed to be addressed. Baker (2015) revealed these four obstacles to be a) labour regulation; b) consumer protection regulation; c) property rights and d) discrimination of services. These concerns were instigated as e-hailing services used similar business models throughout the world (Baker, 2015; Fassbender, 2016), including Malaysia. Since the inception of e-hailing services in the transportation sectors of Malaysia in 2012/2013, the public had widely acknowledged and accepted the e-hailing services as a mean of an alternative mode of transport (Frost & Sullivan, 2016).

However, e-hailing service was once considered to be illegal in Malaysia (Sukumaran, 2015), as no legal provision could regulate the operation. The services offered were also considered disruptive (Clewlow & Mishra, 2017), as traditional transportation services, such as taxis, were severely affected as the service took away a majority of taxi passengers. An open confrontation between taxi drivers and e-hailing service providers were frequently observed at that time. E-hailing services also offered better fares structure, affordability and convenience, which was lacking in other modes of public transport (Mae et al., 2017).

The government had tried to find a balanced approach to managing e-hailing services as early as 2016. The Land Public Transport Agency, better known as APAD under the Ministry of Transport Malaysia (MoT), was tasked to find a solution to address the illegal use of e-hailing services. An amendment to the Land Public Transport Act was suggested and tabled in the parliament, which was gazetted in 2017. As of July 2019, APAD had already allowed 44 e-hailing companies to operate legally (Land Public Transport Agency (APAD), 2019a). Hence, although deemed disorderly (Fatimah Zahirah, 2017; Sukumaran, 2015), the e-hailing industry in Malaysia was eventually accepted and legalised by the government.

The decision by the government to legalise the e-hailing services through the amendment of the Land Public Transport (Amendment) Act 2017 (*Interpretation Of E-Hailing*; Amendment of First Schedule (a) in item 1, Subsection (ii)) which ensure E-hailing to be legally recognised accordingly (Government of Malaysia, 2017).

The second amendment to the legislation was made in the Commercial Vehicles Licensing Board (Amendment) Act 2017 (Amendment of Section 2 (a) *Interpretation Of E-Hailing*; Amendment of section 2 (b) *Interpretation of Intermediation Business License*; Amendment of Section 2 (d) *Classes and Categories of commercial Vehicle*; Amendment of Section 14, Subsection (1_b); and amendment of Section 33 *Prohibition of Use of Unlicensed Public Service*

Vehicle). Effect of the amendment are noticeable through the inception of critical regulation such as E-hailing would be legally recognised by the authority, hence the requirement for TNC to apply and have a license before starting with the operation and apply for an intermediary business license. As such, all e-hailing transactions must be facilitated by a third-party intermediary that facilitated the booking between drivers and users. E-hailing vehicles would now be subjected to Public Service Vehicle (PSV) requirements.

By legalising the services and e-hailing company, the government was able to solve issues regarding labour regulation, consumer protection and property rights. These amendments were also made to regulate the industry and create a competing field among existing transportation operators. Through these specific regulatory bodies, the Land Public Transport Agency (APAD) could impose specific requirements for both the e-hailing company and e-hailing drivers to operate legally. The cost of compliance and the associated expenses consequential from the regulatory requirements deter many existing e-hailing drivers while dissuading potential recruits to the platform. Therefore, E-hailing companies need to reconsider both the business model used and the rates needed to be compensated in fulfilling the regulatory requirements. All these regulations imposed were based on the existing model used by the taxi industries (Todd et al., 2018). For example, the conventional taxi industry required drivers to have a vocational licence of PSV before being allowed to drive. Since the regulatory requirements were emulated in the e-hailing sectors, the process of obtaining those licenses would be troubling and costly for the average e-hailing drivers and those who drove part-time. The time frame in getting these licenses was also brief, with the measures announced in March 2019 and immediately enforced by July 2019. By July 2019, e-hailing drivers must comply with the requirements, as shown in Table 6 as drivers who were found to drive without PSV and EVP would be liable for fines or jail terms upon conviction (Teoh, 2019).

Table 2: Compliances to E-Hailing Rules and Regulations

License and Registration	1. Acquired a Public Service Vehicle License a) Malaysian Citizen b) Not less than 21 years old c) Hold a competent driving license d) No Criminal record e) Not blacklisted under Police, Road and Transport Department and Land Public Transport Agency 2. Applied Electronic Vehicle Permit (EVP) from APAD 3. Obtained Drivers Electronic Cards (EKP) from APAD
Vehicles	4. A vehicle with 3 Star rating under ASEAN NCAP 5. Vehicle within 4 to 11 seat capacity 6. mandatory inspection for vehicle aged three years and above 7. Age of the vehicle must not exceed ten years

	8. To display e-hailing identification signage
Other Requirements	1. Passed the mandatory Health screening 2. Attend and passed the compulsory six hours training module 3. Registered and contribute to PERKESO 4. Insurance Coverage for vehicles, passenger and third-party

Source: Synthesize from Land Public Transport Agency E-Hailing Guidelines (APAD) (2019)

As shown in Table 2, e-hailing drivers needed to comply with more requirements than the TNC, which had left additional costs on e-hailing service drivers. For example, the cost to maintain as a Grab driver under the new ruling could reach to RM 800 to RM 1000 (Teoh, 2019). As a result, some part-time drivers terminated from the role, and 50% of the existing 200,000 drivers were expected to quit (Lai & Hendawy, 2019). The deadline was extended for another six months to October 2019 because many of these drivers were not able to adhere to the requirements within the stipulated time frame. Only 10% of the number of e-hailing drivers obtained the PSV before the deadline (Teoh, 2019).

Future Outlook on E-hailing in Malaysia

The success of e-hailing services in Malaysia was highly dependent on the approaches that would be used to tackle these issues, which involved the services and the income of the drivers. Besides, one of the concerns raised was the safety of consumers. As the regulatory body that was responsible for the e-hailing services in Malaysia, APAD tightened the background check for all e-hailing drivers and ordered all e-hailing operators to expedite the use of panic/SOS button in the service applications (Land Public Transport Commission; SPAD, 2017). While research on this area of interest was domestically scarce, several studies conducted internationally could be used to forecast the impending changes in the industry of e-hailing services. In a report by Shared-Use Mobility Centre (2016), studies from the American Public Transportation Association (APTA) revealed that the consumers would use more shared mobility, with a likelihood to use more public transit, fewer personal cars and spend less on transportation. Consumers would continue to use e-hailing services in the foreseeable future based on a study conducted by Nielsen (2015), which showed 77% (n=2150) of the respondents agreed to the use of this mode of transportation. Industrial forecast for 2018 and beyond estimated e-hailing service sectors at a value of RM354 million with an annual growth rate of 15.3% (Statista, 2018). Public transport users in Malaysia had been shown to have high interchangeability between public transport and e-hailing (Nielsen, 2015), which suggested that e-hailing can be used as transit in a transportation network. Studies also highlighted that e-hailing service complemented public transportation, as opposed to the general notion of being a threat, which resulted in the increment and enhancement of urban mobility (Hall, Price, & Palsson, 2017; Shared-Use Mobility Centre; SUMC, 2016). In studies

authorised by the Land Public Transport Commission (SPAD) throughout 2015, results showed that 28% of the commuters used more than three public transports in the daily commute (Nielsen, 2015), with taxi being one of the public transports used by commuters. This finding was corroborated with the data released by Uber in 2017, whereby 25% of the Uber rides in Malaysia and Singapore started or ended at a train station (Jinn Xiung, 2017). Hence, the potential of e-hailing services to grow in numbers were also acknowledged, whereby regulatory bodies should seek opportunities to participate and ensured that benefits were widely and equitably shared. Initiatives related to the e-hailing service include regulating the application as intermediary services (Land Public Transport Commission (SPAD), 2016). With the legalisation of e-hailing services by the government, the necessary regulatory power was established by the enforcement agency to monitor and regulate the E-hailing industry in Malaysia comprehensively. With major projects such as the Mass Rapid Transit (MRT) systems being planned, matching with several initiatives launched by the government to allow e-hailing services to be a permanent option of transportation in Malaysia. Undeniably, the e-hailing service will continue to grow and to complement any types of transportation modality in the future.

CONCLUSIONS

The amendments made on two statutes that regulate the public transportation system in Malaysia has sealed and legalised the adoption of e-hailing service as part of the service offered. Initially viewed as disruptive in the early years of implementation, the service has currently been accepted by both the government, users and competitors alike and is regarded as a complement to the existing public transportation system. The legalisation of e-hailing services also opens up a new dimension that can be regulated to ensure every stakeholder will benefit from the inclusion. The consumer would also benefit from the regulated e-hailing services and lower fares. However, overregulation by the government can affect the industry, especially the drivers, which could ultimately impede the growth of e-hailing service. Hence, future studies on the impact of these regulations on the stakeholders of e-hailing service, especially the drivers, should be investigated extensively. The growing trends of locally established e-hailing companies would positively affect the e-hailing service to continue to flourish, as the industry remains competitive, with untapped market and regions to explore.

REFERENCES

Audouin, M., & Neves, C. (2018). What are the regulations for ICT-based mobility services in urban transportation systems? The cases of ride-booking regulation in Sao-Paulo and Rio De Janeiro. *WIT Transactions on the Built Environment*, *176*.

Azevedo, F., & Maciejewski, M. (2015). *Social, Economic and Legal Consequences of Uber And Similar Transportation Network Companies (TNCs)* (pp. 1–7). pp. 1–7.

Baker, D. (2015). *The Opportunities and Risks of the Sharing Economy*. Washington D.C.

Chiu Chuen, O., Karim, M. R., & Yusoff, S. (2014). Mode choice between private and public transport in Klang Valley, Malaysia. *The Scientific World Journal*, *2014*, 7–9. https://doi.org/10.1155/2014/394587.

Clewlow, R. R., & Mishra, G. S. (2017). *Disruptive Transportation: The Adoption, Utilization, and Impacts of Ride-Hailing in the United States*.

Cosseboom, L. (2015). The History of The Unicorn: GrabTaxi (Infographic). Retrieved April 26, 2018.

Fassbender, P. (2016). *Ride Sourcing in British Columbia: Stakeholder Engagement Summary*. British Columbia: Ministry of Community, Sports & Cultural Dev.

Fatimah Zahirah. (2017). New Regulatory Framework for Mobile App-Based Ride-Hailing ("E-Hailing") Services in Peninsular Malaysia. Retrieved May 14, 2018

Forno, F., & Garibaldi, R. (2015). Sharing Economy in Travel and Tourism: The Case of Home-Swapping in Italy. *Journal of Quality Assurance in Hospitality & Tourism*, *16*(2), 202–220. https://doi.org/10.1080/1528008X.2015.1013409

Freischlad N. (2015). Three years, $340M funding, millions of users: GrabTaxi's Anthony Tan reflects on the journey. Retrieved April 26, 2018.

Frost & Sullivan. (2016). *What Makes Uber Tick in Malaysia? Insight into the Consumer Preferences and Bahaviour*.

Gabey Goh. (2014). Uber starts its engines in Kuala Lumpur | Digital News Asia. Retrieved April 26, 2018.

Government of Malaysia. Land Public Transport (Amendment) Act 2017., Pub. L. No. A1552, Laws of Malaysia (2017).

Grab Malaysia. (2019). *Grab Corporate Profile 2019*. Retrieved from

Hamari, J., Sjoklint, M., & Ukkonen, A. (2016). The sharing economy: Why people participate in collaborative consumption. *Journal of the Association for Information Science and Technology*, *67*(9), 2047–2059.

Hawlitschek, F., Teubner, T., & Gimpel, H. (2016). Understanding the Sharing Economy - Drivers and Impediments for Participation in Peer-to-Peer Rental by Understanding the Sharing Economy. *49th Annual Hawaii International Conference on System Sciences (HICSS)*, *4801*. Kauai Hawaii.

Horton, J. J., & Zeckhauser, R. J. (2016). Owning, Using and Renting: Some Simple Economics of the "Sharing Economy." In *NBER Working Paper Series* (No. 22029). https://doi.org/10.3386/w22029

Hughes, R., & MacKenzie, D. (2016). Transportation network company wait times in Greater Seattle, and relationship to socioeconomic indicators. *Journal of Transport Geography*, *56*, 36–44. https://doi.org/10.1016/j.jtrangeo.2016.08.014

Jinn Xiung, C. (2017). Uber Malaysia unfazed by opening of Klang Valley MRT | Digital News Asia. Retrieved May 2, 2018.

John, N. A. (2013). Sharing, Collaborative Consumption and Web 2.0. *Media@Lse*, *Retrieved* (26), 17 July 2014.

Juul, M. (2017). *Tourism and the sharing economy*. Retrieved from http://www.sharing.org/information-centre/articles/values-and-sharing-economy

Lai, A., & Hendawy, S. (2019, June). E-Hailing Drivers to Hit the Brakes. *The Star Online*.

Land Public Transport Agency (APAD). (2019a). E-Hailing Company in Malaysia.

Retrieved May 14, 2020.

Land Public Transport Agency (APAD). (2019b). *Requently Asked Question For E-Hailing Implementation*.

Land Public Transport Commission (SPAD). (2016). SPAD Memperkenalkan Pembaharuan Yang Menyeluruh Serta Mampan Melalui Program Transformasi Industri Teksi. Retrieved April 26, 2018.

Land Public Transport Commission (SPAD). (2017). *Tightening of e-hailing drivers's screening and S.O.S button*. Kuala Lumpur Malaysia.: Land Public Transport Commission (SPAD).

Li, Z., Hong, Y., & Zhang, Z. (2017). An empirical analysis of on-demand ride sharing and traffic congestion. *Hawaii International Conference on System Sciences*, 1–13.

Luhn, H. P. (1966). Key Word-In-Context Index for Technical Literature (KWIC Index). In D. G. Hayes (Ed.), *Automatic Language Processing* (pp. 288–295). https://doi.org/10.1002/asi.5090110403

Mae, A., Adriano, M., Chadwick, C., & Su, S. (2017). Out with the Old, in with the New: A Study on the Vehicle Hailing Preferences of Filipino Taxi Riders Based on Participation Intent. *International Journal of Real Estate Studies*, *Volume 11*(Number 1), 7.

Ngo, V. (2015). *Transportation Network Companies and the Ridesourcing Industry: A Review of Impacts and Emerging Regulatory Frameworks for Uber*.

Nielsen. (2015). Public Transport Customer Satisfaction Survey 2015. In *Land Public Transport Commission (SPAD)*. Putrajaya Malaysia.

Public Land Transport Commission. (2013). *National Land Public Transport Master Plan* (p. 107). p. 107. Retrieved from

Rayle, L., Shaheen, S., Chan, N., Dai, D., & Cervero, R. (2014). *App-based, on-demand ride services: comparing taxi and ridesourcing trips and user characteristics in San Francisco*. Berkeley.

Santi, P., & Ratti, C. (2017). A future of shared mobility. *Journal of Urban Regeneration and Renewal*, *10*(4), 328–333.

Shaheen, S., Chan, N., Bansal, A., & Cohen, A. (2015). *Definitions, Industry Developments, and Early Understanding*. Berkeley California: University of California Berkeley - Transportation Sustainability Research Center.

Shaheen, S., Cohen, A., & Zohdy, I. (2016). Shared Mobility: Current Practices and Guiding Principles. *Federal Highway Administration*, p. 120. Washington DC: U.S Department of Transportation.

Shared-Use Mobility Centre (SUMC). (2016). *Shared Mobility and the Transformation of Public Transit*. Chicago: American Public Transport Association.

Statista. (2018). Ride Sharing - Malaysia | Statista Market Forecast. Retrieved May 3, 2018.

Sukumaran, T. (2015, June). SPAD will clamp down on private vehicles used as taxis. *The Star Online*.

Teoh, P. Y. (2019, July 12). Those driving without PSV licence face jail, fine. *The New Straits Time*.

Tessem, B., Bjørnestad, S., Chen, W., & Nyre, L. (2015). Word cloud visualisation of locative information. *Journal of Location Based Services*, *9*(4), 254–272.

Todd, L., Amirullah, A., & Hui Xing, C. (2018). *E-hailing Regulations: Striking the Right Balance*. Institute for Democarcy and Economic Affairs (IDEAS), Kuala Lumpur.

Vallat, D. (2016). An Alternative to State-Market Dualism: The Sharing Economy. Practical and Epistemological Questions. *SASE 28th Annual Conference*.

Wosskow, D. (2014). Unlocking the sharing economy: An independent review. In *Department for Business, Innovation and Skills, UK Government*.

Received: January 2020. Accepted: 16th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 142 – 153

IMPORTANCE-PERFORMANCE MATRIX ANALYSIS OF KOTA BHARU'S ISLAMIC CITY IMAGE

Hasnina Hassan[1], Shida Irwana Omar[2], Ghazali Ahmad[3]

[1,3]*Faculty of Tourism, Hospitality, and Wellness*
UNIVERSITI MALAYSIA KELANTAN
[2]*School of Housing, Building and Planning*
UNIVERSITI SAINS MALAYSIA

Abstract

In 2005, Kota Bharu as the Kelantan state capital in Malaysia was rebranded from a Cultural City to an Islamic City and projecting its image as an Islamic identity. Limited studies have been undertaken to assess city image from the perspective of visitors. Therefore, this paper aims to evaluate the perception of visitors on the importance and performance of the Islamic city image of Kota Bharu. Data were gathered using a self-administered survey questionnaire among domestic and international visitors in Kota Bharu in 2018. The questionnaire was prepared based on ten categories of Islamic Built Environmental factors, namely; natural environment, social need and human comfort, religious identity, tolerance, layout, elements of Jannah (paradise), intellectual and knowledge, cleanliness, economic system, and safety setting. The data were analysed quantitatively using partial least squares-structural equation modelling (PLS-SEM). The results revealed that visitors considered "Religious Identity" as the most important attribute which reached a satisfactory level, while other factors also needed to be addressed. The findings are expected to contribute to a better understanding of stakeholders in enhancing the image of Islam Bharu for management and marketing purposes.

Keywords*:* City image, importance-performance matrix analysis, Islamic city, Kota Bharu.

[1] PhD candidate at Universiti Malaysia Kelantan. Email: hasnina.a15e013p@siswa.umk.edu.my

INTRODUCTION

Kota Bharu as the state capital of Kelantan in 1991, was declared a "Cultural City" based on the historical elements, and its art and cultural heritage (Harun, Md Ali, & Zawawi, 2011). In 2005, the state government rebranded Kota Bharu as an "Islamic City". The principal objective behind the rebranding was to establish Kota Bharu as an Islamic City having its own identity and by highlighting the values of Islam. This was to be achieved by infusing the city's development planning processes with desirable Islamic precepts as stated in the Kota Bharu Islamic City Master Plan (Mohd Yusof, 2011; MPKB-BRI, 2006; Saad & Radzi, 2009), and also in the most recent draft of the MPKB-BRI Local Plan 2035 (Replacement) (MPKB-BRI, 2017). In the context of the research area of this study, the branding of Kota Bharu from a Cultural City to an Islamic City has transformed the city into an excellent strategy for tourism (Hassan et al., 2017b, 2017a; Mohd Nasir & Salleh, 2014) to promote Islamic tourism products aside from other popular cultural varieties.

Accordingly, this transition has resulted in important implications for the development of the city regarding its image to be more conducive with the philosophy of Islam. Not to mention, prevailing studies among the residents of Kota Bharu reported that there was confusion and misunderstanding towards the Islamic city concept and branding of Kota Bharu at the time (Mohd Yusof, 2011). As suggested by Mohd Yusof & Yaacob (2013), a clear understanding of the Islamic city concept and image must be identified and explained to the community and visitors to avoid confusion and misunderstanding that may disrupt the entire process. Therefore, this paper aims to evaluate the perception of visitors on the importance and performance of Kota Bharu's Islamic city image, in order to propose managerial and marketing strategies to improve the current condition of the city's Islamic image.

DESTINATION IMAGE

Image perception is an important aspect in determining an individual's motivation and decision to travel to other locations as a favourable image will likely lead to the individual's satisfaction level (Mungai, 2013). Understanding destination image is essential since it plays a key role in travel decisions (Pike, 2008) destination choice (Abd El Latif Ayad & Shujun, 2013), and tourist loyalty (Alexandre & Ana, 2015). As such, to identify existing imagery for a city, one needs to comprehend the image of the city itself. According to Lynch (1960), a city's image is read according to its physical and perceptible looks of the city's objects which are conveyed as the city's built environment.

Mohd Isa, Hj Zen, & Long (2014) defined Islamic built environment as a situation or setting that encompasses the combination of created elements with the implementation of Islamic ideology to serve human needs and values. Nonetheless, in the present context of this study, the interpretation of an Islamic

city image is reflected by the Islamic built environment (IBE) perceived and adopted from the ten factors of the IBE by Mohd Isa (2015). The factors include the natural environment, social need and human comfort, religious identity, tolerant, order, elements of Jannah *(paradise)*, intellectual and knowledge, hygiene, economic system, and the safety setting.

Table 1: Descriptions of the Factors of the Islamic Built Environment

Islamic Built Environment (IBE) Factors	Description of Factors
Landscape and natural environment	The aspect of the natural environment as emphasised and embedded in the built environment.
Social need and human comfort	The setting that concerns the social need and bringing human comfort.
Religious identity	The religious identity that suits the local culture and is aimed at restoring the noble history of Islamic civilisation.
Tolerant	Able to bring the spirit of tolerance and liberty to the community.
Order	Setting and planning to impose Islamic feelings.
Elements of Jannah *(Paradise)*	The translation elements of Jannah (paradise) which are intelligence, beauty, and tranquillity.
Intellectual and knowledge	Expression of intellectual and knowledge aspects of Islam.
Hygiene	Emphasis on hygiene and cleanliness.
Economic system	Executing an honest and worthy economic system based on Islamic values.
Safety setting	The safety setting to the built environment to provide a safe environment for the community.

Source: Mohd Isa (2015)

IMPORTANCE-PERFORMANCE MATRIX ANALYSIS (IPMA)

Importance-Performance Analysis (IPA) which is also called Importance-Performance Matrix Analysis (IPMA) is a method of evaluating the quality of service (Ormanovic et al., 2017). According to Ramayah & Rouibah (2016), this simple graphical tool can identify the most crucial attributes concerning their need for managerial action and define areas of improvements in developing a successful marketing programme to achieve an advantage over competitors. Hence, it is necessary to perform IPMA to avoid any ambiguity concerning managerial decisions and for marketing purposes (Deng & Pierskalla, 2018; Ramayah, Cheah, Chuah, Ting, & Ali Memon, 2016).

In tourism research, IPMA has been employed by researchers in many fields and has proven to be a valuable destination management tool (Deng &

Pierskalla, 2018; Rašovská, Kubickova, & Ryglová, 2020). It has also been used in Malaysia in reviewing urban tourism development (Muhibudin, Mohamed, & Abooali, 2010) and is widely used as an analytical technique for customer satisfaction management (Ahmad & Wan Afthanorhan, 2014; Dmitrieva, Fernandes, & Nunes, 2019). Therefore, in this study, IPMA is used to assess the visitors' perceptions of the Islamic city image attributes of Kota Bharu as areas for further research.

Conventional IPA was first introduced by Martilla & James (1977), where the assessment provides the average value of the importance and performance of different service attributes calculated in a defined coordinate system on a two-dimensional matrix. In this approach, the horizontal axis represents performance, and the vertical axis represents importance. The attributes are represented on a matrix where each attribute falls into one of four quadrants, as shown in Figure 1. The objects that fall into the "concentrate here" quadrant are of the utmost interest to the evaluators, as they represent areas of improvement.

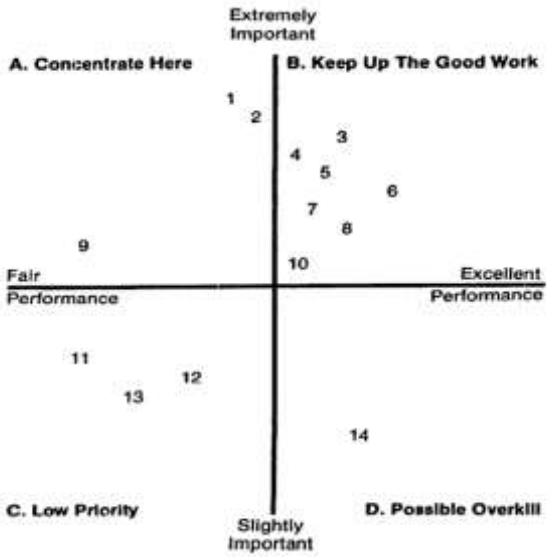


Figure 1: The partition of the original IPA matrix
Source: Martilla & James (1977)

Although, one of the most significant drawbacks in the quadrant model (QM) rests in the priority of elements for improvement, where the smallest element that shifts in the coordinate system can lead to drastic changes in identifying priorities. Therefore, researchers have incorporated the concept of "gap" (discrepancy), which is regarded as the difference between performance and importance by adding the diagonal line at an angle of 45˚. This is where the values of importance are the same as the values of performance which forms a diagonal model (DM), where generally, the DM performance is better than the QM (Abalo, Varela, & Manzano, 2007; Ormanovic et al., 2017). Figure 2 shows the modified IPMA grid used in this study.

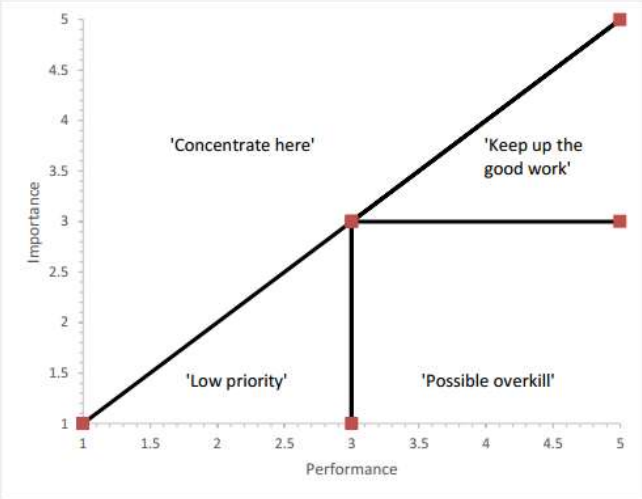


Figure 2: The partition of modified IPMA matrix
Source: Pitas et al. (2017)

METHODOLOGY

Instrument Design and Measurement of Variables

A survey questionnaire comprising 62 questions was used in this study as the data collection instrument. Given that most of the items in the questionnaire were targeted to measure the respondents' perceptions and attitudes, a Likert-type scale was considered more appropriate and reliable to use (Ibrahim et al., 2013; Maiyaki & Mohd Mokhtar, 2010). The survey instrument was developed to measure the key variables of the research based on a 5-point Likert-type rating scale; 1 = "strongly disagree" and 5 = "strongly agree".

Data Collection
The survey was carried out amongst 428 domestic and international visitors aged 18 and above between April and August 2018. The duration of the survey was determined based on the peak seasons noted for international tourist arrivals (Kelantan Tourist Information Centre [TIC], 2018). The location of the survey included the city centre, public transportation hubs (airport and bus stations), and at popular tourist locations. Both a paper-based questionnaire, as well as an electronic copy displayed on a mobile tablet device, was used as instrument options for respondents in order to achieve a higher response rate.

Data Analysis
The data analysis consisted of two stages. In the first stage, the data were analysed with frequency using the Statistical Package for the Social Sciences (SPSS) software to determine the respondent's demographic profile, characteristics, and their perceptions towards Kota Bharu's overall Islamic city image attributes. In the later stage, Partial Least Squares-Structural Equation Modelling (PLS-SEM) of the SmartPLS 3 software was used to evaluate the IPMA to identify the overall effects of the structured model (importance) and the average value of the latent variable performance (performance).

FINDINGS

Demographic Background and Travel Characteristics of the Respondents
Table 2 displays the respondents' demographic background and travel characteristics. Regarding gender, the respondents were equally divided with the majority of respondents married (51.9%) and well-educated (85.5%) aged between 26 and 40 years (49.8%). More than half of the respondents (63.8%) were local visitors, while the remaining respondents were international visitors. About 41.4% of respondents worked as professionals, followed by students (19.9%). Also, more than half of the respondents (51.6%) were first-time visitors, who mostly visited Kota Bharu with their families or friends (51.4%). Their primary sources of information were based on their experience as well as via the media or the internet. Given the majority of respondents travelled for leisure (53.9%) and shopping (37.2%), this could reflect the visited locations which were mainly the city centre (67.4%) and local markets and night markets (66%). The intention to revisit the study area was very high, at 91.3%.

Table 2: Respondents Demographics and Characteristics

Demographics/ Characteristics	Category	Frequency	Percent
Gender	Male	216	50.5
	Female	212	49.5
Age	18-25 years	164	38.3

	26-40 years	213	49.8
	41-56 years	49	11.4
	57 and above	2	0.5
Marital status	Single	222	51.9
	Married	193	45.1
Religion	Muslim	302	70.6
	Others	126	29.4
Residence	Local	273	63.8
	International	155	36.2
Education level	No formal education	1	0.2
	Primary school	2	0.5
	Secondary school	55	12.9
	College/ University	366	85.5
	Others	4	0.9
Occupation	Employed (management/ professional)	177	41.4
	Employed (manual/ clerical)	65	15.2
	Employed (design)	36	8.4
	Self-employed	51	11.9
	Unemployed	10	2.3
	Retiree	3	0.7
	Student	85	19.9
Travel Frequency	First visit	226	51.6
	More than one visit	212	48.4
Travel Accompany	Alone	73	16.7
	Partner	99	22.6
	Friends or families	225	51.4
	Colleagues	31	7.1
	Others	7	1.6
Travel Learn	Already knew	229	52.3
	Media or Internet	213	48.6
	Friends or relatives	142	32.4
	Books or guides	50	11.4
	Travel agency	55	12.6
	Fair or exhibitions	23	5.3
	Others	37	8.4
Travel Purpose	Holiday	236	53.9
	Shopping	163	37.2
	Business	52	11.9
	Meeting, conference, seminar	78	17.8
	Education	66	15.1
	Arts and culture	42	9.6
	History and heritage	33	7.5
	Sports and recreation	40	9.1
	Health	15	3.4

	Religious activities	40	9.1
	Visit friends or relatives	116	26.5
	Others	48	11.0
Place Visited	City centre	295	67.4
	Market or night market	289	66.0
	Museum or palaces	128	29.2
	Art, culture or craft centre	134	30.6
	Mosque or *pondok*	120	27.4
	Nature, beach or river	159	36.3
	Others	39	8.9
Intention to Revisit	Yes	400	91.3
	No	36	8.2

The Importance-Performance Analysis of Kota Bharu's Islamic City Image

Table 3 displays the findings of the total impact (importance) and the index value (performance) from the IPMA. Regarding importance, the Order construct (OD) marked the highest score (74.769) followed by Intellectual and Knowledge (IK) (68.083). Nevertheless, concerning performance, Order (0.200) and Religious Identity (RI) (0.393) were far better compared to other constructs.

Table 3: Index Value and Total Impact of IPMA

Construct	**Importance (Total effect)**	**Performance (Index Values)**
Element of Jannah (EJ)	62.655	0.097
Economic System (ES)	64.486	0.045
Hygiene (HG)	56.865	-0.125
Intellectual and Knowledge (IK)	68.083	0.125
Construct	**Importance**	**Performance**
Landscape and Natural Environment (NE)	60.163	0.133
Order (OD)	**74.769**	0.200
Religious Identity (RI)	67.806	**0.393**
Social need and human comfort (SN)	62.282	-0.027
Safety Setting (SS)	63.040	-0.022
Tolerant (TL)	64.147	0.008

Figure 3 below illustrates the Priority Map (IPMA) of the Islamic City image viewed among Kota Bharu visitors. As shown in the figure, it can be seen that most of the factors were seen as equally important based on the component's position in the plotted priority map. The map reveals that the Religious Identity (RI) construct was viewed as attentive, but with lower performance compared to the Order (OD) construct. Nevertheless, Religious Identity (RI) is excellent since its ratings of importance and performance were reasonably balanced. This indicates that the RI factor has been at a satisfactory level (keep up the good work).

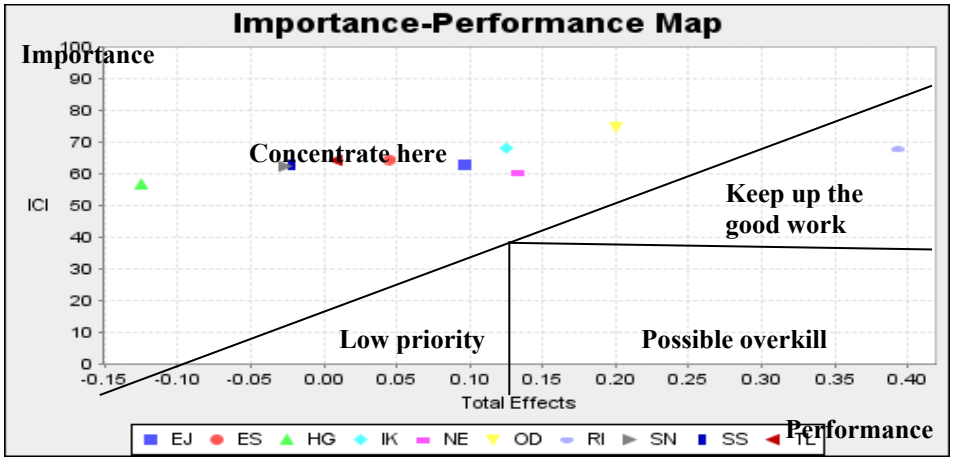


Figure 3: IPMA of Islamic City Image amongst Visitors

Aside from that, other constructs occupy the zone above the diagonal, which means that the remaining constructs need to be concentrated. According to Ramayah et al. (2016), the greater discrepancy between importance and performance leads to a higher need for remedial action. Accordingly, this is because a larger discrepancy is assumed to cause greater dissatisfaction, which needs to be noted and concentrated. Regarding Hygiene (HG), this construct is quite remote from the other constructs having the lowest performance, which is an issue that should be addressed among the entire concentrated constructs. On the other hand, no construct was found in the 'low priority' and 'possible overkill' section.

DISCUSSIONS

IPMA analysis was conducted to identify the most relevant indicators for the management and marketing of Kota Bharu. According to the results of the analysis, all factors were found to be excessively exemplified based on the component's position in the plotted IPMA map. This indicates that all factors are

important and should be considered in building the Islamic City image. The Religious Identity (RI) factor has also been at a satisfactory level of the city's Islamic image, which assessed whether the city features were constructed incorporating Islamic architecture features. This illustrates the sense of Islamic ambience, evoking a sense of reviving the glorious history of Islamic civilisation, and representing the local culture. These features are in line with the initiatives implemented from the initial inception of the Islamic city concept in Kota Bharu where it has a set of design features by applying the characteristics of Islamic architecture while preserving the Kelantan local identity.

Although Identity (RI) is viewed as attentive, its performance is less compared to the Order (OD) factor. OD was perceived as being more dominant compared to RI, possibly because the mosque and *Qiblat* structures gave a higher impact on the waking spirit of Islam, compared to the structures with Islamic façades. The Islamic urban setting with the mosque as the core provides memories to God and reminds Muslims of the obligation of prayer. The location of the mosques attached to the commercial and social centre falls along the same lines with the common features of other Islamic cities.

Nonetheless, it is also important to highlight that Hygiene (HG) had the lowest score in the IPMA, which should be acknowledged by city managers. Cleanliness is also an important factor regarding the Islamic city image but was found in this study to have the lowest performance. As such, it must also be taken seriously by the authority to determine feasible and affordable solutions to address this issue. Notably, the government should undertake and promote creative and effective awareness-raising campaigns based on the Islamic approach in conjunction with the branding of Kota Bharu as an Islamic city.

CONCLUSIONS

The results of the IPMA analysis revealed that visitors assessed Religious Identity (RI) as the most important attribute; even though all nine factors were equally perceived as important but still require the same degree of attention. Hygiene was identified as the main area of focus in projecting the city's Islamic image, given its importance and significance. The result of this study could be used as a reference for city managers, tourism marketers and other stakeholders in propelling the Islamic image of Kota Bharu. Though, this should be supported by a sound marketing strategy and awareness programs. For future study, investigation on other segments of domestic and international visitors to Kota Bharu could be undertaken. Here, different contexts could be employed by considering new variables such as tourist loyalty.

ACKNOWLEDGEMENTS

The authors would like to extend their appreciation to Universiti Sains Malaysia (USM) for granting the Short-Term Grant [Grant No. 304/PPBGN/6315164] that made this study and paper possible.

REFERENCES

Abalo, J., Varela, J., & Manzano, V. (2007). Importance values for Importance-Performance Analysis: A formula for spreading out values derived from preference rankings. *Journal of Business Research*, 60, 115–121. https://doi.org/10.1016/j.jbusres.2006.10.009

Abd El Latif Ayad, T. H., & Shujun, Y. (2013). Perceived Egypt's Destination Image by Chinese University Students. *African Journal of Business Management*, 7(41), 4288–4297. https://doi.org/10.5897/AJBM12.1380

Ahmad, S., & Wan Afthanorhan, W. M. A. (2014). The Importance-Performance Matrix Analysis in Partial Least Square Structural Equation Modeling (PLS-SEM) with SmartPLS 2.3 M3. *International Journal of Mathematical Research*, 3(1), 1–14.

Alexandre, L. L. C., & Ana, P. M. S. (2015). Strategic image management: The image of the City of So Paulo/SP. *African Journal of Business Management*, 9(6), 288–297. https://doi.org/10.5897/ajbm2014.7562

Deng, J., & Pierskalla, C. D. (2018). Linking importance-performance analysis, satisfaction, and loyalty: A study of Savannah, GA. Sustainability (Switzerland), 10(3). https://doi.org/10.3390/su10030704

Dmitrieva, M., Fernandes, P. O., & Nunes, A. (2019). Guests' Satisfaction: Application of the Importance-Performance Analysis. In J. M. Cristina Sousa, Isabel Vaz de Freitas (Ed.), ICTR 2019 2nd *International Conference on Tourism Research* 2020.

Harun, S. N., Md Ali, Z., & Zawawi, R. (2011). The Changing Image and Identity of Kota Bharu, Kelantan, Malaysia: From Cultural City to Islamic City. International *Journal of Social Planning and Development*, 1, 75–80.

Martilla, J. A., & James, J. C. (1977). Importance-Performance Analysis. *Journal of Marketing*, 41(1), 77–79. https://doi.org/10.2307/1250495

Mohd Isa, N. (2015). Developing a Definition for Islamic Built Environment in Malaysia by Sieving through the Interpretation of Public Opinion Shapers. International Islamic University Malaysia.

Mohd Isa, N., Hj Zen, I., & Long, A. (2014). The Indicator of Factors That Make an Environment Truly Islamic in Malaysia. *Australian Journal of Basic and Applied Sciences*, 8(23), 53–61.

Mohd Yusof, M. F. (2011). Persepsi Komuniti Setempat Terhadap Penjenamaan Kota Bharu sebagai Bandar Raya Islam. In *Persidangan Kebangsaan Masyarakat, Ruang dan Alam Sekitar* (MATRA2011) (pp. 1–8). Pulau Pinang, Malaysia: Universiti Sains Malaysia.

Mohd Yusof, M. F., & Yaacob, M. R. (2013). Penjenamaan Tempat (Place Branding) dan Faedah kepada Sektor Pelancongan. In *Persidangan Kebangsaan Ekonomi Malaysia* ke VII (PERKEM VIII) (Vol. 1, pp. 159–165).

MPKB-BRI. (2006). Pelan Induk Kota Bharu Bandar Raya Islam 2005-2015. Kota Bharu: Majlis Perbandaran Kota Bharu Bandar Raya Islam.

MPKB-BRI. (2017). Draf Awal Rancangan Tempatan MPKB-BRI Kelantan 2035 (Penggantian). Kota Bharu: Majlis Perbandaran Kota Bharu Bandar Raya Islam.

Muhibudin, M., Mohamed, B., & Abooali, G. (2010). A Review on Urban Tourism Development in Malaysia. In B. Mohamed (Ed.), *Regional Conference on Tourism Research: The State of the Art and its Sustainability* (pp. 205–211). Penang, Malaysia: Universiti Sains Malaysia.

Mungai, M. (2013). Exploring Motivations and Factors Impacting upon Destination Choice of the UK Residents: Reflecting on Kenyan Tourism. *Information and Knowledge Management*, 3(7), 10–17.

Ormanovic, S., Ciric, A., Talovic, M., Alic, H., Jeleskovic, E., & Causevic, D. (2017). Importance-Performance Analysis: Different Approaches. *Acta Kinesiologica*, 11(2), 58–66.

Pike, S. (2008). Destination Marketing: An Integrated Marketing Communication Approach. Hungary: Routledge. https://doi.org/10.1017/CBO9781107415324.004

Ramayah, T., Cheah, J., Chuah, F., Ting, H., & Ali Memon, M. (2016). Partial Least Squares Structural Equation Modelling (PLS-SEM) using Smart PLS 3.0 (First). Kuala Lumpur, Malaysia: Pearson Malaysia.

Ramayah, T., & Rouibah, K. (2016). Identifying Priority Using an Importance-Performance Matrix Analysis (IPMA): The Case of Internet Banking in Malaysia. *International Journal of E-Adoption*, 6(1), 1–15. https://doi.org/10.4018/ijea.2014010101

Rašovská, I., Kubickova, M., & Ryglová, K. (2020). Importance–Performance Analysis Approach to Destination Management. Tourism Economics, (February). https://doi.org/10.1177/1354816620903913

Saad, S., & Radzi, M. M. (2009). Urus Tadbir sebuah Bandaraya Islam Malaysia: Kajian Kes di Kota Bharu, Kelantan. *Malaysian Journal of Society and Space*, 3(3), 8–25.

TIC. (2018). Kelantan Tourist Arrival Statistic. Kota Bharu.

Received: January 2020. Accepted: 15th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 154 – 166

EVOLUTION AND DIVERSIFICATION OF MUSEUM FUNCTIONS: A REFLECTION OF MARKET DEMAND IN PENANG, MALAYSIA

Suraiyati Rahman[1] and Sathish Kumar Velayuthan[2]

[1] School of Housing, Building and Planning,
UNIVERSITI SAINS MALAYSIA
[2] Azman Hashim International Business School,
UNIVERSITI TEKNOLOGI MALAYSIA

Abstract

Changes in human values and technological advancements have led to the reinvention of museum interpretation. Studies have shown that the transformation of museums' functions and emerging typology of museums occur globally. Initially, museums' function was to educate society and preserve artefacts for public access, but nowadays, museums have expanded their functions and have become market driven. The increasing number of museum establishments in George Town, Penang has mixed impacts to the curatorship and interpretation of museums. The strategic location of George Town, Penang, its branding as a World Heritage Site, cultural heritage attractions, and local values have gained popularity as a touristic destination. Museums and galleries are the top attractions reviewed by users in TripAdvisor. This article investigates the transformation of functions and typology of museums on the basis of the top 20 museums in Penang listed in TripAdvisor. Content analysis from the secondary data was conducted to establish the pattern and trends of museums' diversification in Penang. Findings revealed that the diversification of museums in Penang has expanded from histories such as natural, science, human, and art to history and art, technology, and specialty. Considering that George Town has been nominated as a World Heritage Site, museums have become consumer-oriented, and private ownership and collaborative partnership have grown drastically. This study contributes by showing that the diversification of museums' function enhances creativity to meet future needs.

Keywords: Museums' function, museums transformation, market demand, Penang and eWOM

[1] Senior Lecturer at Universiti Sains Malaysia, email: suraiyati@usm.my

INTRODUCTION

The traditional manner of museum interpretation that exposes passive interpretation is no longer aligned with today's society. With the advent of technology, users now prefer 'info-cultural-entertainment' experiences, which combine leisure, entertainment, culture, education and sociability (Hesseldahl, McGinley, & Monk, 2018; Homadovski, 2009; McCarthy & Wright, 2005; Stuedahl, D., Lowe, 2013). Nevertheless, museums have become recently popular as cultural attractions, art galleries and monuments. History museums, natural history, sciences, art, technology and virtual museums are examples of museum typology. Recently, consumers are demanding for different museum experiences, such as knowledge and entertainment-based offerings (Chung, Marcketti, & Fiore, 2014; Del Chiappa, Andreu, & Gallarza, 2014; Park & Vargo, 2012). This new demand has led to the transformation of museum functions and diversification, which emphasise on consumers' preferences. Scholars cited issues of changing values of the current generation, which serve as a barrier for the conventional way of museums to appeal to consumers. The advancement of information technology and the influence of electronic word of mouth (e-WOM) influence the current shift experienced by the new type of museums. Privately owned museums and collaborative partnership are competitive in providing services to the market. Thus, museums have shifted to a market-oriented stance, and their new twofold function as knowledge and entertainment hubs has boomed. The present demand, which is influenced by technology-savvy travellers and market orientation, portrays changes in human values. This article attempts to investigate the transformation of functions and typology of museums on the basis of the top 20 museums in Penang listed in TripAdvisor.

LITERATURE REVIEW

Terminology and Functions of Museums

The general concept of museums can be traced to ancient Greek civilisation and mythology. A museum is a product and service that is delivered in a physical setting, which takes into account aspects such as building area, shape, lighting, visitor flow, queues, waiting time, crowding and activities that involve engagements (Goulding, 2000). A museum is associated with a non-profit organisation; it is open to the public and acquires, conserves, researches, communicates and exhibits materials or artefacts for education, study and enjoyment' (ICOM definition of a museum 2007). The Department of Museums Malaysia (2016) defined a museum as an institution that is not fixed, non-profit, serves the society and open to the public for educational purposes. The primary function of museums is to educate the public and preserve and protect heritage resources. As a non-profit institution, a museum is essentially formed to heighten

appreciation of cultural values and to instil the value of knowledge among the public.

A museum can be interpreted as a space or building that displays objects or artefacts of historical, artistic or scientific value. One of the aspects that define overall visitors' experience in museums is customer service, which requires interaction between museum staffs and visitors (Sheng & Chen, 2012). Museums also provide opportunities for self-directed learning for people from different backgrounds and with different abilities. Museums serve as a place for public gathering for entertainment and leisure. As a medium that preserves local identity, a museum protects national, regional and community identity inherited from the past. This function was further acknowledged by Pitman and Hirzy (2004), who stated that museums play an important role in the continuity of inheritance while portraying the progression of human ideas. Therefore, museums function as an entity to enrich local culture, a pillar in disseminating knowledge and a venue for community engagement.

Types and Ownership of Museums

Various types of museums are found worldwide. Some major categories are historical, natural history, art and science museums. Historical museums play a major role in encouraging appreciation of history and in promoting the value of history for future understanding. Most cities have a diverse categorisation of museums, which are managed by governmental bodies, private companies and both parties. Today, managing museums entails an understanding of the custodial role and the need to attract visitors. Museums are essentially under the non-profit sector and depend on the government for up to 70 percent of financial support; hence, museums should be made competitive by the government by increasing visitor numbers (Gilmore & Rentschler, 2002). Historic villages or living history museums are other types of historical museums. On the one hand, since their introduction in the late 1970s, interactive-type museums or 'living' heritage museums have been dedicated to Victorian and post-Victorian societal and industrial recreations (Del Chiappa et al., 2014). On the other hand, natural history museums aimed to exhibit natural science and history in transmitting knowledge to society. Today, natural history museums portray various aspects, including a history of biodiversity, ecology, human evolution and animal evolution. Generally, science museums incorporate an interactive approach in interpreting materials to a heterogeneous group of users. This approach uses interactive technologies that give hands-on experiences to visitors while stimulating curiosity for better understanding of science in real-world practice. Art museums reflect historic and modern artistic executions as they allow visitors to appreciate and enjoy the beauty of art works. A current trend is that everything

that surrounds us is being 'museumised' for educational heritage (Álvarez, Dávila, & Naya, 2017).

Technological Advancements and the Influence of Electronic Word of Mouth (e-WOM)

The advancement of technology has strengthened a shift towards user-friendly museum interpretation that enhances users' experiences. To enhance visitors' experiences and engagement, museums have started adopting the use of information communication and technologies (ICTs) and related features (Giacomo, Luisa and Martina., 2014). Meeting the demands of well-informed and technology-savvy visitors, the interactive interpretation approach of museums reflects the shift from product-oriented to consumer-orientated offerings in this sector.

> *This shift from a product orientation to consumer orientation has been longer to come for researchers interested in museums than in any other tourism service*
>
> *(Giacomo, Luisa and Martina., 2014 p.421).*

The era of globalisation has attempted the transformation of museum functions, which were initially seen as educational centres that educate people as well as provide social and spiritual experiences through exhibitions and other activities (Ab Samad et al., 2012). The virtual museum combines various forms of interactivity and immersions for educational purposes and enjoyment while enhancing visitor experience (Barbieri, Bruno, & Muzzupappa, 2017; Koslow, 2019; Schweibenz, 1998). Nowadays, technology and virtual museums generally integrate exhibits with the use of advanced technology to create interactive interpretation. In the digital age era, the Internet has evolved from a broadcast medium to a participatory platform that allows people to become the media themselves as they collaborate and share information. The ability to share information via social media has made substantial changes in information asymmetry and the bargaining power of consumers. According to Ahmed, Ahmad, Ahmad and Zakaria (2019), social media has fundamentally changed the consumer decision process, and a complex view of how consumers engage with brands has emerged in the last decade. The usage of smartphones with high-quality built-in camera has led to an increase in the sharing of museum experiences among consumers (Weilenmann, Hillman, & Jungselius, 2013). In addition, Shaharir and Zanuddin (2018) pointed out that museums should emphasise impactful communication strategies, such that social media, rather than solely depending on official websites, can be utilized for audience interaction.

METHODOLOGY

A content analysis technique based on secondary data was conducted to examine the evolution of museum functions and diversification of types in Penang, Malaysia. Content analysis requires a systematic reading of texts or images that refer to codes to identify an emerging pattern that reflects meaningful content (Denzin & Lincoln, 2006, 2008). The data were sourced from previous literature related to museums in Penang, museum websites and TripAdvisor. Consumer reviews from top 20 museums in Penang listed in TripAdvisor were extracted. A cut-off date is set until 20 May 2020 in obtaining the top 20 museums to obtain the total reviews and star rating. The technique used is important in objectively and systematically examining the characteristics of museums according to their respective websites. The codes were extracted on the basis of the research objectives, such as the museum name, year of establishment, ownership, functions, location and descriptions. Themes on the typology of the museum were developed according to the descriptions.

FINDINGS AND DISCUSSION

Types and Functions of Museums in Penang before being Nominated as a World Heritage Site

George Town has a total of approximately 5,000 premises, which is the largest collection of pre-war premises in Southeast Asia. The conservation of historic buildings has become one of the approaches to prevent deterioration and to safeguard heritage buildings. Since the nomination of George Town as a World Heritage Site, the creative economy has grown tremendously in the inner city of George Town. As a part of the creative economy, privately owned museums have become an emerging business sector in George Town. In 1941, the first establishment of a museum in Penang was initiated, but it was a failed attempt due to the Japanese colonisation. Later, the Penang Museum and Art Gallery was opened on 14 April 1965 by the state governor (Ahmad, 2015). The Penang State Museum and Art Gallery has a collection of 300 displays for public viewing. In addition, the University Museum was established in 1982 to focus on natural history and science. This museum is renowned for its archaeological experts, technological advancements and their interesting programmes like 'Night in the Museum'. Table 1 presents the types of museums, year of establishment, ownership, location and primary features of exhibits. Since 1965, only nine museums were established before the inscription of George Town as a World Heritage Site. Before 2008, the museums mainly focused on history, art, natural history and science.

Table 1: Types and Key Features of Museums in Penang before 2008

Name of Museum	Establishment and Ownership	Type	Location	Features
1.**Penang State Museum and Art Gallery**	1965 (State)	History	Farquhar Street, George Town	Exhibits the history of the city, formations, culture of various races, colonial artefacts and population history.
2.**Museum and Gallery Tuanku Fauziah**	1982 (University)	Natural History & Science	Minden Campus, USM	Holds the finding on Perak Man in Lenggong Valley. Renowned for Archaeology, Sciences, Ethnography, Technology and Astronomy.
3.**Penang Forestry Museum**	1983 (Forestry Department)	Natural History & Science	Telok Bahang	Home for all the information on the jungle, daily usage of woods & its industry in Penang, flora & fauna and related natural resources.
4.**Penang Islamic Museum**	1995 (Private)	History	Acheen Street, George Town	Exhibit the Islamic Culture, Leaders, Architecture, Islamic Education and related believes practised in Penang
5.**P.Ramlee Gallery**	2002 (National Achieves)	Speciality (History)	Perak Road, George Town	Exhibits the real-life history of the actor, film and musical practices and other involvement by the actor
6.**Penang War Museum**	2002 (Private)	History	Batu Maung	Exhibits military motorcycles, military intelligence room, Gun and used cartridges, Japanese torture rooms and weapons, war replicas and related photos.
7.**Khoo Kongsi Museum and Gallery**	2002 (Private)	History and Art	Lebuh Cannon, George Town	The clan temple that retained its authentic character in the late 19th century. It includes association building, traditional theatre and clan houses.
8.**i-box Glass Museum Penang**	2006 (Private)	Art	Jalan Burma	Portrays decorative glass artworks and paintings as a reflection of people's lifestyle.
9.**Sun Yat-Sen Museum**	2006 (Private)	History and Art	Armenian Street	A beautifully preserved house of Sun Yat Sen's historic period. Original features, furniture's, house fixtures and ancient landscapes.

Source: TripAdvisor and other websites

Diversification of Museum Typology and Function after the Nomination of George Town as a World Heritage Site

As shown in Table 2, museum trends have evolved in Penang. After the nomination of George Town as a World Heritage Site in 2008, more than 30 museums have opened, the majority of which are privately owned. Table 2 shows that the number of museums that focus on art, specialty, history and technology has increased drastically. From 1965 to 2018, a total of 7 museums are categorised under art, followed by 5 museums under history, 4 museums under history and arts, 2 museums under natural history and science, 2 museums under technology and 2 museums and gallery under category specialty. Today, most museums in Penang are focused on the arts, whereas earlier museums focused on history, natural history and science. Knowledge-focused and interactive or leisure-based offerings started to emerge due to consumer demand. A similar pattern was noted by Giacomo, Luisa and Martina (2014), in which museums have started adopting interactive features and technology to enhance visitors' experiences and engagement. Examples of such technology-based museums are Penang Camera Museum, Asia Camera Museum and Tech Dome Penang. These museums and galleries portray the transformation of technology innovation in curatorship. Secondly, the evolution of museums in Penang has notably added value in leisure, education and cultural preservation, which is aligned with the need for knowledge and entertainment offerings (Álvarez et al., 2017; Lee, 2010; Volkert, 2019). The development of consumer-oriented products (Brännback, 1999), customer orientation and 'total customer care' will provide superior value to customers, which leads to success in the global competition.

Private and Collaborative Ownership of Museums

Table 2 shows that the number of museums has increased drastically, and the majority are profit organisation museums that focus on art museums. The transformation of the museum has changed in terms of function and ownership. However, the primary role of preservation and exhibition still apply. According to McPherson (2006), the vast changes in the function of museums started in the 20th century due to the new market revolution that concentrated on financial advancements. The market revolution and the new idea of museums in Penang emerged due to its new status as a World Heritage Site and the re-adaptive use of heritage buildings. A prime example is The Peranakan Museum, which was initially a privately owned mansion that showcased various historical collections, cultural traditions and lifestyle and architecture. The museum was reinvented such that it was commodified and transformed into a profitable product. Del Chiappa et al. (2014) noted that this shift from a product orientation to a consumer orientation is particular in museums. The partnership between private companies

and governmental bodies is evident in newly established museums and galleries, such as Tech Dome and Penang House of Music.

Table 2: Types and Key Features of Museums in Penang after 2008

Name of Museum	Establishment and Ownership	Type	Location	Features
1.**Penang Peranakan Museum**	2010 (Private)	History and Art	Church Street, George Town	The Pinang Peranakan Mansion is a re-creation of a typical home for wealthy Peranakan Chinese. Exhibit extravagant lifestyle and variety of customs with a collection of antiques of Peranakan heritage.
2.**The Camera Museum**	2013 (Private)	Technology	Muntri Street, George Town	Portrays collections of vintage cameras and accessories since the 18th century.
3.**Batik Painting Penang Museum**	2013 (Private)	Art	Armenian Street, George Town	About 90 Batik Paintings are being presented in this Museum. Teng's early works done in the 1950s up until the current period, over 30 artists are represented.
4.**Made in Penang Interactive Museum**	2013 (Private)	Art and technology	Weld Quay, George Town	Pooled with the interactive kiosk and videos, it offers the 3D interactive arts.
5.**Asia Camera Museum**	2014 (Private)	Technology	Lebuh Armenian, George Town	Home for more than 1000 ancient cameras and photographic accessories. History of Photography and Rare magic lanterns projectors.
6.PENANG 3D TRICK ART MUSEUM	2014 (Private)	Art	Lebuh Penang George Town	Feature art and painting of 2D and 3D as an art hub.
7.**Upside Down Museum**	2015 (Private)	Art	Lebuh Kimberly, George Town	It provides the unique experience of living upside down and visitors could enjoy photography session throughout their exploration.
8.**Colonial Museum**	2015 (Private)	History	Jalan D.S. Ramanathan, George Town	Provides the experience on colonial past, a lifestyle of both British Administrators, merchants and other historical leftovers.

9.**Penang Ghost Museum**	2015 (Private)	Art	Lebuh Melayu George Town	Features the horror and myth of all evils and ghost stories in Malaysia.
10.**Penang Time Tunnel Museum**	2015 (Private)	Art and History	Jalan Green Hall, George Town	Presents the ancient discovery and old Penang since the year 1592 via 11 tunnels.
11.**Wonder Food Museum**	2015 (Private)	Art	Lebuh Pantai, George Town	Showcases a variety of food and beverages locally served. Presents the larger version of those wonder foods representing the state as food heaven.
12.**Penang Gold Museum**	2016 (Private)	Art	Lebuh Bishop, George Town	Features the Gold & Silver collections, Gold Panning Experience, Physical Gold & Silver Touching, Live Panning & Demonstration, 3-D Murals.
13.**Penang House of Music**	2016 (State Government and Perbadanan Bekalan Air Pulau Pinang	Art and Music	Penang Road (Komtar Level 2)	Penang's glorious musical heritage and cultural diversity with carefully curated exhibitions and interactive features. Feature on communal music, a recreation of a radio booth and cinema.
14.TEDDYVILLE MUSEUM	2016 (private)	Speciality	Jalan Low Yat, Batu Feringghi	Malaysia's first and largest collection of Teddy Bears from various nations and eras; as early as the 1900s.
15.TECH DOME PENANG	2016 (a collaboration between State Government & private sector)	Speciality (Science and Discovery Centre)	Jalan Penang, Komtar	Hub for technology learning and exchange ideas.
16.3D GLOW IN THE DARK MUSEUM	2016 (Private)	Speciality (art)	Kimberly Street, George Town	First Glow-In-The-Dark Museum in Malaysia. The Dark Mansion appears to be one of the trendiest modern art museums as it integrates technology with arts.
17.ASIA COMIC CULTURAL MUSEUM	2017 (Private)	Speciality (arts)	Jalan Magazine, George Town	Exhibit the history and development of comics from the first beginnings to the present in 9 Asian countries including Malaysia.

Source: Multiple websites

Influence of e-WOM in Marketing Museums

As shown in Table 3, the recently established museums were listed as top 20 museums in Penang compared with museums established before 2008. The top museum listed in TripAdvisor is Penang House of Music, which was launched in 2016. Although many newly museums were established within less than 10 years, their services and products were shared by users with a high rating on TripAdvisor compared to museums established before 2008. The second top museum in Penang is Penang Peranakan Museum with a total of 4,270 reviews with 4.5-star rating. The majority of users posted positive comments in terms of museum interpretation, the collection of exhibits, interior architecture and tour guide. Only three museums established before 2008 were included in the top 20 museums in TripAdvisor. These museums are Khoo Kongsi, Sun Yat Sen Museum and Penang State Museum and Art Gallery. Similarly, Li and Wang (2011) mentioned that marketing and promotions have evolved from a broadcasting medium to a participatory platform.

Table 3: Ranking of Museums according to Reviews and Star Rating

Rank	Name of Museum	Year of Est	Numbers of Reviews	Star Rating
1	Penang House of Music	2016	210	5
2	Penang Peranakan Museum	2010	4270	4.5
3	Colonial Museum	2015	375	4.5
4	Asia Camera Museum	2014	279	4.5
5	**Khoo Kongsi**	**2002**	**1774**	**4.5**
6	Wonder Food Museum	2016	362	4.5
7	TeddyVille Museum	2016	116	4.5
8	**Sun Yat-Sen Museum**	**2006**	**363**	**4**
9	Tech Dome Penang	2016	105	4.5
10	The Camera Museum	2013	637	4
11	Upside Down Museum	2015	840	4
12	Penang Time Tunnel Museum	2015	278	4
13	Penang 3D Trick Art Museum	2014	540	4
14	Batik Painting Penang Museum	2013	48	4.5
15	**Penang State Museum and Art Gallery**	**1965**	**254**	**4**
16	Made in Penang Interactive Museum	2013	193	4
17	3D Glow in the Dark Museum	2017	206	4
18	Penang Gold Museum	2016	257	4

Rank	Name of Museum	Year of Est	Numbers of Reviews	Star Rating
19	Penang Ghost Museum	2015	163	3.5
20	Asia Comis Cultural Museum	2017	23	4.5

Source: Secondary Data TripAdvisor

CONCLUSION

A world-recognised seal such as a World Heritage Site and strategic location in the city centre are the factors that contributed to the increased number of museums established as a tourism product. Market response towards the heritage tourism industry boosts the opportunity to commodify heritage resources into profitable products, such as museums. Results revealed that the trend of transformation in museum function has diversified and oriented towards consumer preferences. Social media platforms are the emerging marketing strategy in influencing technology-savvy users in sharing their reviews on museums' services and products. The transformation of museum roles in Penang has implications on the preservation of locality and cultural values as the primary role of museums. Despite the positive impact of creativity and collaboration among agencies, the implication on museums' interpretation was due to market-oriented products and boosting visits. The absence of state intervention and museology institutions to ensure the preservation of cultural traditions militate against non-commodifiable aspects, such as intangible cultural heritage, everyday practices and the spirit of a place.

ACKNOWLEDGEMENT

The author(s) would like to extend their appreciation to the Ministry of Higher Education, Malaysia for granting the Fundamental Research Grant entitled 'Establishing an Interpretation Model of Built Heritage Commodification for Tourism in Georgetown, Penang.' [Grant No. 203.PPBGN.6711405] that makes this study possible.

REFERENCES

Ab Samad, K., Shahidi, A.H, Rahim, A., Zuraidah, H. and Daeng H.J. (2012). Pendidikan Warisan di Muzium *Malaysia Journal of Society and Spaces, 8*(8), 35-48.

Ahmad, A. T. (2015). Penang Museums, Culture and History. *Kajian Malaysia, 33*(2), 153-174.

Department of Museums Malaysia. (2017). *Organization Chart*. Retrieved June 14, 2017, from the Department of Museums Malaysia: Department of Museums Malaysia

Ahmed, Y. A., Ahmad, M. N., Ahmad, N., & Zakaria, N. H. (2019). Social media for knowledge-sharing: A systematic literature review. *Telematics and Informatics*, *37*, 72–112.

Álvarez, P., Dávila, P., & Naya, L. M. (2017). Education museums: Historical educational discourse, typology and characteristics. The case of Spain. *Paedagogica*

Historica.
Barbieri, L., Bruno, F., & Muzzupappa, M. (2017). Virtual museum system evaluation through user studies. *Journal of Cultural Heritage*.
Brännback, M. (1999). The Concept of Customer -Orientation and Its Implication for Competence Development. *Researchgate*.
Chung, T. L., Marcketti, S., & Fiore, A. M. (2014). Use of social networking services for marketing art museums. *Museum Management and Curatorship*.
Del Chiappa, G., Andreu, L., & Gallarza, M. G. (2014). Emotions and visitors' satisfaction at a museum. *International Journal of Culture, Tourism, and Hospitality Research*.
Denzin, N. K., & Lincoln, Y. S. (2006). The Sage Handbook of Qualitative Research, 2nd ed. Edited by Norman K. Denzin, and Yvonna S. Lincoln. *Library*.
Denzin, N. K., & Lincoln, Y. S. (2008). Methods of Collecting and Analyzing Empirical Materials. *Collecting and Interpreting Qualitative Materials*.
Gilmore, A., & Rentschler, R. (2002). Changes in museum management. *Journal of Management Development*, *21*(10), 745–760.
Goulding, C. (2000). The commodification of the past, postmodern pastiche, and the search for authentic experiences at contemporary heritage attractions. *European Journal of Marketing*, *34*(7), 835–853.
Hesseldahl, K., McGinley, C., & Monk, G. (2018). Using design thinking to develop new methods of inclusive exhibition making. In *Studies in Health Technology and Informatics*.
Homadovski, A. (2009). Transformations in Cultural Institutions - Contemporary Museum Destinations and Influences of Industrial Branding Values. *Prostor*.
Koslow, J. (2019). Museums and digital culture: new perspectives and research. *Museum Management and Curatorship*.
Lee, H.-K. (2010). Role of museums in managing design education: a case study. *International Journal of Education Through Art*.
McCarthy, J., & Wright, P. (2005). Time, place and technology in museums: A dialogical approach to the experience. *Re-Thinking Technology in Museums: Towards a New Understanding of People's Experience in Museums*.
McPherson, G. (2006). Public memories and private tastes: The shifting definitions of museums and their visitors in the UK. *Museum Management and Curatorship*.
Park, S.-Y., & Vargo, S. L. (2012). The Service-Dominat logic Approach to Tourism Marketing Strategy. *In: Strategic Marketing in Tourism Services*.
Pitman, B., & Hirzy, E. (2004). Art Museums in Transformation. *Trust Magazine*.
Schweibenz, W. (1998). The '"Virtual Museum"': New Perspectives for Museums to Present Objects and Information Using the Internet as a Knowledge Base and Communication System. In *Internationalen Symposiums für Informationswissenschaft*.
Shaharir, S. A., & Zanuddin, H. (2018). Museum institutions in the digital age: The insights of Malaysian museums' use of Facebook. *Journal of Social Sciences Research*.
Sheng, C. W., & Chen, M. C. (2012). A study of experience expectations of museum visitors. *Tourism Management*.
Stuedahl, D., Lowe, S. (2013). Design experiments with social media and museum

content in the context of the distributed museum. *Nordes*.

Volkert, J. (2019). The future of museum and gallery design: purpose process, perception. *Museum Management and Curatorship*.

Weilenmann, A., Hillman, T., & Jungselius, B. (2013). Instagram at the museum: Communicating the museum experience through social photo sharing. In *Conference on Human Factors in Computing Systems - Proceedings*.

Received: January 2020. Accepted: 11th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 167 – 178

ASSESSING CHILDREN'S CONNECTEDNESS TO NATURE THROUGH THEIR INTEREST IN NATURAL ELEMENTS

Nor Diyana Mustapa[1], Nor Zarifah Maliki[2], Nor Fadzila Aziz[3] & Aswati Hamzah[4]

[1]*Faculty of Architecture and Ekistics*
UNIVERSITI MALAYSIA KELANTAN
[2]*School of Housing, Building and Planning*
UNIVERSITI SAINS MALAYSIA
[3]*School of Educational Studies*
UNIVERSITI SAINS MALAYSIA

Abstract

This study aims to assess children's connectedness to nature (CTN) through drawing based on their preferences and interest in natural elements in spaces. A sequential explanatory mixed-method research design was employed to achieve the aim. For the quantitative part, questionnaires were distributed to 760 children in 20 schools located in Kedah and Penang, Malaysia. For the qualitative part, 72 children were grouped into draw and focus groups. The children in the qualitative part were chosen from low-, moderate- and high-level CTN groups. The results confirm that children's CTN can be assessed through their drawing based on their interest in natural elements in spaces. The findings indicated that children from the high-level CTN group had more interest in natural elements in spaces compared to the children in the moderate- and low-level of CTN groups.

***Keywords**:* children, connectedness to nature, drawing, natural elements

[1] Lecturer at Universiti Malaysia Kelantan. Email: diyana.m@umk.edu.my

INTRODUCTION

Connectedness to nature (CTN), which develops from childhood, is important because its effects endure to adulthood. Studies have found that the adults who frequently visit green areas (Thompson, Aspinall, & Montarzino, 2007) and adults who have positive perceptions of the natural environment and natural recreation activities (Jorgensen & Anthopoulou, 2007) are those who have strong CTN that stems from their childhood. A strong CTN developed since childhood has also been found to influence environmental career choices and environmental concerns (Chawla, 2007) and their attitude towards activities with nature (Lohr & Pearson-mims, 2005) when they become adults. Although the development of CTN is a lifelong process and could change over time, researchers have suggested that childhood, especially middle childhood age, is important because it is a critical period for the development of CTN (Kellert, 2005). Hence, the importance of CTN during childhood and its crucial role in the assessment and measurement of children's CTN at an early age should not be ignored.

Researchers have developed various instruments to measure children's CTN. However, the instruments are mostly quantitative instruments. Despite the importance of the quantitative instrument in generalizing the results and identifying the position of children's CTN along a continuum, many researchers have suggested that the qualitative approach is the best method to use with children. The qualitative approach best suits and offers a more reliable approach to understanding children's thoughts, feelings and experiences (Chawla, 2006b). With focus on children and nature, several studies have used drawing to evaluate children's perceptions and attitudes towards nature and the environment and found it to be a useful method for understanding children's relationship with nature and the environment (Labintah & Shinozaki, 2014). Drawing helps stimulate children to give a response and to communicate (Horstman, Aldiss, Richardson, & Gibson, 2008). However, limited studies have used drawing to assess children's CTN.

Previous studies have demonstrated that children are fascinated with the natural environment (Korpela, Kyttä, & Hartig, 2002; Mahidin & Maulan, 2012), specifically, areas with trees, flowers and grass (Loukaitou-sideris, 2003). A study with adults showed that adults with higher CTN plant more trees in their gardens (Lin et al., 2017). Similarly, studies with children found that children with high CTN have more interest in natural areas (Ballantyne & Packer, 2002) and also natural elements especially the elements that they are familiar (Bizerril, 2004; Jansson, Gunnarsson, Mårtensson, & Andersson, 2014). Interest in natural elements in spaces is one of the constructs or indicators to assess children's CTN. Hence, this study aims to assess children's CTN using drawing based on their interest in natural elements in spaces.

METHODOLOGY

Research Design

Mixed method research design, specifically sequential explanatory, was employed to achieve the aims of this study. The sequential explanatory mixed-method research design involves data collection and analysis of the quantitative data in the first stage, followed by qualitative data collection and analysis in the second stage. In the first stage, questionnaires were used to identify the children's CTN levels. Three groups, namely, low-, moderate- and high-level of CTN, were formed based on the quantitative results. The differences between the groups regarding their preferences toward natural elements in spaces were explored through drawing. Data collection was conducted from April 2016 to June 2017.

Participants

This study involved children aged 10 and 11 years old from 20 urban and rural schools in Kedah and Penang, Malaysia. Middle childhood children were chosen as the respondents because children of this age explore the outdoor environment extensively and they learn more from their environment (Mårtensson et al., 2014). The sample for the quantitative part was chosen based on stratified random sampling. Overall, the total sample size is 760, with 383 children from Kedah and 378 children from Penang.

Meanwhile, in the qualitative stage, the participants were selected based on purposive sampling, specifically, intensity sampling. The 72 children chosen for the quantitative part consists of 24 children from the low-, moderate- and high-level CTN groups. In total, 12 groups of three to four children per group were created. Before data collection, approval was obtained from the Ministry of Education, Malaysia and the Department of Education from both states and respective schools. Verbal assent was also obtained from the children by asking whether they wanted to volunteer to participate in this study.

Procedure

In the first phase, the children were asked to answer the CTN scale with guidance from the researcher and assistant researchers. A pilot study was conducted before the actual data collection to ensure that the children understood the items on the survey and to test the reliability of the CTN instrument. In the actual data collection, copies of the questionnaire were distributed personally to the children in the selected classes in each school. The researcher read the questions and statements out loud one by one and explained each one to the children and had a better understanding of each statement. The children took about 30 to 40 minutes to complete the questionnaire.

In the second phase, the qualitative part, the selected children that comprise the low-, moderate- and high-level CTN groups were asked to draw their dream home on an A4 paper to explore their CTN through their interest in

natural elements in spaces. The instruction was "Imagine that in the future, you own a house with a big yard. What do you want to have in the yard? Draw your dream home". The children were given about 30 minutes to draw. The children's CTN level was determined from the elements they included in their future dream home yard. Their drawing also reflected their experiences with nature, knowledge of nature, familiarity with nature, and their preferences towards natural elements. Then, the children were asked to share what they drew during the focus group discussion. The discussions were recorded using a voice recorder.

Research Instrument

In the quantitative stage, the questionnaire was used to measure the children's CTN level. The questionnaire distributed to the children was in the Malay language. The questionnaire for this study has two sections, namely, the children's background and CTN scale. The CTN scale consists of six constructs adapted from previous instruments. The constructs are nature awareness, environmental identity, enjoyment in nature, empathy towards nature, interest in nature activities, and interest in natural spaces. The CTN was measured by asking the children to indicate their level of agreement using a smiley icon (Abebe & Ennew, 2009) on each item for each construct in a four-point Likert scale. In the qualitative stage, drawing was used to identify children's preferences towards natural elements in spaces.

Data Analysis

The quantitative data were analysed using IBM SPSS Statistics Version 22. Descriptive analysis of the mean and standard deviation was used to identify the children's CTN level. Descriptive analysis was also used to analyse the children's background. Then, content analysis was used to examine the discussion with the children on their drawing. Content analysis was conducted for the focus and drawing groups and the results were cross-checked. Finally, summative content analysis was conducted by computing the recurring codes, sub-themes and themes for CTN to explore further the differences between children from low-, moderate-, and high-level CTN groups.

RESULTS

Level of Children's Connectedness to Nature

Descriptive analysis was performed to identify the children's CTN level. All three groups (low, moderate and high level) are of unequal sizes. The mean for each group is calculated using Mean $\pm$ 1SD (M= 3.31 and SD= 0.34).

The means for each group are as follows: low (M<=2.97), moderate (2.97<M<3.65) and high (M>=3.65). The frequency and percentage of children for each group are as shown in Table 1. More than two thirds (66.8%) of the children had a moderate level of CTN, 16.7% of the children had a high level of

CTN and 16.4% of the children had a low level of CTN. The result shows most of the children have a moderate level of CTN. Then, 24 children were chosen randomly from each group for the qualitative part, which involved the drawing and sharing parts.

Table 1: Percentage for Low, Moderate, and High Level of CTN

CTN level		Frequency	Percentage
Low level	(M<=2.97)	125	16.4%
Moderate level	(2.97<M<3.65)	508	66.8%
High level	(M>=3.65)	127	16.7%

Themes from Drawing

The results from drawing show that most of the children had an interest in having natural elements in their dream home with 70.8%, 87.5% and 91.7% respectively for the low-, moderate- and high-level CTN groups. Based on the content analysis from 72 children, the elements that were drawn and mentioned by the children were categorised into five themes, namely, plants, scenery, animals, hardscape, and relaxation. Other than those mentioned themes, some children also included clouds and the sun in their drawing. However, those elements were included in the analysis because the focus is on the natural elements in their future dream home. Table 2 shows the number and percentage of children that drew for each theme. The results from Table 2 show that the most natural element that the children included in their drawing is plants with 93.1%, followed by hardscape, animals, scenery and relaxation. A huge difference was observed between the low-, moderate- and high-level groups for scenery and animal themes.

Table 2: Number and Percentage of Children for Interest in Natural Elements Sub-themes

Group (n=24 per group)	Themes				
	Plants	**Scenery**	**Animals**	**Hardscape**	**Relaxation**
Low	21	2	9	6	1
Moderate	23	7	4	16	2
High	23	15	15	16	1
Total (n=72)	**67 93.1%**	**24 33.3%**	**28 38.9%**	**38 52.8%**	**4 5.6%**

Plants

Limited difference was observed between children from the low-, moderate- and high-level group for the plant themes because most of the children included plants in their home yard. The children drew trees, ornamental plants, fruit plants, vegetables, and grass in their home yard. A 10-year-old boy from urban Penang (high-level) explained his drawing as follows: '*I want to have roses, orchids,*

vegetables and rambutan trees in my future house yard' (see Figure 1). Some of the children included a vegetable patch for cultivation purposes. For example, a 10-year-old girl from urban Penang (high- level) described her dream house as '*I want my dream house to be located on a hill…the air is fresh. I want to have a swimming pool, river, small bridge, a vegetable patch and chickens. I want to save money'* (see Figure 2), while an 11-year-old girl from rural Penang (moderate-level) explained, '*My dream house has a garden with flowers, vegetables and a fishpond. There is also a swimming pool ... At the top of my house, I also have a garden full of plants'* (see Figure 3). Even though children from all three groups have included plants in their drawing, a difference can be observed between these three groups when the children from the high-level and moderate-level groups drew plants for cultivation purposes.

Figure 1: Drawing by a 10-year-old Boy from Urban Penang with High Level of CTN.

Figure 2: Drawing by a 10-year-old Girl from Urban Penang with High Level of CTN.

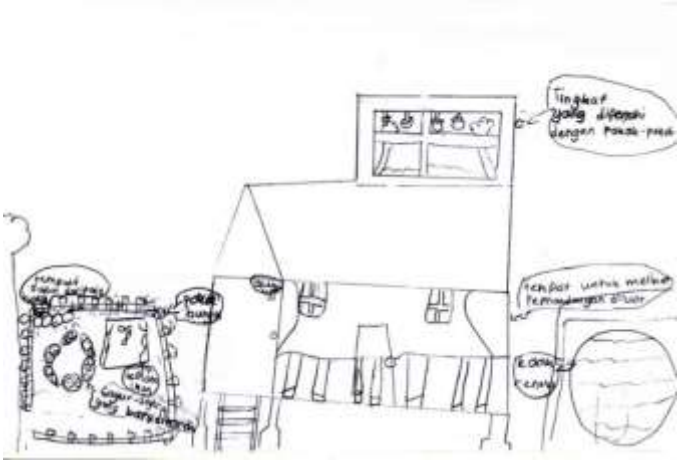


Figure 3: Drawing by an 11-year-old Girl from Rural Penang with Moderate level of CTN.

Hardscape

The second most mentioned and drawn element by the children is hardscape at 52.8%. Children from the high-level group had many ideas compared to children from the moderate- and low-level groups. Instead of drawing a fishpond and a swimming pool, children in the high-level group also drew other elements such as *wakaf,* henhouse, butterfly house and treehouse. For example, an 11-year-old girl from rural Kedah (high-level) drew a fishpond, butterfly house and

swimming pool. She shared that '*My dream house has a fishpond, tortoise, butterfly house, swimming pool and garden'* (see Figure 4).

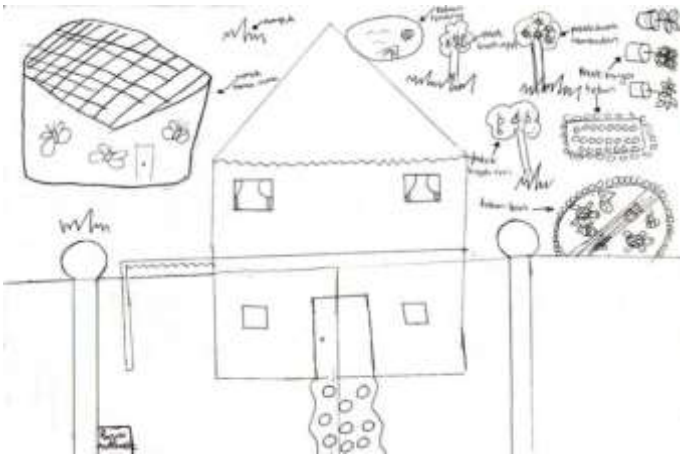


Figure 4: Drawing by an 11-year-old Girl from Rural Kedah with High Level of CTN

Scenery

Regarding scenery, 33.3% of the children drew scenery, such as paddy fields, rivers, hills, mountains, waterfalls and beaches. Table 2 indicating a decreasing trend from the high-level group to the low-level group. More children in the high-level group included the scenery and landforms in their drawing, followed by children from the moderate- and low-level groups. A 10-year-old boy from urban Penang (high-level) explained what he had drawn when he shared, *'I want to live near the hills, mountains, waterfalls, and rivers'* (see Figure 1). An 11-year-old boy from urban Penang (moderate-level) described his drawing, stating that '*I want to live near the beach because I like the sound of the waves and I want to have coconut trees. I can hear birds chirping and I can always drink coconut water'* (see Figure 5). A 10-year-old girl from urban Penang (low-level) explained, "*I want to live near a river and a hill"*. Some other children explained they wanted to have a view of natural scenery because of the beauty and the fresh air. For instance, a 10-year-old boy from urban Penang (high level) had drawn a hill near his dream house. He explained, '*My dream house will have a hill view… The hill is beautiful'* (see Figure 1).

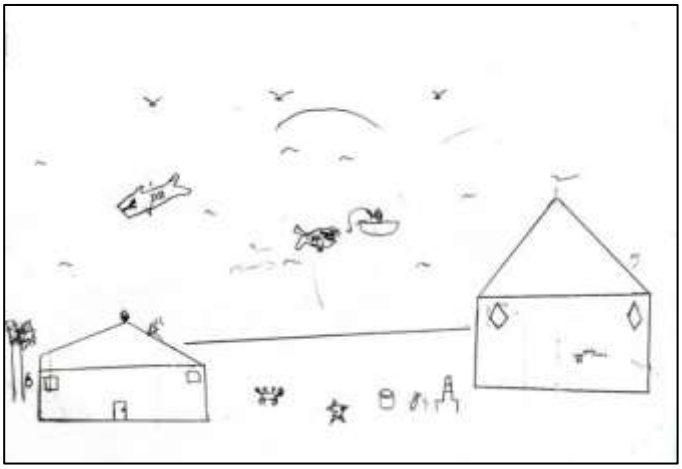


Figure 5: Drawing by an 11-year-old Boy from Urban Penang with Moderate Level of CTN

Animals

As to the animal theme, 38.9% of the children included animals in their drawing. Most of the animals that the children drew were domestic animals, such as cats, chickens, ducks, tortoise, insects, fish, and birds. For instance, a boy aged 10 from rural Penang (high level) described his drawing by stating that*,* '*I want to keep rabbits and birds in my house yard'.* Another 10-year-old boy, from rural Kedah (high- level), explained, '*I want to have a cat and chicken in my future house'.* Figures 2 and 3 shows the children wanted to have chickens in their future dream house yard.

Relaxation

Some of the children (5.6%) also included elements of the relaxation such as theme park, playground, and jogging track in their drawing. For example, an 11-year-old boy from urban Penang (moderate-level) had drawn a park and a jogging track. He further described, '*My dream house is shaped like a mushroom, has mango trees, grass, and a park with a jogging track'* (see Figure 6). A 10-year-old girl, also from urban Penang (moderate level), had drawn a playground. She explained, '*I want my house to be in a tree and to have a playground'* (see Figure 8). Interestingly, the children had also drawn different forms of house. The boy had drawn a house in a mushroom shape, whereas the girl had drawn a treehouse (see Figure 6).

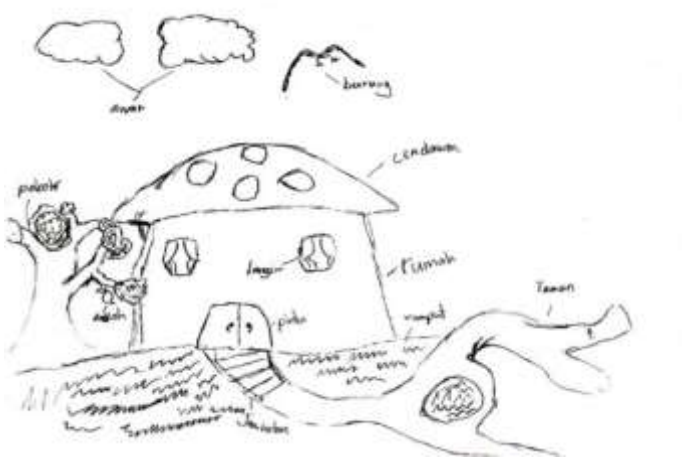


Figure 6: Drawing by an 11-year-old Boy from Urban Penang with Moderate Level of CTN.

DISCUSSION

Findings showed that children's CTN can be assessed through their interest in natural elements. The findings indicated that children from the high-level CTN group had more interest in natural elements in spaces compared to children in the moderate- and low-level CTN groups. Children in the high-level CTN group showed a greater appreciation towards nature because they included nature in a wider context other than plants. This finding supports findings in previous studies that children with higher CTN have more interest in natural areas (Lin et al., 2017, Ballantyne & Packer, 2002). For example, most of them included natural landscapes as the background of their dream house. They described that they wanted to live nearby paddy fields, hills and waterfalls and they wanted to have a view of scenery every day. This statement further suggests that the children with high levels of CTN had more imagination compared to the children in the moderate- and low-level CTN groups. This finding may be related with the children's level of knowledge because children from the high-level CTN group demonstrated more knowledge about nature compared to children from the low-level CTN group, who demonstrated limited knowledge and therefore, lacked interest in natural spaces and elements.

The findings also show that children prefer familiar natural elements. The children mostly drew the natural elements that could be found in their own homes and based on what they had experienced. This result agrees with previous studies that found frequent direct experiences with natural elements to develop their interest in those elements (Bizerril, 2004; Jansson, Gunnarsson, Mårtensson, & Andersson, 2014). Hence, it is important to reconnect children with nature in

the outdoor environment, as nowadays, the frequency of children having direct experiences with nature is declining. Another interesting finding is that some of the children drew plants used for cultivation purposes. These findings suggest children's knowledge is also reflected in their drawings. In addition, the children exhibited an appreciation of nature because of their enjoyment of being in nature and for aesthetic reasons.

Most importantly, the findings are in agreement with previous studies that drawing is an effective way of stimulating children to communicate and exhibit children's CTN (Labintah & Shinozaki, 2014). Hence, drawing can become a toolkit to assess children's CTN in schools. The advantages of using drawing as part of the focus group activities are it helps stimulate children to give a response and to communicate because some children might have difficulties expressing their feelings and perceptions through verbal interviews. Although drawing is an enjoyable and easy way to gather information from children, the drawing method also has certain disadvantages. Some children felt inferior and were anxious about drawing because it was an activity that they felt they did not do well. In addition, given the limited time, some children were not able to draw as many elements as they had thought about because in the follow-up discussion, they explained that there were elements that they wanted to include but did not have time to draw. Despite these disadvantages, the drawing method helped the researcher to hold an interactive focus group discussion and explore children's CTN through their interest in natural elements.

CONCLUSION

Overall, this finding suggests that children's CTN can be assessed through their interest in natural elements using drawing. Hence, drawing can be a toolkit to measure children's CTN as part of an environmental programme or green module in schools. It is important to assess children's CTN at their early age as misconceptions of and misinformation on nature are difficult to correct later in adulthood. Moreover, CTN has a long-lasting effect until the children become adults. Future research can develop a rubric for the drawing activity to assess children's CTN.

ACKNOWLEDGEMENTS

The author would like to thank the Fundamental Research Grant Scheme (FRGS) (203/PPBGN/6711403) under the Ministry of Education (MOE) for funding this research. Also, thanks to University Sains Malaysia (USM) and University Malaysia Kelantan (UMK) for the continuous support.

REFERENCES

Abebe, T., & Ennew, J. (2009). The right to be properly researched: How to do rights-based, scientific research with children. Bangkok: Black on White Publications.

Ballantyne, R., & Packer, J. (2002). Nature-based excursions: School students' perceptions of learning in natural environments. *International Research in Geographical and Environmental Education*, 11(3), 218–236.

Bizerril, M. X. A. (2004). Children's perceptions of Brazilian Cerrado landscapes and biodiversity. *The Journal of Environmental Education*, 35(4), 47–58.

Chawla, L. (2006). Research methods to investigate significant life experiences: Review and recommendations. *Environmental Education Research*, 12(3), 359–374.

Chawla, L. (2007). Childhood experiences associated with care for the natural world: A theoretical framework for empirical results. *Children, Youth and Environments*, 17(4), 144–170.

Jansson, M., Gunnarsson, A., Mårtensson, F., & Andersson, S. (2014). Children's perspectives on vegetation establishment: Implications for school ground greening. *Urban Forestry & Urban Greening*, 13(1), 166–174.

Jorgensen, A., & Anthopoulou, A. (2007). Enjoyment and fear in urban woodlands - Does age make a difference? *Urban Forestry and Urban Greening*, 6(4), 267–278.

Kellert, S. R. (2005). Nature and childhood development. In *Building for Life: Designing and Understanding the Human-Nature Connection* (pp. 63–89). Washington, DC: Island Press.

Korpela, K., Kyttä, M., & Hartig, T. (2002). Restorative experience, self-regulation, and children's place preferences. *Journal of Environmental Psychology*, 22(4), 387–398.

Labintah, S., & Shinozaki, M. (2014). Children drawing: Interpreting school-group student's learning and preferences in environmental education program at TanjungPiai National Park, Johor Malaysia. *Procedia - Social and Behavioral Sciences*, 116, 3765–3770.

Lin, B. B., Gaston, K. J., Fuller, R. A., Wu, D., Bush, R., & Shanahan, D. F. (2017). How green is your garden?: Urban form and socio-demographic factors influence yard vegetation, visitation, and ecosystem service benefits. *Landscape and Urban Planning*, 157, 239–246.

Lohr, V. I., & Pearson-mims, C. H. (2005). Children's active and passive interactions with plants inflence their attitudes and actions towards trees and gardening as adults. HorTechnology, 15(3), 472–476.

Loukaitou-sideris, A. (2003). Children's common grounds: A study of intergroup relations among children in public settings. *Journal of the American Planning Association*, 69(2), 130–143.

Mahidin, A. M. M., & Maulan, S. (2012). Understanding children preferences of natural environment as a start for environmental sustainability. *Procedia - Social and Behavioral Sciences*, 38, 324–333.

Thompson, C. W., Aspinall, P., & Montarzino, A. (2007). The childhood factor: Adult visits to green places and the significance of childhood experience. *Environment and Behavior*, 40(1), 111–143.

Received: January 2020. Accepted: 15th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 179 – 189

PUBLIC TRANSPORT PLANNING: LOCAL BUS SERVICE INTEGRATION AND IMPROVEMENTS IN PENANG, MALAYSIA

Azfizan Aziz[1] and Jamilah Mohamad[2]

[1]*School of Housing, Building and Planning*
UNIVERSITY OF SCIENCE MALAYSIA
[2] *Faculty of Arts and Social Sciences*
UNIVERSITY OF MALAYA

Abstract

An integrated public transport system should provide seamless travel to passengers so that they can enjoy good service connection, reasonable waiting time at interchanges, comprehensive information and an integrated ticket amongst different transport modes. Such a system is essential because it allows integrated travel by using all public transport modes that suit passengers' routes. The concept of integration in public transport, which includes physical, network, fare, information and institutional integration, generally adopts the vision of 'good practice' in terms of integration of public transport services. This research concentrates on bus service because it is the primary public transport mode in Penang, Malaysia. This work analyses the Rapid Penang Bus Operation and Network in detail by using a system of indicators derived from surveys and detailed information supplied by the operator. Several recommendations are also provided to improve the reliability, convenience, accessibility, coordinated physical effort and fair fare of bus services.

***Keywords**:* Transport planning, public transport and integration, Penang

[1] ASTS at University of Science Malaysia and a Ph.D. candidate at University of Malaya. Email: azfizan@gmail.my

INTRODUCTION

In recent years, integrated public transport has received considerable attention in Europe, Singapore, Hong Kong and many cities. Extensive effort has been exerted to improve the connectivity across transport modes so that public transport can become a viable alternative to car travel, thus reducing road congestion, pollutant emission and other negative effects. The concept of integration in public transport generally adopts the vision of 'good practice' in terms of integration of public transport services. Integration is about travelling from one place to another via rider-friendly intermodal facilities and interconnections. Improved integration between public transport modes helps people move around easily and reduces the costs and inconvenience of travel (Ibrahim, 2001).

People in Hong Kong can afford current transport fares with short waiting and travelling times. Coordination between transport modes minimises wasteful competition and duplication of services. Many people will use public transport services if these services offer fair fares, speed, convenience and good vehicle quality. Entering the new millennium, people need to have a good vision of the future. Continuous improvement and upgrading of the quality of the public transport system in an environmentally friendly manner can maintain the popularity of such a system and ensure a satisfactory quality of life for the future generation (Yiu, Kwok-Kin & Antonio, 2005).

PHYSICAL INTEGRATION

Physical integration in the field of transport means that passengers can make door-to-door and multi-modal journeys in an uninterrupted manner. Close integration at an operational level amongst different transport modes should be organised (Luk, James & Olszewski, 2005). Each transport mode performs complementary rather than competitively. Punctuality, frequency, coordination of timetables, synchronisation of arrival and departure times, operation management, adherence to safety standards and resource allocation must be consistent, uniform and standardised to achieve such an aim. High frequencies must be supported by high reliability. Timetables of public transport must also reflect close integration so that the waiting times indicated on the timetables are acceptable and achievable during peak and off-peak periods. Most bus service interchanges are located at key locations, such as jetty stations and major shopping malls (Komtar and Bukit Jambul). Good public transport interchange facilities can encourage people to use bus services in Penang Island. Through bus service interchange, passengers can easily transfer between buses and shift amongst different modes of public transport, especially in Weld Quay and Komtar. The design of public transport interchanges should enhance the service integration between buses and other public transport modes. The key issues in reliability at initial bus departure studied in this work belong to the following

categories: headway variance of bus departures from terminals, analysis of timetables and assessment of infrastructure and facilities. The headway variance of bus departures from terminals was generally found to be within the target set, suggesting that Rapid Penang is managing the scheduling of buses well.

A consolidated bus station can accommodate any future development to provide enhanced public transport systems under the Recommended Transport Master Plan Strategy for Penang State. Weld Quay would become a strategic network hub under the Master Plan, and the new bus station design would consider any future upgrade in bus rapid transit, tram or light rail. The current pedestrian walkway and associated commercial stalls between existing terminals will be under different land owners, but the provision of first-floor air-conditioned commercial space in the new bus terminal would encourage the development of a consolidated new plan.

An assessment of infrastructure and facilities concentrated in the busiest bus stops in Penang will also be conducted; these bus stops include the eastbound bus stop at Hub Bukit Jambul, Komtar and the latter's associated bus stop in Jalan Penang. An immediate solution to the problem of the current on-board payment system would be to have conductors collecting payments and issuing tickets aboard buses, but this scenario would double the on-board staffing overnight with no guaranteed increase in income. Rapid Penang has reported that it is currently in the process of implementing a new smart card electronic ticketing system, which will solve the aforementioned problem. Even with smart cards, a backup fare box is still used on buses in Singapore; the same would probably be applied in the case in Penang. This adoption would benefit the many tourists and visitors to this World Heritage Site who do not know where to buy a smart card, but it could also encourage the local population to continue paying cash. Many existing bus passengers are of modest means and will be unfamiliar with and perhaps even unwilling to invest money in a stored-value card. The eastbound bus stop at Hub Bukit Jambul does not have major problems that require improvement.

NETWORK INTEGRATION

Network integration should be implemented at planning and operational stages (e.g. guaranteed interchanges) together with the coordination of infrastructures and main interchanges at the investment stage. Network integration is often interpreted as the creation of a structure where each public transport mode fulfils a specific role in the system by utilising its relative advantages (Luk, James & Olszewski, 2005). A related keyword is 'coordination' because network integration also relates to the links between long-distance and local public transport networks (including specialised public transport services). The headway variance of bus arrivals at terminals is influenced by delays en route, such as traffic congestion, and the results for bus arrivals at terminals are much worse

than those for arrivals, suggesting that this is a problem in Penang Island. Bus journey speeds have also been investigated for buses crossing GeorgeTown between Weld Quay and Komtar and found to be much lower for routes using the south-eastern section of Lebuh Chulia, where three sets of traffic signals have been observed to delay buses significantly throughout the day.

The assessment of infrastructure and facilities shows that many of the streets plied by buses in Penang are unsuitable for the development of physical bus priority measures, such as bus lanes or high-occupancy vehicle lanes, because they are too narrow. These measures ideally require divided three-lane carriageways to accommodate two lanes per direction for mixed traffic and allow for the passage of emergency vehicles during accidents and breakdowns. Similar to narrow streets, bus lanes may also be subject to congestion caused by illegal parking or loading encroachment; if this congestion is not properly regulated, it might cause a problem on narrow streets. Additionally, motorists' compliance with bus lane usage is related to the number of buses running along these lanes. A bus lane with few buses is likely to be encroached upon, and the general rule of thumb for a bus lane is to have one bus per minute or 60 per hour for the period of operation; however, this can be reduced in places such as Singapore where motorists' compliance is good. Traffic signals in Penang also have long cycle times and no coordination between junctions close to each other, and this can cause delays and bunching of buses.

TICKETING AND FARE INTEGRATION

An integrated ticket system is based on the principle of joint ticketing through fares to allow passengers to complete their journeys without any additional charge for transferring from one mode to another in an integrated public transport system. Fare integration enables passengers to use a single fare card to avail of multiple transit services involving transfers between modes. The integrated fare should be reasonable. Fare discounts and concessions should be made (i.e. the total fare must be lower than the sum of individual fares when more than one mode is involved) to enable the system to succeed. The higher the level of concessions and discounts is, the more passengers are attracted (Luk, James & Olszewski, 2005). Although passengers can transfer within the network, the number of transfers within a period needs to be specified. Bus services in Penang Island has no integrated fare. Thus, passengers need to pay for transfer from one mode to another. However, passengers could adopt an alternative approach. To encourage people to use the public transport system and enhance coordination, bus service operators often give discounts to passengers. Passengers are offered different levels of transfer discounts on trips through interchange schemes between buses and other participating transport modes via the use of smart cards. To some extent, an interchanging scheme is generally welcomed by passengers because they can enjoy fare discount and convenient interchanging locations.

Previous recommendations indicated that Rapid Penang should ensure that the use of the proposed smart card electronic ticketing system would be beneficial for passengers so that cash payment at the fare box can be discontinued. In Singapore, cash fare is at least 70% higher than the stored value smart card fare for the first two stages of bus trips up to 4.2 km; gradually, it decreases to about 20% higher for 40 km trips. Affordability of fares requires a detailed study, but general comparisons can be made between the fares of Rapid Penang and Rapid KL. The fares for Rapid KL are approximated from the zone-based fare system operating in the capital, but they are generally equivalent to those paid in Penang. Although the initial fare in Penang is more expensive than that in KL, fares in KL increase with decreasing distance (SPAD, 2015). Salaries are generally high in the capital, but the cost of living in Penang is lower than that in KL. Whether the roughly equivalent fares mean lower affordability in Penang is difficult to tell, but this might explain the low mode share of public transport. It might also imply that the scope for increasing the fares in the implementation of electronic ticketing in Penang is small. Penang's distance-based fare increments are in the second group of cities. Although the scope of increasing the fares in the implementation of electronic ticketing in Penang is small, the increase in cash fares with distance could be adjusted effectively to provide the previously recommended discount for the proposed smart card electronic ticketing system in terms of cash fare.

INFORMATION INTEGRATION

Bus services should provide an improved level of services and facilities to passengers. Passengers should be able to obtain information about all alternative forms of public transport easily and conveniently. Information must be displayed at stations, bus terminals and interchange areas. Passengers should also be able to obtain up-to-date information through customer hotlines, brochures, Internet platforms and passenger information display boards. Effort should be exerted to develop a comprehensive transport information system of public transport services that will provide a table of fares, route information, departure times and arrival times (Luk, James & Olszewski, 2005). The following information on Rapid Penang's website has been made available for review during this study: information currently available at bus terminals and bus stops and a proposed new bus stop poster. Rapid Penang's website also has the following information available: stored value cards, bus route diagrams, schedules, a trip planner with a drop-down menu of options, 'places of interest' function with a drop-down menu of options, bus stop estimated time of arrival function using the bus stop code as the input and information on fares and concessions.

However, very little information is available at bus stops, if Hub Bukit Jambul was excluded from this classification. Several bus stops do not even have a Rapid Penang post and logo to inform the travelling public that stage buses

actually stop there (hence, they could be confused with other private street furniture). The problem is that bus shelters are owned and operated by a third-party organisation, which owns the advertising rights. Rapid Penang needs to pay an advertising rate to post bus service information on the panels of bus shelters, but it is allowed to erect its own signs at the sides. The websites related to other public transport systems around the region are not as user-friendly as they could be, and Rapid Penang could take its cue from Google Maps.

Other potential improvements to information provision/promotion fall into the following categories: information on streets, information on major nodes and other types of information. Information on streets primarily concerns bus stops, which pose an issue in the way information/advertising is managed. Nevertheless, Rapid Penang has proposed a new bus stop poster with considerable useful information on it. The proposed poster and additional advertising content have to be specifically prepared for each bus stop, which would require extensive effort and high costs for Rapid Penang, with each poster representing a limited catchment of potential viewers. Another issue is the updating/maintenance of the information at each individual bus stop or changing it when a new traffic management scheme affects bus routes, similar to what happened in George Town during the study. A glass or Perspex bus stop sign casing with inserted paper signage is the most cost-effective means of dealing with this issue.

INSTITUTIONAL INTEGRATION

Many agencies at the central level are involved in public transport. The involvement of too many authorities with an unclear scope and function is another source of problems. Regulatory bodies, including local authorities, can produce plans, but without an agreement or clear definition of their respective jurisdiction, the plans are likely to fail. Local authorities, through regulatory bodies, lack the authorisation to plan and implement appropriate public transport policies. Other issues that contribute to this present state of deficiency are inadequate planning resources (staff) and lack of local involvement in public transport planning. Whether or not the functions of the existing authority are clearly defined, the operators still have to keep bus transport services operating (Azfizan & Jamilah, 2013).

With the exception of Penang, none of the local authorities in Malaysia is given the responsibility to plan the transport system for their respective areas. The present organisational structure widens the gaps of planning and implementation between central and local agencies. Public transport in Penang must be coordinated and improved further depending on the development of the comprehensive strategy or the Public Transport Plan, which could include a mixture of improvement infrastructures, greatly improved marketing system for public transport, enhanced public transport services, reorganised and streamlined

public transport at the strategic level, guidelines and improved statutory requirements for the planning of public transport, encouragement for local authorities in the planning and control of public transport, increased number of transport personnel through vigorous training and integration of public transport with urban development. The support of the public and politicians and the cooperation of the federal government are required for the urban public transportation system to be improved. The Penang government believes that collaboration and partnership between parties, including the government, private sectors and transport operators, are crucial to implementing transport planning.

LOCAL BUS SERVICE IMPROVEMENTS

This research on integration concepts provides numerous implications for those involved in the planning of and policy-making for public transport. A number of implications in terms of policies related to bus services provided for general passengers are also established.

7.1 Convenience, Simplicity and Reliability

Integrated public transport delivers fast, frequent, reliable services to passengers. Service frequency, coverage and operating hours can be synchronised into a standard. It also provides easy access to numerous destinations and allows people to reach the places they wish to visit. Accessibility is improved as the network develops in central or strategic growth areas. Feeder services promote easy access to main transport points and offer choices of transport mode to passengers. Integrated tickets make travel easy and simple for passengers. The provision of adequate facilities makes journeys safe, comfortable and convenient. An integrated public transport system results in enhanced quality and a fair, equitable, safe system for people. Integration reduces costs, and thus, fares. A healthy competition maintains reasonable fares and ensures that passengers will have choices. Fares will be set at an economical level. The introduction of rebates for transferring and zoning would also benefit passengers.

Many existing bus routes are circuitous and serve a series of destinations; consequently, they have extended journey times. Many locations close to city centres also exhibit extensive duplication between routes, with several bus routes travelling within the same bus corridor. Similarly, the current vehicular/passenger ferry service between Butterworth and GeorgeTown treats passengers as second-class users, limiting their usage to certain services and providing them with a sub-standard travel experience. A much more integrated, simplified, efficient, passenger-friendly public transport network than the one at present needs to be created. A series of new design principles have been developed and used to achieve this aim. These design principles are as follows:

a) Establishment of a core network that offers frequent service and is simple, direct and easily understood;
b) Provision of a network of regular feeder services;
c) Promotion of operating efficiency;
d) Need for a hierarchy of services;
e) Provision of convenient transfers and good network accessibility; and
f) Provision of adequate and up-to-date information.

Many factors, such as current provision, planning goals, viability and value for money and network change mechanisms and processes, need to be considered when developing bus services that can be implemented (SPAD, 2015).

7.2 Frequent Services and Easy Access by Passengers

Bus and ferry operators should promote an integrated and frequent service. Then, the operating characteristics of operators, such as operation hours, headways, rolling stock and interchange points, route design stops and service coverage and frequency, can be closely integrated. Hence, highly integrated service, convenient interchange and a barrier-free environment can be provided to passengers. Through the removal of interchange ticket gates, passengers could enjoy seamless transfer and fast journey between two terminals or bus stations and can do away with the cost of a second boarding charge when making a transfer at the interchange points of two networks. Moreover, bus services should be restructured and integrated with ferry operation. Unnecessary overlap services should be reduced, and additional direct routes should be provided to areas without sufficient public transport services. These services include route planning, adjustment of operating hours, fare readjustment, relocation of bus stops, placement of transfer points and provision of service information. Frequent services should be maintained during peak hours. In addition, headways should be kept to a level that meets commuters' needs, especially in areas with low demand or outside the catchment of bus services. Peak and off-peak headways can be adjusted to be integrated with ferry operation and meet passengers' demands. In the provision of high-frequency bus services, 5- and 10-minute headways are acceptable for peak and off-peak periods, respectively. The transfer time from one mode to another is another issue. Five minutes of walking for a transfer between ferry and bus services are generally acceptable. Improvements in bus network and careful selection of new bus routes are also required to avoid unnecessary duplication.

Normally, the service punctuality of bus services in Penang Island is unacceptable, except when incidents or accidents occur. Frequent causes include problems in overhead lines or signals and bus breakdowns. Bus operators should look into these issues. Suitable technical and workmanship improvements should be made to maintain system reliability. Regular maintenance should be performed

to avoid unreliability. Passengers always complain about bus operators' poor customer service and quality. Reliability, frequency and punctuality are their primary concerns. Improvement of bus services is required in different areas, such as frequency of service, reliability, safety and comfort. The rationalisation of bus services and bus stops is a major initiative for integration.

7.3 Coordinated Physical Integration

Most of the public interchanges in Penang are located adjacent to the main transport hubs. Improved physical integration between operators can be smoothly implemented depending on whether convenient interchanges are provided. Good public transport interchanges provide convenience and close connectivity to facilitate intermodal transfers. Under integration, bus services will provide feeder services to bus terminals, and frequent services from bus terminals to major destinations should be maintained regularly to synchronise service connections. The operating hours and timetables between services should be optimised to reduce waiting times. Operators must ensure that the first and last scheduled services between modes are fully synchronised. The arrival and departure times of bus services between modes should be coordinated, and the gap between the first and second departures should not exceed five minutes at peak periods.

For enhanced service, the coverage and routes of bus services between modes should be designed to maximise the coverage and minimise the walking distance of passengers. The design of future bus terminals should shorten walking distances and closely connect stage and feeder buses. The stops of bus services must be designed and located to provide increased coverage for easy pick up and drop off of passengers. Bus stops or major bus transfer stops should be situated between modes at the stations or within a short walking distance of less than five minutes to destinations. Passengers are thus given easy access to nearby bus stations and transfers from bus services to other feeder modes through interchanges.

7.4 Fair Fare, Quality Facilities and Integrated Information

A fully integrated fare does not exist in Penang. A partnership amongst railway (Butterworth), ferry and bus services may provide a significant contribution to the establishment of an integrated fare. Public transport operators individually use their own fare and zoning systems. If service integration can be undertaken, fare and zone systems should be restructured. Fares, including concessions and discounts, need to be aligned. Reorganisation of zoning should be implemented to reduce duplicate fare charging. The proposed combined network must be divided into a set of zones on the basis of the distance (in kilometres) between zones. Fares should be calculated using the number of zones made for the journey and should be kept at reasonable levels. Although passengers can make free transfers within an integrated network, limitations should be set to prevent abuse.

The number of transfers should be limited within a specified period. Transferring discounts should be allowed, and rebates should be offered to all ticket holders in an integrated public transport system. Concession fares for people aged 60 and above, full-time students and children should be continued.

To encourage people to use the public transport system, safer and more convenient pedestrian facilities than those established before must be provided for accessing interchanges or main transport hubs. The provision of quality pedestrian connections is essential in linking district centres to public transport hub stations, including weatherproof pedestrian facilities and bridges. The design of road crossings and footpaths should consider passengers' safety and connectivity in order to shorten the distance to the main transport points. Integrated information on public transport modes, such as route numbers, headways, fares and zones, timetables, locations of stops and stations and connection services, should be made available. In addition, accurate, clear and updated information on the use of the intelligent transport system and information technology can help passengers make decisions regarding their travel. The extent of integration depends on the relationship amongst three key operators, namely, railway, ferry and bus services. Good coordination can be secured by institutional integration. Initially, this aim can be achieved through the merger of the opportunities provided by bus, ferry and railway. Institutional integration should facilitate central planning of service levels, coordinated timetables between services, coordinated major routes, implementation of an integrated ticket system and maintenance of standard fares, concessions and zones.

CONCLUSION

Public transport, especially bus service, in Penang needs to be upgraded and improved. The current network must be simplified, and its service should be made increasingly reliable through integration. Partnership between modes can contribute to integration and serve as a step towards fully integrated public transport. Railway (Butterworth), ferry and bus services should be coordinated to achieve modal integration. The integration of public transport takes time and funds to achieve. It faces many obstacles and difficulties, and a collaborative cooperation platform should be provided by the government and operators. Although an integrated public transport system will support our society and economy, its impacts need to be considered. Therefore, the local government and APAD need to develop a balanced public transport strategy to address the challenges in Penang Island. Good planning and coordination and collaboration between the government and operators are important criteria to achieve this aim. APAD with the public is necessary to minimise social exclusion and enhance social cohesion.

REFERENCES

Angela, H. (2005). Integrated transport planning in the UK: from concept to reality, University of the West of England. *Journal of Transport Geography*, 65, 1024-1036.

Akihiko, S., & Yukimasa, M. (2015). Development of bus location system with smartphone and effect of providing regional information added on bus information. *Journal of the Eastern Asia Society for Transportation Studies*, Vol. 10, 1311-1322

Azfizan, A. & Jamilah, M. (2013). Urban public transport in Penang: some policy considerations. Paper presented at the 10th *International Conference of Eastern Asia Society for Transportation Studies*, Taiwan.

James, L. (2013). Road & transport research: integrated public transport in *Singapore and Hong Kong. Transport Reviews*, 21(3), 124-139.

Konopatzki, M. (2005). From vision to reality: SMRT's approach to integration and multi-modal transportation, Proc. workshop on integrated transport. UTTP Asia Pacific Division. November 15-16, 2001, Singapore. (also published in *Journal of Institution of Engineers* Singapore, 42(3), 37-41.

Luk, J., & Olszewski, P. (2005). ITS measures and integrated transport in Singapore, Proc. 23rd Conf. Of Australian Institutes of Transport Research CAITR 2001, Melbourne, Australia

Muhammad, F. I. (2003). Improvements and Integration of a Public Transport System: The Case of Singapora, 205 – 216

Herbert, K., & Marta, A.K. (2016). Integrated operational transportation planning in theory and practice. *European Journal of Operations Research*, 165, 657-667.

Penang State Structure Plan. (2020). Department of Town and Country Planning (Penang Branch), Malaysia.

Pejabat Setiausaha Kerajaan (SUK) Negeri Pulau Pinang. (2015). Penang transport master plan strategy: the public transport improvement plan. Penang State. Government Printing Office

Suruhanjaya Pengangkutan Awam Darat. (2015). Land Public Transport BILL 2010, Malaysia.

World Bank Group. (2006). PPIAF: Urban bus toolkit - toolkit and options for reforming bus system. Hanoi, Vietnam.

Received: January 2020. Accepted: 10th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 190 – 201

SPATIAL PATTERN OF RESIDENTIAL BURGLARY. THE CASE STUDY: KUCHING, SARAWAK

Norita Jubit[1], Tarmiji Masron[2], Azizan Marzuki[3]

[1,2] *Centre for Spatially Integrated Digital Humanities (CSIDH), Faculty of Social Science and Humanities*
UNIVERSITI MALAYSIA SARAWAK
[3]*School of Housing, Building & Planning*,
UNIVERSITI SAINS MALAYSIA

Abstract

Residents in Malaysia are mostly concentrated in urban areas. However, people do feel worried about residential burglary despite living in urban areas. Although burglary cases have recorded a decline, the fears of crime are still high among the people in Kuching, Sarawak. The objective of this study is to identify the spatial pattern of residential burglary in Kuching, Sarawak. This study is using Global Moran's I method as it can evaluate the spatial autocorrelation of residential burglary in the global context. The spatial data consists of Kuching district boundary, road data, police station boundary and police sector boundary, while non-spatial data includes residential burglary from 2015-2017, time, addresses of the crime occurrences, latitude and longitude. The result revealed that the strong global spatial patterns were found for residential burglary in Kuching, Sarawak between 2015 and 2017. However, there was no global spatial pattern found for residential burglary in 2016.

***Keywords**:* Spatial Pattern, Urban Property, Global Moran's I, Kuching

[1] Postgraduate (PhD) at Universiti Malaysia Sarawak. Email: noritajubit90@gmail.com

INTRODUCTION

One of the most worrying issues around the world is increasing crime rate. At the world level, burglary was reported highest in Oceania which is 84% followed by Europe 72% while America recorded 59%, Africa 55%, and the lowest burglary levels are found in Asia with 40% (UNHABITAT, 2007). A residential area is one of the most targeted areas by offenders for criminal activities such as theft, robbery, burglary day and night. This situation increases the fear of crime among the people especially those living in urban areas. Today, in Malaysia, crime cases in residential areas have created a fear of crime among society (Mohammad Abdul & Aishath, 2008). Based on previous studies related to the Safe City in Malaysia, most researchers focused on the people's perceptions about the effectiveness and expert views on the safe city using SPSS, hence the effectiveness of the safe city was also measured based on crime statistics or trends without emphasizing spatial elements (Ainur dan Jalaludin, 2010; Mohd Fareed and Mohd Yusof, 2013; Rohana, 2013).

Therefore, to understand the phenomenon of crime in spaces, spatial information technology such as the Geographical Information System (GIS) has been adopted in the Safe City programme to identify the spatial pattern of crime (Department of Town and Country Planning, 2019). GIS can also integrate the extensive amount of spatial and non-spatial data (Tarmiji Masron et.al, 2015). According to property crime trends in 2015-2017, statistics show burglary cases in Kuching, contributed 848 cases or 20.2% during that period (Crime Investigation Department of Kuching, 2018). Thus, what is the spatial pattern of residential burglary in Kuching, Sarawak? This study can reveal the spatial pattern of residential burglary in Kuching, Sarawak by using GIS as the system has the ability in handling spatial data in a geographical environment. GIS is considered as one of the approaches for decision-making and problem solving as well as in urban planning (Tarmiji Masron and Ruslan, 2004; Thangavelu et.al, 2013; Patel et.al, 2014).

LITERATURE REVIEW

Kouziokas, (2017) has conducted a criminal investigation by using GIS to identify high crime concentration in urban areas and assess the level of urban security. Hot spot analysis has been used for detecting areas with a high risk of crime. Rasul and Ibrahim, (2016) has identified the pattern of burglary as a measure to reduce the burglary in South Yorkshire by using GIS. The result of Global Moran's I show that the distribution of burglary is clustered. Kernel Density Estimation analysis has successfully detected areas with high crime compactness. Besides, the rate of burglary is also influenced by unemployment.
Wang and Liu, (2017) examined the burglary hotspot and near-repeat phenomenon in the large city located in Southeastern China using the method of

Near Repeat Matrix to identify high-risk areas of burglary for the period of 1 January 2013 until December 30, 2013. The results showed that the near-repeat phenomenon's contributions of hot spots. The burglary hotspot area is constantly changing in space and time. Chen et.al, (2013) examined space-time analysis of burglary in Beijing by using Nearest Neighbor Index (NNI) and Kernel Density Estimation. The results of the study showed the spatial pattern of burglary was influenced by urbanization. The hot spot of burglary was detected in the Eastern region and decreasing to the western part. This is because the Eastern area is close to the central business district of Beijing city.

Mohd Norarshad and Tarmiji Masron, (2016) have identified drug hot spot in the Northeast District in Penang, Malaysia by using Getis Ord Gi*. In 2013, 7 sectors were detected as hot spot areas including the police station of Jelutong, Jalan Pantai, Kampung Baru dan Lebuh Pantai while in 2014, 3 sectors were classified as hot spots such as Lebuh Pantai and Kampung Baru. Drug abuse cases were recorded higher in the densely populated city area. Norita Jubit et.al, (2019) have identified the hot spots of property crime in Kuching, Sarawak by using Getis Ord Gi*. There were two categories of data in this study which include non-spatial data (property crime cases from 2015-2017, address of incidents) and spatial data (map of Kuching, Sarawak, road data, police station boundary, and police station sectors boundary). This study also revealed that hot spots of property crime do exist in certain police station sector boundaries especially concentrated in the central business district and high-density population area. Tarmiji Masron et. al, (2020) found that GIS can also examine the spatial distribution of university students and Covid-19 pandemic.

METHODOLOGY AND STUDY AREA

Kuching is the most populated city in the state of Sarawak in Malaysia. The population was recorded at about 617, 887 people in 2010. Besides that, Kuching has the highest property crime rate in Sarawak. In 2015-2017, Kuching recorded 4,123 cases (81.3%) of property crime while violent crime was about 18.6%. This study has included 9 police station boundaries (57 sector boundaries) such as (1) Santubong, (2) Gita, (3) Satok, (4) Sentral, (5) Sungai Maong, (6) Padungan, (7) Tabuan Jaya, (8) Bintawa and (9) Sekama as shown in Figure 1. There are two types of data used in this study; (i) spatial data and (ii) non-spatial data that were obtained from the Crime Investigation Department of Kuching and the heads of the police station under IPD Kuching administration. The spatial data consists of Kuching district boundary data, road data, police station boundary, and police sector boundary, while non-spatial data includes residential burglary cases (2015-2017) by nine police stations, addresses of crime occurrences, time, latitude, and longitude. The burglary cases have taken place directly from the Police Reporting System (PRS).

Figure 1: Map of Study Area

ANALYSIS OF SPATIAL PATTERN

The method used to identify the spatial pattern of residential burglary in Kuching Sarawak is Global Moran's I. Global Moran's I is used for this study as it can evaluate spatial patterns of urban burglary in the global context. Three indicators were used to determine the residential burglary patterns namely Moran Index value, z-score value, and the p-value. Positive spatial autocorrelation occurs when Moran's I is closed to +1. This means the values cluster together and have similar elevation values close to each other, while the unrelated values, will create scattered patterns of negative spatial autocorrelation (Lederer, 2012). For random patterns, there is no resulting pattern that shows no spatial autocorrelation (Abdulhafedh, 2017). For the Global Moran's I statistics, the null hypothesis states that the attribute being analyzed is randomly distributed among the features in the study area (ESRI, 2019).

RESULT AND DISCUSSION

Figure 2 shows the spatial distribution of residential burglary in Kuching, Sarawak from 2015-2017. The statistics report shows that the residential burglary decreased in 3 years from 2015-2017 of 53 cases or 15.6%.

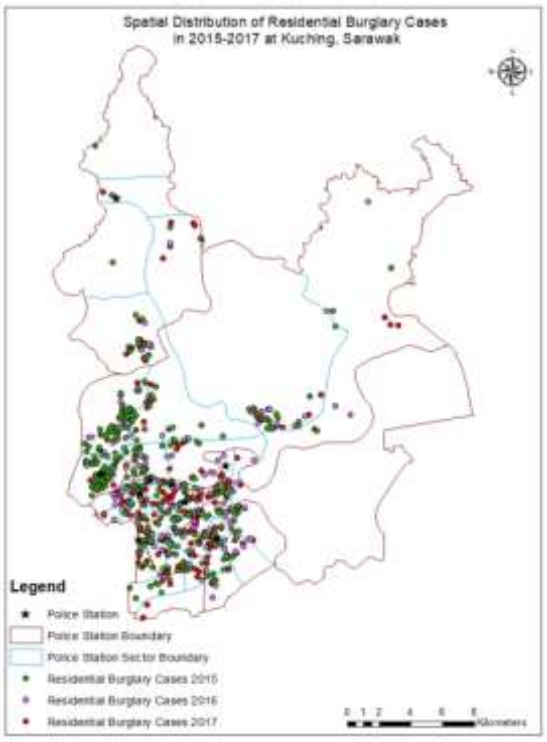


Figure 2: Spatial Distribution of Residential Burglary Cases in 2015-2017 at Kuching, Sarawak

According to statistics, the residential burglary in Kuching from 2015-2017 showed a decrease by 99 cases or 58.9% in Gita. However, in Sekama the residential burglary cases recorded decreased by 8 cases or 14.5% from 2015-2016 in Sekama and increased again by 10 cases or 21.1% in 2017. In Tabuan Jaya, burglary cases increased by 8 cases or 17.3% from 2015-2016 while in 2017, the number of cases was static. The burglary cases of Sungai Maong increased by 6 cases or 35.2% in 2015-2017. The residential burglary cases in Santubong increased by 4 cases or 23.5% from 2015 to 2016 and then reduced by 1 case in 2017. The number of burglary cases in Satok increased by 25 cases from 2015-2016 and dropped by 10 cases in 2017. The statistical reports also showed that burglary cases in Sentral decreased by 6 cases (2015-2016) and then increased by 6 cases or 85.7% in 2017. The crime statistics showed that the incidents of residential burglary in Padungan decreased by 3 cases or 33.3% from 2015-2016. However, the burglary was reported to have increased by 1 case in 2017. Bintawa recorded an increased residential burglary cases from 2015-2017 with 14 cases. In 2015-2017 there were only two police stations recorded an increase of burglary cases namely Sungai Maong and Bintawa. This study also

found that Gita had recorded the highest burglary cases within three years (2015-2017).

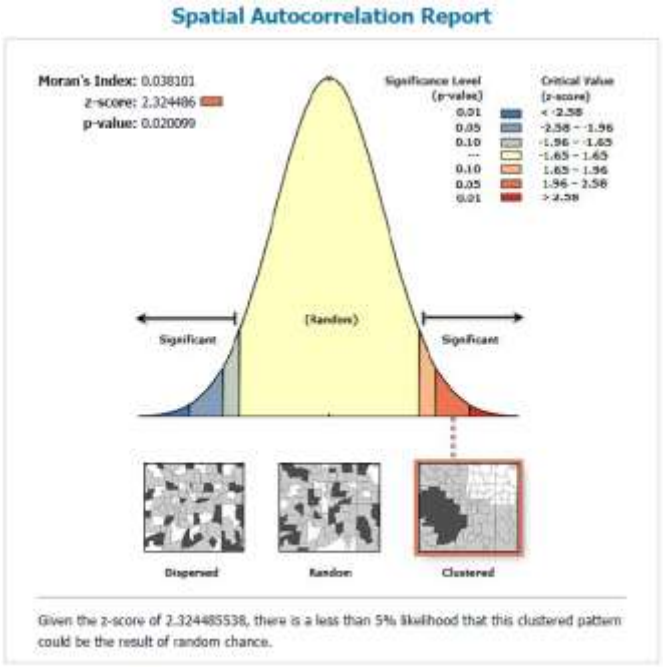


Figure 3: Result of Global Moran's I Analysis for Residential Burglary of Kuching, Sarawak in 2015

The result of Global Moran's I for residential burglary in 2015 shown in Figure 3. Based on the results, the Moran index value is 0.038101, z-score = 2.324486 with p-value 0.020099 which is <0.05. It is shown that the residential burglary in the study area is clustered. Thus, the null hypothesis is rejected.

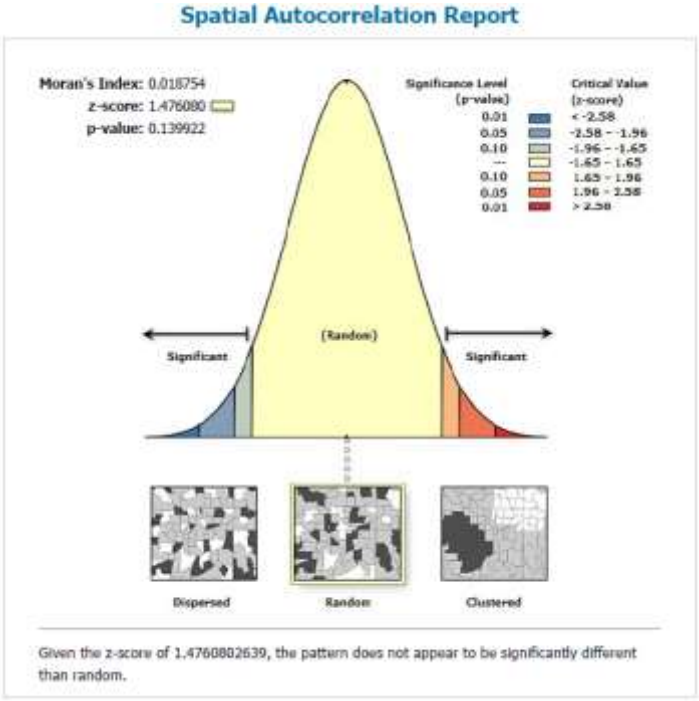


Figure 4: Result of Global Moran's I Analysis for Residential Burglary of Kuching, Sarawak in 2016

The result of Global Moran's I for residential burglary in 2016 shown in Figure 4. This study found the Moran index is 0.018754 with z-score = 1.476080, p-value is 0.139922 which indicated that there is no global spatial pattern is generated because the p-value reaches 0. This result found that the residential burglary in Kuching for 2016 was random pattern.

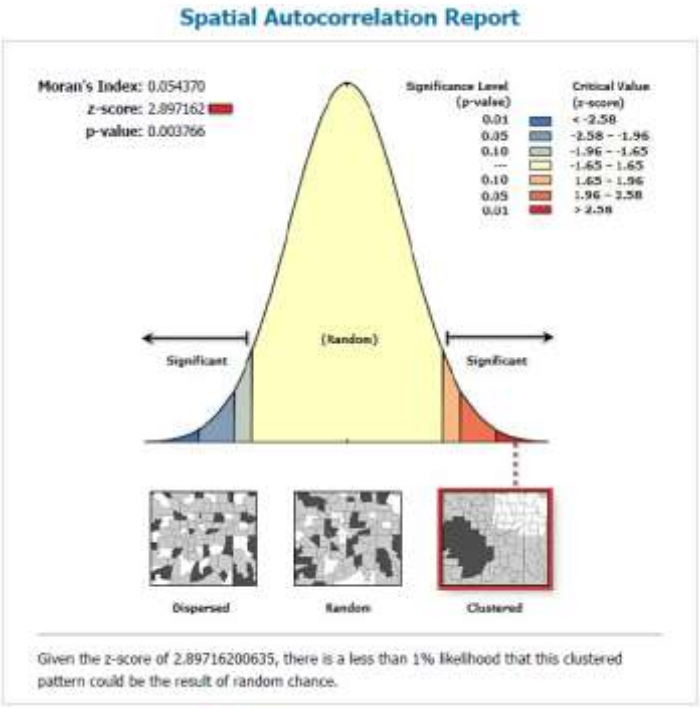


Figure 5: Result of Global Moran's I Analysis for Residential Burglary of Kuching, Sarawak in 2017

The burglary cases in Kuching showed a strong positive spatial autocorrelation in 2017 as shown in Figure 5. Global Moran's I analysis showed that the Moran index was 0.054370 with a z-score of 2.897162 greater than 2.58 with the p-value of 0.003766 indicating a case was clustered. This result showed that the burglary cases in 2017 were concentrated in several sectors. The null hypothesis is rejected as the case of a residential burglary does not occur at random.

DISCUSSION

This study revealed that the spatial analysis method helps to better understand the increasing issue of theft crime that focuses on the spatial pattern of residential burglary in Kuching, Sarawak. The urban area has undergone a lot of changes including in the aspect of the social dimension, economy, rising residential mobility, and more heterogeneous urban dwellers. This transformation has impacted the rise of crime and the change of crime patterns in urban areas (Song and Liu, 2013). The residential burglary in Kuching, Sarawak tends to be clustered in 2015 and 2017 due to the opportunity of crime. It is clear that there are some potential targeted areas by offenders during the period. Most researchers explained that residential burglary cases occur due to the crime opportunity that

exists in residential areas (Groff & Vigne, 2001; Sanders et.al, 2016). Crime opportunities refer to individual routines and lifestyle activities that either enhance or reduce the risk of burglary cases (Kuo, 2015). Burglary is one of the property crimes that are often associated with the design of physical environments. (UNHABITAT, 2007). According to Cohen and Felson, (1979) three important elements influence crime, are namely (i) suitable target, (ii) motivated offenders, and (iii) the absence of capable guardians to prevent crime (Ratcliffe, 2002).

There are a few reasons why offenders break into houses. The first is to obtain valuable items such as money, jewelleries and other precious items. Next, crime opportunities are concentrated in time and space (Aantjes, 2012) as well as situations that enable them to enter the house especially if the houses that are located at the corner, with poor or no lighting, located near the road, and no occupants are at higher risk of burglary (Gyamfi, 2005). The statistics report showed residential burglary from 2015-2017 in Kuching most likely occurred between 6 am - 8 am but the burglary decreased during night-time between 9 pm to 12 pm (Crime Investigation Department, Kuching, 2018). This indicates that the cases of residential burglary in Kuching are more likely to occur when residents are out for work. Someone who goes to work leaves home without occupants during the day has a higher risk of becoming a victim of burglary (Luo et.al, 2016; Chon, 2016). Hence, from the findings of this study, the residential burglary in Kuching depends on the crime opportunity such as the physical environment and time that enable offenders to break the house.

CONCLUSION

GIS can contribute to the field of crime and helps police in Kuching, Sarawak to prevent crime more effectively as well as enable local authorities to take action to create a safer environment for the people. From this study, the information of property crime in Kuching can be shared with the police and community in the affected area and it is hoped that more research in various fields can be conducted by using the GIS approach.

ACKNOWLEDGMENTS

This study was funded under Special Top-Down Grant (SPTDG) F06 / SpTDG / 1731/2018, Spatial Distribution, and Pattern of Drugs Addict and Crime: Case Study in Kuching and Penang, Universiti Malaysia Sarawak. I wish to thank Bukit Aman, Kuching District headquarters especially the Crime Investigation Department (CID) and the heads of police stations in Kuching for giving cooperation.

REFERENCES

Aantjes, F. (2012). Residential Burglaries A Comparison Between Self-Report Studies of Burglars and Observational Data From Enschede. (Unpublished master dissetation). Enschede, Netherlands: Universiti Twente.

Abdulhafedh, A. (2017). A Novel Hybrid Method for Measuring The Spatial Autocorrelation of Vehicular Crashes: Combining Moran's Index and Getis-Ord Gi* Statistics. *Open Journal of Civil Engineering*, 7, 208-221.

Ainur Zaireen Zainuddin & Jalaluddin Abdul Malek (2010). Keberkesanan Program Bandar Selamat Persepsi Penduduk Kajian Kes: Bandaraya Shah Alam. Jurnal Teknologi, 53, 13-3.

Chen, P., Yuan, H. & Li, D. (2013). Space-Time Analysis of Burglary in Beijing. *Security Journal*, 26(1), 1-15.

Chon, D. S. (2016). Residential Burglary Victimization: Household and Country-Level Mixed Modeling. International Review of Victimilogy, 23(1), 1-15.

Cohen, L. E & Felson, M. (1979). Social Change and Crime Rate Trends: Routine Activity Approach. *Americal Sociology Review*, 44(4), 588-608.

Crime Investigation Department of Kuching. (2018). Property Crime Report Statistics. Kuching: Kuching District Police.

Department of Town and Country Planning. (2019). What is Safe City Monitoring System (SCMS). Retrieved Jun 21 Jun, 2019, from Official Plan of Malaysia: https:// www.townplan. gov.my/index. php?option=com_content&view=article&id=361&catid=141&Itemid=498&lang =ms

ESRI. (2019). Spatial Autocorrelation Global Moran's I. Retrieved July 7, 2019, from pro.arcgis.com: https://pro.arcgis.com/en/pro-app/tool-reference/spatial-statistics/spatial-autocorrelation.htm

Groff, E. R. & Vigne, G. L. (2001). Mapping An Opportunity Surface or Residential Burglary. *Journal of Research in Crime and Deliquency*, 38(3), 257-278.

Gyamfi, A. J. (2005). Property Offenses in Ghana: Tha Case of Burglary Trends and Patterns in Accra. *International Journal of Comparative and Applied Criminal Justice* Fall, 29(2), 150-172.

Kouziokas, G. N. (2017). Applying a GIS-Base System and Crime Hot Spot Analysis in Public Management and Place Marketing and Branding for Sustainable Urban Development and Planning. Proceedings of The 2nd *Panhellenic Place Marketing and Place Branding Conference* (pp. 1-7). Larissa Greece: University of Thessaly. March, 31-April 2, 2017.

Kuo, S. Y. (2015). Opportunity, Choice and Burglary Victimization in Taiwan. *International Journal of Offender Therapy and Comparative Criminology*, 59(8), 873-891.

Lederer, D. (2012). Am I Safe in My Home? Fear of Crime Analyzed with Spatial Statistics Methods a Central European City. Verlag Berlin Heidelberg: Springer.

Luo, F., Ren L., Zhao, J. S. (2016). Location Based Fear of Crime: A Case Study in Houston, Texas. *Criminal Justice Review*, 41(1), 75-97.

Mohammad Abdul Mohit & Aishath Abdulla. (2008). Resident's Crime Experience and Safety Perceptions in Gated and Non-Gated Low Middle Income Communities in

Kuala Lumpur Malaysia. *Journal of Architecture, Planning & Construction Management*, 1(1), 71-96.

Mohd Fareed & Mohd Yusof Hussain (2013). Keberkesanan Program Bandar Selamat: Persepsi Komuniti di Bandar Kulaijaya, Malaysia. *Akademika*, 83(1), 25-34.

Mohd Norarshad Nordin & Tarmiji Masron (2016). Analisis Ruangan Hot Spot Penyalahgunaan Dadah di Malaysia: Kajian Kes Daerah Timur Laut, Pulau Pinang. *Malaysian Journal of Society and Space*, 12(5), 74-82.

Norita, Jubit, Tarmiji Masron, Mohd, Norarshad Nordin & Danggat Chabo. (2019). Aplikasi GIS dalam Mengenal Pasti Kawasan Hot Spot Jenayah Harta Benda di Kuching, Sarawak. Jurnal Geografia, 15(4), 30-49.

Patel, K., Thakkar, P., Patel, L. & Parekh, C. (2014). GIS Based Decission Support System For Crime Mapping, Analysis and Identify Hot Spot in Ahmedabad City. *International Journal of Modern Engineering Research* (IJMER), 4(1), 32-35.

Rasul, G. & Ibrahim, G. R. F. (2016). Spatial Pattern of Burglary in South Yorkshire Using Geographic Information System (GIS). *International Journal of Astrophysics and Space Science*, 2-11.

Ratcliffe, J. (2002). Burglary Reduction and The Myth of Displacement. Australian *Instute of Criminology Trends and Issue in Crime and Criminal Justice*,232, 2-6.

Rohana Sham, Muhammad Zaly Shah Muhammad Hussein & Hairul Nizam Ismail. (2013). A Dilemma of Crime and Safety Issues Among Urban Female Dwellers in Malaysia. Proceeding in 2013 *ASEAN Conference on Environment-Behaviour Studies* (AcE-Bs 2013). United Kingdom.

Sanders, A. N., Kuhns, J. B. & Blevins, K. R. (2016). Exploring and Understanding Differences Between Delibrate and Impulsive Male and Female Burglars. Crime and Deliquency, 63(12), 1547-1571.

Song, W. & Liu, D. (2013). Exploring Spatial Patterns of Property Crime Risks in Changchun, China. *International Journal of Applied Geospatial Research*, 4(3), 80-100.

Tarmiji Masron & Ruslan Rainis. (2004). Sistem Sokongan Perancangan PSS: Analisis Aplikasi Bagi Sektor-Sektor Terpilih . Jurnal Teknologi 40(B), 41-66.

Tarmiji Masron, Badaruddin, Mohamed & Azizan, Marzuki. (2015). GIS Base Tourism Decision Support System for Langkawi Island, Kedah, Malaysia. *Theoritical and Empirical Researches in Urban Management,* 10(2), 21-25.

Tarmiji Masron, Danggat Chabo, Nur Faziera Yaakub, Ailis Elizabeth Epa, Ahmad Hata Rasit, Mohd Suhaidi Salleh, Shahrizal Hashim, Mohd Hairulnizam Mohd Zamri. (2020). Coronavirus (COVID-19) Post-Control Study of University Students: Case Study of Spatial Distribution of Universiti Malaysia Sarawak (UNIMAS) Students and National COVID-19 Cases. Centre for Spatially Integrated Digital Humanities, Faculty of Social Sciences and Humanities Universiti Malaysia Sarawak, Kota Samarahan, Sarawak.

Thangavelu, A., Sathyaraj, S. R. & Balasubramanian, S. (2013). Assessment of Spatial Distribution of Rural Mapping in India: A GIS Perspective. *International Journal of Advanced Remote Sensing and GIS*, 2(1), 71-58.

UNHABITAT. (2007). Global Report on Human Settlements 2007. Africa.

Wang, Z. & Liu, X. (2017). Analysis of Burglary Hot Spots and Near-Repeat Victimization in a Large Chinese City. *International Journal of Geo-Information*, 6(5), 2-14.

Received: January 2020. Accepted: 13th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 202 – 217

URBANISATION AND THE CONCERNS FOR FOOD SECURITY IN MALAYSIA

Azizan Marzuki[1] & Ahmad Sahir Jais[2]

[1,2] *School of Housing, Building & Planning*
UNIVERSITI SAINS MALAYSIA

Abstract

Urbanization is an effect of population growth. Increasing population contributed to the expanding of urban areas as cities try to accommodate more people within a minimal landscape. Urbanization takes up valuable land, sometimes productive agricultural land that feeds the population. The objectives of this paper are to investigate the connection between urban sprawl and its impact on agricultural productivity, and ultimately whether it affects food security in Malaysia. For this qualitative exploratory review exercise, a Systematic Literature Review (SLR) of secondary data was employed as the base for this study. Data mining techniques were used to gather relevant literature that included archival data, academic writings, and publications. The data are then dissected, analysed, and clustered using Atlas ti 8 software, focusing on thematic analysis. Urbanisation did affect the self-sufficiency level (SSL) of Malaysian food security, especially on land-intensive food products such as vegetables and livestock. Recent government initiatives such as urban farming, land use policies were promoted to reduce the differences in food imports, ensuring Malaysian food security to be at an acceptable level. Significant development of this population-dense proximity has created urban sprawl beyond the city limits, taking up valuable land space. Land-use conversion from agricultural land in Malaysia has been studied regarding its adverse effects on agricultural production. Urbanization therefore does affect food security through the land conversion of agricultural lands.

Keywords: Urbanisation, Food Security, Land Use Policy, Agricultural Production

[1] NA

INTRODUCTION

It is a herculean challenge to ensure food security in the face of continuous urbanisation (Ismail Bakar, Agriculture and Agro-Based Industry Ministry Secretary-General as cited in Bernama (2018)). For the challenges to be met, it must be observed from three perspectives, which are *Food Supply, Food Demand* and *Interaction between Supply and Demand*. On the food supply and demand narratives, significant issues arise, where competition for limited resources occurs as cities stretched and agricultural land converted into residential or industrial areas (Bernama, 2018). Arable land as any other natural resources is limited and exhaustible. Malaysia faces competition for land space between urbanisation and agricultural usage (Gumma et al., 2017). Located in SouthEast Asia, it is among the most developed nations in the region, with a population of 32,385,000 inhabitants in 2018, spanning both Peninsular and East Malaysia (Sarawak and Sabah). Annual population growth rate marked steadily in between the bottom of 1.1 per cent, to the highest 2.4 per cent annually since the year 2010. The median age group is 28.6, which indicates the resiliency in Malaysian age-group and workforce supply (Department of Statistics Malaysia, 2018b).

The Malaysian economy has shown remarkable diversification from the early days of independence, where agriculture and natural resources were the mainstays of the economy, before moving to industry-based economies. Malaysia went full-steam ahead with the industrialisation of its economy in the early ’70s, ’80s and ’90s (Samat et al., 2014; Yaakob et al., 2010). The economy is currently moving away from the primary industry towards downstream and value-added production and manufacturing. This surge has created tremendous job opportunities in urban areas, hence the continuous influx of migration from rural areas, which kick-started the urbanisation boom. In the process, smaller towns became cities and cities became mega conurbations as illustrated in the case of Klang Valley, Johor Bahru, and Georgetown. As of 2010, 70 per cent of the Malaysia population live in urban areas (Department of Statistics Malaysia, 2018a; Yaakob et al., 2010). Peninsular Malaysia is more urbanised than in East Malaysia (Sabah and Sarawak). Peninsular Malaysia presently has about 70 per cent of its population living in urban areas as compared with Sabah and Sarawak with 48 per cent and 48.1 per cent, respectively (Gumma et al., 2017). The aims of this paper are to investigate and answer pertinent propositions - whether land conversion due to the urban sprawl is a critical issue, Secondly, to assess whether there is a correlation between urban sprawl and agricultural productivity and finally, to assess the effects of land conversion to food security in Malaysia.

LITERATURE REVIEWS

Urbanisation is seen as a distinct sign of growth and modernity; notwithstanding, urbanisation is not without its ugly sides (Olaniyi et al., 2013). Studies have shown the multifaceted impact of urbanisation on social, environmental, and

economic aspects. Social and environmental impact of urbanisation has been studied over the years (Chase Sova, 2018; Dadi et al., 2016; Gumma et al., 2017; Rosni & Mohd Noor, 2016; Siong, 2008; Tripathi & Rani, 2017; Yaakup et al., 2008). Urban sprawl, as an outcome of urbanisation, is one of them. In order to accommodate more urban inhabitants, a new development was forced upon the surrounding environments to facilitate the mobility and movement of the city dwellers.

Movement and mobility of urban inhabitants can be predicted (Chapin, 1974). Most often, they move in conjunction with significant transport networks such as roads, highways, train tracks, etc. (Ewing, 1994). In urban areas, the core of the built-up areas has mostly been taken up by commercial development. Kuala Lumpur for example, is the centre of commerce and administrative capital for the federal government. Rapid development and economic booms in the early ’80s and ’90s have resulted in uncontrolled development (Abdullah et al., 2009). Squatters and slums were cropping up at the urban fringe, catering for those who were unable to afford expensive houses, which mostly comprised the Malay ethnicity (Bakeri et al., 2017). This happened due to the city centre being taken up by commercial buildings, increasing its land value tremendously. For example, the Klang Valley is geographically constrained on both sides, with mountain ranges to the east and west, and new townships or satellite towns were constructed to alleviate the stress on Kuala Lumpur. More urban areas were annexed to the Klang Valley, providing accommodation and housing, and the annexation of the new township created the Greater Klang Valley Conurbation. Land that was previously set aside for tin mining and agriculture, rubber plantation and palm oil plantation has been converted to housing estates and commercial development, all to cater for the urban population.

Living in urban areas poses a few challenges, and among others is the issue of creating sustainable food security (World Food Program, 2017). The United Nation’s (UN) International Fund for Agricultural Development (IFAD), has fixed in their nutrition security frameworks, a food security element, where individuals have access to adequate food supplies as well as necessary prerogatives to healthcare and personal hygiene, in a hygienic environment (Jennings et al., 2015). Land space is considered a natural resource and is inadequate in supply. Competition for valuable land space, to provide hospitable living to every urban resident is more pressing than ever. Urbanisation also has adverse consequences with regard to the distribution of the population and the enormous demands for land, water, housing, transport and employment (Siong, 2008). The dynamic between urban and rural spaces is some of the issues faced in urbanisation. The interrelation between urban and rural areas works on so many levels, which lead to disengagement between user-production-producer (Jennings et al., 2015). Food is already packed and processed when it reaches the consumer. Rural areas are marked to be the suppliers of cheap food for urban

consumers, thus changing its purpose beyond economies of scale. The increasing demand for food of the urban inhabitants, changes in their diets and the changes in the food supply chains and operators all have implications both in the city and the rural areas (Jennings et al., 2015).

Food security is an intricate, multi-layered issue influenced by culture, environment and geographic location (The Economist Intelligence Unit, 2017). For example, findings indicate that as a result of urbanisation-related, land-use change, together with high applications of fertiliser, most of Europe's freshwater bodies have been contaminated (Kuuskorpi & Gonzalez, 2011). The Food and Agricultural Organization (FAO) defines food security as "a situation which permits all people, at all times, to have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO 1996). Four dimensions that exist in food security are availability, stability, safety, and access.

METHODOLOGY

A qualitative approach was adopted as the research paradigm by incorporating a Systematic Literature Review (SLR) method and Thematic Analysis. Data mining procedures using Keywords in Context (KWIC) (Luhn, 1966) to find a "lead" and then flowed by "snowball techniques" (Wohlin, 2014) were used to create an initial raw data. Keywords were used to find the lead references, incorporate Boolean Operator in data archives (Data repository such as resource centre at the Ministry of Agro-based Industry (MoA)), printed publications and also through online-based archives. 150 data sets comprising periodicals, production data, research journals, annual reports, newspaper, and magazine articles were collected. The raw data were then analysed using thematic analysis using qualitative analysis software, Atlas ti. 8. For this, data in the electronic format were screened using "*Word Cloud Techniques*" (Tessem et al., 2015) to assess discerning word patterns. Repetition of specific phrases such as *Food Security, Urban Sprawl, Land Use, Land Conversion, Agricultural Productivity* were flagged. Inclusion criteria with specific keywords were used as the parameter for the search. Only 73 works of literature references were found to be useful for this study.

The narratives of this paper are presented according to the emerging theme, distinguished as part of this SLR. The theme includes 1) the relationship and effects of urbanisation toward food security in Malaysia, and 2) the issues of land conversion and urban sprawl. The discussions were posited into three argumentative enquiries; firstly, does land conversions and urban sprawl affect urbanization as a critical issue in Malaysia. Secondly, are there any direct linkages between land conversion practices and urban sprawl within the context of agricultural productivity, and thirdly, is food security affected in any way by these practices.

RESULTS & ANALYSIS

The discussions encompass the commonality between food security and urbanisation, urban growth and food security from the Malaysian context and the initiatives for food security to increase urbanisation.

Urbanisation and Land Conversion Practices in Malaysia

Two distinctive narratives need to be fully understood in order to picture a link between urbanisation and food security. It is also imperative to understand the underlying factors contributing to the process of urbanisation growth as a dynamic, persistent process, yet governable to a certain extent. The first narratives are the urbanisation process itself, and what propagates urbanisation to the point of being seen as a threat to sustainable living. Urbanisation is the process of physical growth of urban areas. In Malaysia, an urban area is defined as a gazetted area with their adjoining built-up areas, having a combined population of 10,000 or more. 60 percent of the population of that gazetted area (aged 15 and above) must engage in non-agricultural activities to be acknowledged as urban areas (Department of Statistics Malaysia, 2018a).

Its distinctive feature can characterise urban development in Malaysia. As most urban centres are unplanned initially (Majid & Yahya, 2010), the morphology of its terrain and land composition can be described using its land-use zoning (McHarg, 1969). Most urban cities in Malaysia consist of several layers, as shown in Figure 1. Core zone comprises a commercial building, while the outer layer comprises the commuting zone, where urban inhabitants ply to work every day to the core zone.

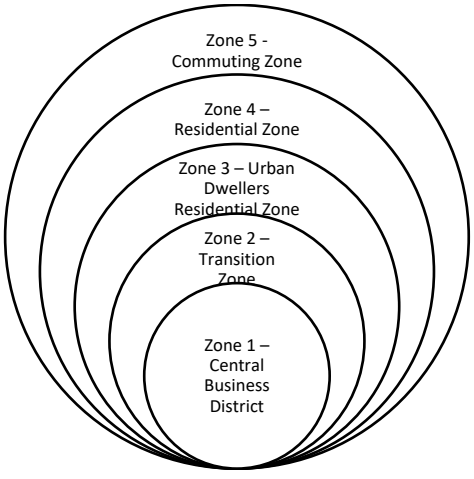


Figure 1: Urban Land Use According to Zoning
Source: Adapted from McHarg (1969)

Population growth is principally due to the process of migration from rural areas to urban areas. However, research also indicates that much of the urban growth is due to natural growth, such as higher birth rate than mortality rates (Matuschke, 2009). In the '70s and '80s, the government encouraged rural Malays to migrate to urban areas to offset the racial imbalances in those areas (Siong, 2008). In some areas, the rural areas become the urban areas itself because of population explosion. Further, better economic, and social development opportunities motivate the migration from rural to urban areas. Research also indicates that better education levels among the rural communities meant the lack of suitable jobs and work opportunities in rural areas forced them to migrate to the cities (World Food Program, 2017).

In Figure 2, the correlation between urban and rural population growth in Malaysia undeniably supports the assumption. The current population, which already populates the urban areas, has decreased the rural population. Urban dwellers' quest for fundamental needs, such as housing and food, became pertinent issues that needed to be accommodated by town planners. City centres, where most of the commercial areas were located, were no longer able to support the influx and growth of the population, thus making the city move outwards beyond its intended footprints (Rashid & Ghani, 2007).

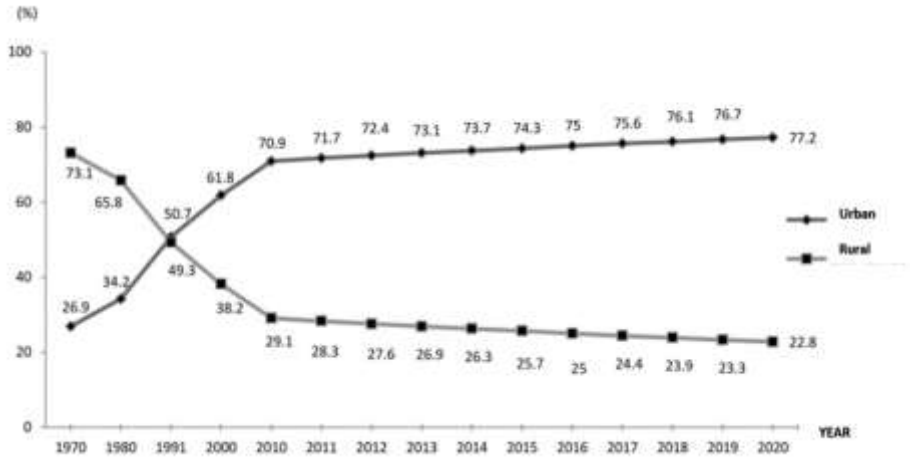


Figure 2: Malaysia Population Distribution Urban Versus Rural Area, 1970-2020
Source: Data aggregated from the Ministry of Rural and Regional Development (2015)

This outward movement of built-up areas often follow a particular corridor, such as following major transport networks like main roads, highways, trains tracks and riverfronts. Another characteristic of this movement is that it tends to move away from the core section of the built-up areas, resulting in the decrease of the population within the core areas as cited by Siti Zakiah Muhamad Isa (2007) in

Yaakob et al. (2010). This is due to the high living cost, and a decreased life quality. Most migrants tend to stay at the urban fringe while commuting to their work daily as cheaper housing options, better and newer facilities, added with the use of personal transport, have resulted in the urban dwellers moving further away from the urban centre (Rashid & Ghani, 2007).

This movement, if unchecked and not adequately planned, will lead to urban sprawl (Majid & Yahya, 2010). The connection of urban sprawl and losses of agriculturally productive lands have been thoroughly documented (Chase Sova, 2018; Dadi et al., 2016; Duran et al., 2012; Gumma et al., 2017; Heimlich & Anderson, 2001; Osman et al., 2012; Samat et al., 2014; Samat et al., 2012; Wilson & Chakraborty, 2013). Direct linkages have been proven between these two, either the relationships supporting or inverted (Seto & Ramankutty, 2016).

The second narratives are the relationship of urbanisation affecting land use. The transformation of non-developed areas into built-up areas has created significant changes in the physical land space as well as in the socio-economic situation (Samat et al., 2012) (Osman et al., 2012). Land-use conversion is an after-effect of urbanisation, where land resources are scarce. In order to meet the demand of the population, available land spaces were turned for development purposes. In most cases, lands marked for agricultural activities were the first to be converted, as opposed to already inhabited land spaces. Samat et al. (2014) in their research of urban expansion in Seberang Perai, Penang countryside uncovered some interesting findings. They deduced that local communities have more employment opportunities and experienced a better quality of life from urban development. Inadvertently however, the growth of built-up areas has put pressure on land. Consequently, this has caused significant loss of agriculture land, affecting the likelihood of the farming communities at the peri-urban areas (Samat et al., 2014). Ultimately, continuous land conversions threaten the existence of agriculture that provides staple food mainly rice to large communities in both rural and urban areas.

Urbanization versus Agricultural Productivity

For this study, the paddy production output for rice is used to visualize the relationship between urbanization and agricultural productivity. Figure 3 visualised the correlation between urban growth rate, rice production and rice imports over the last four decades. The urban growth rate for the last four decades has shown an upward trend, consistently. In the 1980s, urban growth rate stood at 34.2 per cent, rising steadily to 71 per cent in 2010 (2010 was the last national census; the next census will be in 2020). When compared to the rice production per capita within the same timeline, it trended towards a downward movement. Rice production (kg/person/year) in 1980 stood at 79 kg per person annually but reduced to 59 kg in 2010. While this is happening, rice imports have risen relative to the downwards production of rice. On average, Malaysia imported 29.2 kg of

rice per person. Taking this into consideration, Figure 4 shows paddy planting areas in hectare versus productivity throughout fifteen years (Arshad et al., 2011). From the graph, the productivity of paddy crop in tonne has shown an upward trend. Although there are several fluctuations in productivity, it is still comparatively higher, notwithstanding the lower hectarage of paddy planted areas. The size of hectarage of paddy planting areas has also shown significant downsizing, albeit remaining consistent.

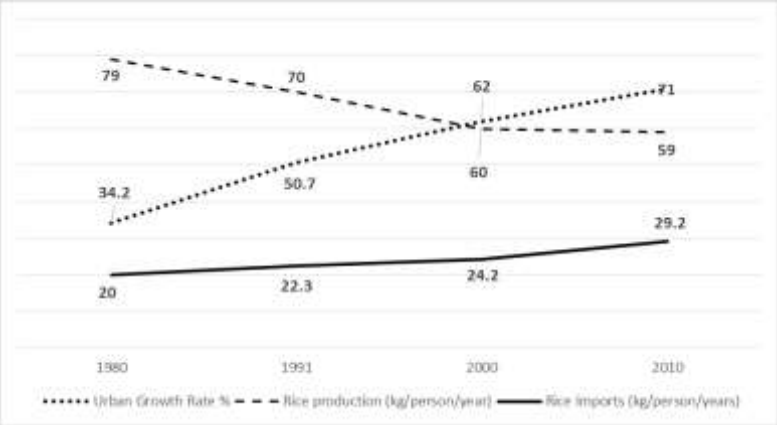


Figure 3: Correlation between urban growth, Rice production and Rice Imports
Source: Data aggregated and synthesizes from the Department of Agriculture Peninsular Malaysia, (2015); Ministry of Rural and Regional Development (2015); Rezai, Shamsudin, & Mohamed (2016)

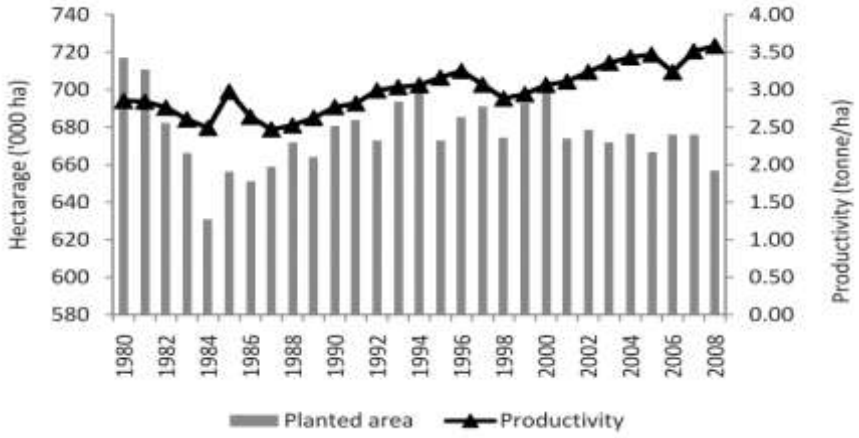


Figure 4: Paddy Planted Area versus Paddy Productivity
Source: Arshad et al. (2011)

In comparison, data in Figure 3 and Figure 4 indicate some discrepancies, especially on the figure of rice production (kg/person/year) with the overall productivity (tonne/ha). Even though rice productivity (tonne/ha) seemingly increases over the years, so does the population of Malaysia. The level of productivity, although rising, indicated inadequateness to provide a consistent supply of rice for the average Malaysian, thus increasing the volume of imported rice. Given the circumstances, the number of paddies planted areas is also decreasing, which inadvertently contributed to the inadequacy. This indicates that the productivity of rice, in general, is correlated to the growth in population. The loss of arable and usable land for agriculture can be offset by better crop and agricultural practices which provide adequacy in terms of food supply (Gumma et al., 2017).

Effect of Urbanization, Land Conversion and Food Security

The links between urbanisation and food production are concealed due to the lack of research and studies. Seto & Ramankutty (2016) visualised the linkages of a known body of knowledge between urbanisation and the food system. They suggested that there were still hidden linkages between these two, especially on the areas of land use and built environment that needed to be understood and studied thoroughly. There is, however, clear evidence that suggests a direct linkage between built-up expansions and the loss of agricultural land in particular. Seto & Ramankutty (2016) postulated a linkage between urbanisation and the food system. In their study, Seto & Ramankutty (2016) produced evidence that supports land conversion as an effect of urban sprawl to the loss of agricultural land. Collective wisdom foresees that agricultural productivity is proportionate with the loss of agricultural land. As agriculture land size diminishes, it becomes unprofitable to work. The agricultural land became idle and unused to a point where farmers are willing to sell their land in the hope for a quick return (Samat et al., 2014). Foreseeably, land losses mean a reduction in agricultural production. The importance of the agricultural sector as a means of securing food security in Malaysia has been on the main agenda since independence. The Malaysia Plans (First to Eleventh) gave priority to agricultural development for achieving economic growth, especially in the first 15 years of the plan (1966-1980) (Olaniyi et al., 2013).

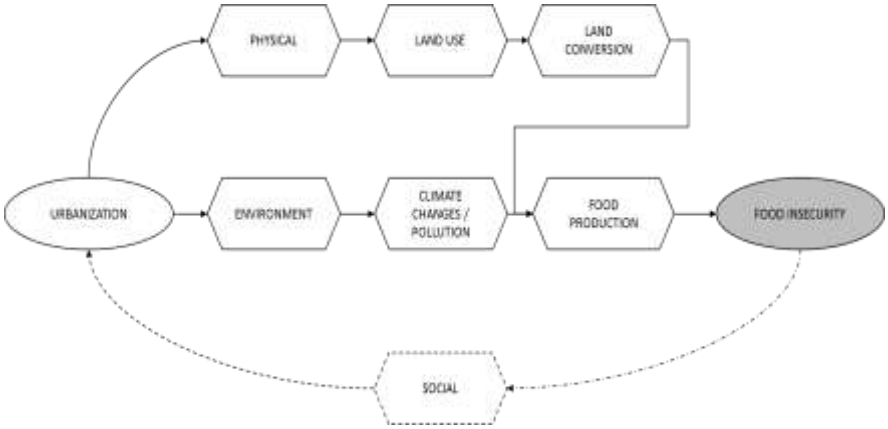


Figure 5: Urbanization and Food Security Linkage
Source: Synthesised from Beatly (2000); Rashid & Ghani (2007); Naimah Samat et al. (2014) and World Food Program, FOA (2017)

Urbanisation has an impact on the physical and spatial use of the land, as shown in Figure 5. Much of it is due to the expansion of urban footprint, both controlled and uncontrolled. As discussed earlier, an after-effect of urbanisation is the expansion of the urban footprint itself. Available land space is converted from agricultural land to commercial and built-up areas. Much of the areas surrounding urban cities are gazetted as agricultural lands. For example, in the town of Seberang Perai in Penang, surrounding areas are designated as paddy farming areas. Being annexed as part of the Georgetown Conurbation, the urban footprint expanded much more significantly than it used to be. The repercussion was that much of the agricultural areas are converted for commercial and housing use (Samat et al., 2014). Losses of land, especially those primed for food production will eventually lead to food insecurity as shown in Figure 5.

Food insecurity can also move backwards, affecting the urbanisation process, contrary to the urbanisation process affecting the social stratum. In a recent report from the World Food Programme (WFP), it was suggested that for everyone per cent increase in food insecurity, an additional 1.9 per cent of people were compelled to migrate. Moreover, as more people migrate, they may hinder the ability to access, or have no resources, to purchase food on their journey, forcing them to continue moving (World Food Program, 2017). Urban areas attract these migrants due to better access to employment and other resources (Samat et al., 2014) rather than working in the agricultural sectors. These cycles therefore need to be addressed urgently. In the Malaysian context, studies by Rashid & Ghani (2007) on the urban migration in the Klang Valley, supported the supposition of social factors affecting urbanisation. In the 1980s, the interaction of urban migration was inverse, in that there were streams of outward movements of population from the city centres to the urban fringes.

The connection between urbanisation and food security is not solely based on a negative impact or adverse repercussion. The philosophy of urbanism encapsulates that the process of urbanisation itself shares a broader undertone, and should be observed holistically as a balance between progress and nature (Marzuki et al., 2016). Through organised, balanced, and systematic urbanisation, the noble values of preserving sensitive zones, environments and habitats could and should be ingrained in the planning process. Initiatives such as conservation, density control, land use planning and spatial design can be implemented to replace any resources consumed during urbanisation (McHarg, 1969). Beatly (2000) reiterated similar ideas, where in an ideal situation, well-planned urbanisation would lead to a city which is ecologically designed, with reduced ecological footprints, walkable and liveable. Most importantly, a well-planned city would be able to provide their population with food resources of their own and promote a holistically better living quality.

Better living quality means that urban inhabitants can access basic food quickly and affordably. For example, for the average Malaysian, access to rice, a daily staple, is a must. Rice production is an excellent example to illustrate and visualise the connection between urban growth and food security. Rice is a staple food in Malaysia where, on average, each Malaysia consumes 78 kg of rice per person annually (Department of Statistics Malaysia, 2018b). Malaysia is already known for its natural resources such as tin and petroleum, agro-products such as palm oil and rubber. Today, however, Malaysia remains a net importer of food, a fact difficult to comprehend given the country's origins and history, but one that needs to be thoroughly studied. It is indeed a monumental task to ensure food security in the advent of rapid urbanisation and include the possible impact of related challenges having dire consequences to the well-being of society. Critically, pertinent issues often raised by researchers and policymakers focus on the competition of resources as cities expand beyond its footprint, forcing the conversion of productive agricultural land into residential, commercial, or industrial areas. The base arguments are simple enough; land is a critical constituent of agriculture and without arable land means food crops cannot grow and raising livestock will be hindered. Agricultural production, while imparting a sense of security over food supplies, sometimes can be misleading. This false sense of security is premised further as not all agricultural products are used as food. Some are processed and reprocessed to become food and other industrial products. Palm oil and rubber, for example, are agricultural products, but not directly benefiting the population as it needs to be processed. In a report released by the Department of Statistic Malaysia, the Self-Sufficiency Level (SSL) in 2016 for selected food crops/ livestock and fisheries, surpassed the 100 per cent level. However, the crops had a low consumption rate per capita such as mango, jackfruit and tuna (The Office of Chief Statistician Malaysia, 2017). In the Malaysian context, a benchmark often used to gauge the Self-Sufficiency Level

(SSL) and food security is rice production. Rice is a staple in Malaysia, where almost 70 per cent of the supplies were domestically cultivated. In order to sustain and maintain this high level of productivity, the government has inducted several interventions in comparison with other commodities such as palm oil, as financially, rice production yields lower returns per hectare (Arshad et al., 2011). To ensure the paddy fields from being turned to other agricultural commodities, the government subsidised the rice production heavily. Malaysia ranked at number 41 out of 113 countries in the global food security index (The Economist Intelligence Unit, 2017). The Self-Sufficiency Level (SSL) looks promising, notwithstanding the trade imbalance that still existed for food imports. Malaysia's SSL for certain food products show high levels of sufficiency for produce such as eggs (119%), poultry (103%), fish (94.7%), fruits (79%) and rice (71.4%). However, the country is still lagging in regards to achieving a food security minimum threshold for specific essential items such as vegetables (48.3%) and beef/buffalo meat (23.4%) (Carvalho, 2018; The Office Of Chief Statistician Malaysia, 2017). The rice production level has achieved its intended target of SSL at 70 % of domestic reliance, as stated in the Agro-Food Policy 2011-2020 (Arshad et al., 2011). Land use for food crops cultivation has been decreasing from 1960 to 2005, where land used for food is at 31.5 percent compared to 16.3 per cent of the total arable land (Olaniyi et al., 2013).

Malaysia once had an SSL for rice at 95 per cent in 1975, and this higher percentage was due to the strong government policies and initiatives, which encouraged paddy production. As urbanisation continues to grow rapidly, the reliance and sustainability on food supplies shift, from regional food supply chains towards a more globalised supply chain. This means that instead of multiple different suppliers being involved, the centralised supply chain has taken over, with a high proportion of already processed food, rather than raw materials being involved (Jennings et al., 2015). As mentioned, Malaysia was ranked 41 out of 133 nations in terms of self-reliance on food. However, this reliance is not wholly comprehensive, and in some aspects of food production, the country still lags. Over dependency on specific regions for food production in Malaysia has had an adverse impact on its food security. For example, rice is mainly cultivated to the northern Malaysian peninsular, accounting for almost 34 per cent of the national rice production while Cameron Highlands remain the nation's salad bowl, where almost 20 percent of domestic vegetables come from (NoranizaYusoff, 2015). Apart from these two significant areas, various food crops are cultivated across Malaysia, albeit on a small scale. For fisheries, the east coast of Peninsular Malaysia remains the top fisheries product landing areas.

As urban areas grew, compounded with the migration of the rural population, the supply of food often associated with the rural areas became disrupted. Workforce needed to cultivate, and harvest food-based agricultural products have moved out to seek better living, at the obvious expense of this

sector. Cameron Highland, for instance, hired more than 13,000 immigrants, both legal and illegal from Bangladesh, India and Myanmar to cope with the demands of the agricultural produce there (Fernando & Tasnim, 2018). For the past ten years, agriculture was thrusted back into the national development agenda. This resurgence is attributable to the government acknowledging the problem of food security and resiliency in the changing population structure. Among the initiatives to regenerate the agriculture sectors, the use of biotechnology, direct penetration to supply chain and re-engineering poverty through agriculture were leveraged upon (Wong, 2007). The biotechnology sectors were used primarily to promote better technology-driven practices in agricultural sectors and include the use of better and improvised seeds, livestock breeding and fisheries technologies, to improve productivity.

CONCLUSION

Urbanisation plays a causative role in the undermining of food security in Malaysia. It derives from the losses of agricultural land due to land conversion and urban sprawl. Although steady growth in agricultural productivity has been achieved due to better crop and agricultural management, land-loss is still impacting agricultural production, since the activities are land-intensive. As Malaysia attempts to be self-sufficient in terms of food production especially for staple crops such as rice, urbanisation and the movement of rural population due to migration have contributed to the lower agricultural yield, primarily due to the lack of workforce to work the land. It is thus imperative that government policies on food self-reliance must ensure that urbanisation does not impede or hinder food security, by ensuring that losses of valuable agricultural land are minimized.

ACKNOWLEDGEMENT

The publication of this article was supported by Ministry of Higher Education (MOHE) research grants. *Fundamental Research Grant Scheme (FRGS) 203/PPBGN/6711555*, *Proses Rebakan Bandar dan Kesannya Terhadap Pengeluaran Hasil Pertanian. Kajian Kes: Daerah Kota Setar, Kedah, Ministry of Higher Education*.

REFERENCES

Abdullah, J., Yahaya, M. Z., Yunus, M. Z. M., & Safudin, M. S. M. A. (2009). Urban Sprawl in Malaysia : Evidence From Three Largest Metropolitan Areas. *Journal of the Malaysian Institute of Planners*, 7, 69–82.

Arshad, F. M., Alias, E. F., Noh, K. M., & Tasrif, M. (2011). Food security: self–sufficiency of rice in malaysia. Ijms, 18(2), 83–100.

Azizan, M. U., Raid, M. M., & Hussin, K. (2016). Urbanisation and Food Security : An Overview. *Sains Humanika*, 8(4–3), 71–75.

Bakeri, A., Ramli, Z., Choy, E. A., & Awang, A. (2017). Rebakan Bandar Dan Kenaikan

Harga Hartanah: Kajian Awal Impak Terhadap Masyarakat Melayu Pinggir Bandar Di Hulu Langat Selangor. In Z. Ramli, M. Hadrawi, A. Duli, K. Jusoh, & M. S. M. Ali (Eds.), 6th *International Seminar on Archeology, History and Cutural in the Malay World* (Issue September, p. 900). Institut Alam dan Tamadun Melayu (ATMA) Universiti Kebangsaan Malaysia 43600.

Beatly, T. (2000). Green Urbanism: Learning From European City. Island Press.

Bernama. (2018). WUF: Challenge to ensure food security with rapid urbanization. *The Malay Mail*. https://www.malaymail.com/s/1575739/wuf-challenge-to-ensure-food-security-with-rapid-urbanisation

Carvalho, M. (2018, July). Malaysia's food security ranks No. 2 in South East Asia. *The Star*. https://www.thestar.com.my/news/nation/2018/07/26/malaysia-food-security-ranks-no2-in-south-east-asia/

Chapin, S. F. (1974). Human activity patterns in the city; things people do in time and in space. John Wiley & Sons, Inc. https://doi.org/9780471145639

Chase Sova. (2018). Increasing Urbanization Threatens Food Security In Africa | World Food Program USA. World Food Program USA. https://www.wfpusa.org/articles/increasing-urbanization-threatens-food-security-africa/

Dadi, D., Azadi, H., Senbeta, F., Abebe, K., Taheri, F., & Stellmacher, T. (2016). Urban sprawl and its impacts on land use change in Central Ethiopia. *Urban Forestry and Urban Greening*, 16(February 2016), 132–141. https://doi.org/10.1016/j.ufug.2016.02.005

Department of Agriculture Peninsular Malaysia. (2015). Paddy Statistics of Malaysia 2014.

Department of Statistics Malaysia. (2018a). Population and Housing Census. Frequently Asked Question. https://www.dosm.gov.my/v1/index.php?r=column/cone&menu_id=bDA2VkxRSU40STcxdkZ4OGJ0c1ZVdz09

Department of Statistics Malaysia. (2018b). Press Release - Current Population Estimates Malaysia 2017-2018 (Issue July). Department of Statistics Malaysia. https://www.dosm.gov.my/v1/index.php?r=column/pdfPrev&id=c1pqTnFjb29HSnNYNUpiTmNWZHArdz09

Duran, C., Gunek, H., & Sandal, E. K. (2012). Effects of urbanization on agricultural lands and river basins: Case study of Mersin (South of Turkey). *Journal of Environmental Biology*, 33(April), 363–371.

Ewing, R. H. (1994). Characteristics, Causes, And Effects Of Sprawl: A Literature Review. *Environmental and Urban Issues,* 21(2).

Fernando, F., & Tasnim, L. (2018, January). Labour Shortage in Cameron Highlands. *The New Straits Times*. https://www.nst.com.my/news/exclusive/2018/01/327205/labour-shortage-cameron-highlands

Gumma, M. K., Mohammad, I., Nedumaran, S., Whitbread, A., & Lagerkvist, C. J. (2017). Urban sprawl and adverse impacts on agricultural land: A case study on Hyderabad, India. Remote Sensing, 9(11), 1–16. https://doi.org/10.3390/rs9111136

Heimlich, R. E., & Anderson, W. D. (2001). Development at the urban fringe and beyond:

Impacts on agriculture and rural land. In *Agriculture Economic Report* (Issue 803). https://doi.org/10.1111/1540-5834.00132

Jennings, S., Cottee, J., Curtis, T., & Miller, S. (2015). Food in an Urbanized World:The Role of City Region Food Systems in Resilience and Sustainable Development. In *UN Food and Agriculture Organization* (Issue April). http://www.fao.org/fileadmin/templates/agphome/documents/horticulture/crfs/foodurbanized.pdf

Kuuskorpi, M., & Gonzalez, N. C. (2011). The Future of the Physical Learning Environment: School Facilities that Support the User. {CELE} Exchange, 2006, 6. https://doi.org/10.1787/5kg0lkz2d9f2-en

Luhn, H. P. (1966). Key Word-In-Context Index for Technical Literature (KWIC Index). In D. G. Hayes (Ed.), *Automatic Language Processing* (pp. 288–295). American Elsevier Publishing Company Inc. https://doi.org/10.1002/asi.5090110403

Majid, M. R., & Yahya, H. (2010). Sprawling of a Malaysian City: What Type and What Solutions. *The First International Conference on Sustainable Urbanization* (ICSU 2010), December, 15–17.

Matuschke, I. (2009). Rapid urbanization and food security : Using food density maps to identify future food security hotspots. *International Association of Agricultural Economists Conference*, 1–15.

McHarg, I. (1969). Design with Nature. John Wiley & Sons, Inc.

Ministry of Rural and Regional Development. (2015). Malaysia Fundamental Data. In Ministry of Rural and Regional Development Official Portal. http://www.rurallink.gov.my/wp-content/uploads/2015/05/1-DATA-ASAS-MALAYSIA1.pdf

NoranizaYusoff. (2015). Food Production and Management in Malaysia. International *Journal of Humanities and Social Science Invention ISSN* (Online, 4(8), 2319–7722. www.ijhssi.org

Olaniyi, A. ., Abdullah, A. M., Ramli, M. F., & Sood, A. M. (2013). Agricultural Land Use In Malaysia: An Historical Overview And Implications For Food Security. Bulgarian *Journal of Agricultural Science*, 19(1), 60–69.

Osman, S., Abdullah, J., & Nawawi, A. H. (2012). Cost of Urban Sprawl in Malaysia. 6th *International Real Estate Research Symposium* (IRERS), 1–16.

Rashid, M. F. A., & Ghani, I. A. (2007). Analisis Interaksi Migrasi dan Pertumbuhan Bandar di Wilayah Lembang Klang, Malaysia menggunakan Model Komponen Berganda. Seminar Kebangsaan Rupa Bandar Malaysia: Lumut Perak, 2003, 1–10.

Rezai, G., Shamsudin, M. N., & Mohamed, Z. (2016). Urban Agriculture: A Way Forward to Food and Nutrition Security in Malaysia. *Procedia - Social and Behavioral Sciences*, 216(October 2015), 39–45. https://doi.org/10.1016/j.sbspro.2015.12.006

Rosni, N. A., & Mohd Noor, N. (2016). A Review of Literature on Urban Sprawl: Assessment of Factors and Causes. *Journal of Architecture, Planning & Construction Management*, 6(1), 12–35. https://doi.org/10.20959/wjpps20169-7546

Samat, Naimah, Ghazali, S., Hasni, R., & Elhadary, Y. A. E. (2014). Urban Expansion and its Impact on Local Communities : A Case Study of Seberang Perai , Penang

, Malaysia. Pertanika Journal of Social Sciences & Humanities, 22(2), 349–367.

Samat, Narimah, Ghazali, S., Hasni, R., Abdallah, Y., & Hadary, E. (2012). Tekanan Pembangunan Di Seberang Perai Tengah Pulau Pinang : Peluang Dan Cabaran Kepada Masyarakat Tempatan. Jurnal Perspektif, 4(2), 67–84.

Seto, K., & Ramankutty, N. (2016, May). Hidden linkages between urbanisation and food systems. Science, 352(6288), 943–945. https://doi.org/DOI: 10.1126/science.aaf7439

Siong, H. C. (2008). Urban Governance and Rapid Urbanization Issues in Malaysia. *Jurnal Alam Bina*, 13(4), 1–24.

Tessem, B., Bjørnestad, S., Chen, W., & Nyre, L. (2015). Word cloud visualisation of locative information. *Journal of Location Based Services*, 9(4), 254–272. https://doi.org/10.1080/17489725.2015.1118566

The Economist Intelligence Unit. (2017). Global Food Security Index. In *Global Food Security Index*. http://foodsecurityindex.eiu.com/

The Office Of Chief Statistician Malaysia. (2017). Supply and Utilization Accounts Selected Agricultural Commodities, Malaysia 2012-2016. In Department of Statistics Malaysia Official Portal. Department of Statistic Malaysia. https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=164&bul_id=UDROQllWME5ETGZrcUE5VnAzcHJEQT09&menu_id=Z0VTZGU1UHBUT1VJMFlpaXRRR0xpdz09

Tripathi, S., & Rani, C. (2017). The impact of agricultural activities on urbanization: Evidence and implications for India. Munich Personal RePEc Archieve, 10679.

Wilson, B., & Chakraborty, A. (2013). The environmental impacts of sprawl: Emergent themes from the past decade of planning research. Sustainability (Switzerland), 5(8), 3302–3327. https://doi.org/10.3390/su5083302

Wohlin, C. (2014). Guidelines for snowballing in systematic literature studies and a replication in software engineering. 8th *International Conference on Evaluation and Assessment in Software Engineering*. https://doi.org/10.1145/2601248.2601268

Wong, L. C. Y. (2007). Food Security and Growth: Malaysia's Startegic Approach and Future Adjustment. In S. A. Chin & Y. H. Sen (Eds.), 2nd Series of *ASM Biotechnology and Agriculture Forums: Food Security* (pp. 55–67). Akademi Sains Malaysia. http://www.isis.org.my/attachments/438_LW Food Security Bk09.pdf

World Food Program. (2017). At the root of exodus: Food security, conflict and international migration.

Yaakob, U., Masron, T., & Masami, F. (2010). Ninety Years of Urbanization in Malaysia : A Geographical Investigation of Its Trends and Characteristics. *Journal of Ritsumeikan Social Sciences and Humanities*, 4(3), 79–101. https://doi.org/10.1007/978-1-4020-4385-7_3

Yaakup, A., Muhamad, A. N., Johar, F., & Man, N. C. (2008). Criteria For Urban Sprawl/ Land Use Expansion. Jabatan Perancangan Bandar Dan Wilayah Fakulti Alam Bina. https://doi.org/10.15713/ins.mmj.3

Received: January 2020. Accepted: 16th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 218 – 228

CHALLENGES AND OWNERSHIP ISSUES FACING BY LOW (B40) AND MEDIUM INCOME GROUP (M40) IN SELANGOR

Mariana Mohamed Osman[1], Farah Eleena Zainudin[2], Noor Suzilawati Rabe[3], Mizan Hitam[4] & Zakiah Ponrahono[5]

[1,2,3]*Kulliyyah of Architecture and Environmental Design,*
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
[4]*Faculty of Architecture, Planning and Surveying*
UNIVERSITI TEKNOLOGI MARA
[5] *Faculty of Forestry and Environment*
UNIVERSITY PUTRA MALAYSIA

Abstract

A shelter is a necessity based on Maslow's hierarchy of needs and in the present situation, owning a home is quite difficult for low-income earners living in urban area. Currently, it was found that people living in a city mostly prefer to rent rather than buying a house due to the expensive house prices. Access to decent and affordable housing can be consider as fundamental human right and the government have the responsibility to address this human right issue. Thus, the study tries to analyse the perception of community specifically within the B40 and M40 living in Selangor towards the idea of purchasing a house. The study surveyed 500 respondents using stratified random sampling. The study found that the main challenges was the high prices of property, followed by unable to obtained loan and high monlty expenses that lead to them unable to pay for the 10% deposit of the house. In term of affordability level, with level 3 considered as afforabable range, the study found that Petaling and Kuala Langat were severely unaffordable followed by Hulu Langat, Klang, Sepang and Sabak Bernam (Seriously unaffordable) and Hulu Selangor, Kuala Selangor and Gombak were at moderately unaffordable.

***Keywords**:* affordable housing, definition of b40 and m40, obstacles

[1] Associate Professor at International Islamic University Malaysia. Email: mariana@iium.edu.my

INTRODUCTION

This paper discusses on the housing affordability, its issues and challenges faced by household income earners categorized within the Below 40% (B40) and Middle 40% (M40) of household income group living in Selangor. Under the Mid Term Review of the 11th Malaysia Plan (MTR), the middle-class group refers to middle-income households with earnings of between half and double the national median monthly household income. Therefore, by this definition, the middle class in Malaysia are those with a monthly household income of RM2,614 to RM10,456. This is based on the Household Income and Basic Amenities Survey 2016, where the national median monthly household income stood at RM5,228. Thus, the study intends to discover the responses and challenges faced by B40 and M40 in buying housing property. This paper also explores the affordability issues in selected districts in Selangor within the scope of housing policy and the housing price range. Findings from this study is expected to contribute to the body of knowledge in fulfilling the gaps for policy maker in formulating housing policy in the country.

LITERATURE REVIEW

Definition of Housing Affordability

The idea of affordable housing recognizes the needs of households whose incomes insufficient to allow them to access appropriate housing in the market without assistance (O'Neill, 2008). Thus, the term 'affordable housing' describes as a housing that can be accessed by lower income group without experiencing undue financial hardship (O'Neill, 2008). As for the higher income earners with purchasing power, the purchasing affordability is an issue of choice rather than access (Amy Beech, 2014). According to AHURI (2004), "affordability of housing" is the ability of households to meet housing costs, while maintaining the ability to cover other basic living costs. Affordable housing should be defined as what is appropriate in terms of quality and location other than price. In Malaysia, based on *Dasar Perumahan Negara 2018-2025*, people with low income and medium income should be priorities in getting affordable housing units as these houses considered as assisted market or subsidies market where government pump in financial allocation to the construction of these houses. The private sector is also required to built affordable houses as part of planning condition in an approval in planning application process.

M40 and M40 Group of Income

The B40 and M40 group are classification given based on the income level as shown in Figure 1. Based on Figure 1, the B40 group consist of 2.78 million household referred to household with income below RM4,360, mean monthly income of RM2,848 and median income of RM3,000. Based on Figure 1 from the MTR, the household income bracket breaks down the segments further,

classifying the B40 (Bottom 40%) as those with household income of less than RM4,360 per month, M40 (Middle 40%) with household income between RM4,360 and RM9,619 and median income of RM6,275. Additionally, the Top 20% of household income group known as T20 refered to household having income above RM9,619 with median income of RM 13,148. (Malaysian Economic Report, 2015/2016).

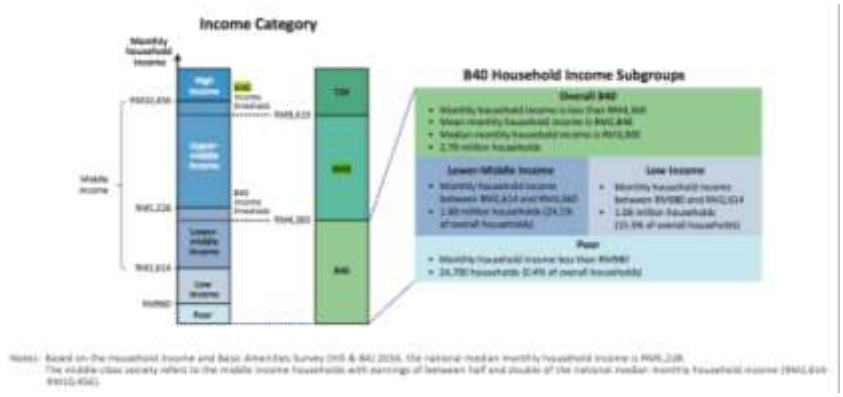


Figure 1 Income Category and the B40 household income subgroups, 2016.
Source: *Khazanah Research Institute Report, 2017*

Nambiar (2014) claimed that there is an improvement on income levels for each income group over the past three years but according to Liang (2016), the increased were more in the number of households in B40 categories as compared to the M40 and T20 groups (Liang, 2016). This clearly showed that household is getter poorer over the years (2012-2016). It is worth noting that the B40, M40 and T20 thresholds change with the country's gross national income The B40 group faced the most difficulties when it comes to ownership and buying property (Joseph, 2015; Mariana et.al, 2017). However, the M40 definition for a household of four that earns RM4,360 to RM9,619 per month in Selangor would hardly fall into the "wealthy" category that the middle class is often associated with. Khazanah Research Institute (KRI) (2016), found that a high percentage of the M40 group in the Malaysia showed similar consumption patterns with the top end of the B40 group. It does not take into account, however, the household size nor the cost of living that varies across states and locations. This shows that M40 group are far from the 'wealthy' or middle-class households that should represent a significant part of society in the country.

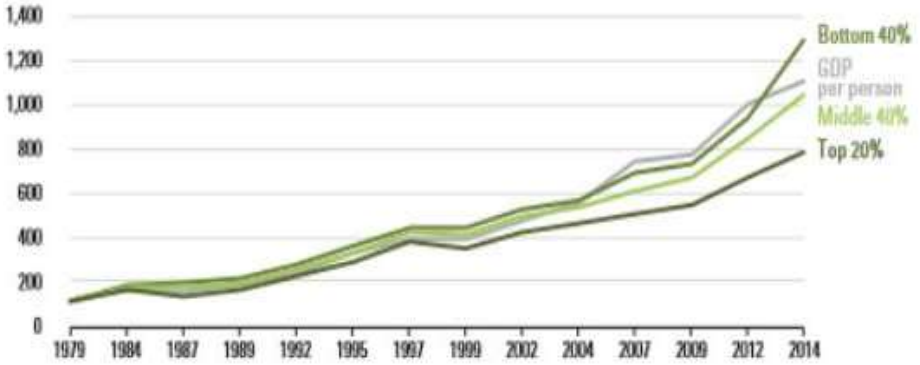


Figure 2 Index of nominal GDP per person and nominal average household income, circa 1979 - 2014
Source: Khazanah Research Institute Report, 2015

Figure 2 indicates the growth of household income level from year 1979 until 2014. Based on the above figure, it clearly shows that the income for the B40 have grown the fastest. Thus, it created a gap on income level and affordability level as the increase in the B40 income level is lower compared to the increase in housing price. According to Bank Negara, the housing affordability issue in Malaysia is largely due to the supply-demand mismatch and slower income growth. (The Star, 2018). Bank Negara Malaysia had issued a statement stating that houses in Malaysia will remains to be seriously unaffordable by the international standards with a median multiple of 5.0 if the there is no measure to manage this situation. Bank Negara estimated in 2016 that the maximum affordable house price in Malaysia was RM282,000 but the actual median house price was RM 313,000, which beyond the means of many households, where the median national household income is only RM 4,228 monthy and affordable housing price (median household income RM4,228 x 12 months x 3) should be within RM154,208.

Income level measurement usually does not take into account the household size nor the cost of living that varies across states and locations. The living wage concept and measurement introduced by Bank Negara Malaysia is a functional approach to defining more accurately the economic realities that Malaysian households face. Bank Negara in its 2018 annual report said the living wage of a couple with two children in the Klang Valley, based on provisional income of 2016, was RM6,500. The living wage is the minimum income of a household so that they can afford an acceptable standard of living. Studies and research have found that countries with a strong and prosperous middle-class report stronger economic growth. This is because a strong middle class helps generate demand for aspirational goods and services besides being an important

element in nurturing small and medium enterprises and spurring the entrepreneurial sector. (Khazanah Research Institute, 2015, 2016).

Selangor Housing Policy

Thrust 1 under National Housing Policy aims at providing adequate housing to meet the needs for the lower income group (B40) that makes up 33.4%, the medium income group (M40) with 42.4% and T20 with 24.2% for the year 2015. The objective of the housing policy in Selangor is to provide each family with a decent home (Suhaida, 2010). The purpose of the Selangor housing policy is to introduce new affordable housing types and to provide comfort to the occupants in terms of size, design and community. The direction of Housing Policy in Selangor is to ensure the housing development that is adequate, decent and affordable without compromising the environmental quality and security.

Table 2 The Direction of Housing Policy in Selangor

Policy 1	The housing supply of various types and costs according to its requirements.
Policy 2	**To prepare and supply the affordable homes units with a good quality and sufficient according to its capacity or requirement**
Policy 3	To provide a programme called "Affordable home for Rent" is provided to enable the less fortunate to inhabit with a good living comfort
Policy 4	Housing development should be equipped with facilities based with the compliance of standard and guidelines of current planning
Policy 5	The installation of technology and green neighbourhood concept with elements of safe city concept is highly encourage in the new housing development
Policy 6	Squatter resettlement program will continue in line with target of zero Squatters

State Structure Plan of Selangor 2035

In reference to Table 3, the eligibility of the household income for affordable housing in Selangor is within the range income of RM 3,000 to RM 10,000. It shows that the housing policy in Selangor covers the level income group B40, M40 and T20. Despite the assumption, the T20 group still have access to the assisted housing market, where in theory this group should be able to buy property without any government assistance.

Table 3 Details of Housing Policy in Selangor

Type of Houses	Rumah Selangorku Jenis A, Rumah Selangorku Jenis B Rumah Selangorku Jenis C, Rumah Selangorku Jenis D
House Price	RM 42,000 – RM 250,000
Size	700 sft (minimum)
Household Income	RM 3,000 to RM 10,000
Moratorium	5 Years
Development Quota	RST A = 10-20% of the overall development; RST B = 5% (minimum); RST C = 5% (minimum); RST D = 5% (minimum)
Minimum Specification	3 Bedrooms, 2 Toilets

State Structure Plan of Selangor 2035

METHODOLOGY

The data used for this study are from primary and secondary data collection. The primary data collection involved a face to face interview and questionnaire survey. Questionnaire survey form was used to gain more information from the respondents. Questions listed in the survey form were based on findings from various literature review and also policy papers on housing sector. For the secondary data collection, information was obtained from various study reports, articles, internet, newspaper articles, statistics data, bulletins and a variety of other sources.

Sampling Size

Based on Yamane (1973) formulae as shown below, at 95% confidence level, the adequate sample size for the study is 500.

$$n = \frac{N}{1 + N\,(e)^2}$$

N sample sizes
N population size
E acceptable sampling error

Source: Taro Yamane, 1973

Type of Sampling

This study using a non-probability samples method (purposive stratified sample), where respondents were selected based on a set of criteria. The criteria of respondents for the study were Malaysia citizen staying in study areas, married, working (have income) and do not have a property but have the intention to a buy property. These criteria were set as to know the reasons why the respondents still do not own a house even though they have a fix income.

Type of Analysis

The study used as a descriptive analysis to describe and explained the findings of the study. All data were analyse using the Statistical Package for Social Sciences (SPSS) version 23. A graphical analysis was also conducted using a heat map of Selangor to show the level of housing affordability distribution based on districts. The map was produced based on the calculation done using median house price with annual median income gathered from statistic database (Napic and Department of Statistic 2016 data.

FINDINGS AND DISCUSSION

Table 4 Respondents' Profile

	Categories	**Percentage (%)**
Age	20 and Below	0.6
	21 - 30	45.8
	31 - 40	36

	41 - 50	10.1
	51 - 60	5.0
	61 - 70	1.7
	71 and above	0.8
Household Income (RM)	1,000 - 3,000	43.0
	3,001 - 6,000	32.8
	6,001 - 9,000	14.2
	9,001 and above	10.0
Level of Income	B 40	46.2
	M40	41.4
	T 20	12.4

		B 40	M 40
Number of Working Household	0 - 2	52	27.4
	3 - 4	23.6	49.3
	5 and above	24.4	23.3
Number of Household	0 - 2	29.7	23.8
	3 - 4	46.8	33.2
	5 and above	23.5	43

In Table 4, majority of the respondents' aged within 21 to 30 years old (45.8%) followed by age group between 31- 40 years old (36%). In term of the household income, 43% respondents earned between RM 1,000 to RM 3,000 followed by RM 3,001 – RM 6,000 (32.8%), RM6,001-9,000 (14.2%) and above RM9,001 (10%). Based on household income 46.2% of respondents were B40, followed by 41.4% were M40 and the remaining 12.4% were T20. Interm of working household, 52% of B40 group had 2 persons working in a household, while for M40, 49.3% had 3-4 persons working in a household. 46.8% from B40 groups claimed to have 3-4 households while the highest number of households for M40 were 5 and more with 43%.

In the questionnaire survey, respondents were asked to rank the issues they encountered when trying to purchase a property. The ranks were between 1 to 5 where, 1 indicated the most significant factor while 5 shows the least significant factor. Result of survey is shown in Table 5 below.

Table 5 Ranking on the difficulties faces by B 40 and M40 in Buying Properties

	B40		**M40**	
Reasons for Not Buying Property	Mean	Rank	Mean	Rank
House Price is Expensive	1.6	1	1.9	2
Other Commitments Towards Bank Loan	3.46	4	3.42	3
High Monthly Expenses	2.64	3	1.67	1
Not Eligible for housing Loans	2.54	2	3.57	4
Blacklisted for Applying Loan	4.76	5	4.45	5

Based on Table 5, the results show different reasons between B40 and M40 groups on the difficulties they faced in purchaseing a properies. In B40 group, the most difficulties faced by the respondents to purchase a house was the high house price (mean = 1.6), while for M40 respondents, the main difficultities

identified were high monthly expenses. Based on table 4, almost half of the M40 respondents were having 5 and more households saiz which can be the reason of high montly commitment. Next, the second highest rank of difficulties faced by B40 respondents in buying a house was related to their eligibility to obtain housing loan (mean = 2.54), while for the M40 groups, the second reasons were high housing price with mean 1.9. The third problem identified by B40 respondents was their high monthly expenses with mean 2.64 while for M40 respondents, their other bank commitment with mean 3.42 ranked as third reasons. Respondents from the M40 group also claimed that they delayed in purchasing a house due to having other loan commitments such as car loan or personal loan (mean = 3.42). As shown in Table 4, 46.8% of B40 respondents stated that they had more than 5 household numbers which explained their high monthly expenses that further reduced their disposal income and eligibility to get loan. In Selangor, Rumah Selangorku housing units are being sold at RM42,000 which is considered quite low, but when asked during the interview, many respondents stated that the difficulties in getting housing loan due to their low income has led to them unable to purchase these houses.

Table 6 House price expected by the buyers

Districts	Median House Price Expected by B 40 (RM)	Median House Price Expected by M 40 (RM)	Affordable Maximum Median House Price Based on Housing Affordability Index Ratio of 3.0 (RM)
Petaling	200,000	210,000	258,660
Kuala Langat	110,000	160,000	164,016
Hulu Langat	120,000	200,000	234,252
Klang	200,000	200,000	197,568
Sepang	200,000	280,000	259,848
Sabak Bernam	200,000	190,000	121,356
Gombak	200,000	200,000	239,040
Hulu Selangor	160,000	200,000	159,840
Kuala Selangor	200,000	250,000	154,908

Source: Author's calculation based on Household Income Survey (2014) and NAPIC (2014)

Table 6 indicates the house price expected by the respondents and also the affordable house price calculated based on median household income data from Department of Statistic for all districts in Selangor. As shown in the Table 6, the proposed house price based on the median multiple 3 in all districts were higher except Sabak Bernam, Hulu Selangor and Kuala Selangor. This means that the respondents expected prices were lower than the multiple median 3 calculated based on actual housing market. In a nutshell, both of group B40 and M 40 in the district of Sabak Bernam, Hulu Selangor and Kuala Selangor have higher possibility to purchase a property if the housing prices is within the median multiple 3.

Figure 2 Heat Map of Selangor Based on Median Income 2014
Source: Author's calculation based on Household Income Survey (2014) and NAPIC (2014)

Figure 2 illustrates the distribution of the level of housing affordability in the state of Selangor. The level of affordability has been calculated by divided median house price with the annual median income. The data was from National Household income survey 2016 conducted by Department of Statistic and Napic data 2016. Based on the heat map, none of the districts in Selangor were at affordable level. The map show Petaling and Kuala Langat were at severely unaffordable level followed by Hulu Langat, Klang, Sepang and Sabak Bernam which were at seriously unaffordable. Lastly, Hulu Selangor, Kuala Selangor and Gombak were considered as moderately unaffordable. Based on this heat map, it can be concluded that the B40 and M40 group will be having to purchase a property in major urban districts of Petaling, Kuala Langat, followed by distrcts

of Hulu Langat, Klang, Sepang and Sabak Bernam due to the severity of the affordability within these districts.

CONCLUSION AND RECOMMENDATION

In conclusion, there were several factors that caused difficulties to the B40 and M40 group to purchase a property. Based on the study, the main reason of B40 and M40 in the state of Selangor were unable to purchase a house were due to the high prices followed by high monthly expenditure, unable to get housing loan and other financial commitment. Furthermore, the study found that the house price in urban districts were higher compared to the rural districts. Thus, the study recommended that the state government of Selangor to identify affordable housing price ranges to be based on locality and household income level. As the national household income survey is conducted every two years, this income data can be used as an indicator to set the affordable housing prices at districts level. It is also recommended that the government to monitor and encourage housing developer too built more affordable housing units by giving some financial and tax exemption incentives. The price of assisted or affordable housing prices should be based on the income of the people within the district and should not be set at RM250,000 throughout the state. The current elegibility criteria which allowed household with income of RM10,000 monthly (T20 group) to purchase affordable housing should be revised because T20 group should be buying should be able to buy property without any government assistance.

In conclusion, Selangor state government need to relook at their housing policy in order to manage the overall housing supply effectively. An overall study on the local housing supply, the current housing condition and the household income conditions need to be conducted yearly or once every 2 years so that real issue of housing affordability can be addressed efficiently.

REFERENCES

Amy Beech, R. D. (2014, March). The Distribution of Household Spending in Australia. Retrieved from Reserve Bank of Australia: https://www.rba.gov.au/publications/bulletin/2014/mar/2.html

Bank Negara's Five-Pronged Approach to Affordable Housing. (2018, February 14). Retrieved from *The Star Online*: https://www.thestar.com.my/business/business-news/2018/02/14/bank-negara-five-pronged-approach-to-afforable-housing/

(n.d.). Draf Rancangan Struktur Negeri Selangor 2035. Shah Alam: Jabatan Perancangan Bandar dan Desa.

Joseph, J. (2015, September 28). Houses for middle income group. Retrieved from The Star Online: https://www.thestar.com.my/metro/community/2015/09/28/houses-for-middle-income-group-state-studying-proposal-to-sell-affordable-homes-for-rm3000-to-rm5000/

(n.d.). Laporan Tinjauan Kajian Rancangan Struktur Negeri Selangor 2035. Shah Alam: Jabatan Perancangan Bandar dan Desa Negeri Selangor.

Liang, T. Y. (2016, October 21). Budget 2017: B40 group has fastest income growth. Retrieved from *The Star Online*: https://www.thestar.com.my/news/nation/2016/10/21/budget-2017-b40-group-has-fastest-income-growth/

M. S. Suhaida, N. M.-A. (2010). A Conceptual Overview of Housing Affordability in Selangor, Malaysia. *International Journal of Architectural and Environmental Engineering*, 3.

Maslow, A. H. (2013). A Theory of Human Motivation. Createspace Independent Publishing Platform.

Nambiar, S. (2014). The Malaysian Economy: Rethinking Policies & Purposes. Kuala Lumpur: Gerakbudaya Digital.

(2017). National Housing Policy. Putrajaya: National Housing Department.

O'Neill, P. P. (2008). Housing Affordability Literature Review and Affordable Housing Program Audit. Syd

Received: January 2020. Accepted: 6th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 229 – 240

PROFILING THE PERCEIVED MANGROVE FOREST USE VALUE AND COMMUNITY'S WILLINGNESS TO PAY FOR MANGROVE CONSERVATION

Yakin Nur Sunoto[1], A.A. Fatiah[2], Zakiah Ponrahono[3] & Mariana Mohamed Osman[4]

[1,2,3] *Faculty of Forestry and Environment*
UNIVERSITY PUTRA MALAYSIA
[4] *Kulliyyah of Architecture and Environmental Design,*
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

Abstract

A broad range of ecological services from mangrove forest encompasses a mixture of landward and seaward transition around tropical and subtropical areas in many regions that are threatened by humans. Among the issues highlighted in this research are i) the decline in mangrove areas due to development activities, and ii) zero price value of mangrove areas. This study reports on the direct use value of mangrove forest, willingness to pay for the conservation of mangrove forests, and satisfaction towards current mangrove management in Kampung Sungai Melayu, located at Johor state in Malaysia. A face-to-face survey was employed, targeting 111 heads of households and 219 individuals from the local community through a simple random sampling technique. This study concludes that the local community are willing to pay for mangrove conservation at RM17.84 per year. Based on the significant results from the Chi-Square analysis, three factors have a significant correlation with the "willingness to pay" for mangrove conservation which includes the length of residency (X2 = 11.780) and household income (X2 =13.463).

***Keywords**:* Mangrove forest, Use-value, Willingness to Pay, Mangrove Conservation, Environmental Valuation

[3] Senior Lecturer at Universiti Putra Malaysia. Email: zakh@upm.edu.my

INTRODUCTION

A biologically complex mangrove forest encompasses a mixture of landward and seaward transition area that supports biodiversity with a wide range of habitats for flora and fauna (Nagelkerken et al., 2010). The variety of mangrove resources is a source of income for many lower and middle-class households living near a mangrove forest (Vo, Kuenzer, Vo, Moder, & Oppelt, 2012). The appropriate monetary value can be channelled for the protection and conservation of mangroves. Total Economic Value (TEV) is one of the tools used to quantify natural assets by placing a monetary value on environmental goods and services (Kumar, 2012). However, the inability to trade it in the market for monetary gain is viewed as an issue and challenge in valuing environmental assets when many of them have zero market price, and the ecosystem services is granted 'freely'. in the present study, the mangrove forests are mainly situated along the edges of '*Sungai Melayu*' (Melayu River) and '*Sungai Perepat*' (Perepat River) in the state of Johor in Malaysia and the respective tributaries of these two rivers cover an area of about 378.17 ha. Harvesting activities have ceased in the study area for the past 15 years. As such, the mangrove forests are still regenerating, thus it can be considered as a moderately mature forest.

PROBLEM STATEMENT

The forest cover in the state of Johor is currently less than 50% and its mangrove forest area is declining with a total loss 6,120.7 ha within two decades, contributed by large scale projects involving land reclamation activities resulting in the disruption of their ecosystem (PLANMalaysia@Johor, 2017; Azwan, Hani, Hamdan, Aziz, & Shamsudin, 2011). The primary factor contributing to this decline as identified by Azwan et al., (2011) is mainly due to aquaculture industry activities (66.03%), followed by coastal erosion (14.92%), agriculture (11.45%) and others (7.6%). Conflict often arises between environmental protection and economic development; thus, managing land use from an economic perspective is crucial for key decision-makers and stakeholders to use economic approaches to strengthen the intrinsic value of the ecosystem (Vo et al., 2012). This study aims to determine the local community's "Willingness to pay (WTP)", and evaluate their satisfaction level on the current mangrove forest management; The objectives of this study are to determine the WTP among the local community for mangrove conservation; to identify the perception of the responsibility of individuals and the community in mangrove conservation and finally to assess the current satisfaction level towards mangrove forest management.

LITERATURE REVIEW

Mukherjee et al., 2014 suggested that the monetary valuation of ecosystem services is crucial to address the issue of its decline. The regulation and maintenance services could be assessed using the contingent valuation method

where it incorporates the "Willingness to pay (WTP)" measure. The major weakness in the current economic assessment of the mangrove ecosystem is the lack of nature-human values.

Environmental Valuation

Total Economic Value (TEV) framework comprises two major components which are use value and non-use value, that are further classified into three subcomponents including direct uses, indirect uses and existence value. The direct use value (DUV) is derived from the direct consumption of a mangrove forest including i) consumptive uses of its readily-available resources such as charcoal, wood, fisheries stock and ii) non-consumptive functional services such as tourism, recreation, research and education. In general, direct-use value is straightforward since it is observable and quantifiable (Department of Marine Park Malaysia, 2011). The option value is a more complex use-value as it combines both direct and indirect use values and is associated with future mangrove use. The option value is derived since there is an uncertainty in the future individual consumption (Department of Marine Park Malaysia, 2011). Meanwhile, the non-use value consists of i) existence value: values one place on a resource just by knowing that it exists (Azmi, 2014) and ii) bequest value: a value derived from whether the person can benefit directly or indirectly from it.

There are two common existing valuation techniques for non-market valuation of goods and services which are the preference and stated preference method (Barbier, 2016). In this study, stated preference method is used to obtain the value of WTP by using the Contingent Valuation Method (CVM), which can reflect the economic value of non-market goods. As far as this paper is concerned, CVM is the only method that can measure bequest value and existence value of environmental goods or services (Nor Hizami, 2014). **Figure 1** presents the non-market valuation method. WTP is considered as one of the most crucial approaches in CVM as it can determine the amount of money that a person is willing and can afford to pay to receive goods or services (Samdin, 2008).

Community-Based Conservation

Community-Based Conservation (CBC) is defined as 1) conservation strategies that emphasize on the role of local communities in decision making and being actively involved in the management of the protected area, and 2) sustainable management where local communities can manage and benefit from natural resources to improve their livelihoods and to foster pro-conservation attitude. Therefore, CBC is a concerted management framework that adequately allocates power and responsibility in managing natural resources (Abdullah, Said, & Omar, 2014).

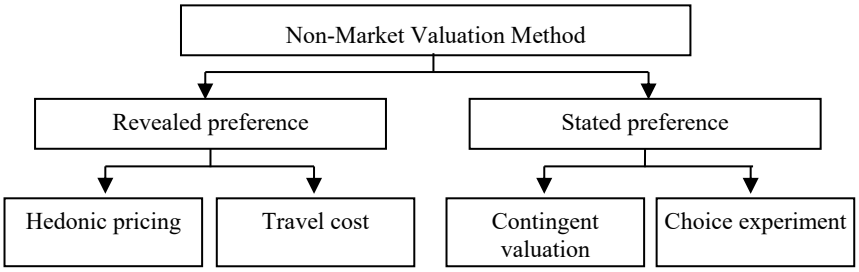


Figure 1 Non-market valuation method *(Source:* Barbier, 2016*;* Vo et al., 2012)

METHODOLOGY AND MATERIALS

The research approach consists of descriptive analysis, factor analysis and economic valuation analysis. In this study, the data used consist of primary and secondary data. The primary data were collected using face-to-face surveys with respondents. The survey was conducted from 18 January 2018 until 21 January 2018 in Kampung Sungai Melayu, Johor, Malaysia. Secondary data collection involved acquiring data, for example, numerical data, reports, and maps from agencies in the private sector. Other than that, a preliminary site visit was conducted on Thursday (19 October 2017) to get the overall view of local activities at Kampung Sungai Melayu. The study area is Kampung Sungai Melayu which is located downstream of '*Sungai Melayu*' (Melayu River) **(Figure 2).** Kampung Sungai Melayu is selected as the study area because of its vicinity to the mangrove forest of *Sungai Melayu* and has a local community who depends on fisheries activities. The population size of Kampung Sungai Melayu is 813 villagers.

Questionnaire

In this study, probability sampling techniques were employed through simple random sampling. The sampling technique ensures all the residents have an equal chance of being selected and produce precise estimates of the population percentage. By using Slovin's formula of sample size, the number of samples for the local community was determined, which was 269 respondents. Two sets of questionnaires were distributed to the selected respondents. The first set was for the heads of households, and the second set was for the common villagers. The questionnaires were prepared in the Malay language as all the villagers are of Malay race; this was to provide an easy and locally intact atmosphere during the survey and to reduce any possibility for errors. The items constructed in the questionnaires were referred and based on previous studies to ensure the answer could reflect and represent the variables. Experts in the fields related to this study were consulted to validate the items in the questionnaires.

Figure 2 Satellite image of Kampung Sungai Melayu
(Source: Google Map, retrieved on 16 January 2018)

RESULTS AND DISCUSSIONS

The local community survey successfully engaged with 111 heads of households and 219 villagers; and the data analysis is conducted by using descriptive analysis and inferential analysis.

Socio-demographic profile of the head of household

Out of the total 111 heads of households that participated in the survey, 91.9% (102) were male and 8.1% (9) were female. More than half of the respondents have primary school education (55.9%); 65.8% (73) respondents are self-employed mostly as fishermen, 10.8% (12) are working in the government sector, 18.0% (20) work in the private sector while the other 6 respondents were categorised as others. Majority of the respondents, 86.5% (96) has been a resident in the study area for more than 20 years. A total of 75.6% (84) respondents have a household income of RM2000 and below, 11.7% (13) had a household income within RM2001-RM3000, and the rest generated more than RM3000 monthly. 61.3% (68) respondents are fishermen, and 38.7% (43) are non-fishermen. Only 16.2% (18) respondents said that they had a side income by doing other jobs, and 8 of them are involved in fisheries activities as their source of side income.

Mangrove Use Value by Head of Households

Frequency analysis of mangrove related consumption among the community was conducted (**Table 2**). A simple majority represented by 63.1% of respondents are

directly utilising the mangrove products as their main source of income, and 45.9% of them are earning a side income from the mangrove produce. A total of 55.0% respondents claimed that they use the mangrove area for fisheries activities at the river; however, 37.8% of respondents stated that they are involved in marine fisheries activities at the Straits of Johor. Overall, 67.6% of respondents claimed that their income would be affected if the mangrove area is compromised, thus indicating its significant contributions to the households' livelihoods.

Table 2 Frequency table of mangrove related consumption

No.	Item	1 (No)		2 (Yes)	
		Freq	**(%)**	**Freq**	**(%)**
B1	Contribute as main income	41	36.9	70	63.1
B2	Contribute as a side income	60	54.1	51	45.9
B3	Use for river fisheries activity	50	45.0	61	55.0
B4	Use for marine fisheries activity	42	37.8	69	62.2
B5	Use as mussel farming area	89	80.2	22	19.8
B6	Mangrove wood for cooking	103	92.8	8	7.2
B7	Mangrove wood for house foundation	104	93.7	7	6.3
B8	Use as mangrove ecotourism tour	89	80.2	22	19.8
B9	Fishing activity in free time	48	43.2	63	56.8
B10	Mangrove degradation will affect income	36	32.4	75	67.6

Among 19 (17.1%) respondents who gave an estimation of the value for one acre of mangrove forest, the lowest value recorded was RM8000, while the highest was RM1,000,000. The average value between these 19 respondents is RM128,315.79, and the median is RM50,000.00. Contrary to an earlier study (Kuenzer & Tuan, 2013), the average was 7,145.29 USD or RM23,436.55 (RM3.28 per USD in 2013) per acre and that was multiplied by the size of the mangrove-covered area to get the overall value. However, in this study, the mangrove-covered area in Kampung Sungai Melayu is not known; thus, the overall value could not be calculated.

Table 3 shows the estimation of monthly income gained from fisheries activities annually. A total of 31.6% of respondents who did not obtain any income from fisheries activities were those who were not involved at all. A total of 54.0% (60) respondents earned below RM1000 from fisheries activities, whereas 22 respondents gained below RM500. The number of respondents that generated more than RM1000 is only 14.4% (16) because they have better fisheries tools and equipment.

Table 3 Income gained from fisheries activity

Item	Range	Frequency	Percentage (%)
Income from fisheries activities	0	35	31.6
	1-500	22	19.8
	501-1000	38	34.2
	1001-2000	13	11.7
	>2000	3	2.7

Socio-demographic profile of the respondents

The socio-demographic background of respondents in this study consists of 56.2% (123) male and 43.8% (96) female. Respondents with a secondary school education represent almost half from the total respondents (47.9 %). Meanwhile, 39.7% (87) of respondents were self-employed mostly as fishermen, and 'others' here referred to the housewives and the unemployed at 32.4% (71). Majority of the respondents, 79.5% (174) has been living in the study area for more than 20 years. This is similar to a study conducted by (Abdullah et al., 2014), where up to 75% of their respondents has lived in the area of interest for more than 20 years. The household income is considered low since 37.4% (82) of the respondents has a household income of below RM1000, and 37% have a household income between RM1001-RM2000. A total of 32.9% (72) respondents were fishermen, while 67.1% (147) were non-fishermen. Only 10% (22) of the respondents said that they had a side income by doing other jobs.

Willingness to pay for mangrove conservation

The amount that the local community were willing to contribute to mangrove conservation were identified through an open-ended question. It allows respondents to state whatever amount they are willing and able to pay based on their current income and situation. A simple majority of 62.1% (136) respondents are willing to contribute for mangrove conservation in the future while the rest disagreed.

Table 5 Frequency table of WTP

Willingness to pay	Frequency	Percentage (%)
Yes	136	62.1
No	83	37.9

A further question was asked for both responses (Yes or No). For the 136 respondents who were willing to pay, they were asked to state the value of

the annual fee. The mode value listed was RM10 by 52 respondents. One respondent is willing to pay RM275 per year for mangrove conservation; however, this amount will be excluded in the calculation as it is classified as an outlier whilst the lowest amount recorded was RM1. The mean amount of WTP was RM17.84 per year for mangrove conservation. A study by (Kamri, 2014) on visitors' WTP in Bako National Park, Sarawak reported that 80.5% tourists (non-local visitors) were willing to pay for conservation while only 43% of locals were felt the same way. The WTP value for foreign visitors (RM51.76) was 1.58 higher than local visitors (RM18.80). Another study by Shammi (2014) discovered that a majority (61.2%) of tourists were willing to pay with an estimated median ranging from RM17.98 to RM21.72.

For the 83 respondents who answered, they were not willing to pay, the following question asked for them was 'What is the reason for your answer in Question 1?'. **Table 6** shows the frequency of the reasons stated by all the respondents. A majority (46) of respondents stated that they were not aware of the conservation measures, 18 respondents considered it as a government responsibility to fund the conservation works, while 12 respondents said it was because of income constraints. Further analysis is conducted in this study to identify the socio-demographic factors that are significant to the WTP by using Chi-Square test of significance **(Table 7)**. Based on the results, two factors are significant which include the length of residency (X^2 = 11.780) and household income (X^2 =13.463).

Table 6 Reasons for not willing to pay

Reason, not WTP	**Freq.**	**Percentage (%)**
Government responsibility	18	21.7
Income constraint	12	14.5
Did not know about conservation	46	55.4
Others	7	8.4

Table 7 Chi-square tests result between socio-demographic characteristics and WTP

	Willingness to Pay				
Characteristic	Value	df	CV	Min expected count	Asymp. Sig.
Gender	0.30	1	3.84	36.38	0.863
Educational level	2.620	3	7.81	3.03	0.454
Job sector	7.482	3	7.81	6.05	0.058
Category of villagers	0.007	1	3.84	27.29	0.932
Age	4.178	4	9.49	12.13	0.382
Length of residency	11.780	4	9.49	1.52	*0.019
Household income	13.463	5	11.07	3.03	*0.019

Number household members	0.665	4	9.49	1.89	0.956

*significant value, p<.05

Community's satisfaction towards mangrove conservation activities

Items D1, D2 and D3 in **Table 8** were employed to assess their satisfaction towards the current management practice(s) by the authority, which is currently under the control of the Forestry Department. **Table 8** also presents the respondents' view regarding the current mangrove management practices by the Forestry Department that is responsible to manage, maintain and protect the mangrove forest. This mangrove forest has only been gazetted in 2013 when this village was undergoing the eco-tourism program under the Iskandar Regional Development Authority. Previously, the local community can freely access and consume the products and by-products of the mangrove forest.

Table 8 Respondents' satisfaction toward current management practice(s) by the Forestry Department

No.	**Item**	**1 (No)**		**2 (Yes)**	
		Freq.	**(%)**	**Freq.**	**(%)**
D1	Forestry Department is doing their responsibility	27	12.3	192	87.7
D2	Satisfied with current protection status on mangrove forest by Forestry Department here	70	32.0	149	68.0
D3	Satisfied with current mangrove conservation practice(s) done by the Forestry Department here	73	33.3	146	66.7

A total of 149 (68%) respondents are unsatisfied with the current protection status of the mangrove forest by the Forestry Department in Kampung Sungai Melayu, while 146 (66.7%) of them are not in agreement with the current mangrove conservation practice(s) done by the Forestry Department. Majority of them, 192 (87.7%), also agreed that it is the Forestry Department's responsibility in managing the mangrove area. On the other hand, item D4 and D5 as presented in **Table 9** were employed to assess respondents' view on themselves and the community regarding the responsibility towards the mangrove forest.

Table 9 Respondents' view on self and community responsibility

No.	**Item**	**1 (No)**		**2 (Yes)**	
		Freq.	**(%)**	**Freq.**	**(%)**
D4	I feel responsible to take care of mangrove here	64	29.2	155	70.8
D5	Community should be involved in mangrove management too	63	28.8	156	71.2

Then, the respondents were asked about their personal views on the matter of responsibility. Most of them, 155 (70.8%), felt responsible for taking care of the mangrove forest, while the remaining 64 respondents did not felt otherwise. They were then asked about community engagement in mangrove forest conservation with the Forestry Department. A majority of them, 156 (71.2%), agreed that the community should be involved in mangrove forest management and assist the Forestry Department in managing, maintaining and protecting the mangrove forest, whereas 63 (28.8%) respondents disagreed. These are the positive results obtained from the survey conducted where the local community does have a high sense of responsibility and agrees to the idea of collaborating with the Forestry Department to protect and manage the mangrove forest. Therefore, this indicates a significant opportunity for the authority to engage with the community in managing the mangrove forest together, whether it is through discussion or management and decision-making processes as well as in conducting related activities.

CONCLUSION AND RECOMMENDATIONS

In summary, the willingness of the local community to pay for mangrove conservation is important as an overall view for establishing a mangrove conservation fee that may be imposed on them. The unwillingness to pay also needs to be understood because, through their response, this study highlighted the probable causes of refusal in paying for mangrove conservation among the villagers, thus suggesting ways to overcome it. The mean payment that the local community are willing to contribute for mangrove conservation purposes is RM17.84 per year and the mode of the listed amount is RM10. This study also discovered that the local community agreed with the responsibility of the Department of Forestry. In addition, they felt that the local community should be involved in mangrove conservation along with the forestry rangers.

RECOMMENDATIONS

In summary, this study recommends:

i. Local community empowerment

Generally, the local community showed a positive response to mangrove conservation. Thus, empowerment initiatives in maintaining the mangrove forest are recommended to achieve excellent mangrove management. Governmental agencies, for example, should involve local villagers into the management, policy and decision making in mangrove management as shared property. Thus, conservation-based management will be able to be executed effectively.

ii. Action plan

Acknowledgement of perceived mangrove ecosystem benefits through ecotourism and fisheries activities could act as a foundation to formulate a sustainable mangrove forest management plan collectively. The authority or governmental agency may provide various forms of support for the community in helping them to develop their stewardship towards mangrove forest management, and conservation works as the mangrove area has a unique character which can be utilized in the tourism industry. Mangrove area in Kampung Sungai Melayu could be developed and rejuvenated as a passive recreational area.

iii. Promoting conservation efforts

Authorities should consider the inclusion of the whole village rather than focusing only on the fishermen in mangrove tour activities as being currently practised, through the promotion of local community's participation in mangrove forest management.

iv. Setting the conservation fee

Finally, the WTP responses can be used as a predictor or indicator of future behaviour if the conservation or protection fee is initiated. Policymakers and forest managers might use the information to assess public support for conservation of the mangrove forest or as a measure of unwillingness and displeasure against the conservation to maintain its environmental quality. The monetization of the forest benefits in this study provides a useful insight into the allocation of the forest conservation and protection funds.

REFERENCES

Abdullah, K., Said, A. M., & Omar, D. (2014). Community-based Conservation in Managing Mangrove Rehabilitation in Perak and Selangor. Procedia - Social and Behavioral Sciences. https://doi.org/10.1016/j.sbspro.2014.10.047

Barbier, E. B. (2016). The protective service of mangrove ecosystems: A review of valuation methods. *Marine Pollution Bulletin*. https://doi.org/10.1016/j.marpolbul.2016.01.033

Kamri, T. (2014). Economic Values of Conservation and Management Attributes in Bako National Park, Sarawak, Malaysia (Doctoral dissertation, Universiti Putra Malaysia). Retrieved from http://psasir.upm.edu.my/id/eprint/39604/1/FEP 2014 14 IR.pdf

Kuenzer, C., & Tuan, V. Q. (2013). Assessing the ecosystem services value of can gio mangrove biosphere reserve: Combining earth-observation- and household-survey-based analyses. Applied Geography. https://doi.org/10.1016/j.apgeog.2013.08.012

Kumar, P. (2012). The economics of ecosystems and biodiversity: Ecological and economic foundations. In the *Economics of Ecosystems and Biodiversity: Ecological and Economic Foundations*. https://doi.org/10.4324/9781849775489

Mukherjee, N., Sutherland, W. J., Dicks, L., Hugé, J., Koedam, N., & Dahdouh-Guebas, F. (2014). Ecosystem service valuations of mangrove ecosystems to inform decision making and future valuation exercises. PLoS ONE. https://doi.org/10.1371/journal.pone.0107706

Nagelkerken, I., De Schryver, A. M., Verweij, M. C., Dahdouh-Guebas, F., van der Velde, G., & Koedam, N. (2010). Differences in root architecture influence attraction of fishes to mangroves: A field experiment mimicking roots of different length, orientation, and complexity. *Journal of Experimental Marine Biology and Ecology*, 396(1), 27–34. https://doi.org/10.1016/j.jembe.2010.10.002

Samdin, Z. (2008). Willingness to pay in Taman Negara: A Contingent Valuation Method. *International Journal of Economics and Management*.

Vo, Q. T., Kuenzer, C., Vo, Q. M., Moder, F., & Oppelt, N. (2012). Review of valuation methods for mangrove ecosystem services. Ecological Indicators. https://doi.org/10.1016/j.ecolind.2012.04.022

Received: January 2020. Accepted: 11th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 241 – 250

EVALUATION OF LEVEL OF SERVICE (LOS) ON ROUTES OF SMART BUS IN KAJANG, SELANGOR

Nur Shazreena Mat Shukri[1], Zakiah Ponrahono[2], Yakin Nur Sunoto[3], & Wan Noratikah Wahidah Wan Ghazali[4]

[1,2,3,4] *Department of Environment*
Faculty of Forestry and Environment
UNIVERSITI PUTRA MALAYSIA

Abstract

Level of service (LOS) is a method used for the development of transportation infrastructure designations based on a specific analysis. The concept of LOS lies on the importance of an assessment of roadway operational performance services for the improvement of bus service delivery. A high performance of bus service delivery could relatively influence the satisfaction level of its users. This study assesses the LOS of three main designated routes of SMART buses in Kajang Selangor (KJ01, KJ02, and KJ03). The SMART buses are free buses provided under a free transit programme which aims to encourage people to use public transportation. An on-board survey and inventory observation were employed to collect the data. Findings indicate that KJ01, KJ02, and KJ03 fall under the category of LOS D considering the attributes of service frequency, service hours, passenger load/thresholds, and speed of bus. The discovery may serve as a useful guidance for the development of a comprehensive plan for LOS to be coordinated in improving the service quality of bus transportation.

Keywords: Level of service (LOS), public transport, free bus

[1] Student at Universiti Putra Malaysia. Email: shazreena110@gmail.com

INTRODUCTION

The concept of free-fare public transportation known as SMART buses was introduced in Kajang by the local authorities in 2016. According to Goodman et al. (2014), this free bus concept can facilitate passengers' ability to travel in a way of their choice and their freedom to practice independently while riding a bus. However, the trend of using a bus as a mode of public transportation has declined throughout the years due to the mode's less competitive service performance compared to other motorised modes (Hu, Zhao, & Wang, 2015). As noted by Cats et al. (2017), although the free-fare public transportation has been operated within a large public transportation system, they have yet to undergo rigorous evaluation.

The Selangor state is known for having the highest number of average daily traffic (ADT) of about 412 155 vehicles on road compared to other states in Malaysia (Ministry of Transport Malaysia, 2017). This number indicates that many of the road users in the state have chosen private vehicles over public transportation to commute daily. In response to this scenario, the Selangor state government introduced an initiative to shift the modal split of the state towards public transportation orientation. The SMART bus, also known as Selangorku bus, was introduced to promote free-fair, high-service frequency buses to influence passengers to switch their mode of transportation. Towards achieving this aim, the quality of services provided by the free buses needs to be on certain standards of performance. A service quality assessment is therefore necessary towards achieving a service delivery that portrays a good image of accessibility and mobility of places (Das & Pandit, 2013). According to Bachok, Osman, and Ponrahono (2014) a good service quality is one of the key developments for economic growth; such quality not only contributes to giving less impact to the environment but is also a major factor in supporting the capacity of population growth of places. In addition, the quality of service delivery of public transportation plays an important role in influencing more users to shift their mode of transportation within places. Given these points, the LOS standard assessment can be employed as a main tool for determining the quality of services provided by a facility (Das & Pandit, 2013).

Level of service (LOS) is a standard measurement for determining an acceptable level of quality of services using specific attributes, such as service frequency and service hours (Chen & Larry, 2009; Ponrahono et al., 2017). In the perspective of the Transportation Research Board (2000), LOS is defined as the measurement for operational conditions based on a traffic stream, which covers the aspects of speed, travel time, freedom to manoeuvre, traffic interruptions, comfort, and convenience. An LOS analysis is designated with an outcome that ranges from LOS A (best operation conditions) to LOS F (worst operation conditions).

This study focuses on Kajang, Selangor, specifically on the three main routes of the SMART buses. The LOS measurements were used to measure the buses' service quality from the perspectives of the actual passengers who ride the buses. Results from the assessment may be used to aspire improvement of the service delivery of the SMART buses for current and future passengers (Ponrahono et al., 2015). This study aimed to determine the service quality performance of SMART buses of selected routes in Kajang, Selangor. The objectives of the study are to examine the level of service (LOS) of the SMART bus service delivery in Kajang, Selangor; and to determine the highest and lowest level of service (LOS) of the SMART bus service delivery in Kajang, Selangor.

RESEARCH METHODOLOGY

Study Area

Spanning 9298 hectares, Kajang is located 14 miles from the southeast of Kuala Lumpur and is directly linked to Putrajaya (national administrative centre) and Cyberjaya (national multimedia city). The SMART buses in Kajang operate in five routes: KJ01, KJ02, KJ03, KJ04, and KJ05. This study focuses on three of the main routes (KJ01, KJ02 and KJ03) that have been in operation for more than three years compared to two other routes. Table 1 provides a summary of the routes studied.

Table 1: Information of Bus Routes for KJ01, KJ02 and KJ03

Information	KJ01	KJ02	KJ03
Distance	20 km	19.8 km	14 km
Total number of bus	4 diesel buses	2 diesel buses	2 diesel buses
Location	Bandar Kajang – Komplek Hentian Kajang	Komuter Bangi – Bandar Seri Putra – Bandar Bukit Mahkota	Stesen MRT BTHO – Cheras Perdana – Taman Tun Perak
Frequency	20 minutes	30 minutes	30 minutes

Source: Kajang Municipal Council Management (2018)

Level of Service (LOS)

An LOS assessment was made based on the attribute of fixed-route service frequency, fixed-route hours, passenger threshold, and bus speed.

Fixed-route service frequency

This measure determines how often potential passengers have access to the transit service (Transportation Research Board, 2013). Table 2 summarises each of the LOS indicators for this attribute.

Table 2: Fixed-route Service Frequency

LOS	Average Headway (min)	Remarks
A	< 10	Passengers do not need schedule
B	10 - 14	Frequent service, passengers consult schedule
C	15 – 20	Maximum desirable time to wait if bus/train missed
D	21 – 30	Service unattractive to choice riders
E	31 – 60	Service available during the hour
F	> 60	Service unattractive to all riders

Source: Adopted from Haron & Tahir (2018); Ponrahono et al. (2015); Transportation Research Board (2013); Yaakub & Napiah (2011)

Fixed hours of service

Table 3 below summarises the LOS indicator for hours of service.

Table 3: Fixed Hours of Service

LOS	Hours of Service	Remarks
A	19 – 24	Night "owl" service provided
B	17 – 18	Late evening service provided
C	14 – 16	Early evening service provided
D	12 - 13	Day time service provided
E	4 - 11	Peak hour service only or limited midday service
F	0 - 3	Very limited or no service

Source: Adopted from Haron & Tahir (2018); Ponrahono et al. (2015); Transportation Research Board (2013; Yaakub & Napiah (2011)

Passenger thresholds

The attribute refers to passengers that have the opportunities to obtain a seat when riding the bus and to identify the overall crowding level on the vehicles (Transportation Research Board, 2013). Passenger load was studied during peak hours on weekdays and weekends (Haron & Tahir, 2018). Table 4 shows the peak hours involved during the data collection and Table 5 summarises the LOS indicator for this attribute. The data were collected for three days on weekdays and one day during a weekend.

Table 4: Peak Hours during Weekdays and Weekend

Peak Hours	Time
Morning	6:30 am – 8:30 am
Afternoon	12:30 pm – 2:30 pm
Evening	4:30 pm – 6:30 pm

Table 5: Passenger Thresholds

LOS	Passenger/Seat	Remarks
A	0.00 – 0.50	No passenger needs to sit next to another
B	0.51 – 0.75	Passenger can choose where to sit
C	0.76 – 1.00	All passenger can sit
D	1.01 – 1.25*	Comfortable standee load for urban transit
E	1.26 – 1.50*	Maximum schedule load for urban transit
F	> 1.50*	Crush load

Source: Adopted from Ponrahono et al. (2015); Napiah, Kamaruddin, & Suwardo (2011)

Bus speed

According to Ponrahono et al. (2016), bus speed is known as an acceptable indicator of how a bus deals with the traffic conditions along the designated routes. Table 6 shows the summary of LOS for the bus speed indicator.

Table 6: Bus Speed

LOS	Speed (km/h)	Adapted from Ministry of Urban Development India (n.d)	Adapted from Cortes, Gibson, Gschwender, Munizagag & Zuniga, (2011)
A	< 30	Primarily free flow movement at average travel speeds usually about 70% of the free flow speed for the key corridors	Excellent
B	< 25 to ≤ 30	Small increase in traffic causing substantial increase in approach delay and hence, decrease in arterial speed	Good
C	< 21 to ≤ 25		Fair
D	< 19 to ≤ 21	Significant approach delays and average travel speed of 1/3 the free flow speed or lower. Such conditions causing combination of one or more reasons such as high signal density, extensive queuing at critical intersections and	Barely acceptable

		inappropriate signal timing	
E	< 15 to ≤ 19	Key corridors at extremely low speeds below 1/3 to 1/4 of the free flow speed. Intersection congestion is likely at critical signalised locations, with high approach delays	Bad
F	≤ 15		Very bad

Source: Adopted from Ponrahono et al. (2015); Cortés, Gibson, Gschwender, Munizaga, & Zúñiga (2011)

On-board Survey

The on-board survey was considered the most appropriate for studying the trip characteristics of passengers, demographics, and the attitude of passengers related to the service provided to them (CJI Research Corporation, 2016; Ponrahono et al., 2015). In this study, the on-board survey was employed to gain data on the frequency of service, speed of bus, and the arrival and departure time for the buses to arrive at the stop points for the analysis of LOS (Haron & Tahir, 2018; Napiah et al., 2011).

RESULTS AND DISCUSSION

Fixed-route Service Frequency

Table 7 summarises the service frequency for the three main routes (KJ01, KJ02, and KJ03). KJ01 was recorded with an LOS D compared to the other two routes. The total operation hours recorded for KJ01 was 720 minutes, which was shorter compared to the hours for KJ02 and KJ03. Even though all three routes recorded a similar average frequency (approximately 30 minutes per trip), KJ01 was found to be allocated with more vehicles by the local authorities to run the operation. KJ01 offers more frequent services hence is able to shorten the passengers' waiting time.

Table 7: Fixed-route Service Frequency at KJ01, KJ02 and KJ03 in January 2020

Route	Total operation hours	No. of bus	Average frequency	LOS
KJ01	720 minutes	4	30 minutes	D
KJ02	800 minutes	2	30 minutes	E
KJ03	800 minutes	2	30 minutes	E

Source: Field Survey

Fixed Hours of Service

Table 8 shows that the LOS for KJ01, KJ02, and KJ03 indicates that the services provide early evening transportation to passengers.

Table 8: Fixed hours of service at KJ01, KJ02 and KJ03 in January 2020

Route	First trip	Last trip	Total service hours	LOS
KJ01	7.00 am	9.38 pm	14 hours 38 minutes	C
KJ02	6.30 am	9.40 pm	15 hours 10 minutes	C
KJ03	6.30 am	9.41 pm	15 hours 11 minutes	C

Passenger Thresholds

Table 9 shows that the three routes recorded with LOS F indicate the lowest LOS for the services provided. The number of on-board passengers during peak hours has caused the buses to be crowded, most passengers did not have chances to sit as the number of seats provided is limited (36). Most of them had to stand for a short period despite the proximity of the stop points between destinations.

Table 9: Passenger Thresholds at KJ01, KJ02 and KJ03 in January 2020

Route	Seat	Passenger thresholds		LOS	
		Weekday	**Weekend**	**Weekday**	**Weekend**
KJ01	36	7.31	4.64	F	F
KJ02	36	7.64	3.06	F	F
KJ03	36	4.94	2.36	F	F

Bus Speed

KJ02 was indicated with LOS C compared to the other two routes (Table 10). This is because the traffic condition in KJ02 was not as poor as that in KJ01 and KJ03. KJ01 faces heavy traffic during peak hours, thus, the speed of buses was slower compared to the speed during normal traffic. Similarly, KJ03 faced poor traffic flow at certain locations with many stops and traffic lights; such obstructions have caused longer travel time and low speed of vehicle movement.

Table 10: Bus Speed at KJ01, KJ02, and KJ03 in January 2020

Route	Total trip	Travel time	Speed (km/h)	LOS
KJ01	20 km	63 minutes	19	E
KJ02	19.8 km	52 minutes	23	C
KJ03	14 km	50 minutes	17	E

Overall LOS for KJ01, KJ02 and KJ03

Table 11 below shows the tabulated data that represent the overall LOS for the SMART bus services in Kajang, Selangor. From the analysis, the overall LOS for SMART bus is LOS D. Hence, few improvements should be considered in delivering better services, particularly in the aspect of service frequency. This attribute brings significant impact to the other attributes, such as service hours, passenger threshold, and speed of bus.

Table 11: Summary of LOS for KJ01, KJ02, and KJ03 in January 2020

Attribute	LOS	LOS Score	Mean LOS	Overall LOS
Fixed-route service frequency	E	2	3.33	D
Fixed-route Hours	C	4		
Passenger Threshold (Weekday)	F	1		
Passenger Threshold (Weekend)	F	1		
Bus Speed	E	2		

**Score range: A = 6, B = 5, C = 4, D = 3, E = 2, F = 1*

CONCLUSION AND RECOMMENDATION

The conclusion of the study can be drawn as follows:

1. The overall LOS for three main routes (KJ01, KJ02 and KJ03) is categorised under LOS D based on the four main specific attributes (fixed-route service frequency, fixed-route hours, passenger threshold and bus speed).
2. The highest number of passengers during the data collection period was during afternoon peak hours (12.30 p.m. till 2.30 p.m.). The passengers who appeared to use the public bus most frequently were school and college students.
3. The outcomes in terms of service frequency, service hours, passenger thresholds, and bus speed of service quality assessment can serve as important baseline data for improving the performance of SMART bus delivery in the future.
4. Therefore, an assessment for LOS should be imply again at the three main routes (KJ01, KJ02 and KJ03) and with the other two new routes (KJ04 and KJ05) at Kajang after improvement being made by local authorities and bus management.
5. From the analysis, both parties (local authorities and bus management) should figure out a few solutions in improving the service frequency of the bus (example: departure and arrival time) where it will directly influence other attributes such as speed of the bus that is basically affected due to traffic conditions on that particular route. Dedicated bus lane, real-time departure and arrival information can be enhanced with

the usage of information technology. Updated SMART bus apps (SITS) are necessary to increase the passengers' satisfaction level and trust towards the service delivery.

6. It is recommended that this study be replicated with more extensive scopes. Land use catchment modelling of SMART bus services will help in providing an estimation of trip distribution based on the land use component and the trip distance along the route catchment. More frequent trips, shorter travel time and suitable drop off points can be achieved by reviewing the land use catchment and definitely encouraging the passengers to shift from private vehicle to public transportation as their main mode to reach their destination.
7. As for the implication, cost benefit analysis (CBA) on the routing catchment will bring a huge impact within the changes of operation cost and ensuring the sustainability of the free bus services.
8. Hence, embedded land use catchment modelling and CBA in the LOS assessment of free bus services should become parts of the main parameter in achieving a sustainable public transportation system in Malaysia. Further study using empirical evidence through quantitative approach on embedded land use catchment modelling and cost benefit analysis of routing catchment (CBA) into the LOS assessment is recommended.

ACKNOWLEDGEMENTS

This research was fully supported by Putra Grant UPM – Putra Young Initiative (GP-IPM/2018/9592500).

REFERENCES

Bachok, S., Osman, M. M., & Ponrahono, Z. (2014). Passenger's Aspiration Towards Sustainable Public Transportation System: Kerian District, Perak, Malaysia. *Procedia - Social and Behavioral Sciences*, 153, 553–565. https://doi.org/10.1016/j.sbspro.2014.10.088

Cats, O., Susilo, Y. O., & Reimal, T. (2017). The prospects of fare-free public transport: evidence from Tallinn. Transportation, 44(5), 1083–1104. https://doi.org/10.1007/s11116-016-9695-5

Chen, K. ., & Larry, S. . (2009). Determination of Level of Service (LOS) on Different Roads in Kuching Area (A Case study). UNIMAS *E-Journal of Civil Engineering*, 1(1), 1–6.

CJI Research Corporation. (2016). An Onboard Survey Of GoTriangle Passengers.

Cortés, C. E., Gibson, J., Gschwender, A., Munizaga, M., & Zúñiga, M. (2011). Commercial bus speed diagnosis based on GPS-monitored data. *Transportation Research Part C: Emerging Technologies*, 19(4), 695–707. https://doi.org/10.1016/j.trc.2010.12.008

Das, S., & Pandit, D. (2013). Methodology to determine level of service for bus transit in a developing country like India. Proceedings of CUPUM 2013: 13th *International Conference on Computers in Urban Planning and Urban Management* - Planning Support Systems for Sustainable Urban Development, 1–24.

Goodman, A., Jones, A., Roberts, H., Steinbach, R., & Green, J. (2014). "We Can All Just Get on a Bus and Go": Rethinking Independent Mobility in the Context of the Universal Provision of Free Bus Travel to Young Londoners. Mobilities, 9(2), 275–293. https://doi.org/10.1080/17450101.2013.782848

Haron, N. F., & Tahir, W. (2018). Assessing Bus Performance Rating in Kajang , Selangor. IOP Conf. Series: *Earth and Environmental Science* 140, 1–9.

Hu, X., Zhao, L., & Wang, W. (2015). Impact of perceptions of bus service performance on mode choice preference. *Advances in Mechanical Engineering*, 7(3), 1–11. https://doi.org/10.1177/1687814015573826

Ministry of Transport Malaysia. (2017). Statistik Pengangkutan Malaysia. In Statistik Pengangkutan Malaysia 2017. Retrieved from http://www.mot.gov.my/my/Statistik Tahunan Pengangkutan/Statistik Pengangkutan Malaysia 2017.pdf

Napiah, M., Kamaruddin, I., & Suwardo. (2011). Punctuality index and expected average waiting time of stage buses in mixed traffic. WIT Transactions on the Built Environment, 116(September 2014), 215–226. https://doi.org/10.2495/UT110191

Ponrahono, Z., Bachok, S., Ibrahim, M., & Osman, M. M. (2016). Assessing Passengers' Satisfaction Level on Bus Services in Selected Urban and Rural Centres of Peninsular Malaysia. *Procedia - Social and Behavioral Sciences*, 222, 837–844. https://doi.org/10.1016/j.sbspro.2016.05.183

Ponrahono, Z., Bachok, S., Mohamaed Osman, M., Ibrahim, M., & Abdullah, M. F. (2017). Public Bus Level of Service Performance in Peninsular. *Journal of the Malaysian Institute of Planners*, 15(1), 229–234.

Ponrahono, Z., Bachok, S., Osman, M. M., Ibrahim, M., Abdullah, M. F., & Abdullah, A. (2015). Assessing the urban and rural stage bus services disparities in Peninsula Malaysia. *Planning Malaysia,* 13, 65–84. https://doi.org/10.21837/pmjournal.v13.i5.140

Transportation Research Board. (2000). Highway capacity manual.

Transportation Research Board. (2013). Transit Capacity and Quality of Service Manual, Third Edition. In *Transit Capacity and Quality of Service Manual, Third Edition*. https://doi.org/10.17226/24766

Yaakub, N., & Napiah, M. (2011). Public bus passenger demographic and travel characteristics a study of public bus passenger profile in Kota Bharu, Kelantan. 2011 *National Postgraduate Conference - Energy and Sustainability*: Exploring the Innovative Minds, NPC 2011, 1–6. https://doi.org/10.1109/NatPC.2011.6136379

Received: January 2020. Accepted: 11th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 251 – 260

PROFILE OF AEDES BREEDING IN URBAN HIGH-RISE BUILDINGS: A CASE STUDY OF DENGUE OUTBREAK IN MALACCA, MALAYSIA

Wan Nor Fareeda W. Yahya[1], Nazri Che Dom[2]

[1] *Centre of Environmental Health and Safety, Faculty of Health Sciences*
UNIVERSITI TEKNOLOGI MARA
[2] *Integrated Mosquito Research Group (I-MeRGe), Faculty of Health Sciences*
UNIVERSITI TEKNOLOGI MARA

Abstract

An understanding of dengue vector ecology plays an integral role in the effective elimination of vector breeding sites. The aim of this study was to assess the profile of the breeding habitat of the Aedes mosquito in urban high-rise buildings in Malacca. This study utilized epidemiological data from 2013 to 2017 to determine the distribution of dengue cases and Aedes breeding sites in high-rise buildings. The Analytical Hierarchy Process (AHP) was used to evaluate the characteristics of Aedes breeding in high-rise buildings. In addition, the age and the total number of floors in the high-rise buildings were found to be important determinants of DF. The findings from this study will aid in the identification of target areas, which in turn can support future community-based search-and-destroy intervention efforts. Furthermore, the conclusions of this research may guide the future design and construction features of high-rise buildings in Malaysia, which in turn can contribute toward a holistic and sustainable environment in the country.

***Keywords**:* Aedes, dengue outbreak, high-rise buildings, Analytical Hierarchy Process (AHP)

[2] Associate Professor at Universiti Teknologi MARA Email: nazricd@uitm.edu.my

INTRODUCTION

Dengue fever (DF) is an important mosquito-borne viral disease that affects tropical and subtropical regions worldwide, predominantly in urban and semi-urban areas. The World Health Organization (WHO) has classified dengue fever as a major public health concern due to the expanding geographical distribution of both the virus and the mosquito vector. DF can be transmitted primarily by the *Aedes aegypti* (Linnaeus) as well as through the *Aedes albopictus* (Skuse) (Gubler, 1998). Both species have been found to be responsible for the transmission of the dengue virus in many urban areas in Southeast Asia, including Malaysia. The Aedes mosquito can be found breeding in proximity to human settlements, typically in natural and artificial water-holding containers, and the life-cycle of the vector is closely related to human activities. Among the preferred breeding sites of the vector are ant traps, earthen jars, flower pots, drums, concrete tanks, coconut shells, and discarded tyres (Paupy *et al.,* 2009; Dom *et al.,* 2013a, Dom *et al.,* 2013b). The rise in DF is of concern since there is no curative treatment for the viral disease. At present, abate, an organophosphate larvicide, is widely used for the control of dengue vectors in many parts of the world, including Malaysia.

The abundance of Aedes mosquitoes has had a negative impact on the quality of human life. The survival rate of the mosquitoes and the increase in dengue cases are influenced by several climatic factors. Among the governing parameters are rainfall, humidity, and warm temperatures (Barclay, 2007; Hii *et al.* 2009), which provide optimal conditions for mosquitoes to breed and expand into new territories. Malaysia has a tropical climate with an average temperature of 27˚C and an average rainfall of 250 cm. The high temperature, relative humidity and rainfall throughout the year provide ideal conditions for the Aedes mosquito to thrive and breed. Cheong *et al.* (2014) documented that human settlements and non-agricultural areas largely influence the incidence of DF. Aedes mosquitoes have been found indoors and outdoors in human settlements, especially in culverts, water compartments, metal drums, plastic drums, pails, gully traps, discarded containers, and solid waste dumps, open spaces, construction sites, and factories. Furthermore, it is claimed that buildings with flawed structural designs contribute to the transmission of dengue (Omonikweinka & Iyagba, 2005; Yee, 2014). This study was aimed at further investigating and analysing the research gap in the identification of Aedes breeding sites on building structures. The findings will be useful in guiding relevant policy and public health decision makers in tackling the root causes of dengue outbreaks in Malaysia and other countries with similar climate characteristics. Community empowerment in identifying breeding places is a key aspect in the prevention and control of dengue. The conclusions of this study will help to highlight potential areas of concern with the goal of strengthening the overall dengue prevention strategy framework.

RESEARCH BACKGROUND

Study Population

The Melaka Tengah district was selected as the main research site to study the distribution of Aedes breeding habitats in urban high-rise buildings. Melaka Tengah, with an area of 314 km^2, is the capital of the state of Malacca. It is comprised of 44 towns and 95 villages, the total population of which was more than 503,000 residents in 2016, of whom 303,000 were Malays (58%), 169,000 were Chinese (32%), 22,000 were Indians (4%), and the rest were of other ethnicities. This district is administrated by two local authorities, namely, Majlis Bandaraya Melaka Bersejarah (MBMB) and Majlis Perbandaran Hang Tuah Jaya (MPHTJ) (Figure 1).

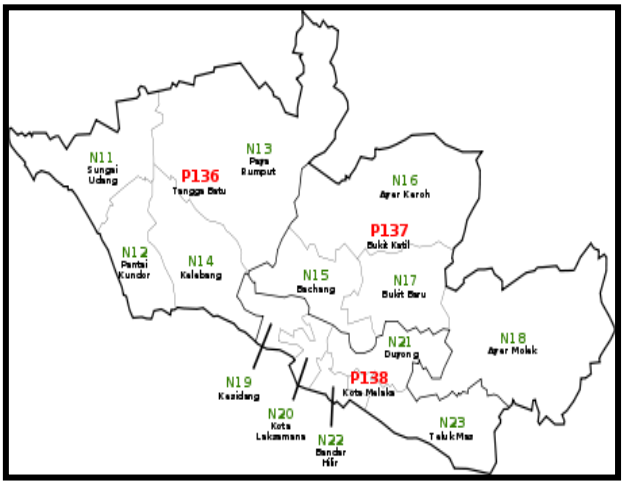


Figure 1: Administrate areas in Melaka Tengah. The red and green colours indicate the Parliament zone and DUN, respectively.

Study design

This study applied an integrated observational epidemiological approach to determine the distribution of dengue cases and outbreaks as well as the types of containers and the main problems in high-rise buildings. Data from January 2013 to December 2017 were extracted from the e-Dengue version 2.0 online system of the Vector-Borne Disease Control Sector of the Ministry of Health (MOH). The study design required "exposure information" for the complete profile of the breeding habitats of the Aedes mosquito in areas with dengue fever outbreaks from 2013 – 2017. The research methodology consisted of three phases, namely, (i) distribution pattern of DF in high-rise buildings, (ii) profile of Aedes breeding habitats in urban high-rise buildings, and (iii) evaluation of the main problems in high-rise buildings using AHP.

Data collection and management

The proposal for this study was submitted to the National Medical Research Register (NMRR) (NMRR-17-3503-38568 (IIR) for ethical clearance. This research utilized dengue surveillance data (DSD) collected from the Vector Control Division, Malacca State Health Department. The original DSD is a daily-based dataset compiled between 2013 and 2017 with a few attributes (year, month, type of container, mean AI, mean BI, mean CI, mean PI). The dataset consists of relevant information concerning the breeding habitats of the Aedes mosquito in high-rise buildings in Melaka Tengah from 2013 - 2017.

The preliminary phase of this study involved the determination of the distribution pattern of dengue outbreaks in high-rise buildings in the Melaka Tengah District from 2013 - 2017. In relation to the risk and exposure to DF, high-density population settlements in Melaka Tengah are associated with escalating incidences of DF cases. Moreover, the number of DF cases in Melaka Tengah is amongst the highest in Malacca compared to other districts. Even though the Melaka Tengah district has undergone extensive development, this study assessed the differences in the risk of exposure to DF and the distribution of outbreaks in specific premises in high-rise buildings between 2013 and 2017.

The aim of this study was to identify the distribution pattern of dengue outbreaks in high-rise residential buildings in the Melaka Tengah district, Malacca from 2013 to 2017. The data represented secondary data retrieved from the MOH. The cases were categorised into two groups; either single cases or outbreaks. The data were computed according to outbreak categories, namely, controlled, uncontrollable, and hotspot outbreaks. Only the data on the outbreaks were maintained for further analysis. The epidemiological data were aimed at determining the dengue risk areas in Melaka Tengah, while the mosquito breeding habitat data were aimed at demonstrating the major contributing factors to dengue outbreaks, and the breeding container data at correlating the source of the issues. The distribution and pattern of dengue outbreaks involving high-rise residential buildings in Melaka Tengah were selected for the study.

Two types of data were analysed, namely, the data on mosquito breeding habitats and types of breeding containers. This study integrated the environmental indicators and the demographic profile of the dengue vector distribution for the surveillance, monitoring and evaluation of dengue outbreaks. These in turn were correlated with the types of containers used for breeding, the locations of the containers (indoor/outdoor), the Aedes index (AI), Breteau index (BI) and Container index (CI) for the outbreaks, and the classification of the mosquito larvae species within residential areas to ensure that the type of larva belonged to the Aedes mosquito. The AI, BI and CI are commonly used to record Aedes mosquito infestation levels, and to evaluate the distribution and density of the mosquito species in a study area.

RESULTS AND DISCUSSION

Figure 2 illustrates the temporal pattern of DF cases in Melaka Tengah from 2013 - 2017. The number of DF cases increased in 2013, especially in the middle of that year, but gradually declined. Incidents surged in the early months of 2014 before fluctuating, and the highest peak was reached in 2015. Following this, the number of DF cases reported steadily declined from 2016-2017. The temporal pattern of DF cases in Melaka Tengah from 2013 - 2017 was subjected to further analysis. The results were divided into five fractions, namely I, II, III, IV and V, to represent the years 2013, 2014, 2015, 2016 and 2017, respectively. In order to determine the pattern of DF cases for each year, a simple linear regression approach was used to estimate the general pattern of DF cases in response to the months of the year. The plot of the monthly DF cases revealed increasing trends in the number of DF cases reported, the number of DF cases in outbreaks, and the number of DF cases reported in high-rise buildings in the Melaka Tengah district from 2013 to 2017. The number of DF cases due to outbreaks escalated significantly between the years 2014-2015 in high-rise buildings.

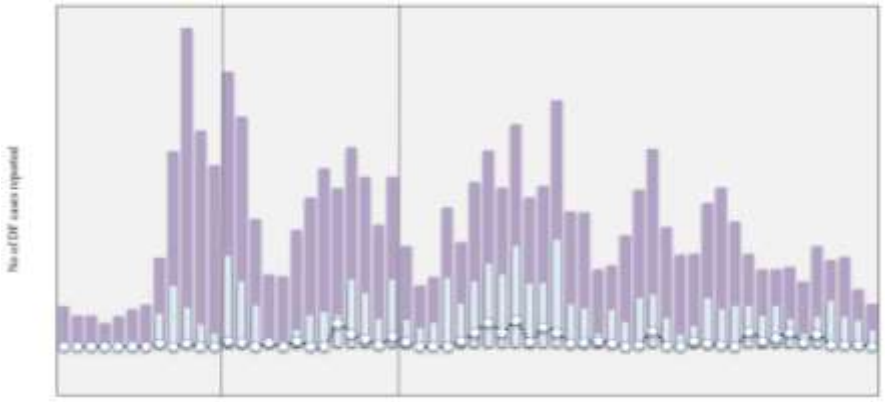


Figure 2: Temporal pattern of DF cases in Melaka Tengah from 2013 to 2017

All the data on DF outbreaks were categorized according to the outbreak status, namely; (i) controlled outbreaks, (ii) uncontrollable outbreaks, and (iii) hotspot outbreaks. Table 1 represents the total number of dengue outbreaks from 2013 to 2017, of which 12.5% of them were reported in high-rise residential buildings. The outbreak cases were classified as follows: 57 controlled outbreaks, 2 uncontrollable outbreaks, and 4 hotspot outbreaks.

Table 1: Distribution pattern of dengue outbreaks in Melaka Tengah district from 2013 to 2017 based on the status of the outbreak

Years	Total of Dengue Outbreaks	Total Outbreak Involve High Rise Residential Building	Percent	Classification of outbreaks in high-rise buildings		
				C1	C2	Hotspot
2013	37	2	5%	2		
2014	101	11	11%	11		
2015	149	18	12%	14	1	3
2016	120	16	13%	16		
2017	100	16	16%	14	1	1
Total	**507**	**63**	**12.5%**	**57**	**2**	**4**

Note: Control outbreak (C1) refers to locality with successfully of prevention action and end after 14 days. Uncontrollable outbreak (C2) refers to locality when there are occurred a new case after 14 days and Hotspot refers to locality reaches 30 days and beyond the day of the outbreak started (MOH, 2008).

Next, a total of 63 dengue outbreaks in Melaka Tengah were further analysed. Overall, 92% (58/63) of the outbreaks occurred in areas where there were positive mosquito breeding sites on their premises. 47.6% (30/63) of the outbreaks were positive for the *Aedes albopictus*, and 11.1% (7/63) for the *Aedes aegypti.* 33.3% (21/63) of the mosquitoes detected were of mixed breed (*Aedes aegypti* with *Aedes albopictus*), a finding that was comparable with previous reports. Table 2 highlights the risk categorizations of the outbreaks according to the mosquito indices. Out of the 63 outbreaks that were analysed, 202 of the breeding containers were positive with Aedes species. The controlled outbreaks revealed the highest number of positive breeding containers, with 32% (65/202) of the containers being found indoors, and 52% (106/202) outdoors in high-rise buildings. 3% (6/202) of the breeding containers were found to have mosquitoes breeding only in outdoor areas for the uncontrollable outbreaks. Positive breeding containers were also found in indoor and outdoor areas for hotspots, but at very low frequencies, accounting for 4% (8/202) and 9% (17/202), respectively.

Table 2: Risk categorizations of outbreaks according to mosquito indices

Status of Outbreak			Control	Uncontrollable	Hotspot
Breeding container (n=202)		Indoor (%)	65 (32)	0	8 (4)
		Outdoor (%)	106 (52)	6 (3)	17 (9)
Index type (n=63) (%)	Premise Index (PI)	< 1	24 (38)	1(2)	4(6)
		1-5	32(50)	1 (2)	0
		> 5	1 (2)	0	0
	Aedes Index (AI)	< 1	34 (54)	2 (3)	4 (6)
		1-4	22 (35)	0	0
		> 4	1 (2)	0	0
	Breteau Index (BI)	< 1	20 (32)	2 (3)	1 (2)
		1-4	37 (58)	0	3 (5)
		> 4	0	0	0
	Container Index (CI)	< 1	50 (79)	2 (3)	4 (6)
		1-10	6 (10)	0	0
		> 10	1 (2)	0	0

The controlled outbreaks, with a range of 1 to 5, recorded the highest PI (50%; 32/63) compared to the uncontrollable outbreaks (2%; 1/63), in the range <1 and 1 to 5, and the hotspot outbreaks (6%; 4/63) in the range of <1. For the outbreak status, the controlled outbreaks reported a high AI in the range of between 1 and 4 (54%) and > 4 (35%). This signified that most of the houses had positive breeding sites. None of the outbreaks had a BI of >4, and the controlled outbreak had a high BI value in the range 1 to 4 (58%; 37/63). However, several outbreaks revealed values of <1. A total of 88% (56/63) of the outbreaks had low levels of transmission based on the CI, 10% (6/63) of the areas had a moderate CI, and 2% (1/63) had a high CI. The mixed breeding of *Aedes albopictus* and *Aedes aegypti* was detected in containers from the controlled and hotspot outbreak areas.

In order to evaluate the problem of the breeding of the Aedes mosquito in high-rise residential buildings, five factors were identified and clustered according to their domain of influence, namely; (i) building structure, (ii) age of building, (iii) maintenance status, (iv) total number of residences, and (v) total number of floors. All the criteria were assigned different ratings on a scale of 1 (low relationship with dengue outbreak) to 7 (high relationship with dengue outbreak), according to a comprehensive analysis of the local data obtained by different analyses. The results obtained from a preliminary analysis of all the factor groups and criteria after evaluation are summarized in Figure 3. The most

significant factors were building structure, age of building, maintenance status, total number of residences, and total number of floors. Most of the problems were found to be related to the age of building (CR = 0.07) and the total number of floors (CR= 0.07). The results indicated that each factor had its own role in enhancing the transmission of dengue. The CR values were lower than 0.1, which indicated that the use of weights was suitable. The problems in high-rise buildings were derived by following the weighted linear combination method.

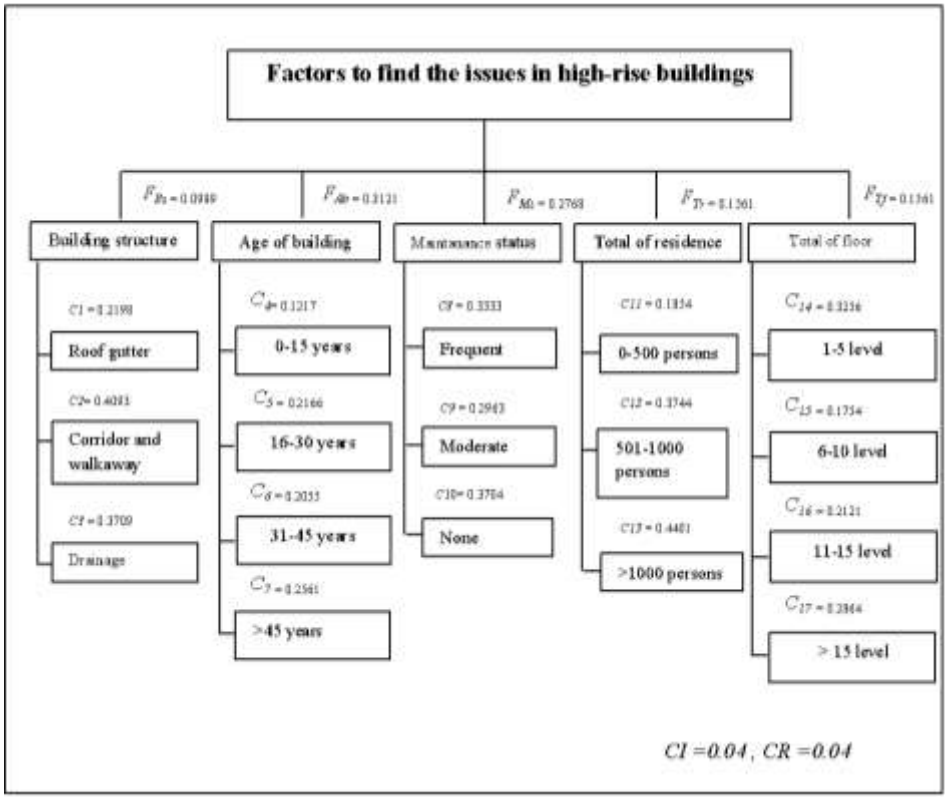


Figure 3: Weights of all the decision processes. The symbol (F) indicates the main criteria, and (C) indicates the sub-criteria.

The nature of the vector-breeding habitat is associated with the influence of the building design on the human social factor. The design of the high-rise buildings affects the assessment of certain residences. The body tasked with the management of high-rise buildings has failed in certain areas, including the lack of a septic tank management system, abandoned rain gutters, and poor air-well management. This was proven in the findings, where the public and the building management failed to achieve a satisfactory level of hygiene awareness. The behaviour and habits of people living in high-rise buildings, regardless of

their economic status, are still traditional when it comes to managing municipal waste. Despite a regular waste management collection schedule, the presence of illegal settlements is still evident. On the other hand, the results also revealed that kitchen utensils and other man-made containers were left uncovered outside. Malaysia, being a tropical country, experiences frequent rainfall throughout the year. Water tends to stagnate in the exposed containers, thereby providing breeding sites for the Aedes mosquito. The breeding sites point to the failure of the building management to systematically maintain gully traps and rooftops. These findings indicate that the building design and surrounding environment will affect the breeding habitat of the Aedes mosquito. DF outbreaks can be permanently controlled by improving the environmental conditions. The dengue transmission chain can be broken by destroying the habitats of the Aedes mosquito and halting the life cycle of the immature mosquitoes. Measures to prevent Aedes infestation can be made feasible by simply removing the stagnant water, which can be effectively achieved through public campaigns and vector control activities. The relationship between density and risk will vary temporarily, depending on factors like human social factors, population growth, uncontrolled and underserviced urbanization, and the deterioration of high-rise building infrastructures.

The key to effectively controlling DF outbreaks is to recognize high-potential transmission areas with the densest human and vector populations. The results of the present study demonstrated significant differences in the preferred breeding habitats, and highlighted potential areas of concern, which can form the baseline information in detecting the potential occurrence of DF outbreaks, especially involving high-rise buildings. The findings from this study provide insights that could help policymakers to formulate guidelines aimed at tackling the root causes of the escalating dengue crisis in Malaysia and neighbouring countries. In addition, such findings can give rise to greater community empowerment and enhanced social responsibility to aid in the identification, evaluation and elimination of breeding places, thereby helping to augment and strengthen the existing dengue prevention framework.

ACKNOWLEDGEMENTS

The contribution of research funding from Research Management Centre (RMC) Universiti Teknologi MARA (UITM), Universiti Teknologi MARA (UiTM) and Ministry of Higher Education (MOHE) Malaysia are also duly acknowledged.

REFERENCES

Achee N.L, Gould F, Perkins T.A, Reiner R.C Jr, Morrison A.C, Ritchie S.A, (2015). A Critical Assessment of Vector Control for Dengue Prevention. PLoS Neglected Tropical Disease 9 (5); e0003655

Aidil Roslan, Aziz Shafie, Romano Ngui, Yvonne Ai L.L, Wan Yusoff W.S (2013). Vertical Infestation of the Dengue Vectors Aedes Aegypti And Aedes albopictus In Apartments In Kuala Lumpur, Malaysia. *Journal of the American Mosquito Control Association*, 29(4):000–000

Cheong, Y.L., Leitao, P.J. & Lakes, T. (2014). Assessment of land uses factors associated with dengue cases in Malaysia using Boosted Regression Trees. Spatial and Spatio-temporal Epidemiology, (10),75-84.

Dom, N. C., Ahmad, A. H., Ishak, A. R., & Ismail, R. (2013a). Assessing the risk of dengue fever based on the epidemiological, environmental and entomological variables. *Procedia-Social and Behavioral Sciences*, (105),183-194.

Dom, N. C., Ahmad, A. H., & Ismail, R. (2013b). Habitat characterization of Aedes sp. breeding in urban hotspot area. *Procedia-Social and Behavioral Sciences*, (85), 100-109.

Gubler, D.J (1998). Resurgent Vector-Borne Diseases as a Global Health Problem. Emerging Infectious Diseases, 4(3), 442-450

Hii, Y.L., Rocklöv, J., Ng, N., Tang, C.S., Pang, F.Y. & Sauerborn, R. (2009). Climate variability and increase in intensity and magnitude of dengue incidence in Singapore. *Global Health Action*, (2).

Monica Danial , Subramaniam S., Yoon C.K, Ong L.M (2016). External Factors Governing Dengue Outbreaks and Practices Associated in Curbing Dengue Infections among Population in Northern Malaysia *International Journal of Health Sciences & Research* (www.ijhsr.org). 6 (5).

Nazri Che Dom, A. Abu Hassan, Z. Abd Latif and Rodziah Ismail (2011). *Colloquium on Humanities, Science and Engineering Research*. Impact of Climate and Land Use Variability Based on Dengue Epidemic Outbreak in Subang Jaya, 907 – 912. doi:978-1-4673-0020

Omonikweinka, R.R. & Iyagba, A. (2005). The Menace of Sick Buildings: A Challenge to All For Its Prevention and Treatment. Lagos: University of Lagos Press.

Paupy, C., Delatte, H., Bagny, L., Corbel, V., & Fontenille, D. (2009). Aedes albopictus, an arbovirus vector: from the darkness to the light. Microbes and Infection, 11(14), 1177-1185.

Wan-Norafikah, O, Nazni, W.A., Noramiza, S, Shafa'ar-Ko'ohar, S. Azirol-Hisham, A., Nor-Hafizah, R., Sumarni, M.G., Mohd-Hasrul, H., Sofian-Azirun, M. and Lee, H.L (2012). Distribution of Aedes Mosquitoes in Three Selected Localities in Malaysia. *Sains Malaysiana* 41(10): 1309–1313

Wan-Norafikah, O, Nazni, W.A., Noramiza, S, Shafa'ar-Ko'ohar, S., Azirol-Hisham, A., Nor-Hafizah, R., Sumarni, M.G., Mohd-Hasrul, H., Sofian-Azirun, M. and Lee, H.L (2010). Vertical dispersal of Aedes (Stegomyia) spp. in high-rise apartments in Putrajaya, Malaysia. *Tropical Biomedicine* 27(3): 662–667

Yee, F.P. (2014). Authorities need to get to root cause of dengue fever problem. *The Star*, Kuala Lumpur.

Received: January 2020. Accepted: 13th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 2 (2020), Page 261 – 272

URBAN LIVABILITY INDICATORS FOR SECONDARY CITIES IN ASEAN REGION

M. Rafee Majid[1], D. G. Pampanga[2], Musarrat Zaman[3], Noradila Ruslik[4], I.N. Medugu[5], M.S. Amer[6]

[1,4,6]*Faculty of Built Environment and Surveying*
UNIVERSITI TEKNOLOGI MALAYSIA
[2]*Graduate School*
UNIVERSITY OF MINDANAO
[3]*Faculty of Social Sciences*
BANGLADESH UNIVERSITY OF PROFESSIONALS
[5]*Faculty of Environmental Science*
NASARAWA STATE UNIVERSITY, NIGERIA

Abstract

Urban livability indicators have tremendous influence on policies and growth trajectories of cities or metropolises to the benefit of their communities. Livability is a threshold for measuring the social dimension of people wrought by exogenous factors like infrastructure, environment, social cohesion, transportation, health and education, among others. This research is aimed to generate prototype urban livability indicators for secondary cities in Southeast Asia, benchmarked on the livability indicators of Iskandar Malaysia, Davao City in the Philippines and Makassar in Indonesia. A three-round iterative Delphi survey (scoping, convergence, and consensus) was conducted to pre-qualified 60 experts with equal representations from the three metropolises. The significant phase was the scoping where experts have to supplement the given framework for their aspired urban livability sub-indicators under specific domain indicators. In the convergence phase, reconsideration of sub-indicators and preliminary ranking of domain indicators using the 5-point Likert Scale's degree of agreement and Kendall's W coefficient of concordance were performed. In the consensus phase, both domain indicators and sub-indicators were ranked separately and assigned corresponding weightings. With the total of 108 framework-based and supplementary sub-indicators categorized under the 11 domain indicators, the study conclusively yielded 75 common, comparative, interconnected, and consistent urban livability indicators ranked according to the aspiration of stakeholders in three ASEAN secondary cities. This research, through the employ of robust methodology, has generated comprehensive composite urban livability indicators for secondary metropolitan settlements in Southeast Asia; thus, the resulting final indicators can be potentially engaged to determine a comparative urban livability index of cities in the ASEAN region.

***Keywords**:* Urban indicators, ASEAN, urban livability, Southeast Asia, Delphi

[1] Professor at Universiti Teknologi Malaysia (UTM); Email: rafee@utm.my

INTRODUCTION

The dynamic reconfiguration of urban settlements brought by the confluence of unrelenting urbanization through demographic shifts from rural to urban areas, growth of natural population, and sustained economic affluence continue to alter the traditional spatial and social landscapes of cities in ASEAN (Association of Southeast Asian Nation) region. Added to these are the consequential effects of unmanaged environmental issues as well as impacts of climate change especially to urban centers with so much to lose in terms of lives and properties. Evidently, the convergence of these challenges defines clear manifestation that livability of urban centers is at risk. Thus, the need for enhanced urban livability-based metrics to be embedded in policy-making would steer policy shifts, including the required livability-driven urban infrastructures and services are necessary inputs to create and sustain urban livability in Southeast Asian cities and metropolises.

Livability and Livable City

Livability denotes to the subset of sustainability impacts (Litman, 2011) that directly affects people's lives in a community such socio-cultural, economic development and well-being, and including the protection of the environment of present inhabitants and the future generation (Timmer and Seymoar, 2005; Ji, 2006). Timmer and Seymoar (2005) underscored that comprehensive urban spatial and environmental planning are the key factors towards urban livability, thus sustainable urbanization. Vliet (2002) indicated that available employment should pay a living wage, urban basic services, access to quality educational opportunities, universal health care, decent and affordable housing, clean environment, secure and safe communities, and should be characterized with good governance and the absence of discriminatory norms. On the other hand, Kapoor (2011) gave some positive statements for a livable city that indicates conditions of the urban environment, health facilities, urban infrastructure, and accessibility to recreational facilities.

In sum, a livable city should have the characteristics that satisfy the necessities of its urban residents through the provision of basic infrastructure hardware, with vibrant economy, accessibility to social infrastructure, environment-oriented development paradigm, free from social disorder, the capacity to secure its citizen from the hazards of the changing climate, and cognizant to comprehensive spatial planning.

Some livability conundrums in ASEAN cities

The rapid urbanization and phenomenal economic growth of most cities in Southeast Asia has been the key driver for an improved quality of life of its urban citizens. However, as the population of ASEAN region continues to be unabated, which is projected to grow 9.5% to 720 million in 2025 with 46% of the population living in cities and metropolises by 2020 (UN-Habitat, 2010), key

urban centers in this region will continue to be plagued by a myriad of livability issues that could potentially obstruct its trajectory toward establishing livable and sustainable urban centers. In the same vein that urbanization increases disparity in income and in social inequality that can adversely affect social capital and cohesion and in the worst of cases exclusion of access to home ownership, education, welfare and healthcare, among others.

Inadequate urban public housing where unabated proliferation of informal settlements in Ho Chi Minh City (UN-Habitat, 2010; ISOCARP, 2010) and the problem of affordability and inequality in Hanoi (Tran and Yip, 2008) continue to exist, while housing quality and access to basic urban services continue to deteriorate in Palembang, Pontianak and Kalimantan in Indonesia (Chomistriana, 2011). Malaysia has to grapple with concern on governance, and decent and affordable housing (UN-Habitat, 2010), while Metro Manila in the Philippines has approximately 43% of the 13 million people residing in illegal settlements (Steinberg, 2011). In Indonesia, an estimated 65% of the total urban population has no access to piped water (Asian Trends Monitoring, 2010), Bangkok has inadequate health services and deteriorating sanitation, while Myanmar's urban indicators for health and well-being, compares poorly to other ASEAN countries.

Most Southeast Asian cities are vulnerable to natural calamities such as flooding. Cities in the Philippines, Thailand, Indonesia and Malaysia are prone to coastal flooding. In Southeast Asia, approximately 25.5 million urbanites in 10 cities are at flood risk (ADB, 2012). Issues such as safe streets, adequate urban transportation, accessibility to medical and health institutions, comprehensive land use planning, and the alarming issue on the prevalence of increasing social exclusion which could lead to furtherance of a severe divide between rich and poor, are also prevalent that could hinder the promotion of livability of cities in Southeast Asia.

The significance of indicators

Indicators communicate movements and patterns in a given society as well as offer prospective action to afford important changes in a community. It is used to monitor and assess a particular situation systematically (Friedman, 2005), while the UN Food and Agriculture Organization stressed that indicators support decision-making and management. It "quantifies and aggregates data that can be measured and monitored to determine whether change is taking place. But in order to understand the process of change, the indicator needs to help decision-makers understand why change is taking place" (FAO, 2002). Hezri (2004) emphasized that indicators are a mechanism for effective communication and managerial tool used by decision makers (Alibegovic and De Villa, 2008). Livability indicators are vital to operationalize the sustainability concept in planning and the development of the city. More often, architects of indicators

believe that indicators simplify multifaceted sets of data as well as offer distinct perception of the larger image. For planners, measuring urban livability through indicators would enable them to create a livable city as they can put their concentration on areas where there are weaknesses (Balsas, 2004).

The study is a pioneering agglomeration study for Malaysia, the Philippines and Indonesia or conceivably for the ASEAN region. This empirical gap is basically underpinned on the absence of any comprehensive urban livability indicators framework which is significant to the promotion of sustainable urbanization. This endeavors for the establishment of appropriate and well-defined and comprehensive livability indicators anchored within the concepts of comparability, interconnectedness, and consistency among cities in the ASEAN region. These thematic concepts in the development of urban livability indicators would serve as operational basis for the prospective studies in working out the indexes that has to be constructed based on the three city-models as basis for a comprehensive development of policy-driven urban livability indicators.

The study aims to develop appropriate urban indicators geared towards sustainable urban development that would serve as basic framework for evaluating urban livability of ASEAN secondary cities with Iskandar Malaysia in Malaysia, Davao City in the Philippines and the City of Makassar in Indonesia as city-models. The participation of expert-stakeholders from each city-model was sought to choose preliminary urban livability indicators through the study's framework-based indicators and supplementary indicators.

METHODS

The generic Delphi toolkit (Day and Bobeva, 2005) was used to obtain the most reliable statistical summary of the group responses (Dalkey and Helmer, 1963) and established adequate expert consensus to make a forecast or assignment of values believable or useful (Shields *et al*., 1987). The four key features for defining the procedure are: anonymity, iteration, controlled feedback, and the analyzed and statistical aggregation of group response (Rowe and Wright, 1999). The execution of a Delphi survey in this study secured a three-round iteration scheme. The primary and most significant process was the expert selection criteria, panel size, expertise, recruitment approach, and finally the establishment of members of the expert- panel which is composed of academicians with postgraduate qualifications (32%), professionals/practitioners/NGOs (32%), local government executives (33%) and entrepreneurs (3%).This study has a total of 60 experts from the three selected secondary cities where each was given equal representation with 20 experts.

First Round (Scoping Phase) – Survey questionnaires were sent to experts through e-mail and personal hand-in. Experts were to choose from the 76 sub-

indicators, categorized under 11 domain indicators which are *(a) Urban Infrastructure and Service, (b) Climate resilience and Disaster Preparedness, (c) Protection of Urban Environmental Resources, (d) Choices and Access to Quality Education, (e) Pubic Health and Wellness Services, (f) Social Equality and Security, (g) Urban Recreation and Accommodation Facilities, (h) Dynamism and Promotion of Local Economy, (i) Social Cohesion and Connectedness, (j) Ease in Urban Transportation and Mobility, (k) Good Governance,* which they believe to be the most important urban livability indicators based on the framework. Additionally, they were asked to suggest supplemental sub-indicators which they saw fit under any of the domain indicators. The result as well as the analysis were initially performed and circulated to the expert-respondents in the second round. This phase has likewise determined the number of expert-respondents who participated in the survey which was significant information in terms of panel management.

Second Round (Convergence Phase) – The consolidated results of the scoping phase were circulated to the same panel of experts which were included in the second questionnaire. This phase has directed the experts to reconsider their choices of sub-indicators in the light of the consolidated results from the first round. Similarly, this round further requested the experts to state their preliminary degree of agreement (ranking) on the domain indicators using the 5-point Likert Scale ranging from 1 = strongly disagree to 5 = strongly agree.

Third Round (Consensus Phase)– Results of both the reconsidered choices of sub-indicators and the initial ranking of domain indicators were included in the final survey questionnaires. This phase has asked the experts to provide their degree of agreement on both the sub-indicators and the domain indicators using the 5-point Likert Scale. The use of the Likert Scale is consistent with Delphi scaling (McKnight *et al*., 1991) allowing the experts to rank the extent of their agreement with the indicators (Hemphill, *et al*., 2002).
To validate the consistency of the rankings and to normalize the weights, Kendall's *W* coefficient of concordance (Wallis, 1939; Yeung *et al*., 2007; Donohoe, 2011) was used to determine the existence of an implicit agreement which necessarily indicates the existence of correlation (Altman and Bland, 1983). The ranking of indicators is statistically significant when W=1, while W=0 means all the experts ranked the indicators entirely dissimilar. (Altman and Bland, 1983).

RESULTS

First Round - The Scoping Phase
The scoping phase intends to gain a common understanding of the 11 domain indicators vis-à-vis its respective sub-indicators. Essentially, scoping determines

merely the scope and content that takes forward the preliminary determination of significance made in screening to the next stage of the resolution (Weber and Ladkin, 2003). Thus, this initial process determines which sub-indicators are considered important and increases the likelihood of adequately prepared urban livability sub-indicators.

This phase has generated 108 urban livability sub-indicators which include 32 supplementary sub-indicators proposed by the panel of experts. The comportment of experts supplementing the framework-based indicators infers that there is a profound self-involvement in the generation of urban livability indicators which are reflective of the realities within the confines of their urban communities. This insightful supplementation by the panel of experts ran parallel to the precept that experts and social scientists have the most important facilitative role in establishing unanimity in the process of indicator development (Alibegovic and de Villa, 2008) and enhances credibility to the whole process (Hezri, 2004).

Second Round – The Convergence Phase

This round has allowed the selected sub-indicators in the scoping phase to undergo reconsideration by the experts as to its potency as suitable urban livability indicators. Of the 108 sub-indicators from The Scoping Phase, a total of 75 sub-indicators where 68 are framework-based and seven (7) are supplemental sub-indicators passed this Convergence Phase to be eligible for the final round. The inclusion of a sub-indicator to the final list was qualified through the 50% frequency score cap. The supplemental indicators have provided greater foundation that subscribes to the concept of community ownership of the indicators. Simultaneously, preliminary determination of the degree of agreement of experts on 11 domain indicators was performed using the 5-point response alternatives of Likert Scale. Table 1 shows that the mode of each domain indicator indicates a conclusive summation that there exists a high degree of agreement among experts. The use of the mean is valuable to providing the overall average response.

Table 1. Preliminary Ranking of Domain Indicators

Domain Indicators	Mode	Mean	Overall rank
Urban infrastructure and services	5	4.9	1
Protection of urban environmental resources	5	4.65	2
Good governance	5	4.55	3
Ease in urban transportation and mobility	5	4.48	4
Climate resilience and disaster preparedness	5	4.47	5
Public health and wellness services	5	4.47	5
Choices and access to quality education	4	4.33	7
Social equality and security	4	4.23	8
Urban services, recreation & accommodation facilities	4	4.22	9
Dynamism and promotion of local economy	4	4.17	10
Social cohesion and connectedness	4	3.78	11

Kendall's W = 0.6274 *Source: Pampanga, 2017*

The preliminary ranking of domain indicators was further put to test and validated by employing the non-parametric Kendall's *W*. After running the preliminary ranking, it yielded a coefficient of concordance *W* of 0.6274. The resulting level of concordance coefficient indicated a fair degree of agreement among the members of the panel of experts.

Third and Final Round – The Consensus Phase

The strength and validity of the concluding indicators has evolved with the use of fundamentally scientific approaches and some research complexities through established research methods and applied models. Throughout this study, the critical object was to develop appropriate urban livability indicators framework suitable for secondary cities in the ASEAN region through the consensus of expert-stakeholders from Iskandar Malaysia, Davao City and Makassar. Hence, the concept of operational indicators and the synthesizing of the set of indicators were substantially considered throughout this study. Table 2 shows the conclusive composite urban livability indicators for secondary cities in Southeast Asia with both the domain and sub-indicators ranked with corresponding weightings.

Table 2. Synthesis of Urban Livability Indicators for Secondary Cities in Southeast Asia

Rank	***Domain Indicator***	***Sub-indicator***	***Rank***	***Kendall's W***	***Weighting***
1	***Urban Infrastructure and Services (Weighting: 0.10014)***	*affordable quality public housing*	*1*	*0.9357*	*0.159*
		telecommunication with global network	*2*		*0.151*
		safe and orderly sidewalks and overpasses	*3*		*0.150*
		access to potable drinking water	*4*		*0.139*
		availability of public spaces for public event	*5*		*0.139*
		access to electricity	*6*		*0.138*
		affordable house rentals	*7*		*0.123*

2	***Good Governance (Weighting: 0.09911)***	*accountable city officials* *transparency in government transactions* *local & national laws properly implemented* *government employee's performance* *citizen participation in policy making process* *responsive to needs of citizens*	*1* *2* *3* *4* *5* *6*	*0.7712*	*0.179* *0.178* *0.176* *0.173* *0.151* *0.143*
3	***Protection of Urban Environmental Resources (Weighting: 0.09911)***	*solid waste management system* *air quality* *drainage system* *sanitary landfill* *protection of natural waterways* *water quality*	*1* *2* *3* *4* *5* *6*	*0.8182*	*0.173* *0.167* *0.166* *0.166* *0.165* *0.163*
4	***Ease in Urban Transportation and Mobility (Weighting: 0.09704)***	*quality of urban transportation system* *urban transport connectivity* *quality of urban road network* *availability of transport & traffic mgmt system* *alternative modes of urban mass transport* *pedestrian sidewalks free from vendors* *availability of bicycle lanes** *reasonable public transport fare* *availability of road signs**	*1* *2* *3* *4* *5* *6* *7* *8* *9*	*0.9266*	*0.123* *0.122* *0.121* *0.115* *0.113* *0.112* *0.109* *0.093* *0.092*
5	***Climate Resiliency and Disaster Preparedness (Weighting: 0.09257)***	*flood control system* *availability of risk reduction facilities* *citizen participation in risk assistance* *availability of geo-hazard info. to citizens* *disaster response system**	*1* *2* *3* *4* *5*	*0.9425*	*0.217* *0.206* *0.203* *0.193* *0.182*
6	***Public Health and Wellness Services (Weighting: 0.09119)***	*urban medical/health centres* *availability of universal medical insurance** *ratio of medical officer to 1000 population* *ratio of hospital bed to 1000 population* *response to medical emergencies* *average cost of hospital room/per day*	*1* *2* *3* *4* *5* *6*	*1.000*	*0.183* *0.178* *0.166* *0.164* *0.159* *0.150*
7	***Social Equality and Security (Weighting: 0.08878)***	*crime rate incidence* *well-lighted streets and thoroughfares* *technology in crime response & public safety* *ratio of crime solution to crimes committed* *access of differently-abled to establishments* *crime prevention measures"* *ratio of police to population*	*1* *2* *3* *4* *5* *6* *7*	*0.9739*	*0.161* *0.159* *0.151* *0.138* *0.136* *0.131* *0.124*
8	***Choices and Access To Quality Education (Weighting: 0.08465)***	*ratio of teachers with graduate level education* *number of schools of higher learning* *education centres for out-of-school youth* *teacher-student ratio in elementary level* *percent of high school drop-out*	*1* *2* *3* *4* *5*	*0.9661*	*0.217* *0.215* *0.206* *0.194* *0.168*

9	***Urban Services, Recreation and Accommodation Facilities (Weighting: 0.08465)***	*public markets* *public parks* *supermarkets* *shopping malls* *recreation centres* *public library** *hotels/inns/lodging houses* *religious facilities**	*1* *2* *3* *4* *5* *6* *7* *8*	*0.7550*	*0.138* *0.134* *0.138* *0.138* *0.138* *0.119* *0.108* *0.105*
10	***Dynamism and Promotion of Local Economy (Weighting: 0.08396)***	*employment rate* *growth rate of private investments* *ease in business licensing for new enterprise* *rates of local taxes* *cost of rent of office space* *average income* *incentives to new investors* *inflation rate* *gross city domestic product per person*	*1* *2* *3* *4* *5* *6* *7* *8* *9*	*0.9313*	*0.134* *0.127* *0.126* *0.111* *0.104* *0.103* *0.103* *0.097* *0.095*
11	***Social Cohesion and Connectedness (Weighting: 0.07811)***	*respect of tradition of diverse ethnic cultures* *community resilience and adaptability* *participation in social activities* *religious tolerance** *sense of local community* *volunteerism* *access to social network*	*1* *2* *3* *4* *5* *6* *7*	*0.8962*	*0.170* *0.153* *0.146* *0.145* *0.140* *0.130* *0.117*

**supplemental indicators* *Source: Pampanga, 2017*

In the summary results, all sets of sub-indicators were ranked with robust unanimity when tested with Kendall's *W*. Except for the sub-indicators under the domain indicator Public Health and Wellness Services with the perfect $W = 1.000$ as shown in Table 2, the rest have relatively high *W's* ranging from 0.7712 (Good Governance) to 0.9739 (Social Equality and Security). It can be argued that the members of the expert panel have a collective view on indicators of urban livability with respect to the three city-models.

The domain indicators were also characterized with common properties as the sub-indicators. The *mode* in Rounds 2 and 3 remain relatively unchanged, while the *mean* scores vary insignificantly; this does so with the ranking of the domain indicators. Significantly important was the testing of the ranking through Kendall's *W* which gave a higher degree of agreement with 0.8369 compared to 0.6274 in Round 2, implying the experts were finally in comparative consensus in the ranking of the domain indicators. Finally, corresponding weighting was performed as potential input to perform urban livability index.

Noteworthy that these urban livability indicators are the expressed desires generated via consensus of the survey respondents and are reflective of the needs of urban residents for improved quality of life. It neither serves the interest of transient visitors nor any multinational firms for purposes of relocating their executive staff; though it would most likely interest them. These indicators

are basically transition boards for ASEAN cities towards building more livable and sustainable urban future.

CONCLUSION AND RECOMMENDATION

The concluding urban livability indicators framework characterizes the relative aspiration of citizens in Southeast Asia for livable urban society towards inclusive growth and sustainable development. It is unequivocally apparent that cities in the ASEAN region (as explicitly shown by the three city-models) share common and connected challenges in making livable and sustainable cities. The essentiality of ranking of the indicators convey baseline information of experts' urban knowledge, due to their profound exposure to urban environment and richer repertoire of various urban constructs, thereby professing deeper understanding to ensure a livable urban milieu.

In the ASEAN context, the unequivocal process of determining and ranking of domain indicators (with its respective sub-indicators) as shown in Table 2, has provided significant thematic priorities that would serve as a transition to spur action towards livable and sustainable urban cities. Apparently, the overriding argument of the challenges confronting the ASEAN urban communities is the necessity to improve its livability in the face of unrelenting urbanization; and in furtherance to have an inclusive comprehension as to how ASEAN can generate growth in the economy, including social equality and egalitarian economy.

The urban livability framework generated by this study can be expanded through the creation of a broad and integrated framework involving major cities and urban centers in the ASEAN is essential. This process involves the harmonization of significant issues and concerns that are considered vital in the promotion of urban livability and sustainability. Currently, there is the absence of a theoretically rigorous and empirically grounded framework to evaluate urban livability in the ASEAN perspective within the sustainability nexus of economic-social-environmental paradigm. At this instance, the development of an advanced ASEAN urban livability framework is thus imperative to define and measure urban livability and to determine where a city lies in its transition towards the achievement of its sustainability goals. Therefore, a comparative study on ASEAN cities' urban livability index is significantly imperative and this current study would basically serve as a preliminary platform. The livability index would substantially aid cities in member countries to have common benchmarks that would harmonize livability goals towards sustainability and competitiveness of One ASEAN.

Finally, the authors unequivocally believe that livability or sustainability principles are fundamental in shaping sustainable urbanization challenges and competitiveness of the ASEAN economic community today and the future.

ACKNOWLEDGEMENT

The authors would like to acknowledge the support of the Ministry of Education Malaysia through its Fundamental Research Grant Scheme (R.J130000.7852.5F065).

REFERENCES

Alibegovic D. J. & De Villa, Z. K. (2008). The role of urban indicators in city management: a proposal for Croatian cities. *Transition Studies Review.* 15:63–80. Netherlands: Springer.

Altman, D.G. & Bland, J.M. (1983). Measurement in medicine: The analysis of method comparison studies. *Statistician.* 32: 307–317.

Asian Development Bank (ADB) (2012). *Key Indicators for Asia and the Pacific 2012* (43rd ed.) Mandaluyong City, Philippines: ADB 2012.

Asian Trends Monitoring. (2010). *Good Water Governance Matter*. Bulletin 15. Lee Kuan Yew School of Public Policy, Singapore.

Balsas, C. J. L. (2004). Measuring the livability of an urban center: an exploratory study of key performance indicators. *Planning Practice & Research*, 19(1), 101-110. Carfax Publishing, Taylor & Francis Ltd.

Chomistriana, D. (2011). Indonesia: Neighborhood Upgrading and Shelter Sector Project-Toward Cities without Slums. Inclusive Cities, Florian Steinberg and Michael Lindfield (eds). Asian Development Bank, (p. 47-63).

Dalkey, N.C.& Helmer, O. (1963). An experimental application of the Delphi method to the use of experts. *Management Science 9*. 458–467.

Day, J. and Bobeva, M. (2005). A generic toolkit for the successful management of Delphi studies. *The Electronic Journal of Business Research Methodology*, 3(2), 103–116.

Donohoe, H.M. (2011): A Delphi toolkit for ecotourism research, *Journal of Ecotourism*, 10:1, 1-20

Food and Agriculture Organization of the United Nations (2002). *Pressure-State-Response Framework and Environmental Indicators*. Retrieved from: http://www.fao.org/ag/againfo/ programmes/en/lead/toolbox/refer/envindi.htm

Friedman, M. (2005). *Trying Hard is not Enough. How to Produce Measurable Improvements for Customers and Communities*. Trafford Publishing.

Hemphill, J., McGreal, S. and Berry, J. (2002): An aggregated weighting system for evaluating sustainable urban regeneration. *Journal of Property Research*. 19(4), 353-373.

Hezri, A. A. (2004). Sustainability indicator system and policy processes in Malaysia: a framework for utilization and learning. *Journal of Environmental Management*. 73:357–371.

Ji, B. (2006). The Livable City: The Chinese Perspective and a Plan for Beijing. CPAFFC. (p. 12). Beijing.

Kapoor, A. (2011). *Livability Index 2011: The Best Cities in India.* Institute for Competitiveness. Development Management Institute, Gurgaon: India

Litman, T. (2011). Sustainability and Livability: Summary of Definitions, Goals, Objectives, and Performance Indicators. Victoria Transport Policy Institute.

Pampanga, D. (2017). *Urban Livability Indicators for Secondary Cities in Southeast Asia*. Unpublished Thesis. Department of Urban and Regional Planning. Faculty of Built Environment, Univesity Teknologi Malaysia, Johor Bahru, Malaysia.

Rowe, G. and Wright, G. (1999). The Delphi technique as a forecasting tool: issues and analysis. *International Journal of Forecasting.* 15 (1999) 353–375. Elsevier.

Shaffer D. and Vollmer, D. (2010). *Pathways to Urban Sustainability: Research and Development on Urban Systems: Summary of a Workshop.* National Research Council of the National Academies. The National Academic Press. Washington, D. C.

Steinberg, F. (2011). *Philippines: Strategic Private Sector Partnerships for Urban Poverty Reduction in Metro Manila.* Inclusive Cities, F. Steinberg and M. Lindfield (eds). Metro Manila, Philippines: Asian Development Bank, (p. 64-82).

Timmer, V. and Seymoar N. K. (2005). *The Livable City. World Urban Forum 2006 for Sustainable Cities.* Vancouver Working Grp Discussion Paper. Inter. Center. Canada.

Tran, Hoai-Anh and Yip, Ngai-Ming (2008). Caught between plan and market: Vietnam's Housing Reform in the transition to market economy. *Urban Policy Research.* 26(3), 309-323.

UN-HABITAT (2010). *The State of Asian Cities 2010/2011.* UN Human Settlements Programme (UN-HABITAT) Regional Office for Asia and the Pacific, Japan.

Vliet, Willem van. (2002). Cities in a Globalizing World: From Engines of Growth to Agents of Change. *Environment & Urbanization.* Vol. 14. No. 1 April 2002.

Wallis, W.A. (1939). The correlation ratio for ranked data. *Journal of American Statistics Association.* 34: 533–538.

Weber, K. and Ladkin, A. (2003). The convention industry in Australia and the UK: Key issues and competitive forces. *Journal of Travel Research*. 42, 125–132.

Yeung, J.F.Y., Albert P. C., Chan, A.P.C., Daniel W. M., Chan, D.W.M. and Li, L.K. (2007). Development of a partnering performance index (PPI) for construction projects in Hong Kong: a Delphi study. *Construction Management and Economics*. 25:12, 1219-1237

Received: January 2020. Accepted: 14th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 273 – 288

RESIDENTS' PERCEPTION OF LIVABILITY: A CASE STUDY OF QUAID-E-AZAM TOWN (TOWNSHIP), LAHORE, PAKISTAN

Siddiqa Amin[1], Hafiza Saba Islam[2], Attiya Haseeb[3], Atia Saleemi[4]

[1,2,3,4] *Faculty of City and Regional Planning Department,*
LAHORE COLLEGE FOR WOMEN UNIVERSITY, LAHORE

Abstract

Livability is a concept that has various dimensions and is used to measure the Quality of Life (QOL). In the context of Pakistan, most of the cities/neighbourhoods are not planned to look like livable cities/neighbourhoods. Lahore, the capital of Punjab, was ranked at 199th position in 2015 as per Economist Intelligent Unit's (EIU) livability ranking. This research article focused on a planned neighbourhood (Quaid-e-Azam Town (Township) Scheme) to assess the perception of residents' regarding livability in their area. A framework of research has been developed based on seven indicators of livability: Housing, Neighbourhood, Transportation, Environment, Health, Engagement, and Opportunities. A total 998 respondents were surveyed for each indicator and analysed using Statistical Package for Social Sciences (SPSS). The analysis showed that Health and Environmental indicators are at the lowest level as compared to other indicators of livability. Moreover, livability can be improved if road networks are made efficient and recreational activities are increased as livable neighbourhoods can help to improve the QOL of residents, which is one of the determining factors in achieving liveability in general and QOL as whole.

Keywords: Livability; Residents' Perception; Quality of Life; Quaid-e-Azam Tow

[1] Assistant Professor at Lahore College for Women University, Lahore. Email: plnr_sidika302@hotmail.com

INTRODUCTION

The concept of livability was first introduced in the United Nation's Habitat Conference in 1996, that every city should be habitable (Worawej Onnom, 2018). The ideology of livability was also adopted by The Electors Action Movement (TEAM), an urban reform party in Vancouver, in the last 70's. The TEAM used the term livability to replace the growth-centred approach by socially progressive humane policy (Kaal, 2011). In general, the term livability has no precise definition, but is used as synonymous with QOL. The definition varies from one culture to another and from time to time (Benjamin L., 2014).

Sometimes, describing livability seems to be like sketching a utopia, a place which is safe and secure, socially stable, economically viable, and environment friendly (Kaal, 2011). The coin of livability has two faces. One is livelihood and the other is sustainability. For a city to be livable, it must put both sides of the coin together providing the livelihood for its citizens in ways to preserve the environment (Evans, 2002). Livability can be termed as an umbrella with a variety of meanings. These meanings vary with objects of measurement and perspective of those who are taking these measurements (Rania Nasr Eldi, 2017). To sum up livability or livable city, it can be an ideal situation where every resident/citizen enjoys all the perspectives of life in general and maintains QOL as whole (P. Setikanti, 2011).

The contemporary planning approaches are linked to livability since World War-II when Gross Domestic Product (GDP) was the standard measure of economic development. The drawback of GDP was that it did not account for factors such as pollution, environmental degradation, resource depletion, and human liberty. Consequently, several other city development indices have been developed in addition to GDP and livability index (Worawej Onnom, 2018). Numerous indices and measurement tools were developed over the last three decades to rank cities according to their amenities and opportunities. Various rankings have been published annually, among which the most notable include the Economist Intelligence Unit's (EIU) livability ranking (EIU (Economist Intelligence Unit), 2014), the Mercer Quality of Living Survey, and the Organisation for Economic Cooperation and Development (OECD) Better Life Index (BLI) (Kashef, 2016).

Researchers have defined numerous key dimensions of livability. For instance, Heylen defined livability as an individual's perception about the environment and their living/housing conditions. Throsby described livability in terms of tangible and intangible features such as housing, public infrastructure, and social network. His focus was also on cultural capital that can improve the livability (Hashim, 2010). Kevin Lynch presented five dimensions of a livable city, i.e., vitality, sense, fit, access, and control. Meanwhile, Balsas summed up all dimensions with viability. Balsas defended it in economic terms that it is the ability of a city which attracts continuous investment (Balsas, 2010). All these

aspects are covered in Wheeler's description of livability, i.e., safe public places, affordable and decent housing, proper recreational facility, and accommodating community (Hashim, 2010).

The world is becoming more urbanised in the last few decades. It is projected that the cities will be accommodating 70% of the world's population in urban areas by 2050. The overgrowth of urban population varies from region to region; however, it is expected that half of the urban population will be in Asian cities (Tan Khee Giap, 2014). Similar phenomenon has been observed in Pakistan. It has experienced rapid urbanisation (57%) in a few decades. As per census 2017, total population was 207.774 million with annual growth 2.4, and 36% of this population live in urban areas. The comparative status of the urban population of provinces shows a similar trend with a slight increase in Punjab. However, amongst the provinces, Sindh is the most urbanised province with 50.02 percent population living in urban areas (Ministry of Statistics, 2017). This increase in urban concentrations has raised the need to focus QOL in cites. Cities are dominant for living and working, and are continuously going through the process of degradation of environment over pollution which in turn affects their livability (Sofeska, 2017). Therefore, livability has become a vital factor for large cities, particularly in developed countries where environment and sustainability are the main concerns (Jiao WANG, 2011). The Economist Intelligence Unit's (EIU) published its annual Global Liveability Ranking 2017, which ranked 140 cities for their urban QOL based on assessments of their stability, healthcare, culture and environment, education, and infrastructure. As per report, Karachi was ranked at 134th position among the ten least livable cities in the world. (EIU, 2017). The Mercer Quality of Living Survey is the world's largest human resources consulting firm that creates livable cities' ranking. Mercer analysed 450 cities throughout the world. As per the ranking report 2017, Islamabad stood at 194th position, Lahore ranked at 202, and Karachi came at 204. Hence, there is a dire need to find out the factors which ranked our cities at the lowest positions.

The purpose of this research paper was to analyse the perception of the residents in evaluating various attributes and variable dimensions of livability. Some of the parameters were evaluated in terms of identification of needs and some in the form of satisfaction levels but not in total. Regarding social services, the quality of the services, from poor to excellent mode, was also assessed. That was why we did not limit the title under the heading "the identification of needs or satisfactions". This paper will help in finding out the ways and means to improve the livability of the city as in the EIU ranking of 2015, Lahore stood at 199th position.

There are numerous factors which contribute toward making a city worth living. The constituents of livability are complex. They include natural, socio-economic, and environmental factors. Residential patterns, commercial

activities, and workplace environment can make a city a desirable place to live (Southworth, 2016). There are different techniques to assess the cities' livability, which depend upon the unique characteristics of the area. A single indicator can measure a component of livability while indices evaluate the overall livability of an area. A framework for this research has been developed on the basis of various literature reviews which are most relevant to the case study area (Table-1).

Table-1: The selected livability indicators and sub indicators

Sr. No.	Indicator	Sub-Indicator
1	Housing	Type of Housing (Permanent or Temporary)
		Problems Faced during the Last 12 Months
2	Neighbourhood	Proximity To Destinations, like Grocery, Parks, Libraries, and Workplaces
		Safe and Walkable Neighbourhood
3	Transportation	Convenient Transport Options
		Street Signs
4	Health	Health Behaviours
		Health-Care Services
		Quality of Health Services
5	Environment	Air Quality
		Water Quality
6	Engagements	Civic and Social Engagements, like Cultural, Art, and Entertainment Institutions
7	Opportunity	a) Economic and Educational Opportunities

MATERIAL AND METHODS

The methodology used for the research started with a review of literature regarding basic concepts of livability, its origin, and indicators. This research was undertaken in Quaid-e-Azam Town, commonly known as Township, a neighbourhood comprising 2,775 acres, and located in the Nishter Town (Figure-1). A drain (Sattu Katla) passes in the middle of the scheme and the neighbourhood is surrounded by major roads, i.e.,

North: PECO Road (150 Feet)
East: Madar-e-Millat Road (60 Feet)
West: College Road (100 Feet)
South: Muhammad Hussain Road.

Township is one of the largest residential neighbourhoods in Lahore, which was conceived under Colombo Plan in 1962-63. The scheme was planned and designed by Punjab Housing and Town Planning Agency (PHATA). The allotment of the plots was started in 1971 and completed in 1986. After the completion of development works, it was taken over by Lahore Development Authority (LDA) for its management and maintenance. The town has been divided into five sub-divisions and eight sectors, as shown in Table-2. A total of 22,727 residential plots of various categories, ranging from 4.5 Marla to 4 Kanal, were planned besides provision of health, educational, commercial, religious, and recreational sites to cater the needs of the inhabitants. Industrial estate, spanning over two sectors for medium- and small-scale industries, ranging from 1 Kanal to 25 acres, was also planned to create job opportunities for the inhabitants of the scheme. A total number of 771 commercial sites, including mohallah shops, were provided in the scheme. Apart from the creation of the plots, the PHATA has also constructed 7,210 one-room nucleus houses on 4.5 Marla plots. All the residential plots have since been allotted. The scheme has fully been colonised (Lahore Development Authority, 2018).

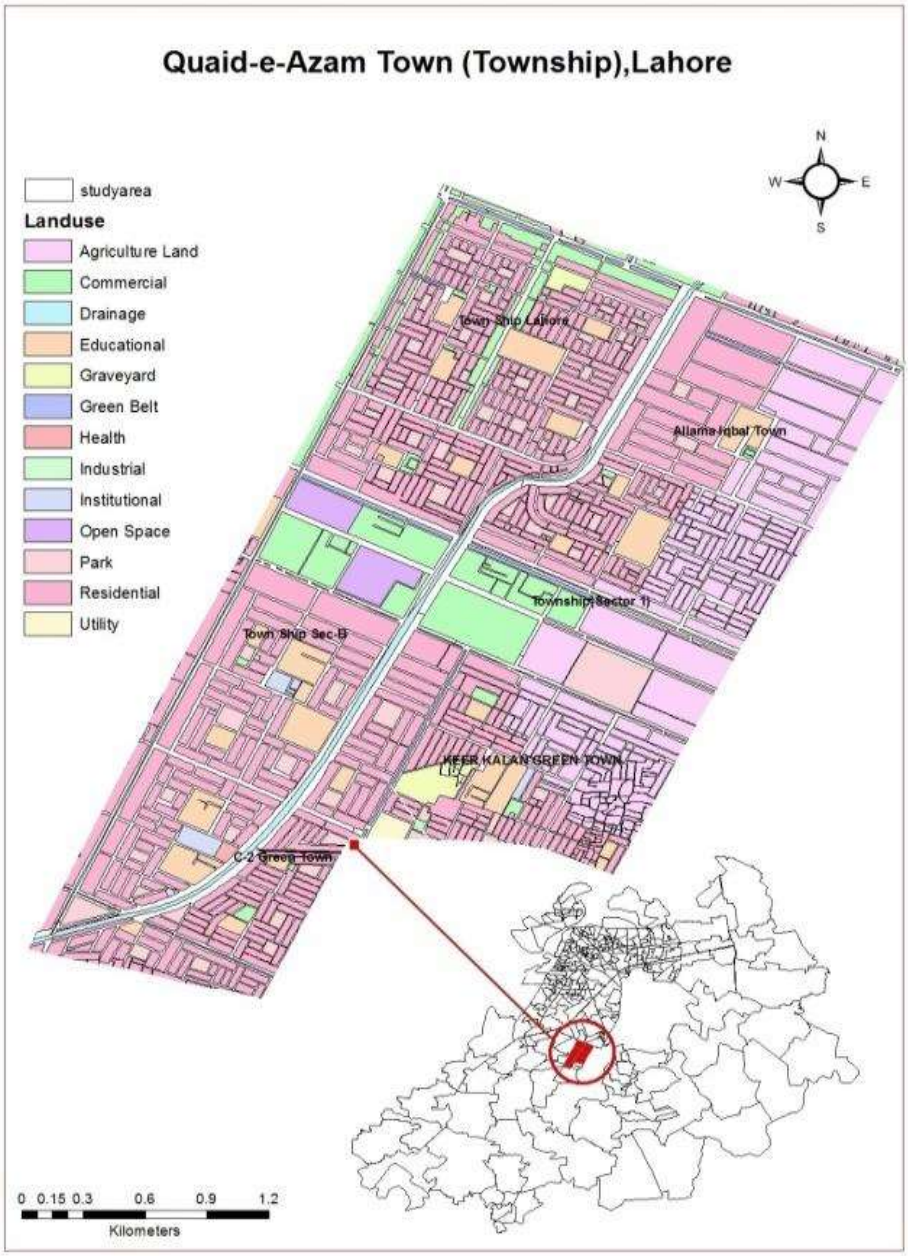


Figure-1: Map showing location and land uses of Quaid-e-Azam Town, Lahore

Table-2: Residential Sector of Quaid-e-Azam Town (Township)

Sub division	Sectors	Blocks
Township A	A1 A2	A1: Government Employees Co-operative Housing Estate (GECH), A2: Blocks 1,2,3,4,5,6
Township B	B1 B2	Blocks 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16
Township C	C1 C2	Residential
Township D	D1 D2	Residential

Source: Lahore Development Authority, 2018

Table-3: Plot Distribution in Quaid-e-Azam (Township)

Sr. No.	Plot Category	No.	Percentage
1	4 Kanal	246	1
2	2 Kanal	357	2
3	1.5 Kanal	40	0.2
4	1 Kanal	1079	5
5	10 Marla	3739	16
6	5 Marla	8572	38
7	Quarters	8694	38
Total		22,727	100

Source: Lahore Development Authority, 2018

A checklist was prepared and used for assessment of livability indicators in a case study which involved different indicators and sub-indicators, like Housing Neighbourhood, Transportation, Environment, Health, Engagement, and Opportunities. According to these criteria, for the level of availability and satisfaction of respondents, each parameter and its sub-indicators were framed. After completion of the assessment process, levels were altogether used for scoring the society (Figure-7). A comprehensive questionnaire was formulated on the basis of livability indicators defined in the earlier section. Apart from this, the questionnaire also contained demographic questions that included socio demographic information. Among them, open-ended questions were used to gauge information regarding livability, perceptions of facilities, experiences living in the neighbourhood, and opinions about livability. A pilot test was carried out before the actual survey to test the workability and communicability of the questions. Changes to the survey were minimal and involved clarifying unclear

items. This research used a random sampling technique for interviewing the residents. A total of 998 questionnaire-based interviews were conducted to gauge peoples' satisfaction level towards livability in their community. For the effectiveness of the survey, residents from all categories of plots were selected to provide more appropriate data for the evaluation of the livability indicators. The results obtained were analysed using SPSS software to get the correlation matrix between different variables.

RESULTS & DISCUSSION

From April 2018 to June 2018, a total of 998 questionnaires were completed. The respondents were composed of 87% males and 13% females. The number of Households (HH) ranged from 2-3 while household size varied from 2-5 persons.

Table- 4: Socio Demographic Information of Quaid-e-Azam Town (Township)

Category		Frequency	Percentage
Gender	Male	868	87
	Female	130	13
Livability	Familiar	519	52
	Unknown	479	48
Ownership Status	Owned	938	94
	Rented	60	6
Family structure	Single	569	57
	Nucleus	40	4
	Joint	389	39
Family Size	2 Persons	50	5
	3 Persons	180	18
	4 Persons	90	9
	5 Persons	659	66
	6 Persons	20	2
Years of Residence	10 years	60	6
	20 Years	160	16
	30 Years	349	35
	40 Years	399	40
	50 Years	30	3

About fifty percent of the respondents were living in the case study area for more than 30 years. Plot size ratio was considered while surveying, i.e., 70% of the survey were conducted on the residents of smaller plots. Trends of owned

houses are prominent in our culture and were found the same in the case study area, i.e., more than 90% of the residents owned houses.

Before taking their perception regarding the different variables of livability, the residents were asked about their awareness of the term "livability". The results revealed that 52% of the respondents were familiar with this terminology. Analysis of all livability indicators are presented under the following sub-heads.

I. HOUSING INDICATORS

The first and foremost aspects which come under housing are its adequacy and affordability. The residents were asked about the various problems faced throughout last year. The contours of housing problems included affordability, security, adequacy, and suitability. Majority of the respondents (48%) were of the view that housing is not affordable as they have to spend more than thirty percent of their income for the maintenance of their houses. Meanwhile, 29% identified security as their main concern. 12% responded that suitability is a major problem. Inadequacy was the interest of 11% respondents. As indicated earlier, HH varied from 2-3, which in turn, reflects the inadequacy (Figure: 2).

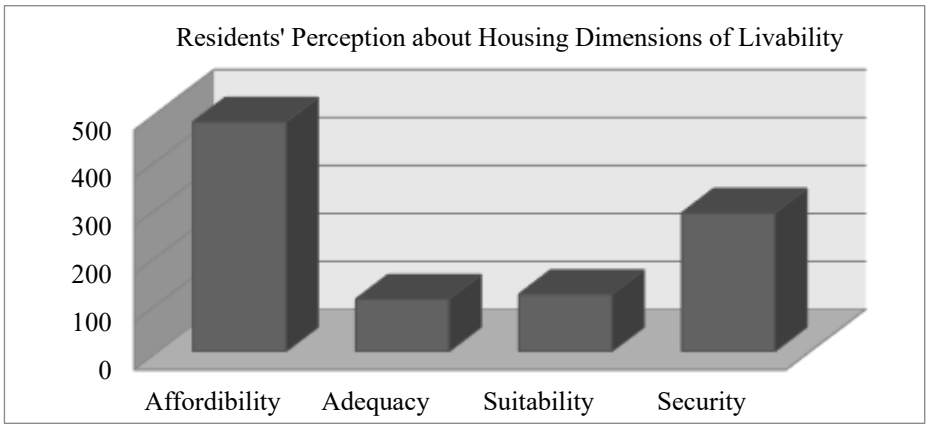


Figure 2 - SEQ Figure * ARABIC 1: Residents' Perception about Housing Dimension of Livability

II. NEIGHBOURHOOD INDICATORS

A wide range of potential indicators, which play an important role in livability of a neighbourhood, were identified and assessed under the category of neighbourhood indicators which included accessibility and proximity to schools, parks, libraries, shopping areas, as well as, easy and convenient transportation services for job places. The most reachable thing as per the views of the residents (97%) was access to shopping (grocery/stores) while the least reachable was the

libraries as the neighbourhood does not have a single library. As far as accessibility to parks is concerned, these were accessible as stated by 87% of the respondents. Nevertheless, they were not satisfied with the maintenance and management of the parks. The accessibility to workplaces through various public modes of transportation was satisfactory as stated by the 99% of the respondents.

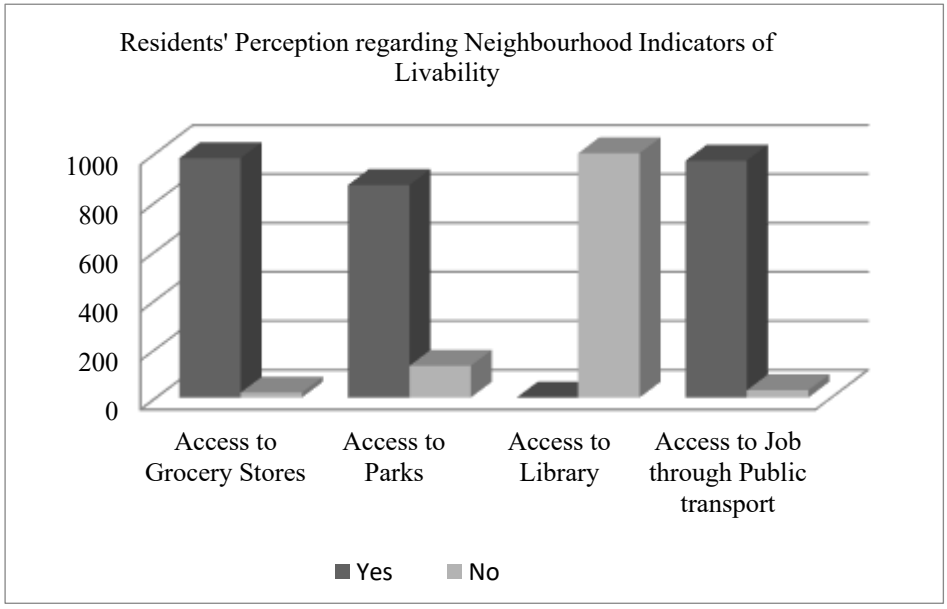


Figure-3: Residents' Perception regarding Neighbourhood indicators

III. TRANSPORTATION INDICATORS

The perceptions of the residents for convenient transport options were also evaluated. As far as the availability of local public transport services was concerned, most of the residents (94%) were satisfied with their availability, but satisfaction regarding the frequency of transport serviced was low as compared to its availability, i.e., 67%. The element of congestion was present in the case study area as mentioned by 90% of the respondents while 88% of them had experienced good walking trips in the same area.

Aged people are particularly vulnerable during community disasters because of their limited mobility. Indicators for the transportation matrix were safe streets for elderly people and safe driving conditions. The streets were not safe and driving conditions were not suitable as the respondents showed dissatisfaction due to absence of speed breakers and high crash rate (Figure-4).

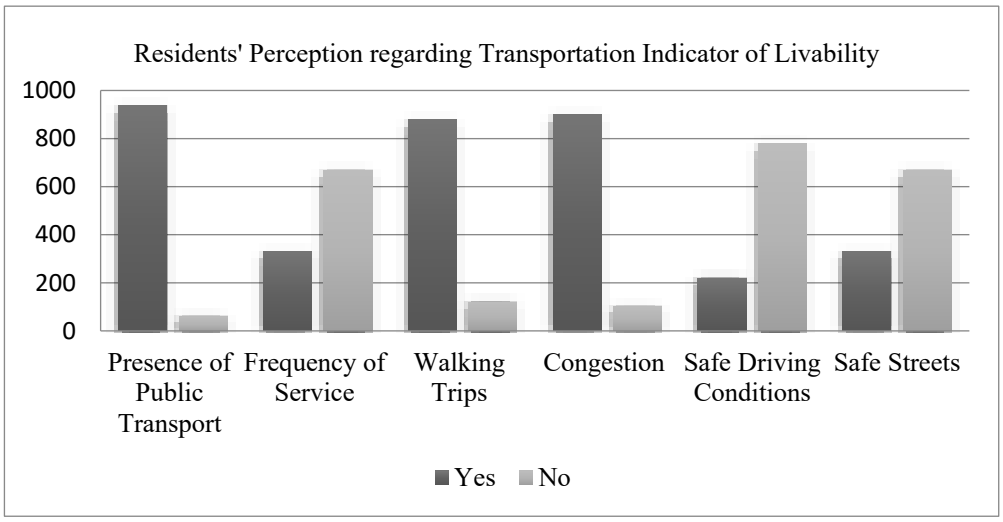


Figure-4: Residents' Perception about Transport Indicators of Livability

III. ENVIRONMENTAL INDICATORS

Air quality is one of the main indicators under environmental concerns. Majority of the residents (52%) were satisfied with the air quality in their area while 48% residents were dissatisfied. Most of these were the roadside residents who were facing air pollution due to vehicular emissions. Water quality is a measure of the conditions of water relative to the requirements of human need or purpose. The residents were not satisfied (83.7%) regarding the quality of drinking water provided in the area (Figure-5).

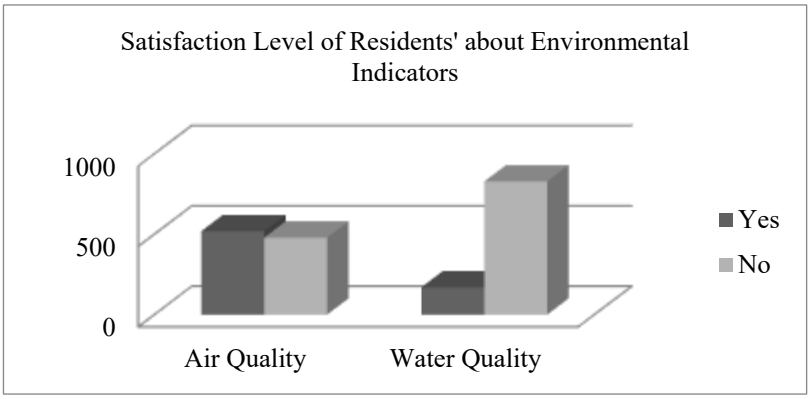


Figure-5: Residents' Perception about Environmental Indicators of Livability

IV. HEALTH INDICATORS

The factors which were examined under the category of healthy behaviours included availability of healthy food, access to health care and quality of services, and access to exercise opportunities. Different opinions were received from the residents. With respect to availability of healthy food, the majority of the people (88%) seemed satisfied. As far as the access to health care services was considered, diverse responses were received. 55% of the respondents considered their neighbourhood as a healthcare professional shortage area. Satisfactory responses were received from 62% of the respondents regarding the presence of health care units (basic health units). Meanwhile, for the Presence of Preventive Health Program, 58% respondents were satisfied. The number and type of health care providers in a community, as well as access to hospitals and preventative services, can indicate how well a community is able to meet the medical needs of its residents. In the township, accessibility to hospital was poor, i.e., 71% of the respondents were dissatisfied as there is no public sector hospital available in the near vicinity and residents have to travel to Jinnah hospital for the medical services. In terms of access to exercise facilities, half of the respondents were satisfied while half of them were not (Figure-6).

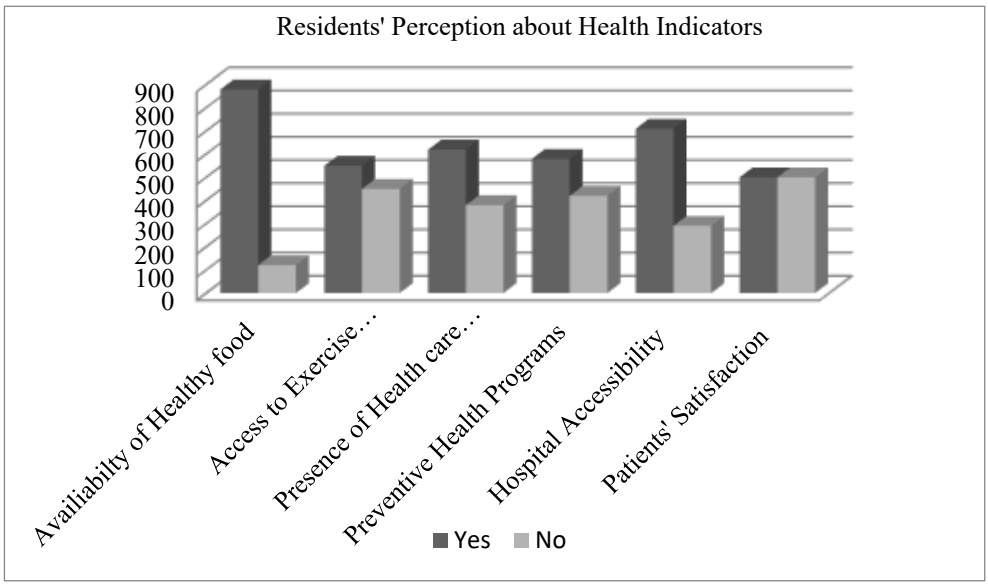


Figure-6: Residents' Perception about Health Indicators of Livability

VI. ENGAGEMENT INDICATORS

Identifying civic and social engagement arrangements in township schemes is very important to measure livability and helps older people to remain civically and socially engaged to maintain health and QOL in the neighbourhoods. Respondents were asked about their opportunities for civic involvement and majority (59%) were satisfied. About the presence of cultural, arts, and entertainment institutions, hundred percent of the residents were dissatisfied. However, cent percent were satisfied with the presence of general retail and services in the area.

VII. OPPORTUNITY INDICATORS

As the economic opportunity is one of the indicators in the opportunity matrix considered for equal opportunities for jobs/equal income distribution throughout all strata of society, on the contrary, the majority of the respondents in almost all sectors of township stated that income inequality existed in the area. Income resources were found to be distributed unevenly. Furthermore, the economic opportunity in terms of job availability, there were more-than-two- jobs holding people in some of the houses. Considering collectively, 77% of the respondents were doing two jobs to meet their needs.

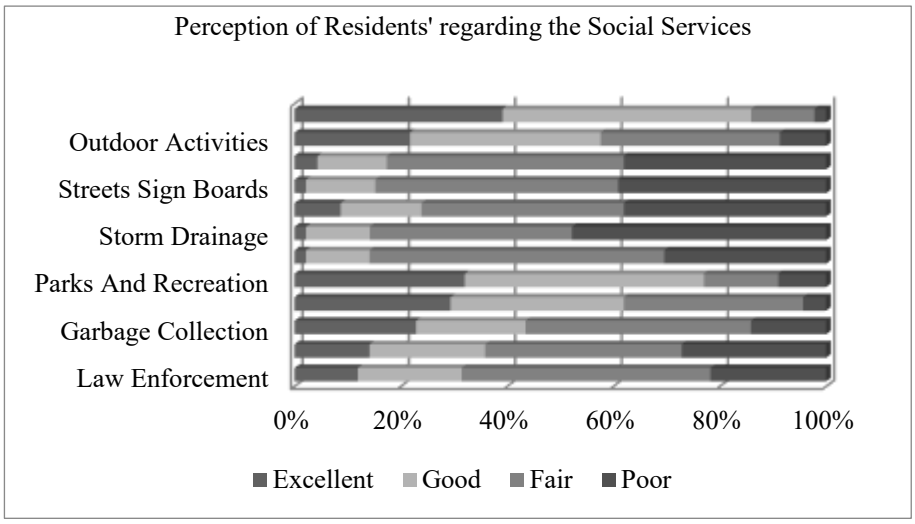
VIII. SCORING OF SOCIAL SERVICES

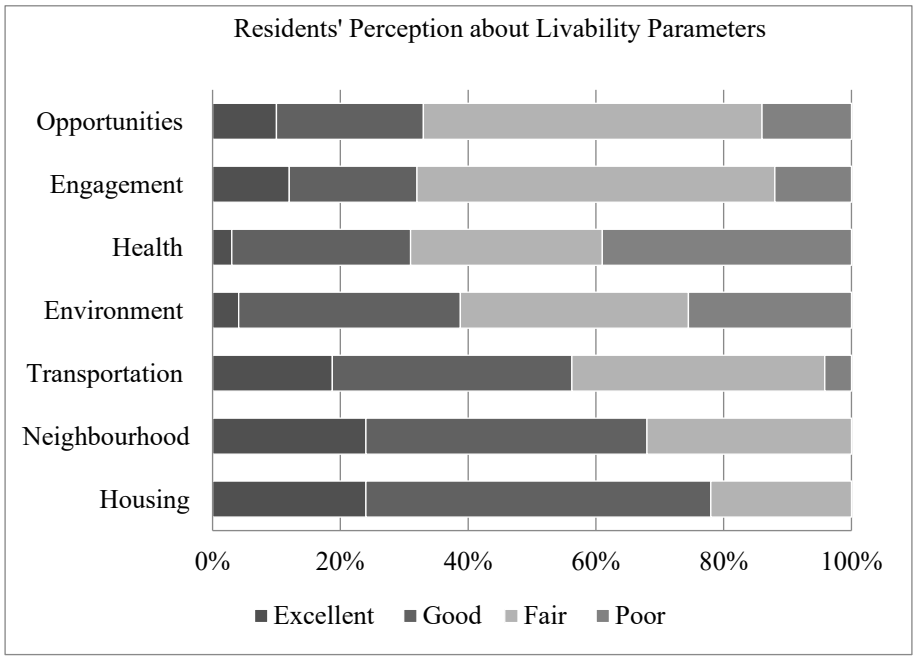
Residents were asked to score the social services as Excellent (10-07), Good (07-05), Fair (05-03), and Poor (03-0) in Township (Figure-7).

- Majority of the residents (48% & 37%, respectively) rated Law Enforcement and Neighbourhood Security as Fair.
- For the collection of Garbage, most of respondents (42%) scored it under Fair category.
- For the Road/Street System, 34% marked as Fair while 33% marked it as Good.
- For availability of Sidewalks and Pedestrian Safety, 55% rated under Fair category, whereas 30% rated it as Poor.
- 38% of the residents rated the Street Lighting as Poor and the same percentage of respondents marked it as Good.
- For availability of Streets Sign Boards, 46% residents rated it as Fair while 39% rated it as Poor.
- Most of the respondents (44%) rated fair for the information received through Public Sign Boards; however, 38% of the residents marked it under the Poor category.
- For the availability of Parks and recreational activities, most of the residents (44%) have rated them as Good, and 34% of the residents

marked this service as Excellent. Meanwhile, 4% of the respondents' rate was under the Poor category.

- For the Storm Drainage, the majority of the respondents (48%) rated it as Poor, i.e., below 3, while 38% rated it as Fair.
- To rate Outdoor Activities, the majority (36%) of the residents marked it as Good, 34% rated it as Fair, and only 8% rated it as Poor.





CONCLUSION

This study has assessed the perception of livability from the perspective of residents. The finding of this study has provided a better understanding of the issues related to livability in Quaid-e-Azam Town (Township). There are no rules or regulations for achieving liveability. The study's result suggests a lower satisfaction level for various livability indicators.

The major issues faced by the residents were inadequate health facilities, deteriorated road condition, fewer frequency of public transport, vehicular emissions causing air pollution, poor water quality, and poor law enforcement. The highest satisfaction level was observed for accessibility to shopping (grocery/stores). To improve the livability of the town, health services should be improved and the maintenance and management of parks/recreational areas be made. It is therefore recommended that while planning for a housing scheme/a neighbourhood, all aspects of livability must consider public authorities and private consultants.

REFERENCES

A.Zanella, A. T. (2014). The Assessment of Cities' livability intregrating Human Wellbeing and environment impact. *Springer Science*, 695-726.

Balsas, C. J. (2010). Measuring the livability of an urban centre: an exploratory study of key performance indicators. *Planning, Practice & Research*.

Benjamin L., S. (2014). Spatial Pattern of Urban Livability in Himalayan Region: A Case of Aizawl City, India. *Social Indicator Research* , 541-559.

Blassingame, L. (1998). Sustainable Cities: Oxymoron, Utopia or Inevitability? *The Social Science Journal*, 1-13.

Chidambar S. Dudgikar, R. S. (2017). Comparing Indicators of "Livability" of Oregon, Melbourne, Bijing and Bhopal. *International Journal of Engineering Research and Technology*, 133-138.

DArio Gallares Pampanga, M. R. (2015). Appropriate Urban Livability Indicators for Metropolitan Johor, Malaysia via Expert-Stakeholder. *International Journal of Built Environment and Sustainability*, 301-316.

EIU, T. E. (2017). The Global Liveability Report 2017.

Evans, P. (2002). Livabile Cities? Urban Struggles for Livelihood and Sustainability . London, England: University of California Press.

Hashim, J. L. (2010). Liveability Dimensions and Attributes:Their Relative Importance in the Eyes of Neighbourhood Residents. *Journal of Construction in Developing Countries*, 67-1.

Jiao WANG, M. S. (2011). A comparative study of Beijing and three global cities:A perspective on urban livability. Earth Sci., 323–329.

Jingjing Liu, P. N. (2017). Urban livability and tourism development in China: Analysis of sustainable development by means of spatial panel data. Habitat International, 99-107.

Kaal, H. (2011). A conceptual history of livability . City analysis of urban trends, culture, theory, policy, action, 533-547.

Kashef, M. (2016). Urban Livability across disciplinary and professional boundaries. *Frontiers of Architectural Research* , 239-253.

Ministry of Statistics, S. D. (2017). Provincial Summary Results of 6th Population and Housing Census-2017.

P. Setikanti, I. D. (2011). Traditional Settlement Livability in creating sustainable living. International Settlement Livability in creating sustainable living, (pp. 204-211).

Rama U. Pandey, D. Y. (2010). A Framework for Evaluating Residential Built Environment Performace for Livability . *Institute of Town Planners, India Journal*, 12-20.

Rania Nasr Eldi, D. A. (2017). Urban Livability Dimensions in the Egyptian New Cities. Case study: Sheikh. Research Gate.

Shuhana Shamsuddin, N. R. (2012). Walkable Environment in increasing the Livability of a city . *ASEAN Conference on Environment-Behaviour Studies*, (pp. 167-178). Bangkok.

Sofeska, E. (2017). Understanding the livabilty in a city through smart solutions and urban planning towards developing sustainable livable future of the city of Skopje. *Procedia Environmental Sciences*, 442-453.

Southworth, M. (2016). Learning to make livable cities. Journal of Urban Design.

Tan Khee Giap, W. W. (2014). A new approach to measuring the liveability of cities: *The Global Livability Index. World Review of Science, Technology and Sust. Development*, 176-16.

Worawej Onnom, N. T. (2018). Development of a Liveable City Index (LCI) Using Multi Criteria Geospatial Modelling for Medium Class Cities in Developing Countries. MDPI.

Received: January 2020. Accepted: 15th May 20

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 289 – 299

URBAN METABOLISM AND TRANSPORTATION ASSESSMENT OF KUALA LUMPUR, MALAYSIA

Ahmad Afiq Shahidan[1], Farah Ayuni Shafie[2]

[1] *Centre of Environmental Health and Safety, Faculty of Health Sciences,*
Universiti Teknologi MARA Selangor, Puncak Alam Campus
[2] *Environmental and Social Health Research Group, Faculty of Architecture,*
Surveying and Planning, Universiti Teknologi MARA

Abstract

Carbon dioxide, a major greenhouse gas has become an indicator in global warming and climate change. Meanwhile, cities are a medium whereby the source of carbon dioxide is released due to the urbanization and transportation sector. This situation leads to unpredictable impact to the environmental, social and economic condition of the city. Kuala Lumpur is a capital city that experiences rapid growth and was chosen for input-output analysis while Bukit Bintang road and Tunku Abdul Rahman road were chosen for ambient air monitoring due to traffic congestion problems in the city centre. The ambient air quality monitoring was measured on Saturday, Sunday and Monday for 8 hours. The sampling started at 7.00 a.m until 3.00 p.m. with a 5-minute log interval. The study found that carbon dioxide emission from both roads in Kuala Lumpur contributed to 376 ppm of carbon dioxide showing that transportation was a massive source of greenhouse gas emission in the city. Meanwhile, the input-output analysis in Kuala Lumpur showed a significant increase between 2010 and 2016 where electricity consumption, food consumption input, water consumption, gas emission and wastewater output rise due to urbanization and increasing population in the city. In contrast, the enforcement of mandatory waste management by the government has resulted in the decrease of solid waste output in Kuala Lumpur. The greenhouse gas released output in terms of Global Warming Potential from the input-output analysis was 5.88 $MMtCO_2eq$. The study showed that the impact of urbanisation such as ambient air pollution is closely related to energy consumption and greenhouse gas emission.

***Keywords**:* material flow, input-output analysis, urbanization, Kuala Lumpur

[2] Senior Lecturer at Universiti Teknologi MARA. Email: farahayuni@uitm.edu.my

INTRODUCTION

Urban areas are domains for the majority of the global human population. The concept of urban metabolism is similar to an organism that consumes resources from its surroundings, excretes waste products and thus the interaction of various systems in the urban areas are the impression of the metabolism. Therefore, urban metabolism enables studies on the city's function and to understand how the cities operate (Chrysoulakis et al., 2013; Dinarès, 2014). The massive development within the cities to meet the population growth increases the resource use such as fossil energy for human activities (Pincetl, Bunje, & Holmes, 2012).

Any human activity that releases greenhouse gases to the atmosphere warms the earth's atmosphere thus contributing to global climate change. The changes in the earth's climate is caused by various activities which include fossil fuels burning and industrial practices due to urbanisation (Hoornweg et al., 2012; Mustafa, Kader, & Sufian, 2012). The increase of temperature of the surface-troposphere system is caused by the increase of greenhouse gas concentration. The rise of global temperature and sea level are the impacts from carbon dioxide emission concentration in the atmosphere which is the main greenhouse gas emission (Hosseini, Wahid, & Aghili, 2013; IPCC, 2014).

Identification of input-output flows can evaluate direct and indirect environmental impact such as greenhouse gas emissions (Dias et al., 2014; Zhang, 2013). In addition, the material flow of the inputs to the city such as energy, water and food consumption while the outputs such as gas emission, wastewater and solid waste can be examined in order to study the economic and environmental aspect of urban metabolism (Pincetl et al., 2012; Piña & Martínez, 2014; Shafie et al., 2016). These urban materials can be used to calculate greenhouse gas emissions related to climate change. The estimation of carbon dioxide emissions associated with the consumption of input in the urban area can be determined by using input-output analysis.

The urbanization of the city is a result in increased population and rapid development within the city. As the city flourished, transportation within the city also expanded to accommodate the increasing population and facilitated the movement of people from one place to another. The problem arises when hotspot sectors such as transportation are intensified within the city to fulfill the mobility needs of the people thus causing carbon dioxide emission to increase (Dias et al., 2017). In Malaysia, the number of vehicles on the road increases every year which is one of the major sources of air pollution in urban areas (DOE, 2014).

Cities are main critical sites for addressing climate change due to increasing populations and high levels of economic and cultural activity. This is because carbon dioxide per capita emission is higher when there is a high resource use and wealth in the cities (Lee & Meene, 2013). Activities in urban areas cause 70% of greenhouse gas emissions and it becomes a source of environmental problems to the world (Chen & Chen, 2015). The increase of pollutants in

ambient air is also due to high density of the human population and growth of industries through urbanization. This showed that many large cities in the world are the major contributors to the global greenhouse gas emission due to compact urban structure such as heavily industrialized cities and high vehicular traffic (Mabahwi, Leh, & Omar, 2015).

MATERIAL AND METHODS

Study location

Kuala Lumpur is a capital city that experiences rapid growth in terms of both economic and population (Han et al., 2014). Kuala Lumpur is a 100% urbanized area where the total land area is 243.7 km^2 (Ling et al., 2010). It is the most popular city in Malaysia with complete transport facilities with an estimation of total population which is about 1.79 million people (Department of Statistics Malaysia, 2016). Therefore, the input and output components (Figure 1) were determined for this city based on a few urban components. Furthermore, traffic congestion due to the increasing transportation sector in cities shared a big portion in among the greenhouse gas emission globally (Grote et al., 2016).

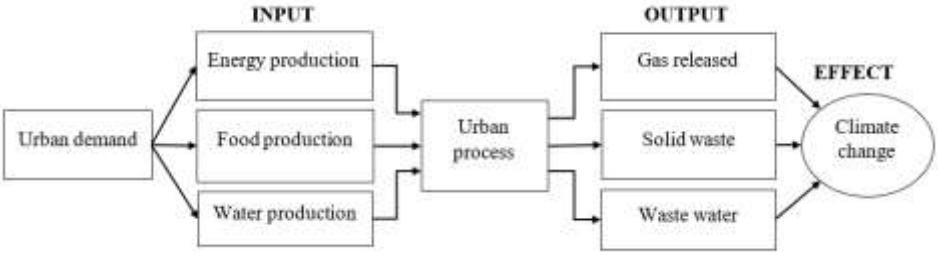


Figure 1. The urban input-output components of Kuala Lumpur

Study procedure

The study was conducted at Kuala Lumpur (Figure 2) where input and output data in Kuala Lumpur were obtained from established secondary sources. The ambient air quality monitoring was conducted at Kuala Lumpur's commercial roads; Bukit Bintang road and Tunku Abdul Rahman road to measure the carbon dioxide level.

Figure 2. The map of input-output analysis boundary. Source: Google Maps (2018)

Material flow for the urban input and output components of the city was established. The ambient air quality monitoring was conducted to determine carbon dioxide level in Bukit Bintang road and Tunku Abdul Rahman road. The level of carbon dioxide emission was measured using Environmental Monitor EVM-7 Quest Technology to measure level of carbon dioxide at both roads. Both roads contributed to the release of carbon dioxide emission in Kuala Lumpur due to its major traffic congestion (Das et al., 2013; Shamsuddin et al., 2014). Vehicle emissions from the road transportation sector is associated with carbon dioxide emission in the city (Abam & Unachukwu, 2009). The duration of sampling was three days for each road which was on Saturday, Sunday and Monday. Meanwhile, the duration for each sampling point was eight hours; from 7.00 a.m. to 3.00 p.m. The air sampling equipment were placed at the curbside with the distance of 5 meters from the main road. The air sampling method used in this study was adapted from Abam and Unachukwu (2009). The sampling point 1 was at Bukit Bintang road while sampling point 2 at Tuanku Abdul Rahman road. The coordinates of sampling point at Bukit Bintang road and Tuanku Abdul Rahman road were 3°08'53.0"N, 101°42'52.4"E and 3°09'28.7"N, 101°41'46.8"E respectively (Figure 3).

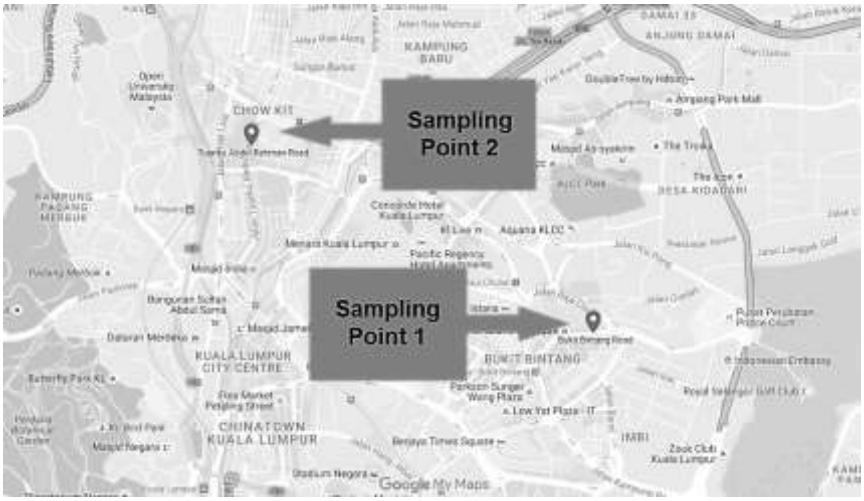


Figure 3. The sampling points for ambient air quality monitoring. Source: Google Maps (2018)

RESULT AND DISCUSSION

Carbon dioxide emission of roads in Kuala Lumpur

For the ambient air quality monitoring, the parameters measured were carbon dioxide emission level, particulate matter (PM_{10}) and temperature. The unit used for carbon dioxide emission was part-per million (ppm) while the unit for PM_{10} was microgram per cubic meter ($\mu g/m^3$). The monitoring on Monday showed higher traffic congestion because it was the first working day of the week compared to the monitoring on weekends. Besides, carbon dioxide emission level was high on Mondays due to large number of vehicles on the road which causes traffic congestion that leads to an increase of carbon dioxide emission (Abam & Unachukwu, 2009; Almselati et al., 2011; Ghadimzadeh et al., 2015). The overall result of average level for ambient air monitoring was tabulated in Table 1.

Table 1: The average level of parameters for ambient air quality monitoring

Parameters	Road	8-hour Average			3-day average
		Day 1	Day 2	Day 3	
CO_2 (ppm)	Bukit Bintang	369.70	379.42	379.96	376.36
	Tunku Abdul Rahman	368.90	376.33	381.78	375.67
PM_{10} ($\mu g/m^3$)	Bukit Bintang	41.04	108.08	54.90	68.01
	Tunku Abdul Rahman	77.51	96.38	51.65	75.18
Temperature (^oC)	Bukit Bintang	30.2	29.1	28.8	88.1
	Tunku Abdul Rahman	29.8	29.9	31.0	30.23

Both roads gave the same reading pattern during the monitoring. The level of carbon dioxide emission was the highest between 1.00 pm until 2.30 pm at both roads and the reading was above 400 ppm. The emission of carbon dioxide tends to be higher in the afternoon and peaks hours due to high traffic on the roads (Ueyama and Ando, 2016). They also pointed out that the level of carbon dioxide emitted was significantly higher during the daytime in the urban areas. This was also for Kuala Lumpur. The minimum and maximum reading of parameters in Bukit Bintang road and Tunku Abdul Rahman road were shown in Table 2.

Table 2. The minimum and maximum level of carbon dioxide emission and PM_{10}

Parameters	Road	Minimum			Maximum		
		Day 1	Day 2	Day 3	Day 1	Day 2	Day 3
CO_2 (ppm)	Bukit Bintang	341	345	333	419	441	472
	Tunku Abdul Rahman	342	354	349	342	425	411
PM_{10} ($\mu g/m^3$)	Bukit Bintang	14	45	24	14	45	140
	Tunku Abdul Rahman	43	43	16	160	330	240

The Malaysia Ambient Air Quality Standard is used as a standard for ambient air pollutants criteria such particulate matter, carbon monoxide, nitrogen dioxide, sulfur dioxide and ground level ozone to control air quality and to prevent pollution. The highest average level of PM_{10} was recorded in the second day of monitoring at Bukit Bintang road which is 108.08 $\mu g/m^3$ while the lowest level of PM_{10} recorded on the first day of monitoring also was at the Bukit Bintang road which was 41.04 $\mu g/m^3$. Throughout the day of monitoring, all the levels of PM_{10} complied with the standard.

The input-output analysis of Kuala Lumpur

The data of input and output analysis in Kuala Lumpur were taken from established secondary sources. In the situation where the material data at city level was not available, the data was downscaled from the national data. The population of Malaysia and number of days in a year were divided from the national figures in order to obtain consumption or production per capita per day. The secondary sources and the main data of input-output analysis were summarized in Table 3.

Table 3. The urban input-output components for Kuala Lumpur

Material	Unit	Total Consumption / Production in a day	Sources (Year)
		Kuala Lumpur Population: 1,790 000	
Input			
Energy (Electricity)	koe/day	3 436 800	Energy Commission of Malaysia (2016)
Water	million liters/day	503	Syarikat Bekalan Air Selangor Sdn. Bhd. (SYABAS) (2016)
Food (Rice)	kg/day	447 500	Food and Agriculture Organization of the United Nations (FAOSTAT) (2013)
Output			
Gas (CO_2)	tonnes/day	16 110	International Energy Agency (IEA) (2016)
Wastewater	m^3/day	515 520	Mat, Shaari and How (2013)
Solid Waste	kg/day	2 219 600	Solid Waste Management and Public Cleansing Corporation Malaysia (SWCorp) (2016)

The collected data were then outlined as an average of individual consumption and production in a day by taking into account the current total population in Kuala Lumpur in order to present the input and output analysis of the city of Kuala Lumpur (Table 4)

.

Table 4. Individual consumption in Kuala Lumpur

Input / Output	Unit	Average individual consumption / production in a day
		Kuala Lumpur
	Input	
Energy (Electricity)	koe/cap/day	1.92
Water	kg/cap/day	281.01
Food (Rice)	kg/cap/day	0.25
	Output	
Gas released (CO_2)	kg/cap/day	9
Wastewater	kg/cap/day	288

Solid Waste	kg/cap/day	1.24

*koe – kg of oil equivalent

The determination of input and output at Kuala Lumpur produced a material flow analysis (Figure 4) where the consumption of inputs by the population through urban processes will produce waste and emissions.

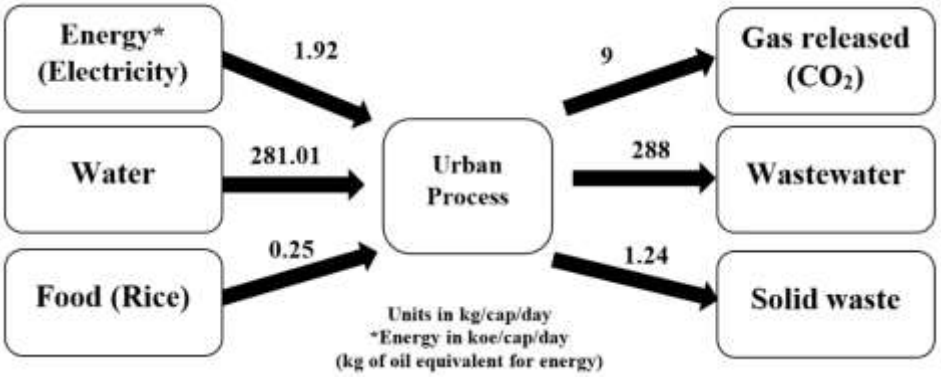


Figure 4. The material flow analysis for Kuala Lumpur

Global Warming Potential (GWP) for Kuala Lumpur

The output component of greenhouse gas emission in this study is carbon dioxide. The data regarding carbon dioxide emission was obtained from the International Energy Agency, 2016. Kuala Lumpur generated 5.88 million metric tonnes of carbon dioxide ($MMtCO_2$) per year for 2016.

The release of 5.88 $MMtCO_2eq$ in Kuala Lumpur were equivalent to greenhouse gas emissions from 1.87 million tons of waste recycled instead of landfilled or driving 1.24 million of passenger vehicles for one year. It is also equivalent to carbon dioxide emissions from 868,281 of annual home's electricity use. The determination of greenhouse gas output in terms of GWP is very useful as it will provide an alternative way to reduce carbon dioxide emission by putting equivalence of the emission with other greenhouse gas. Thus, the strategy will not only focus on the reduction of electricity to reduce carbon dioxide emission, but some other ways such as reducing passenger vehicles on the road or intensifying waste recycling programs in Kuala Lumpur.

The relationship between carbon dioxide emission and climate change impact in Kuala Lumpur

The urbanization of the city causes changes in the environment. Cities are the main contributors to environmental problems and the main contributor to greenhouse gas emission. The massive development of building and

infrastructure in the city increases vulnerability to natural disaster and long-term alteration climate (Hoornweg et al., 2012). The emission of carbon dioxide in Kuala Lumpur can contribute to the impact of climate change. The expansion of Kuala Lumpur and its neighboring areas cause traffic congestion and increase the greenhouse gas emission from vehicles. The continuous release of high amounts of carbon dioxide to the atmosphere can accelerate the climate change in Kuala Lumpur thus causing an impact to the economy, social and environment in the city.

The result of input-output analysis shows an increasing input consumption and output production in Kuala Lumpur. The rise of this inputs and outputs is due to the increasing population and massive development in Kuala Lumpur to meet the demand of the populations (Piña & Martínez, 2014). The input consumption such as electricity shows notable changes resulting from the release of a high amount of carbon dioxide and the carbon dioxide equivalent in terms of global warming potential which also shows various ways carbon dioxide can be emitted to warm the earth. The city becomes a critical site in addressing climate change where the population is rapidly growing, and high levels of economic and anthropogenic activities are going on.

CONCLUSION

In conclusion, greenhouse gas emission in the city is the main cause of current climate change in the manifestation of global warming effect and extreme weather condition. Carbon dioxide, the major greenhouse gas has become an indicator to address global warming potential. Understanding the city's input and output flows due to urbanization and its anthropogenic activities can provide an overview on the environmental performance in a controlled setting.

REFERENCES

Almselati, A. S. I., Rahmat, R. O. K., & Jaafar, O. (2011). An Overview of Urban Transport in Malaysia. *The Social Sciences*, 6(1), 24–33.

Bellucci, F., Bogner, J. E., & Sturchio, N. C. (2012). Greenhouse Gas Emissions at The Urban Scale. *Elements*, 8(6), 445–449.

Chen, S., & Chen, B. (2015). Urban energy consumption: different insights from energy flow analysis, input-output analysis and ecological network analysis. *Applied Energy*, 138, 99–107.

Chen, S., & Chen, B. (2015). Urban energy consumption: different insights from energy flow analysis, input-output analysis and ecological network analysis. *Applied Energy*, 138, 99–107.

Chrysoulakis, N., Lopes, M., José, R. S., Grimmond, C. S. B., Jones, M. B., Magliulo, V., … Cartalis, C. (2013). Sustainable urban metabolism as a link between bio-physical sciences and urban planning: the BRIDGE project. *Landscape and Urban Planning*, 112, 100–117.

Das, A. M., Ladin, M. A., Ismail, A., & Rahmat, R. O. K. (2013). Consumers' satisfaction of public transport monorail user in Kuala Lumpur. *Journal of Engineering Science and Technology*, 8(3), 272–283.

Department of Environment [DOE]. (2014). Malaysia Environmental Quality Report 2014. Putrajaya.

Department of Statistics Malaysia. (2016). The Official Portal of Department of Statistics Malaysia. Retrieved April 8, 2016, from https://www.statistics.gov.my/

Dias, A. C., Lemos, D., Gabarrell, X., & Arroja, L. (2014). Environmentally extended input-output analysis on a city scale-application to Aveiro (Portugal). *Journal of Cleaner Production*, 75, 118–129.

Dias, A., Lemos, D., Gabarrell, X., & Arroja, L. (2017). Comparison of Tools for Quantifying the Environmental Performance of an Urban Territory. *Journal of Industrial Ecology*.

Dinarès, M. (2014). Urban Metabolism: a review of recent literature on the subject. *Documents d'Anàlisi Geogràfica*, 60(3), 551–571.

Ghadimzadeh, A., Makmom, A. M., Hosea, M. K., Asgari, N., Shamsipour, R., & Narany, T. S. (2015). Review on CO2 Emission from Transportation Sector in Malaysia. IOSR *Journal of Environmental Science, Toxicology and Food Technology,* 9(5), 61–70.

Grote, M., Williams, I., Preston, J., & Kemp, S. (2016). Including congestion effects in urban road traffic CO2 emissions modelling: Do Local Government Authorities have the right options? Transportation Research Part D: *Transport and Environment*, 43, 95–106.

Han, N. M. M., Latif, M. T., Othman, M., Dominick, D., Mohamad, N., Juahir, H., & Tahir, N. M. (2014). Composition of selected heavy metals in road dust from Kuala Lumpur city centre. *Environmental Earth Sciences*, 72(3), 849–859.

Hoornweg, D., Sugar, L., & Gomez, C. L. T. (2011). Cities and Greenhouse Gas Emissions: Moving Forward. *Environment and Urbanization*, 23(1), 207–227.

Hosseini, S.E., Wahid, M.A., & Aghili, N. (2013). The scenario of greenhouse gases reduction in Malaysia. *Renewable and Sustainable Energy Reviews,* 28, 400–409.

Intergovernmental Panel on Climate Change [IPCC]. (2014). Climate Change 2014: Synthesis Report. Contribution of Working Group I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. (Core Writing Team, R. K. Pachauri, & L. A. Meyer, Eds.). IPCC, Geneva, Switzerland: The Intergovernmental Panel on Climate Change.

International Energy Agency [IEA]. (2016). CO2 Emissions from Fuel Combustion Highlights 2016. Paris.

Lee, T., & Meene, S. V. D. (2013). Comparative studies of urban climate co-benefits in Asian cities: An analysis of relationships between CO2 emissions and environmental indicators. *Journal of Cleaner Production*, 58, 15–24.

Ling, H. L. O., Ting, K. H., Shaharuddin, A., Kadaruddin, A., & Yaakob, M. J. (2010). Urban growth and air quality in Kuala Lumpur City, Malaysia. *Environment Asia*, 3(2), 123–128.

Mabahwi, N. A., Leh, O. L. H., & Omar, D. (2015). Urban air quality and human health effects in Selangor, Malaysia. *Procedia - Social and Behavioral Sciences*, 170, 282–291.

Mustafa, M., Kader, S. Z. A. K., & Sufian, A. (2012). Coping with climate change through air pollution control: some legal initiatives from Malaysia. 2012 *International Conference on Environment, Energy and Biotechnology*, 33, 101–105.

Piña, W. H. A., & Martínez, C. I. P. (2014). Urban material flow analysis: An approach for Bogotá, Colombia. *Ecological Indicators*, 42, 32–42.

Pincetl, S., Bunje, P., & Holmes, T. (2012). Landscape and urban planning an expanded urban metabolism method: toward a systems approach for assessing urban energy processes and causes. *Landscape and Urban Planning*, 107(3), 193–202.

Shafie, F. A., Omar, D., Karuppannan, S., & Ismail, N. (2016). Urban-scale material flow analysis: Malaysian cities case study. I*nternational Journal of Environment and Sustainability*, 5(2).

Shamsuddin, S., Minhans, A., & Puan, C. O. (2014). Geenhouse gas emission reduction measures in transportation sector of Malaysia. *Jurnal Teknologi (Sciences & Engineering)*, 4, 1–8.

Ueyama, M., & Ando, T. (2016). Diurnal, weekly, seasonal, and spatial variabilities in carbon dioxide flux in different urban landscapes in Sakai, Japan. *Atmospheric Chemistry and Physics*, 16(22), 14727–14740.

Zhang, Y. (2013). Urban metabolism: A review of research methodologies. *Environmental Pollution*, 178, 463–473.

Received: January 2020. Accepted: 28th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 300 – 312

PARTICIPATION IN E-GOVERNMENT SERVICES AND SMART CITY PROGRAMS: A CASE STUDY OF MALAYSIAN LOCAL AUTHORITY

Lim Seng Boon[1], Jalaluddin Abdul Malek[2], Mohd Yusof Hussain[3], & Zurinah Tahir[4]

[1,2,3,4]*School of Social, Development and Environmental Studies*
Faculty of Social Sciences and Humanities
UNIVERSITI KEBANGSAAN MALAYSIA

Abstract

Public participation is gaining popularity in local governance practices where the involvement of the public in the decision-making process is essential in promoting good governance concepts. However, local authorities are facing challenges in guiding public involvement in e-government services such as smart city programmes. Hence, this paper aimed to examine the participation process in e-government services and smart city programmes, and later to recommend a framework to assess participation level and process in local context. Petaling Jaya, Malaysia, was selected as a case study where interviews and observations were conducted with thematic analysis based on relevant themes. Through the selected attributes and designated questions in the participation framework, time and effort can be saved in addition to clearing the ambiguities of stakeholders who are keen on gaining the authentic participation culture in e-services and smart city programmes. This study has provided new insights on how e-government can be implemented by the local government after adopting a smart city policy in the context of public participation.

***Keywords**:* Authentic participation, citizens as equal partners, citizens' prerequisite of participation, public engagement, smart cities, transparency governance

[1] PhD Candidate at Universiti Kebangsaan Malaysia. Email: limsengboonn@gmail.com

INTRODUCTION

Due to the advent and advancement of Information and Communication Technology (ICT), e-government has been practiced since the early 1990s. The initial idea of e-government is to digitize manual paperwork and information of municipalities before publishing this information online through web portals (Yildiz, 2007). The e-government idea is considered as one of the Information System (IS) applications in easing governance. The research on the importance of user participation was pioneered by Mumford (1979) in order to develop the design and implement computer-based IS. Attention from scholars such as Cavaye (1995), DeLone and McLean (2003), and Lynch and Gregor (2004) have revealed the significance of user participation in constructing a successful IS. Furthermore, recent e-governance research such Axelsson and Melin (2008), Axelsson et al. (2010), Jafari and Ali (2011), Kamalia Azma and Nor Laila (2017) have linked the concept of IS to e-government with empirical evidence.

Accordingly, the term 'user' participation is used interchangeably with 'citizen' participation when the government deals directly with citizens in its governing area (Axelsson & Melin, 2008). In another stream of development, the physical governing area of e-government mostly encompasses the city, and the smart city development has attracted growing attention in the 21st century; approximately a decade after the propagation of e-government (Anthopoulos & Fitsilis, 2013). Giffinger et al. (2007) have proposed six elements that construct the smart city conception, namely smart governance, economy, people, environment, living, and mobility. Other scholars, such as Alonso and Castro (2016) as well as Nam and Pardo (2011), have also highlighted the aspect of governance as the backdrop of smart city development. As such, the type of governance employed in a smart city inclines towards participatory, where the involvement of citizens in decision making is emphasized, alongside co-creating, or co-producing with citizens in city services (Giffinger et al., 2007).

It is evident that the linking of user participation in e-government services (or e-services) with citizen participation in a smart city is an emerging phenomenon (Anthopoulos & Fitsilis, 2013). However, this area is still lacking in empirical evidence, especially in Malaysian local context. Axelsson and Melin (2008) claimed that participation in e-government context can be understood from user participation in the Information System (IS) discipline. Nonetheless, most of the local authorities have adopted smart city policy and changes are inevitable in the implementation of the e-government. It is discovered that the participation framework proposed by Axelsson and Melin (2008) was lacking in terms of experiences from citizen participation in smart city programmes. Thus, the current paper aims to examine both the public participation in e-services and smart city programmes in the City Council of Petaling Jaya, Malaysia, as well as to suggest a framework for assessing participation in local context.

The following section discusses the existing literature of the attributes of participation which can be transformed into a set of questions that highlights the citizens' perspective. Furthermore, the difference between the focus of the value chain of public services in user or citizen participation is also addressed. Then, the case study is explained, followed by the evaluation of interview themes results, suggestions and conclusion.

ATTRIBUTES OF PARTICIPATION

The participation topic can be evaluated based on three major disciplines namely, IS (i.e. Mumford, 1979), development and planning (i.e. Arnstein, 1969), or public administration and management discipline (i.e. Vigoda, 2002). With regard to linking the user to the citizen participation concept, this study will specifically emphasise on the perspective of IS discipline with complementary opinions from other disciplines.

According to Mumford (1979), there are three types of user participation which are consultative, representative, and consensus. This conception states that the main concern of user participation is the influence on decision making in the design and implementation stages of a computer-based IS. Based on Mumford's theory, Cavaye (1995) has categorised the characteristics of user participation into six attributes, namely type, degree, content, extent, formality, and influence of participation. Cavaye's attributes has been further expanded by Lynch and Gregor (2004) and Axelsson and Melin (2008). In developing Cavaye's framework, the attribute of the depth of participation has been added by Lynch & Gregor in their work. Additionally, there are three conditions that have been forwarded, namely, 1) the stages of involvement (in the authors' view, this factor overlaps with the extent of participation in Cavaye), 2) frequency of interactions (how active they are), and 3) voices from users (to influence the decision making, similar to Munford and Cavaye's theories). Furthermore, due to the importance of measuring the practical impact of participation activity, Axelsson and Melin (2008) have added an attribute on the (practical) result of participation in their findings.

On the other hand, in the DeLone and McLean (2003) IS success model, they have reconceptualised user participation within the scopes of 1) intention to use and 2) use, based on DeLone and McLean (1992) model. While the term 'intention to use' refers to the interest to pursue, 'use' can be defined as the action to adopt. It should be emphasised that programmes in a smart city cannot be executed successfully without these two factors of citizen involvement. Thus, it is argued that these two attributes are the "citizens' prerequisites" for the authorities in ensuring the effectiveness of the e-services and smart city programmes. This citizens' prerequisite attribute is different from the prerequisites on officials' administrative experience as proposed by Axelsson et al. (2010)'s and it is viewed from the demand side of citizens.

THE VALUE CHAIN OF PARTICIPATION

It is observed that the topic of user participation is focused on the process of 'design', 'testing', or 'implementation' of a computer system and that it does not encompass another value chain. For example, in the bigger scope of the value chain of a programme, or activity organised by a municipality, the processes typically involve 1) agenda setting, 2) decision making, 3) planning, 4) design and testing, 5) commissioning, 6) managing, 7) implementation (vast involvement of users), 8) controlling, and 9) evaluation (Bovaird, 2007). These stages are significant to expand beyond the only focus on the middle stages of design and implementation, to the wider scope of the whole value chain of municipality's services, i.e. the scale of city services level that could also involve the whole city populations. It is much more complex than the internal computer-based IS services level where the emphasis is typically given to a rather well-defined group/users, for instance, in an enterprise resource planning system situation dedicated to a certain industry or market segment (Axelsson et al., 2010).

Although the expansion for deeper engagement is advantageous, Irvin and Stansbury (2004) have described certain conditions under which citizen participation may be costly and ineffective to both government and citizens. Thus, it is implied that all participation activities must be carefully monitored and appropriated to the community's particular needs and interests (Cornwall, 2008). According to White (1996), the interests of 'who' participates range from the perspective of 'top-down': the interests of those who decide, design, and implement development programmes have in the participation of others, as well as 'bottom-up': how the participants perceive their participation, and what they expect to gain out of it. It is discovered that the 'interest' described by White and Cornwall is akin to the 'intention to use' proposed by Delone and McLean (2003), and the 'desired level' by Howcroft and Wilson (2003), where the interest of action will not occur without intention and desire in mind.

Based on the discussion of the literature above, a conceptual framework (refer Table 1) is proposed to offer a better understanding of participation in e-services and smart city programmes.

Table 1 Conceptual framework for assessing citizen participation in e-services and smart cities

Discipline	Scholar	Attributes of Participation
UP-IS	Cavaye's (1995) six attributes	Type, Degree, Content, Extent, Formality and Influence
UP-IS	Lynch and Gregor (2004)	Depth
CP-eGov	Axelsson and Melin (2008)	Result
CP-SC	The authors	Citizens' prerequisite

Note: UP represents user participation; IS represents information systems; CP represents citizen participation; eGov represents electronic government; SC represents the smart city.

Source: The authors (2019)

METHODOLOGY

A case study approach (Yin, 2018) has been employed in this study. Interviews and observations on the authority's websites were the primary methods utilised. The interviews were conducted using semi-structured questions that were formulated based on the attributes of participation discussed in the literature. Using purposive sampling, 12 interviews were carried out with the city stakeholders of the Petaling Jaya (PJ) city, Malaysia (refer Table 2). Codes were extracted from interview transcripts, in addition to themes for thematic analysis using Atlas.ti. The interviews and transcriptions were carried out by the first author, while codes and themes were triangulated by the other three authors.

Table 2 The informants in this study

Informants (abridgement)	Quantity
Politicians (include councillors) (PC)	3
Officers (O)	3
Corporate Sectors (CS)	2
Academics (A)	1
Community leaders and representatives from NGOs (C)	3
Total	12

Source: The authors (2019)

Observations were conducted towards the selected 14 e-services (websites) of the City Council of Petaling Jaya (MBPJ) and was evaluated within the period of July to December 2018. The observation was conducted on the aspects of functionality, accessibility, and maintenance status.

The Case Study of Petaling Jaya, Malaysia

The real-life setting of the PJ city, was chosen due to its prominent recognition as a successful pioneer in implementing the Local Agenda 21 among municipalities in Malaysia. Its vision towards becoming a smart and sustainable city with an emphasis on community participation in governance (MBPJ, 2012) has also become the deciding factor in its selection as the case study.

The e-government service elements in the MBPJ include the official websites and other related links, Facebook pages, e-kiosk for fiscal payment, complaint applications, and email accounts among others. This study focuses on websites with regard to the e-service subject. As for the smart city, it includes elements such as programmes, meetings, projects, and other citizen-related activities conducted by MBPJ. This study specifically considers the smart city subject in terms of programmes related to the smart city itself, and council meetings.

RESULTS AND DISCUSSIONS

A total of 322 codes, 12 categories and 4 themes were categorized accordingly, whereby the 4 themes emerged in examining similarities and differences between experiences of e-government services and smart city programmes and meetings. They were: the ignored role of user/ citizen, the tokenism involvement in the value chain public services, the sense of belonging decides the sustainability of services, and the prerequisite of organising ability, knowledge, and volunteering spirit.

The Ignored Role and Trust of User/ Citizen

In e-government services, majority of the informants (i.e. PC1, PC3, O1, O2, O3, A1, C2, and C3) comprehended that the users' role is direct and simple, i.e. to use the services according to the rules set by the service provider, MBPJ. Nonetheless, the quality of the service provider is observed to still be at the infancy stage (i.e. A1, C1, P1, P2, and PC2). In contrast, the community leader informants C2 and C3 commented that citizens' role in smart city council meetings is mostly indirect and through representatives, where they are not allowed to attend or vote in the decision-making meetings. In smart city programmes, the role of citizens is most direct but limited on the implementation stage and they can only join as participants (i.e. PC3 and C1). This situation implies that the type of consensus of all users involved in consultation as highlighted by Mumford (1979) does not happen in both cases of e-services and smart city meetings and programmes.

This study focuses on the municipal website e-services where they act as an alternative for users to communicate online, rather than be physically present at the municipal's offices. These e-services will benefit users who wish to pay fiscal bills, license or compounds, lodge and check complaints, check services or rent community facilities, check job vacancies, download forms, check tender and status contractor, as well as those who want to register as PJ Green Squad membership (MBPJ, 2019). The official portal (http://www.mbpj.gov.my/en/rakyat/e-services) serves as the master portal for the individual links alongside other existing domains which include embpj.mbpj.gov.my (new), eps.mbpj.gov.my, and eperkhidmatan.mbpj.gov.my. It is commented by the corporate informant CS2 and citizen informant C1 that some old MBPJ websites, such as eAduan, a compound checking website, is not mobile-responsive and not directly linked to the android applications, namely Smart Selangor Parking, eLesen MBPJ, SmartPJenforcement, mForm MBPJ, PJ City Bus, and PJ Sustainable Community Award.

With regard to smart city, the officer informants O1 and O2 explained that MBPJ is in the process of building a comprehensive dashboard for the smart city under the Planning Department. One of the interfaces launched in the Smart

Selangor Conference on September 2018 is the community dashboard (https://pjkcd.net). This dashboard is used for engaging citizens, as well as registering volunteers. According to an officer informant O3, MBPJ currently targets to collect a body of data consisting of 20,000 volunteers in the year 2025. Nevertheless, one of the community leader informants C3 expressed uneasiness while using the community dashboard and other MBPJ websites. Informant C3 reported that these websites are mostly not user-friendly, and not completely constructed. These difficulties have consequently resulted in lack of trust toward the e-system.

The Tokenism Involvement in the Value Chain Public Services

According to officer informants O1 and O2, in the MBPJ e-government services, users are subject to implementation, not of design where they tend to be programmed to involve in the lower level in the value chain. Meanwhile, politician informant PC3 felt that the spectrum of the value chain that can cater to citizens' involvement in the smart city is much wider, but limited in practices.

As for the former, community leader informants C2 and C3 mentioned that users were asked to join passively as 'novice' who are subject to the rules and setting in the information system, i.e. pay bills, create inquiry in the websites with a lack of opportunities for innovative discussions. The participation is limited as they are not directly involved in the other stages such as agenda-setting, planning, design, or evaluation. Thus, the focus on the lower stage of value chain resembles Arnstein's (1969) informing or manipulating level. Notwithstanding these limitations, this situation has been accepted internally as the concern of the municipal is legitimising its administration (i.e. O1, O2 and PC1).

As for the later, according to politician PC3 and community leader C3, citizens were advised to direct their concerns, opinions or complaints through their representatives; this process is subject to discussions and decisions made in meetings. The final decision is in the power of the mayor and 24 councillors, and citizens have no voting power over local issues. Even though the technical departments attend the meetings, they are only there to provide technical advice. A councillor PC2 and an officer O2 claimed that the decision-making process that takes place in the meeting should only be attended by councillors and that the involvement of all citizens will be chaotic as it is much harder to vote, impractical and described as a waste of time and effort. These opinions are considered as the cost of participation explained by Irvin and Stansbury (2004).

The Sense of Belonging in Participation

In e-government services, the depth of participation was based on the context of demand, follow-up, and time constraint. For example, according to NGO informant C1, both websites of PJ Youth Information System and platform to advertise preloved items have ceased in action as they have been idle with no

updates for a long time. Corporate informants CS1 and CS2 pointed out that these are the typical examples of lack of demand, a follow-up from the officers, change of top-down policy, or time constraint where other programmes have been prioritised. According to the academician A1 and corporate informants CS1 and CS2, these scenarios of website abandonment frequently happen and the society at large has been indifferent i.e. 'numb' about it. The academic informant A1 further added that the citizens have no power over these idle programmes as they are in a subjugated position, resulting in a low sense of belonging.

Contrastingly, community leader C3 mentioned that physical contact occurred in smart city participation where citizens' sense of belonging could last longer and produce a stronger impact. Some projects have been actively involving local communities where they depend on the level of power delegated and support of financial assistance. For instance, officers O1 and O2 explained that the PJ community award has been a success where communities were given the opportunities to compete and showcase their innovative ideas to win grants in monetary term. The winning team became models for others to produce a sustainable community, including programmes such as urban farming, tackling cleanliness, and fighting against dengue. Officers, NGOs and citizen informants (i.e. O1, O2, C1, C2 and C3) have acknowledged the positive impact of this programme, as it creates time for bonding between neighbours and community, reduces the risk of pollution, and saves expenses in urban management. A new version of award – PJ SEED community grant programme with a total of RM 3 million has been launched in March 2019 (Sakdon, 2019). In this case, the authenticity of participation as conceptualised by King et al. (1998) is achieved when the interaction style is of collaborative where citizens are treated as 'equal partner'.

The Prerequisite of Organising Ability, Knowledge, and Volunteering Spirit

Officers O2 and O3 clarified that the influence of user participation in PJ depends on the level of usage, the number of visitors, the number of complaints received on such e-service platforms. There is no organising action from users involved; most cases in e-services involve individual users. Nonetheless, corporate informant CS1 sensed that treating users as mere customers has created never-ending demands in e-services. Under such circumstances, the supply side of the administrator acted as managers under the responsive type of interaction (Vigoda, 2002). The administrator prepared a set of customer feedback surveys to gain knowledge from the demand side. However, based on officers O1 and O3, that most of the improvement of the e-services were based on internal officers' guesses, where guesses made based on experiences correlate with Axelsson and Melin's (2008) finding.

In ensuring the success of smart city programmes that directly address the citizens' interest on wellbeing, councillors PC1 and PC2 suggested citizens should organise the programmes themselves by voicing out their opinions collectively, as well as signing petition or memorandum. Otherwise, the minority or single voices will be subjugated (Olson, 2002). Nonetheless, it has been observed that most citizens were self-centred, and did not oblige to actively organise the programmes on their own.

In addition to use and intention to use (interest), another code that 'knowledge' is important in using e-services was discovered. The term 'knowledge' refers to the basic ICT knowledge such as user login, password security, personal emails, and searching for relevant information on websites. Furthermore, when users have strong knowledge in ICT, they will be more cautious about the privacy of data which are shared online through these e-service platforms. In the case of a smart city, professional expertise such as engineering, urban planning or law are vital during the process of drafting appeals to the authority. The content of the appeal which represents the voices of affected citizens is crucial when councillors bring these reports into meetings.

Another code that has been identified is the volunteering spirit. For example, there were social entrepreneur informants who have been working on a website or applications that can help those in need. These informants are representatives from the Epic Homes, and Eijau Millennium Explorer, and both of them have been active in community work and in accumulating volunteers to take part in community projects such as the Kampung Lindungan Community library project (Ch'ng, 2018). Despite this example of active involvement, the volunteering works at the grassroots level are actually very minimal compared to the large population of 730,000 in Petaling Jaya (MBPJ, 2018).

Hence, in addition to use and intention to use, other new codes for the prerequisites of participation have been discovered, namely the organising ability, knowledge, and volunteering spirit.

SUGGESTIONS AND CONCLUSION

From the above discussed themes, the local framework was proposed with an addition of a new attribute of citizens' prerequisites for participation in local context (refer Table 3 below). Through the 9 attributes, 12 designated questions and experiences stated in the Table 3 below; effort can be saved, as well as eliminating the ambiguities of stakeholders who are keen on gaining the authentic participation in e-services, smart city programmes. It should be highlighted that the culture of authentic participation process in Malaysia will hardly occur without such citizens' prerequisites which later result in tokenism participation (Mariana, 2008) and loosening of the public trust on the grassroots level (Zikri et al., 2015).

Besides these suggestions, it must be noted that this study has few limitations, such that it only focused on the municipality's websites, while in fact, the e-services included other platforms such as social media, e-payment kiosk machines, and email. It should also be noted that smart city participation encompasses aspects beyond the domain of programmes. Thus, researchers are urged to test the constructed framework and explore comprehensively in comparing the two. Furthermore, other quantitative methodologies, mixed-method, or multiple case studies across countries are recommended in further triangulating the results of the framework.

Table 3 A local framework for assessing participation in e-services and smart cities

Participation attributes	**Citizens' perspective questions**	**Experiences in e-services (i.e. websites)**	**Experiences in smart cities (i.e. programmes)**
1) Citizens' prerequisite of participation	What are the prerequisites of participating citizens?	i) General knowledge to use (i.e. go online), ii) Intention to use (interest to pursue), and iii) Use (action to adopt)	i) Professional knowledge (in some cases, i.e. urban planning), ii) Volunteering spirit, iii) Organising ability, iv) Intention to use, and v) Use
2) Type of participation	Which citizens participate in development activities?	Users who have paid bills, used book facilities, as well as updated news and activities in town.	Citizens who were eager to improve the quality of services, the performance of municipal, and the democracy level in town.
	How is citizen involvement reached?	Users were required to log in to use the information systems, but most sites were free and direct access were also granted.	Citizens were not invited in meetings and decision-making process; all stage was conducted through representatives i.e. councillors.
3) Degree of participation	What are the citizens' responsibilities?	Users were not required to/ or had less responsibility towards the e-services. They would provide unconscious data while doing transaction/ log in e-services.	Citizens had to share the responsibility towards better living in the city, thus, assisting municipal in decision making is crucial. Nonetheless, since the current democratic system does not allow this, they can only respond through representatives and hope for their voices to be heard in meetings.
4) Content of participation	What activities are citizens participating in?	According to the rules and setting in the information system, users were asked to join	Citizens were eligible to participate in smart city-related programmes, but not in council and technical

		passively as 'novice'; (e.g., to pay bills), lacking rooms for innovative discussions.	meetings. However, they were allowed to participate in meetings once summoned by the municipal or representatives for internal discussions.
5) Extent of participation	In what stages of development do citizens participate in?	Users participated in the implementation stage of e-services, but not in the design stage.	Citizens were mostly involved in the implementation stages; sometimes community leaders might call them for planning, design, evaluation stages; but this condition rarely happened in the decision-making stage.
	To what extent are citizens involved before, during and after the development process?	There was no involvement before and after stages. During the usage stage, they acted as passive users who demanded user-friendly e-services.	The involvement was subject to the municipal's consideration. Citizens acted as beneficiaries of programmes. Situations in which citizens were delegated power as co-producers were less common.
6) Formality of participation	How is citizen participation organised?	No organising action involved; mostly by individual cases.	It relied on interest; citizens were sometimes organised and spoke collectively. Normally, citizens were not obliged to organise actively by themselves.
7) Influence of participation	What influence do the participating citizens have on the outcome?	The higher level of usage, an increasing number of visitors, or fewer complaints on such e-services were considered as a good sign.	It relied on the organising ability and knowledge in order to present their ideas in papers and meetings. Local champions were needed for higher influences, but all were subjected to political and government decisions.
8) Depth of participation	How active are citizens when participating?	Not active. The participation of user were based on needs, i.e. could be once in a year in paying bills.	Not active in attending meetings. However, for programmes, the participation relied on interest matched.
	How deeply involved are citizens in the development project?	Superficial involvement while getting information or e-services. Some portals were idle due to lack of demand, follow-up and time constraint.	The depth of participation varied among citizens and was influenced by physical contact and a sense of belonging.
9) Result of participation	What did the citizen	Achieved the information or services demanded.	Achieved the aim of a better living environment and community, as well as

participation result in?	improving the internal efficiency of the agency.

Source: The authors (2019)

ACKNOWLEDGEMENTS

This paper did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

REFERENCES

Alonso, R. G., & Castro, S. L. (2016). Technology helps, people make: A smart city governance framework grounded in deliberative democracy. In J. Gil-Garcia (Ed.), *Smarter as the New Urban Agenda* (pp. 333–347). Cham Heidelberg: Springer.

Anthopoulos, L., & Fitsilis, P. (2013). Evolution roadmaps for smart cities: Determining viable paths. *Proceedings of the 13th European Conference of the E-Government*, Varese, Italy, 13-14 June, 27–35.

Arnstein, S. R. (1969). A ladder of citizen participation. *Journal of the American Institute of Planners*, 35(4), 216–224.

Axelsson, K., & Melin, U. (2008). Citizen participation and involvement in eGovernment projects: An emergent framework. In M. A. Wimmer, H. J. Scholl, & E. Ferro (Eds.), EGOV 2008, LNCS 5184 (pp. 207–218). Verlag Berlin Heidelberg: Springer.

Axelsson, K., Melin, U., & Lindgren, I. (2010). Exploring the importance of citizen participation and involvement in e-government projects. *Transforming Government: People, Process and Policy*, 4(4), 299–321.

Bovaird, T. (2007). Beyond engagement and participation: User and community coproduction of public services. Pub. Admin. Review, Sep-Oct, 846–860.

Cavaye, A. L. M. (1995). User participation in system development revisited. Information & Management, 28, 311–323.

Ch'ng, B. (2018). New chapter opens for villagers in PJ. Retrieved March 16, 2019, from https://www.thestar.com.my/metro/metro-news/2018/08/04/new-chapter-opens-for-villagers-in-pj-unique-container-library-launched-to-enhance-education-in-the/

Cornwall, A. (2008). Unpacking "participation": Models, meanings and practices. *Community Development Journal*, 43(3), 269–283.

DeLone, W., & McLean, E. (1992). Information Systems Success: The quest for the dependent variable. *Information Systems Research*, 3(1), 60–95.

DeLone, W., & McLean, E. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, 19(4), 9–30.

Giffinger, R., Fertner, C., Kramar, H., et. (2007). Smart cities: Ranking of European medium-sized cities. Wien: TU Vienna.

Irvin, R. A., & Stansbury, J. (2004). Citizen participation in decision making. Pub. Admin. Review, 64(1), 55–65.

Jafari, S. M., & Ali, N. A. (2011). Exploring the values of e-governance to citizens. *E-CASE & e-Tech Inter. Conference*, Jan'11, Tokyo, 1312–1332.

Kamalia Azma, K., & Nor Laila, M. N. (2017). Citizen-centric demand model for transformational government systems. *PACIS 2017 Proceedings*. 139.

King, C. S., Feltey, K. M., & Susel, B. O. (1998). The question of participation: Toward authentic public participation in public administration. *Pub. Admin. Review,* 58(4), 317–326.

Lynch, T., & Gregor, S. (2004). User participation in decision support systems development. *European Journal of Information Systems*, 13, 286–301.

Majlis Bandaraya Petaling Jaya (MBPJ). (2012). Pelan Strategik Sustainable Petaling Jaya 2030. Petaling Jaya: Majlis Bandaraya Petaling Jaya.

Majlis Bandaraya Petaling Jaya (MBPJ). (2018). Petaling Jaya population demographics. Retrieved March 19, 2019, from https://www.pjkcd.net/population-demographics

Majlis Bandaraya Petaling Jaya (MBPJ). (2019). PJ Green Squad. Retrieved January 4, 2019, from http://eps.mbpj.gov.my/query/PJGreenSquadInfo.pdf

Mariana, M. O. (2008). Stakeholder participation in the implementation of Local Agenda 21 in Malaysia. PhD thesis, Universiti Putra Malaysia.

Mumford, E. (1979). Consensus systems design: An evaluation of this approach. In N. Szyperski & E. Grochla (Eds.), Design and Implementation of CBIS. Groningen: Sijthoff and Noordhoff.

Nam, T., & Pardo, T. (2011). Conceptualizing smart city with dimensions of technology, people & institutions. Proceedings of the 12th *Inter. Conf. on Dig. Gov. Research,* June 12–15, College Park, MD, USA, 282–291.

Sakdon, Z. (2019). Council launches RM3mil community grant project. Retrieved March 10, 2019, from https://www.thestar.com.my/metro/metro-news/2019/03/07/council-launches-rm3mil-community-grant-project/

Vigoda, E. (2002). From responsiveness to collaboration. Pub. Admin. Review, 62(5), 527–540.

White, S. C. (1996). Depoliticising development: The uses and abuses of participation. Development in Practice, 6(1), 6–15.

Yildiz, M. (2007). E-government research: Reviewing the literature, limitations, and ways forward. *Government Information Quarterly*, 24, 646–665.

Yin, R. K. (2018). Case Study Research and Applications: Design and Methods (Sixth Edition). Thousand Oaks: Sage.

Zikri, M., Tarmiji, M., & Aziz, A. M. (2015). Local government service efficiency: Public participation matters. *Int. Jour. of Soc. Science & Humanity*, 5(10), 827–831.

Received: January 2020. Accepted: 28th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 313 – 325

THE DEVELOPMENT CONTROL OF URBAN CENTRE IN KUALA LUMPUR

Izuandi Yin[1], Jamalunlaili Abdullah[2]

[1]*School of Housing Building and Planning*
UNIVERSITI SAINS MALAYSIA
[2]*Faculty of Architecture, Planning & Surveying*
UNIVERSITI TEKNOLOGI MARA

Abstract

Development control is the major factor that contributes to the growth of urban centres in Kuala Lumpur City Centre. This paper focuses on the development control in urban centres that faces the challenge of identifying the limit of the development growth's boundary. The scope is identifying the growth rank in Kuala Lumpur prior to the existing physical development. This study is aimed at the function of development control in measuring the ranking of the growth centres in Kuala Lumpur. This has resulted in the ranking of 11 growth centres chosen for this study in Kuala Lumpur. The objectives of this study are to identify the growth level from the urban centre's location and to examine the influence of tools of development control such as built up area towards the development growth. The study uses the qualitative and quantitative methods such as allocation of development intensity in defining the growth of an urban centre in Kuala Lumpur. The study analyses the land use, built-up area, floor space optimisation, total plot ratio, gross development value, and density requirements to find the implementation of intensity of development, zoning of land use, high-density development, and the correlative relation of development control with the growth centre. This study is anticipated to enhance the establishment of land use management and physical development in Kuala Lumpur City Centre for sustainable urban growth and proper management of development control.

Keywords: urban growth, development control, growth center, urban development, built-up area.

[1] Lecturer at Universiti Sains Malaysia Email: izuandi.yin@usm.my

INTRODUCTION

Eleven Growth Centres are selected in Kuala Lumpur for this study based on the growth's hierarchy and their own ranks. This study explains the analysis of development control for each growth centre. These growth centres need to be ranked and classified by measuring the urban economic growth to get the finding for each growth development. The objectives in this study are the identification of the urban growth pattern that leads to the limitation of development border in Kuala Lumpur, examining the influence of development control towards the growth of urban centres, and analysing the location decision and the intensity of development in an area which uses the tools of development control that have an impact on high-density development in Kuala Lumpur. Urban growth development is related to several themes such as development control for intensity of development. This research has identified some tools of development control that influence the growth of the Kuala Lumpur commercial city centre, the surrounding seven district centres and three neighbourhood centres. There are five tools of development control which will be analysed in this study; the size of land use area, built up area, plot ratio, gross development value, and floor space.

DEVELOPMENT CONTROL IN URBAN AREA

Act 172 under Part IV has clearly explained the planning control and mentioned some tools of development control which approve the development (through planning permission) that can be conveyed into change of land use, building and development intensity. Section 19 (2) of Act 172 also mentioned that building alterations must undergo planning permission. Most buildings have been altered to increase building height and floor area, which automatically results in a greater built up area. The development control of Kuala Lumpur has led to the growth of urban centres by rank which aims to control the land and building development and is one of the elements to process and assess the application before the planning permission (either permanent or temporary) is granted for further land development (Yusup. M, et al., 2018). Planning permission is part of urban management procedures, and the current system used for accepting or refusing any development in every local authority in Malaysia (Quigley, 2006). In general, the development of urban centres can be seen from the point of land use optimisation in the context of the intensity of land uses as well as decision of firm's location (Siedentop et al., 2016).

PROBLEM STATEMENT

The National Urbanisation Plan 2 (NUP2, 2016) has mentioned the issues of urban sprawl and limitation of city borders for every city in Malaysia. The major problem is identifying the limitation of the boundary. Because of the high intensity of development, the sprawl of development towards the suburbs cannot

be defined explicitly using the tools of development control. Based on Kuala Lumpur City Plan 2020 , the growth of the Kuala Lumpur City Centre or in the classification of land use zone called City Centre Commercial (CCC) as a workplace which expands and links up to the suburb areas while massive urbanised area occupied by residential buildings in the District Commercial Centre (DCC). However, the development growth in the boundary between the CCC and DCC somehow still isn't properly identified. The urban sprawl issue in Malaysia can be solved with the National Urbanisation Plan 2 (NUP2, 2016). In 2025, an estimated total of 314 cities in Malaysia will have a clear urban boundary thus solving the problem of urban sprawl and the provision of public facilities.

The allocation of development control for CCC development within the DCC development gave different priorities and growth for some areas. At some point we are unable to tell which is the actual area for the urban centre and which is the district centre to be considered in KL City. The district centre is more prominent than the city centre because of the high density of development. This might cause a misunderstanding of the primary development area for the CCC and secondary development areas for district centres in KL City. Kuala Lumpur City Plan 2020 refers to the urban growth from the centre but in the current situation at the physical site, it seems that other locations considered as the district centres also have high-density development and the built-up area is almost the same with the city centre.

The planned MRT project and other mega projects elsewhere have attracted a lot of attention especially in the city centre and other district centres. This Transit Oriented Development in the City Centre attracts more developments with high built up area densities in the Kuala Lumpur City Centre. A major project in Greater KL is the Tun Razak Exchange which is an iconic 70-acre development with an estimated RM40 billion in Gross Development Value located strategically in the Golden Triangle and inside the CCC (Prime Minister's Department, 2016). The potential development of an urban area should be properly planned in line with technological changes and global challenges to maximise its contribution to national economic growth. By using some technological method, the urban growth can be defined systematically (New Straits Times, 2017).

Unbalanced land use distribution within areas in Kuala Lumpur is the new challenge that requires a more systematic planning and management of the city (National Urbanisation Plan 2, 2016). Furthermore, it causes an uneven spread of employment and land use control from the City Centre to the outer city . Big-scaled projects or mega projects also refer to the location in the city (Flyvbjerg, 2013). These projects are often developed in the core area or city centre which contributes to economic gains for the city. Linkages of transportation (Transit Oriented Development) influences the land use activity in

urban centres and leads to an increasing need for services which result in higher taxes and traffic.

High intensity development results in rapid growth in the inner city, and limitation of city borders for every city in Malaysia. This study will analyse the tools of development control which influence the growth towards suburb areas. In 2014, land use area for Kuala Lumpur increased to 2584.11 in total compared to 2001 at only 1824.16 which resulting the land use area in total of 24,221.5 hectare (Boori, Netzband, Voženílek, & Choudhary, 2015a). This demonstrates that the growth of the city has increased. The city density of Kuala Lumpur has increased with urban expansion rapidly growing towards the east side of the city showing a fast growth (Boori, Netzband, Voženílek, & Choudhary, 2015a). The built-up area from the city centre to 50 km outwards decreased in 2014 because of the high intensity and floor space in the city centre (Boori, Netzband, Voženílek, & Choudhary, 2015b).

The link between a city's growth rank and urban land use expansion influenced by the urban hierarchy of the cities would result in a rapid urban growth in the country (Suharto Teriman, Yigitcanlar, & Mayer, 2009). The increased built-up area in the inbound area and out-side the greenbelt area is the result of the provision of green space and the regional patterns of urban growth in urban areas (Paulsen, 2014). Furthermore, the degree of urban sprawl can be used either for single or multiple cities which typically result in the rapid sprawl of the cities that can be seen during the second decade of the developed city (Jiao. L, 2015). Population ageing has affected the land consumption (Kuala Lumpur Structure Plan 2020, 2004). The affected area is in a sub-urban area due to allocation of houses by senior citizens which reflect the reduction of land consumption.

PURPOSE OF THE STUDY

This study explains the analysis of intensity of development for each growth centre and these growth centres need to be ranked and classified by measuring the urban economic growth to get the finding for each growth development. This research will analyse urban growth and development control for a different hierarchy of urban centre in Kuala Lumpur. Urban growth development is related to several themes such as development control for the intensity of development. The intensity of development covers the development of the built-up area, land use within cities, zoning of land use, Gross Development Value, floor space, and development density where the major aspect contributes to the urban growth in the city centre. The research objective is based on a comparison between 11 urban growth patterns (City Centre and 10 District and Neighbourhood Centres).

RESEARCH METHODS

The method used in this study is the overlay technique using GIS data and matrix analysis to find the growth rank. The first stage is a preliminary study on the development of the urban centre to find the development growth of built up area in terms of the relation between the urban centre with surrounding district centres in Kuala Lumpur. It involves determining the study area focus on the growth centre of Kuala Lumpur Federal Territory based on secondary development information. The second stage is a literature review of theoretical studies related to the urban growth development and elements in development control.

The third stage is data collection. Both qualitative and quantitative approaches are used throughout this research. Primary data involves observation and mapping (Qualitative Method) in order to find the development intensity of the urban centre i.e. to calculate the actual plot ratio for each building, gross development value for each building, building height in terms of floor level, building floor space, and also the built up area for each lot. This observation also relates to other areas around the city centre to see the differences in the built-up areas that KL City Hall gives. Some areas will have high plot ratios and their importance will be considered. The other method used in this study is professional interviews (Qualitative Method) with government agencies to get the data related to the development control. A discussion is also carried out with a professional government worker (KL City Hall staff) to discover information related to built-up areas, defining the plot ratio, site decision for development, and the current situation in urban development in Kuala Lumpur.

The findings could help in discovering the growth of urban centres through development control. A comparative study is then conducted on the actual site to determine the measurement result of the elements in land use optimisation to find the level of growth for each urban centre. Land use development also has an influence on urban growth. This interrelationship creates the main element that responds to the development of urban growth for each urban centre and also economically influences the urban growth. Six elements have been analysed and identified to find the growth of each urban area based on this development control element. The element is plot ratio for each building that has its importance based on its growth centre. Built up area is analysed from the total building floor area and is influenced by the building height. The Gross Development Value (GDV) for development intensity comes from the estimation for each phase of development and the cost of the development. The total floor space area for buildings located in the urban centre is usually measured in square feet. The density of each urban centre is influenced by the number of population and the development within the city. Lastly, the mixed land use for each urban centre creates the pattern of growth. The analysis conducted through observation of the number of building floor, floor space & level, data of GDV and distribution of plot ratio & land use. Overlay technique GIS use to find the growth rank and

the score of growth has been identified using the weight-age put for every element (landuse, total built-up area, average plot ratio, GDV and floor space). The scores are then used to rank each 11-growth centre and compare with the growth centre in KL City Plan 2020. The result shows some urban centre in the lower group actually can be promoted to the higher group as it meets the intensity.

ANALYSIS & FINDINGS

There are 11 Growth Centre selected with the radius of the 1km study area for each urban centre. These chosen areas in the district centre and neighbourhood centre are based on its importance of the commercial area in KL. It has been selected for comparison to other growth centre. The difference between the growth centre will be measured based on the intensity development of the selected area that contributes to the urban growth and urban economy for the city (Table 1).

Table 1: Selected growth centre

Growth Centre	Urban Centre	Categories
KL City Centre	City Centre of Kuala Lumpur	Most intensive in land use, building height and plot ratio in City Centre
District Centre	Damansara, Bukit Jalil, Wangsa Maju, Bandar Tun Razak, Bangsar, Datuk Keramat, Sentul Raya	Commercial area in the boundary of District Centre that permissible within City Centre
Neighbourhood Centre	Setiawangsa, Bandar Tasek Selatan, Shamelin	Commercial areas within the residential neighbourhood

Source: Kuala Lumpur Structure Plan 2020

The selection of the case study based on the existing District Centre in KL which is Damansara, Bukit Jalil, Wangsa Maju and Bandar Tun Razak. Three (3) other District Centres analysed are Bangsar, Datuk Keramat and Sentul Raya. While 3 other areas are the Neighborhood Center which is Setiawangsa, Bandar Tasek Selatan and Shamelin. The selection is based on the KL Structure Plan 2020 which has identified the City Centre, District Centre and the Neighborhood Center as selected by their own study in accordance to the criteria and the growth development that is presumed to have the potential to compete to be listed or ranked in a high growth centre. KL City Centre is already in Tier 1 or city centre growth areas so that it can be estimated to compare with other growth centres. However, the rest 10 growth centres are measured with intensity development and growth development by doing observation surveys to achieve the rank and comparison for each place.

Analysis on Population, Density and Floor Space

The Kuala Lumpur City Plan strategic zone shows that Wangsa Maju- Maluri and Sentul- Manjalara were the highest density in KL with 8,163 person/square kilometre and expected to increase to 9,525 person/square kilometre by the year 2020. That resulted in 116% increase rate of 2005 in population density while the lowest density is Damansara-Penchala with 3,521 person/ square kilometre, which clearly shows that people move to the greater urban area because of the market force and job opportunities, in which the commercial floor space in the high-rise development along the main road and highways in the city where many businesses and offices and other uses of commercial activity are located. KL Structure Plan 2020 has specified the total of 41-million-meter square of floor space for commercial and projected the need up to a total of 65-million-meter square by the year 2020 based on KL City Plan 2020. The committed Gross Floor Area (GFA) gained until the year 2005 is 14,916,008 square feet and expected to increase to 41,275,508 square feet by the year 2020. That resulted in a 277% increase which tripled the rate of 2005 in commercial floor space demand. To calculate this aspect of urban growth, the value of acreage for each lot and building lot has to be defined to get the percentage of plinth area and non-built up area for the lot. All development in the selected urban centre has to be calculated to obtain the Gross Development Value (GDV) and to know the value of land.

Table 2: Table 2. Urban Growth Analysis on Selected Growth Centre (1km radius)

Growth Centre	Urban Center	Land use (1 km from centre)			Total Built Up Area (Sqft)	Average Plot Ratio	GDV (RM million)	Floor Space (Sqft)
		Area (Acre)	**Highest**	**Lowest**				
KL City Centre	Kuala Lumpur City Centre	625.1	Commercial (35.4%)	Industry (0.03%)	1,888,711	1: 8	11,726.4	17,668,700
District Centre	Damansara	581.4	Residential (39.4%)	Industry (0.20%)	1,109,287	1: 4	4,833.0	5,966,315
	Bukit Jalil	630.6	Facility (20.0%)	Utility (0.06%)	558,177	1: 3	3,265.4	3,878,451
	Wangsa Maju	558.1	Residential (44.6%)	River (0.05%)	590,884	1: 2.5	2,936.1	5,680,272
	Bandar Tun Razak	767.6	Residential (28.9%)	Facility (0.80%)	551,419	1: 2.5	3.294.0	3,213,700
	Bangsar	576.6	Residential (48.4%)	Facility (0.10%)	1,138,221	1: 5	5,318.4	7,274,800
	Datuk Keramat	515.3	Residential (33.1%)	Facility (0.20%)	1,100,938	1: 4	4,952.3	5,607,700
	Sentul Raya	584.5	Residential (37.9%)	Amenity (0.40%)	1,102,809	1: 4	3,741.0	5,711,625
Neighbourhood Centre	Setiawangsa	552.7	Residential (28.7%)	Facility (0.20%)	548,205	1: 2	2,965.5	3,213,700
	Bandar Tasek Selatan	584.9	Residential (32.6%)	Facility (0.80%)	564,504	1: 3	3,374.0	4,031,476
	Shamelin	587.3	Residential (41.7%)	Facility (0.60%)	559,369	1: 3	3,849.3	3,957,900

Total	**9,712,524**

Table 2 shows the urban growth analysis for selected growth centres. It includes calculation and measurement on plinth area and building level and acreage to get the total number of built-up areas. The data of the plinth area and level of the building has been gathered from the site observation which was conducted to estimate and measure the built up for every single development. Then the total up for every development has come with the total of built-up area for every urban growth centre.

The ranking for the built-up area is different according to the function of the growth centre. Leading the 1st rank is KL (19.5%), a city centre, followed by Bangsar (11.7%), Damansara (11.5%), Sentul Raya (11.4%), Datuk Keramat (11.3%) and Wangsa Maju (6.1%) which are amongst the district centre conquering the 2nd to the 6th rank. While the 7th and 8th rank are the neighbourhood centre: Bandar Tasek Selatan (5.8%) and Shamelin (5.7%). The 9th and 10th rank are the district centre of Bukit Jalil (5.7%) and Bandar Tun Razak (5.6%), while the lowest rank (11th) of built-up area based on growth centre is the neighbourhood centre of Setiawangsa (5.6%). In reference to the ranking order, the result shows that the growth order is not according to the natural order of growth centre (presumably influences its total built up area for each urban centre), instead, the ranking shows that despite the 1st until the 6th ranking follows the natural order of growth centre, neighbourhood centres have increases their built up area, this allows neighbourhood areas to be ranked in the 7th and 8th rank (Bandar Tasek Selatan and Shamelin), ahead of the district centres in the 9th and 10th rank (Bukit Jalil and Bandar Tun Razak.

Matrix analysis used for each variable in growth criteria in KL which is in plot ratio, GDV, floor space and built up area score to determine the importance and the rank for each urban centre with the total score for the growth in KL is 220. The highest growth score is KL City Centre with 40 total scores representing 18.2% of KL growth. Damansara with 22 total scores of 10% of overall growth, Bukit Jalil with 16 total score representing 7.3% from overall growth, the same can analysis is reflected by Wangsa Maju with 16 total score with 7.3% from overall growth, Bandar Tun Razak with 13 total growth represents 5.9% from overall growth, Bangsar with 26 total score represent 11.8% of overall growth. Furthermore, Datuk Keramat with a total growth score of 22 represents 10% of overall growth, and Sentul Raya with total scores 21 represent 9.5% of overall growth's score. Setiawangsa with a total growth score of 11 represents 5% of overall growth, and Bandar Tasek Selatan with a total score of 16 represent 7.2% of overall growth score. Last but not least is Shamelin with a total score of 17 representing 7.7% of overall growth. The score of every variable of

growth which is plot ratio score with 61 (27.7%) from overall variable growth score. Gross Development Value with a total score of 47 (21.4%) from the overall variable growth score. Floor space total score and built up area total score were both 54 scores (24.5%) and 58 scores (26.4%).

Finding on the growth of urban centre

The 1st rank of growth centre in KL is the Kuala Lumpur City Centre in City Centre Growth. Rank analysis shows the 2nd rank is Bangsar followed by Damansara and Datuk Keramat that shares the position of the 3rd rank, then the 4th rank which is Sentul Raya and 5th rank is Shamelin. However, the analysis shows that the 6th rank is a neighbourhood centre, thus it shows that this urban centre is higher than urban centre in the 7th rank which is Bandar Tun Razak that is of a District Centre. Shamelin has the potential to upgrade its growth centre from neighbourhood centre to district centre, while Bandar Tun Razak can be classified as a neighbourhood centre. While the remaining two urban centres in the Neighbourhood Centre which is Bandar Tasek Selatan and Setiawangsa is still classified as Neighbourhood Centre because their position in 6th and 8th rank respectively.

The area in KL CP 2020 (Bandar Tun Razak and Shamelin) and KLSP 2020 (Bandar Tun Razak, Datuk Keramat, Bangsar, Sentul Raya and Shamelin) is categorised as the area that has been affected to be transferred by looking at the growth rank. There is an area that is supposedly being classified as a Neighbourhood centre commercial in KLCP 2020 which is Bandar Tun Razak. Furthermore, Shamelin classified as a Neighbourhood Centre Commercial in KLCP 2020 has significance by its growth rank to be located in the District Centre Commercial group. A centre which is of higher growth compared to Bandar Tun Razak, which is Datuk Keramat, Bangsar, Sentul Raya and Shamelin were supposedly being ranked in District Centre.

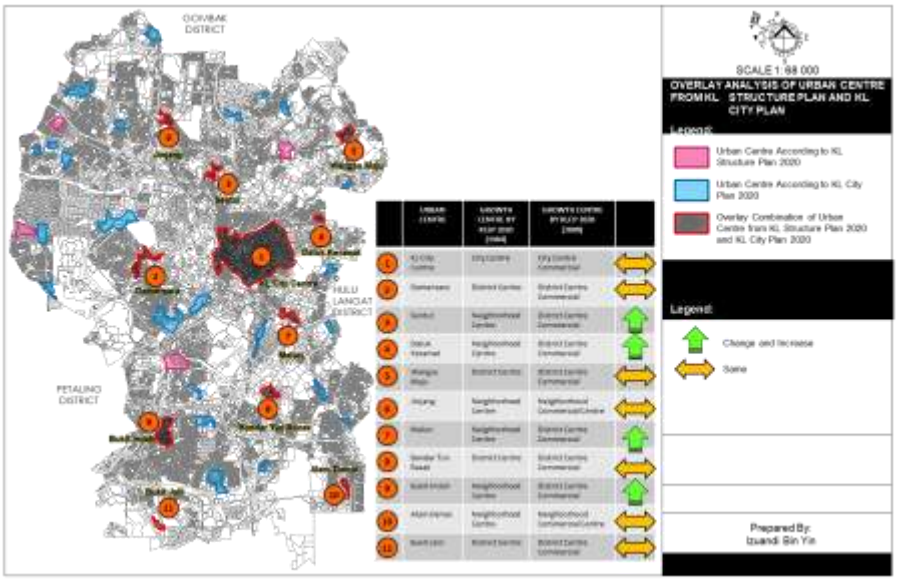


Figure 1: Overlay analysis of urban centre from KL structure plan and KL city plan
Source: Kuala Lumpur Structure Plan 2020: A World Class City (2004)
Kuala Lumpur City Plan 2020: Towards a World Class City (2008)

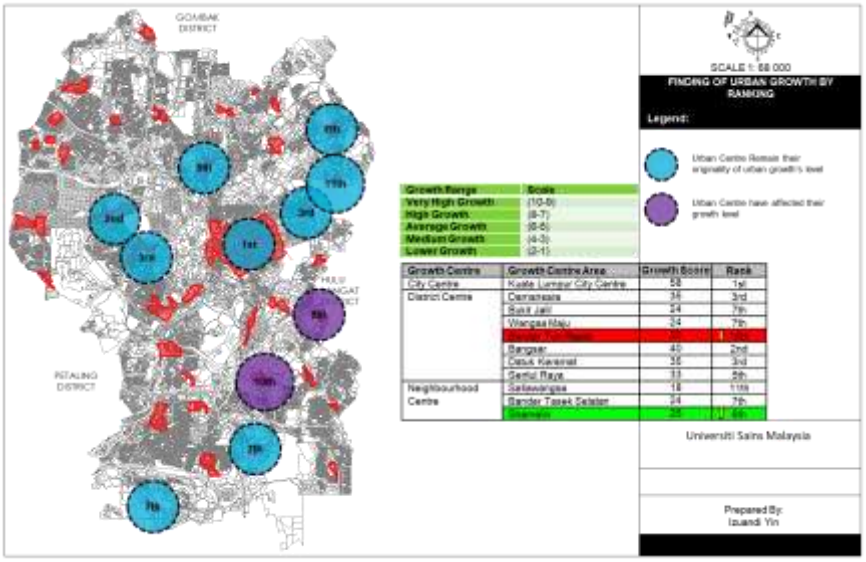


Figure 2: Finding of urban growth by rank

Figure 1 shows the result of an overlay analysis for the urban centres from KLSP 2020 and urban centres from KLCP 2020. The result has identified 11 urban

centres in the overlay and shows a mismatch of growth centres as employed by Kuala Lumpur City Hall. This analysis also has answered a part of the main problem statement for this research. The result shows that seven of the urban centres are stagnant or not experiencing any changes while four other urban centres (Sentul, Datuk Keramat, Maluri and Bukit Indah) have increased in growth from Neighbourhood Centre to District Centre Commercial. Next is the identification of land use for each urban centre with categories for its own use of land and building use. There is a growth centre that has been affected by the significance of the growth in its rank in Kuala Lumpur. The area that has been highlighted or ranked in the table inside Figures 1 and 2 both in KL CP 2020 and KLSP 2020 is categorised as an area that has been affected and to be transferred by looking at the growth rank. The areas in KLCP 2020 (Bandar Tun Razak and Shamelin) and KLSP 2020 (Bandar Tun Razak, Datuk Keramat, Bangsar, Sentul Raya and Shamelin) are categorised as the areas that are to be transferred by looking at the growth rank. Based on Figure 2, the top ranked growth centre in Kuala Lumpur is Kuala Lumpur City Centre in City Centre Growth. Rank analysis defines Bangsar at second followed by Damansara (third) and Datuk Keramat (fourth) who share the same growth score at third position, fifth is Sentul Raya and sixth is Shamelin. However, the analysis shows that the sixth position is come from Neighbourhood Centre's group, which means that this urban centre is ranked higher than Bandar Tun Razak (tenth) in the District Centre group decreasing the growth score. Meaning that anything can happen (lower group of urban centres can overtake the score in upper rank group) in urban centre hierarchy when development control has been analysed through the growth analysis. Shamelin has the potential to upgrade its growth centre status from Neighbourhood Centre to District Centre, while Bandar Tun Razak should be classified as a Neighbourhood Centre compared to District Centre in KLCP 2020. The two remaining urban centres in the Neighbourhood Centre group i.e. Bandar Tasek Selatan (seventh) and Setiawangsa (eleventh) can still be classified as neighbourhood centres base on their score. The centres with higher growth rank's score compared to Bandar Tun Razak is Datuk Keramat (third), Bangsar (second), Sentul Raya (fifth) and Shamelin (sixth)

The analysis that has been done to identify the growth of Kuala Lumpur shows that it can be measured from the land use optimisation which is the estimation of plot ratio, floor space, measuring the built-up area from the development, and gross development value for the intensity of development for each urban centre. The findings clearly show that the urban centre classification in KLCP and KLSP is outdated. There are neighbourhood centre areas that need to be classified in the district centre group because they are growing faster than areas in the district centre group.

CONCLUSION

Development control has influenced the growth of urban centres especially in terms of location and intensity of development. Physical development that has been approved with planning permission allows alteration of buildings and create a higher density for proposed developments. The practise of identifying the capacity of development control in the said urban centre can identify the latest rank and upgrade or downgrade the growth centre. This is important to measure the growth extension which can identify the growth direction through the locational of urban centre.

ACKNOWLEDGEMENTS

The authors would like to thank our main sponsor, Universiti Sains Malaysia through Short Term Grant (304/PPBGN/6315259) to avail this study. The credit also goes to School of Housing Building and Planning, Universiti Sains Malaysia, Pulau Pinang for the encouragement and support during the preparation of this paper.

REFERENCES

Boori, M. K., Netzband, M., Voženílek, V., & Choudhary, K. (2015). Urban Growth In Last Three Decades In Kuala Lumpur, Malaysia. *Urban Remote Sensing Event (JURSE)*, IEEE, 2015, ISSN 2334-0932.

Boori, M. K., Netzband, M., Choudhary, K., & Voženílek, V. (2015). Monitoring and Modeling Of Urban Sprawl Through Remote Sensing and GIS in Kuala Lumpur Malaysia. *Ecological Processes*, 4, 2015.

Flyvbjerg, B. (2013). Mega Delusional: The Curse of the Megaproject. *New Scientist*, 28-29.

Jiao , L. (2015). Urban Land Density Function: A New Method To Characterize Urban Expansion. *Landscape and Urban Planning Journal*, 139, 26-39.

Kuala Lumpur Structure Plan 2020: A World Class City (2004). Dewan Bandaraya Kuala Lumpur, 2004. *ISBN 9839983245, 9789839983241*

Kuala Lumpur City Plan 2020: Towards a World Class City. Dewan Bandaraya Kuala Lumpur, 2008. *ISBN 9839983288, 9789839983289*

National Urbanization Plan 2 (NUP) 2016. Jabatan Perancangan Bandar dan Desa Semenanjung Malaysia. Kementerian Kesejahteraan Bandar, Perumahan Dan Kerajaan Tempatan. Julai 2016. *ISBN 978-967-12812-3-9*

New Strats Times (8 Jun 2017), National Urbanization Plan 2 (NUP2). (Accessed February 2018) Retrieved from *https://www.pressreader.com/malaysia/new-straits-times/20170608/281582355602030*

Paulsen, K. (2014). Geography, policy or market? New evidence on the measurement and causes of sprawl (and infill) in US metropolitan regions. *Urban Studies Journal*, 51(12), 2629–2645.

Prime Minister's Department (2016). Economic Transformation Programme, *Anual Report 2016.Performance Management and Delivery Unit (PEMANDU).*

Quigley, J. M. (2006). Urban Economics. UC Berkeley: Berkeley Program on Housing and Urban Policy. Retrieved from *https://escholarship.org/uc/item/0jr0p2tk*

Siedentop, S., Fina, S., & Krehl, A. (2016). Greenbelts in Germany's regional plans—An effective growth management policy?. *Landscape and Urban Planning Journal*, 145, 71-82.

Teriman, S., Yigitcanlar, T., & Severine, M. (2009). Urban sustainability and growth management in south-east Asian city regions: the case of Kualalumpur and Hongkong. *Planning Malaysia Journal of the Malaysian Institute of Planners,* 7(1), 47-68.

Town and Country Planning Act 1976 (Act 172) (Malaysia)

Yusup, M., Arshad, A.F., Marzukhi, M.A., Abdullah, Y.A. (2018). Temporary Planning Permission In Development Control System For Urban Development, *Planning Malaysia: Journal of Malaysian Institute of Planners,* 16(3),143-155.

Received: January 2020. Accepted: 22th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 326 – 337

THE ATTRIBUTES OF FUTURE SOCIAL LEARNING BUILT ENVIRONMENTS TOWARDS 21st CENTURY EDUCATION IN TERTIARY EDUCATION

V. Ramu[1], Nooriati Taib[2], Nor Fadzila Aziz[3]

[1,2,3] *School of Housing, Building and Planning*
UNIVERSITI SAINS MALAYSIA

Abstract

In the past two decades, the transformation that has captured tertiary education worldwide is a significant task mentioned as "academic evolution". Whereby, the vast exploitation of Information and Communication Technology (ICT) explicitly mentioned as artificial intelligence (AI), digitisation, automation and Internet of Things (IoT) articulate the term Industry 4.0. Furthermore, the application of ICT in teaching and learning foster a new learning theory designated as Connectivism. Hence, there are needs in the formulation of an ideal and compatible classification of a social learning environment to accommodate the new learning theory, which enhances the informal learning undertaken by learners besides their formal lecture hours. Therefore, this study aims to seek factors that influenced learners' preferences toward social learning spaces. A qualitative study was adapted to investigate the learner's preferences attributes on social learning spaces at Polytechnics. An adapted questionnaire consisting of 39 items was administered to 300 Polytechnic students from three Polytechnics in Malaysia. In particular, data were analysed using exploratory factor analysis (EFA) with IBM SPSS version 22. The results from this research recommended a typology of six social learning space preferences attributes as a multidimensional construct with its two underlying dimensions: physical preferences and social preferences. The findings can help in redesigning and planning of social academic learning space in tertiary education institutions to enhance education towards 21st Century Education.

***Keywords**:* social learning space, informal learning, urban campus planning, 21st Century Education, learner's preferences attributes, learning environment

[2] Senior Lecturer at Universiti Sains Malaysia. Email: nooriati@usm.my

INTRODUCTION

In considering upcoming education trend disciplines, current learners and graduates shall be developed to face the challenges towards Industrial Revolution 4.0 and academic revolutions (Mohayidin et al., 2014). Imperatively, the extensive consumption of the Information and Communication Technology (ICT) and rapid developments in technologies such as artificial intelligence (AI), digitalisation, automation, big data, data sciences, robotics and Internet of Things (IoT), coining the term of Industry 4.0 (Freigang et al., 2018; Ministry of Higher Education, 2018; Puncreobutr, 2016). Therefore, the emerging technological breakthrough emphasises the urge to redesign an ideal and compatible academic learning space and has been a crucial debate topic among academician across the globe (Ibrahim, Fadzil, & Saruwono, 2013; Nenonen, 2015; Yap, Neo, & Neo, 2016). Thus, tertiary education is now moving ahead from boundaries looking into the requirements and compatibility of Next-Generation Learning Space whereby, merged by different types of the learning environment.

In this study, the focus will be distinguishing the impact factors that have influenced on learner's learning space preferences attributes towards social learning spaces. Pointed out in the literature, traditional learning theories named as behaviourism, cognitivism, and social constructivism occurred without technology in teaching and learning in schools (Beckers, 2016) (refer figure 1). Consequently, the application of ICT in teaching and learning produced a new learning theory, termed as Connectivism (Goldie, 2016; Marais, 2011; Siemens, 2005). According to Siemens (2005), connectivism is not only learning from peers but learning in the contacts as well, especially from social, digital or virtual networking. Hence, an active social learning space is needed. As coined by Downes (2007), connectivism consummate the needs of 21st-century learner's skills where learners progress far away from content expenditure into critical thinking, collaboration, and content formulation.

Figure 1: Purpose-process-place framework for education
Source: A Learning Space Odyssey by R. Beckers (2016)

LITERATURE REVIEW

As mentioned by Brown & Lippincott (2003), at present more learning activities accorded out-of-classroom learning than ever before. The statement above emphasises the foremost part of social learning spaces in learner's daily life on urban campus. This point of view directs that it is crucial to explore the new concept of informal learning space which is synonymous to social learning space. No doubt, informal learning has been appearing at all levels (Cunningham & Walton, 2016) and promotes and enhances student's engagement, learning experiences, self-regulated learning and collaborative learning as well (Amit Kumar, 2015; Dole et al., 2016; Wilson & Cotgrave, 2016). Currently, students in higher education are utilising transitional spaces such as foyers, internal corridors, hallway, external corridors, gazebo, pavilion, terrace and square as their social learning space in managing their learning activities. Pointed out in the literature, the behavioural factors of students and the functional attributes of learning space are influencing the selection of social learning space (Baker, 1968). Therefore, this scenario urges the researchers and academicians around the globe to explore the importance of social learning built environments towards 21st-century education.

Imperatively, how learners utilise the social learning space and how it can be a redesign for future educational planning need to take into consideration so that can be aligned with education 4.0 (Hunter & Cox, 2014).The recent trend of online learning results in possibilities of learning anywhere with regards to the support of wireless internet connection. The long hours of online learning will now require a conducive environment to support learner's concentration on the dependency on electronic gadgets, commonly laptops and smartphones. Cunningham & Walton (2016) explained that social learning space as a third space and blend area where learners able to concentrate autonomously and mingle with peers. The nature of informal learning style should encourage connectivity and conversation through social activities and sometimes spontaneous acts within the environment setting itself. Boys (2010), claimed that there were "almost" no records regarding this research on this area. Therefore, research needs to be done in order to explore the usefulness and effectiveness of the new emerging learning built environment.

METHOD

Informal learning space is only significant for Post-secondary education. Post-secondary comprises Universities, Polytechnics, Kolej Komuniti, and ILP. In specific, the 4th shifts focus on the Quality Technical and Vocational Education and Training (TVET) graduates. Under the Economic Transformation Programme (ETP), Malaysia will require a 2.5-fold increase in TVET enrolment by 2025. Further, TVET is seen as a less attractive pathway than university education. Therefore, Malaysia needs to make sure academic and TVET

pathways are equally valued and cultivated (Kementerian Pendidikan Malaysia, 2015). The focus population in this research is Malaysian Polytechnic students who studying in three Polytechnics: Ungku Omar Polytechnic established in 1969, Sultan Abdul Halim Mu'Adzam Shah Jitra Kedah established in 1987, and Seberang Prai Polytechnic established in 1999. In addition, several institutions in Malaysia are located in sub- urban areas where accessibility to public facilities such as parks or open space may be limited. In addressing this limitation, research needs to be executed in order to explore the learners social learning space preferences attributes. This survey research involves (N=300) full-time diploma students which comprise technical and non-technical academic programmes. In detail, the technical academic programme consists of diploma in Architecture, diploma in Electrical, diploma in Marine Engineering, and diploma in Mechanical Engineering. Meanwhile, the non-technical academic programme consists of diploma in commerce, diploma in Islamic Banking, diploma in accounting, and diploma in Marketing. The questionnaire that developed to acquire research data which encompasses two parts- Part A and B. Part A involves questions associated with learners' demographics. Part B of the survey related to learner's preferences on social learning space entailing of seven constructs adapted from Beckers, van der Voordt, & Dewulf (2016); Yang, Becerik-Gerber & Mino (2013); Kumar & Bhatt (2015); Beckers et al., (2016); Wilson & Cotgrave (2016); Kamis et al. (2015); Ibrahim, Fadzil & Saruwono (2013). The students were clustered based on the semester for each department from three selected polytechnic and a consensus number of 100 students (4 semesters) were randomly selected from each polytechnic. In sum, a total of 300 students were chosen for the Exploratory Factor Analysis (EFA).

INSTRUMENTATION

Items were established to measure each dimension of learner's preferences on social learning space based on its operationalisation and existing questionnaires, as stated in table 1, respectively. In order to review the items, 3 expert reviewers were invited to review the content validity and reliability of the underlying dimension of learner's preferences towards social learning space. The three expert reviewers were from diverse disciplines in the local higher education institutions. Based on the comments given by experts, quite a few items were found ambiguous, need to rephrase, the items need to be in English and Bahasa Malaysia version, and no items were deleted. A Preliminary test was conducted to ensure the suitability, phrasing, arrangement and instruction. The sample involved in the test is excluded from the study. Finally, a full set of dual language questionnaires with a 5-point Likert-type scale, ranging from 1 (strongly disagree), 2 (disagree), 3 (Neutral), 4 (agree) to 5 (strongly agree) was administered in the pilot study.

Table 1: Conceptualization and Operationalization of learner' perception

Dimension	Conceptualization	Operationalisation
Interaction (5 items)	Learner's involvement in collaborative-learning among peers *(Roskos K & Neuman SB. 2011; Yang Z, Becerik-Gerber B, Mino L, 2013)*	The extent to which students are involved in group learning
Autonomy (4 items)	Personal control in deciding what to do, where, and when. *(Beckers, Van der Voordt & Dewulf, 2016; Harrop & Turpin, 2013)*	Identified the desired autonomy level among students
Privacy (5 items)	Behavioural aspects of the learner's individual preferences. *(T. Jessop, D. Harrop, B. Turpin, 2013)*	The dynamic process to control the level of interaction which varies according to individual
Layout (4 items)	The utilisation of the physical learning environment. *(Yang Z, Becerik-Gerber B, Mino L, 2013, O'Rourke & Gonzalez-Metcalf, 2011)*	The degree of how the physical setting facilities students in learning activities
ICT facilities (5 items)	The usefulness of modern ICT facilities supporting the new way of learning. *(A. Kumar, R. Bhatt, 2015; R. Beckers, 2016; L. Abevsekera, P. Dawson, 2015)*	To what extent ICT facilities provide an opportunity to study anytime, anyhow, and anywhere.
Comfort (12 items)	Learners attain their learning objective with a conducive learning environment. *(S. Ahmad, M. Shaari, R. Hashim et al., 2015; Abbas, Othman & Rahman, 2012)*	To what extents students perceive comfort social learning setting.
Aesthetic (4 items)	Attributed as design elements such as colour schemes, quality floor finishing, and decorative features. *(Fisher, 1998; L. Scannell, R. Gifford, 2017)*	The extent to which students distinguish aesthetic factors influencing their learning activities

Source: Author

ANALYSIS

SPSS Version 22.0 is used to enter all the data from the questionnaire. Principal components extraction method and varimax orthogonal rotation were implemented in order to attain the uncorrelated extracted factors with the eigenvalues greater than 1.0. More concisely, standardised factor loading and Cronbach's alpha are two statistical measures used to examine the extracted factor structures of each variable. The cut-off value for standardised factor loading is .50 (Hair et al., 2014) and above whereas Cronbach's alpha is .70 and above (Peterson, 2013; Thien et al., 2014)

RESULTS

Basically, learner's preferences towards social learning space consisted of 39 items used to quantify seven dimensions, namely, (a) interaction, (b) autonomy, (c) privacy, (d) layout, (e) ICT facilities, (f) comfort, and (g) aesthetic. The Kaiser-Meyer-Olkin measure of sample adequacy index was .91. Bartlett's test of sphericity was significant. Hence, this result designates that the data were fit well for factor analysis. Based on the EFA, six orthogonal factors with eigenvalues greater than 1.0 were produced with a total of 39 items (refer table 2). Considering this, the six factors extracted signified six dimensions of the

learner's preferences towards social learning spaces namely (a) collaborative learning space, (b) self-regulated learning space, (c) private space, (d) ICT provision conducive space, (e) adequate amenities space, and (f) appealing design and layout space. Based on table 2, the loading factor for each item fluctuated from .81 to .55, which above the cut-off value of .50 (Hair et al., 2014). Meanwhile, those items loaded below the cut-off value of .50 were excluded namely item 12, item 18, item 32, and item 35. In addressing this limitation, item 15, item 16, and item 17 were forced to be deleted due to the Cronbach's Alpha .224 below the permissible level after running the reliability analysis.

As a result, the first factor encompassed items 19, 20, 21, 22, 23,30, 33, and 34. In other words, those items principally designated the ICT provision conducive learning space. Subsequently, the second factor described adequate amenities space comprising five items, namely, items 24, 25, 26, 27 and 28. The third factor represented appealing design and layout space, which comprised items 36, 37, 38, 39 and 31. Factor fourth explained about the privacy which encompassed 5 items, listed as items 9,10,11,13 and 14. The fifth factor detailed about the self-regulated learning space covered items 5,6,7, and 8. Finally, the sixth factor explained collaborative learning space which indicated in items no 1, 2, 3 and 4.

DISCUSSION AND CONCLUSION

The finding reveals that the learner's preferences towards social learning built environments are a multidimensional construct consist of six fundamental dimensions: (a) collaborative learning space, (b) self-regulated learning space, (c) privacy learning space, (d) ICT provision conducive learning space, (e) adequate amenities learning space, and (f) appealing design and layout learning space. Imperatively, one novel feature of this research is the learner's utilisation and preferences on social learning built environments towards 21st education and the attributes as well. In relation to this, those six dimensions are perceived as an explicit social learning space attributes which need to take into consideration during the early stage in the urban campus ecosystem design.

Table 2: Analysis of Exploratory Factor Analysis

Items	Loading	Item description	Label	α
1	.681	My favourite locations whenever I am free to meet my friend regarding studies.	Collaborative learning built environments	.791
2	.763	Place where easy to meet my friends.		
3	.751	Suitable space to study with my friend.		
4	.642	Preferred space for group studies with mates.		
5	.551	A place that I can use for a student's project presentation.	Self-regulated learning built environments	.732
6	.674	Where I can have my power nap.		
7	.744	Provide a homely environment.		
8	.674	Where I can have personal discussion with lectures.		

9	.759	Place where I can get more personal.	Privacy learning built environments	.856
10	.546	A place where can provide more peaceful mind.		
11	.586	Privacy spot which no disturbance from others.		
13	.572	Place with noise- free area.		
14	.807	Place where I can get more privacy.		
19	.718	Have good access to the wireless network	ICT provision conducive built environments	.913
20	.813	3 pin electrical power supply is available.		
21	.772	Computer is available for quick online access.		
22	.809	Printing services are available.		
23	.551	Student centre that opens 24 hours, which provide facilities such as space for group and individual studies, printing services, cafe, and computer lab.		
30	.504	A place that provides a comfortable and appropriate chair and table.		
33	.511	Very good shading on the study area.		
34	.521	Good ventilation.		
24	.606	Ergonomically/comfort moveable tables and chairs for the students	Adequate amenities built environments	.854
25	.711	Provide sufficient water dispenser and vending machine.		
26	.762	Provide food and beverage take-away service.		
27	.528	A place that can be used for an exhibition venue.		
28	.579	Have access to food and drink.		
31	.556	Prefer to have a natural environment.	Appealing design and layout built environments	.873
36	.769	Very attractive colour scheme and decorative space design.		
37	.780	Nice landscape and plants.		
38	.795	Good floor finishing and wall decorative.		
39	.769	Good lighting is required.		

Source: Author

As defined by Cleveland & Fisher (2014), informal learning setting is a group learning space, and it is revealed based on research findings. The first social learning space attributes itemised as collaborative learning built-environments. This construct explained learners' preferences towards collaboration and interpersonal interaction with the peer, course mates, and even with lecturers (Harrop & Turpin, 2013). In fact, this location can be learners' favourite location, and this is supported by a very good factor loading which is above .60 (Hair et al., 2014). Evidence shows that learners learn more outside the classroom compared inside the classroom (Maheran, Fadzidah, Nur Fadhilah & Farha, 2017; Yang, Becerik-Gerber, & Mino, 2013) and conversation is the critical factor for "significant learning can occur.

Meanwhile, the self-regulated/directed built environments attribute associated with the individual pod which emphasises on autonomy and own territory with self-rule. In short, autonomy refers to in deciding what to do, where and when (Beckers, 2016). Interestingly, finding reveals that learners requested to have a homely environment which is a private space where they can perform personal meetings with the lecturer, and also to have a short power nap (item no 6 and 7 with a factor loading of .64 and .74). For instance, students prefer to have

an isolated and silent spot where they don't want to be focused on by others and listen to their own music. The third attributes fixated on privacy, and sometimes the preference for privacy and self-regulated go hand in hand. In fact, those learning settings can be found mostly located in the library (Cunningham & Walton, 2016). Basically, this space is a fully enclosed space which needs concentration. This informal learning setting is providing less disturbance and less noise from the surrounding. Thus, the entire university campus would be better to be planned not in an urban area but more too semi-urban. Whereby, the learners can concentrate on their studies. In sum, those three attributes (a) collaborative learning space, (b) Self-regulated learning space, and (c) privacy learning space is driven under social dimension (Beckers, 2016; Beckers, Van Der Voordt, et al., 2016; Harrop & Turpin, 2013).

Pointed out in the literature, new modern technology has influenced the learning space from traditional classrooms to various and diverse learning settings (Yun et al., 2016). In addressing this issue, ICT provision conducive space is very much paramount in 21st-century universities campus planning and design. Therefore, during the preliminary university campus design, site investigation plays an important role. The planner needs to know the capacity of internet coverage. Therefore, the entire campus has to situate at an urban area in which the coverage is robust (Walton & Matthews, 2018). ICT provision is referring to efficient wireless internet coverage in urban campus, adequate 3pin power supply, twenty-four-seven student centre and quick online access which is associated with item no 19-23 with factor loading very high .8 and with Cronbach's Alpha .91 which is very reliable.

Prior to research, learners prefer to have a sufficient and adequate water dispenser and vending machine around social learning space, take-away service, fast food like KFC on campus, proper presentation space, and comfortable tables and chairs (item no 25-28 with Cronbach's Alpha .85). In fact, students don't prefer to sit on the precast concrete bench, which is not comfortable and yet provided everywhere on campus. In addition, social learning space preferences are attributed to the appealing design and layout space. As mentioned in the literature, an attractive and well-design layout can promote learning (Beckers, Van Der Voordt, et al., 2016). The millennium learners demanded to have an attractive soft and hard landscape rather than just a "wakaf ", good colour scheme and decorative space design, suitable floor finishes and adequate natural and artificial lighting. Imperatively, statistical analysis of this paper shows that items that load under appealing design layout construct obtained factor loading as .70 and above. As explored all the constructs above, in sum, illustrated in figure 2. It was demonstrated how those social learning space preferences attributes were integrated within a learning environment which domain with three components namely (a) space (architecture), (b) pedagogy (education), and (c) Technology

(Computer science) and familiarised as "The Pedagogy-Space-Technology" (PST) (Ng, 2015).

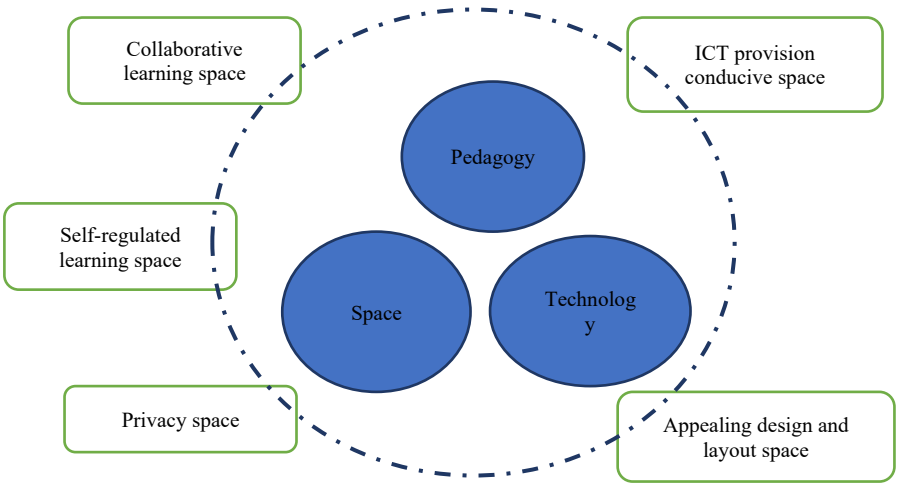


Figure 2: Social learning Environment preferences attributes.
Source: Author

Therefore, as mentioned by Maheran et al., (2017), appropriate design of social learning space in higher education institutions promotes and contributes to the learner's education performance and enhances improved learning outcomes. As stated by Walton & Matthews (2018), before deciding on the strategic approach, it would be wise to evaluate what the surrounding city or urban area provides in terms of the spectrum of informal learning space. For instance, many institutions in Malaysia are situated in the sub- urban areas where informal learning relies mostly on the facilities offered by the institutions alone. In fact, those campuses in the cities or urban areas will have better accessibility of facilities, particularly the ICT provision which is one of the major learning space attributes from this study. At present, universities still predominate by the conventional instructional method without taking into account the affordance of social learning-built environments (Ibrahim et al., 2013). Therefore, in order to bridge the gap, it is vital for a partnership between university stakeholders to take into account those five social learning space attributes during the urban campus planning. The main reason here is, to form a joined-up plan and approach to deliberate the suitability of social learning built-environments in 21st century education urban campus planning.

ACKNOWLEDGEMENT

This research was funded by MOHE and USM under Fundamental Research Grant Scheme (FRGS) 1001/PPBGN/6711669.

REFERENCES

Amit kumar. (2015). A Study of Using Informal Learning Spaces at Indian Institute of Technology, Delhi. Digital Commons@University of Nebraska - Lincoln, August.

Baker, R. (1968). Ecological Psychology: Concept and Methods for Studying the environment of human Behavior. STANFORD UNIVERSITY PRESS, STANFORD, CALIFORNIA.

Beckers, R. (2016). A Learning Space Odyssey. Brighton: University of Brighton Press. ISBN 978-90-365-4105-3

Beckers, R., Van Der Voordt, T., & Dewulf, G. (2016). Learning space preferences of higher education students. *Building and Environment*, 104, 243–252. https://doi.org/10.1016/j.buildenv.2016.05.013

Boys, J. (2010). Towards Creative Learning Spaces: Re-thinking the Architecture of Post-Compulsory Education. Routledge, Oxford.

Brown, M. B., & Lippincott, J. K. (2003). Learning Spaces : More than Meets the Eye. EDUCAUSE QUARTERLY, 1, 14–16.

Cleveland, B., & Fisher, K. (2014). The evaluation of physical learning environments : A critical review of the literature. *Learning Environ Res*, 17(April), 1–28. https://doi.org/10.1007/s10984-013-9149-3

Cunningham, M., & Walton, G. (2016). Informal learning spaces (ILS) in university libraries and their campuses. *New Library World,* 117(1/2), 49–62. https://doi.org/10.1108/NLW-04-2015-0031

Dole, S., Bloom, L., Kowalske, K., Dole, S., Bloom, L., Kowalske, K., & Carolina, W. (2016). Transforming Pedagogy : Changing Perspectives from Teacher-Centered to Learner-Centered. *Interdisciplinary Journal of Problem-Based Learning* Volume, 10(1).

Downes, S. (2007). Learning networks in practice. Emerging Technologies for Learning, 2, 19–27. https://doi.org/10.1039/B910216G

Freigang, S., Schlenker, L., & Köhler, T. (2018). A conceptual framework for designing smart learning environments. Smart Learning Environments, 8.

Goldie, J. G. S. (2016). Connectivism : A knowledge learning theory for the digital age ? Medical Teacher, 38(No. 10), 1064–1069. https://doi.org/10.3109/0142159X.2016.1173661

Hair, J. F., Black, W. c, Babin, B. J., & Anderson, R. E. (2014). Multivariate Data Analysis Seventh Edition.

Harrop, D., & Turpin, B. (2013). A Study Exploring Learners' Informal Learning Space Behaviors, Attitudes, and Preferences A Study Exploring Learners' Informal Learning. New Review of Academic Librarianship. https://doi.org/10.1080/13614533.2013.740961

Hunter, J., & Cox, A. (2014). Learning over tea! Studying in informal learning spaces. New Library World, 115(1/2), 34–50. https://doi.org/10.1108/NLW-08-2013-0063

Ibrahim, N., Fadzil, N. H., & Saruwono, M. (2013). Learning Outside Classrooms on Campus Ground : Malaysia. *Asian Journal of Environment-Behaviour Studies*, 4(13), 97–110.

Kamis, M., Muhamad, M., Junoh, A. M., Asmuni, A., & Idris, K. (2015). Informal Learning in Malaysia. May.

Kumar, A., & Bhatt, R. K. (2015). A Study of Using Informal Learning Spaces at Indian Institute of Technology, Delhi. *Library Philosophy and Practice* (e-Journal). http://digitalcommons.unl.edu/libphilprac

Maheran, Y., Fadzidah, A., Nur Fadhilah, R., & Farha, S. (2017). A Review of Criteria for Outdoor Classroom in Selected Tertiary Educational Institutions in Kuala Lumpur. IOP Conference Series: Materials Science and Engineering, 291(1). https://doi.org/10.1088/1757-899X/291/1/012014

Marais, N. (2011). Connectivism as Learning Theory: The Force behind Changed Teaching Practice in Higher Education. Education, Knowledge & Economy: A *Journal for Education and Social Enterprise*, V4(N3), p173-182.

Ministry of Higher Education, M. (2018). Framing Malaysian Higher Education 4.0. Department of Higher Education Malaysia.

Mohayidin, M. G., Suandi, T., Mustapha, G., Adam, A., Man, N. A., Konting, M. M., & Abdullah, S. N. (2014). Implementation of Outcome-Based Education in Universiti Putra Malaysia: A Focus on Students' Learning Outcomes. International Education Studies, 1(4). https://doi.org/10.5539/ies.v1n4p147

Nenonen, E. B. Y. (2015). How to CO-CRATE campus ?

Peterson, R. A. (2013). A Meta-analysis of Alpha Cronbach ' s Coefficient. 21(2), 381–391.

Puncreobutr, V. (2016). Education 4.0: New Challenge of Learning. St. Theresa *Journal of Humanities and Social Sciences*, 2(2), 92–97.

Siemens, G. (2005). Connectivism : A Learning Theory for the Digital Age. http://connectivism.ca

Thien, L. M., Abd Razak, N., & Ramayah, T. (2014). Validating Teacher Commitment Scale Using a Malaysian Sample. SAGE Open, 4(2). https://doi.org/10.1177/2158244014536744

Walton, G., & Matthews, G. (2018). Exploring Informal Learning Space in the University. Routledge.

Wilson, H. K., & Cotgrave, A. (2016). Factors that influence students' satisfaction with their physical learning environments. *Structural Survey*, 34(3), 256–275. https://doi.org/10.1108/SS-01-2016-0004

Yang, Z., Becerik-Gerber, B., & Mino, L. (2013). A study on student perceptions of higher education classrooms: Impact of classroom attributes on student satisfaction and performance. *Building and Environment*, 70, 171–188. https://doi.org/10.1016/j.buildenv.2013.08.030

Yap, W. L., Neo, M., & Neo, T. K. (2016). The impact of the role of teacher and balance of power in transforming conventional teaching to learner-centered teaching in Malaysian institution of higher education. P*ertanika Journal of Social Sciences and Humanities*, 24(4), 1849–1868.

Yun, Z., Anan, L., Huiping, S., Lan, L., & Fengkuang, C. (2016). The design reserach of future informal learning space constructing the "smart space" of Beijing Normal

University Library. 19th *International Conference on Knowledge-Based and Intelligent Information & Engineering Systems*, May 2015. https://doi.org/10.1007/978-3-319-19875-0

Received: January 2020. Accepted: 20th May 2020

PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 18 ISSUE 3 (2020), Page 337 – 347

DO INFLATION, INTEREST RATE AND COST OF RENTING AFFECT THE PRICE OF TERRACE HOUSES IN PENANG?

Zaemah Zainuddin[1], Rosylin Mohd Yusof[2]

[1,2] *Universiti Utara Malaysia*
UNIVERSITI UTARA MALAYSIA

Abstract

In Malaysia, the housing ownership is reported to decrease from 85% in 1999 to 72.5% in 2010. This is due to the outstripped increase of house price over the income level and the unstable economic situation which creates unaffordability to own a house for many people. Therefore, the main objective of this study is to examine whether the price of terrace houses in Penang is being affected with fundamental factors such as inflation, interest rates and the cost of renting. This study uses multivariate regression analysis with quarterly data of terrace house prices (HPI terrace house in Penang), inflation (CPI) and interest rate (mortgage rates) from 2009: Q1 to 2016: Q4. Evidently, the cost of renting terrace houses in Penang does not have any impact on the price of terrace houses and the stable movement of cost of renting indicates that the growth of rental rate is at acceptable price for middle income earners.

***Keywords**:* terrace house price, rental, inflation and interest rates

[1] Associate Professor at University Utara Malaysia, Kuala Lumpur. Email: zaemah@uum.edu.my

INTRODUCTION

Housing is the basic necessity need for people. It is important to examine the relevant cost which can affect the price of houses as households spend a larger percentage of income on housing rather than on clothing and health care (Fieldman, 2002). In the housing market, there are two submarkets which are the rental market and the homeownership market. According to Quercia, Stegman and Davis (2002), both of these markets are being affected by the lack of affordable housing.

This study examines the fundamental shift, such as the interest rate, cost of renting and inflation on the price of terrace houses in Penang from 2009 to 2016 by using multivariate regression technique. The primary contribution of this paper relative to the existing literature is incorporating household cost of renting (rental payment of terrace houses) into a model of the housing market. The inclusion of this factor is important as it could give a general description about the trend of the rental market for terrace houses in Penang and the relationship it has on prices of terrace houses in Penang.

Penang, which is located on the northern west part of Malaysia, has 1.746 million population living in Penang Island and Seberang Perai (refer to Figure 1). Penang state is divided into five areas which are: 1) Utara (Seberang Perai Utara- SPU); 2) Tengah (Seberang Perai Tengah- SPT); 3) Selatan (Seberang Perai Selatan –SPS); 4) Barat Daya (DBD) and 5) Timur Laut (DTL). Among these areas, 53% of housing stocks are located in Penang Island (MacDonald, 2011).

According to the report by SERI (2011), the average house price in Penang has increased by 50% for the past 5 years, which mostly comes from the Island. The housing stock for Penang State is more concentrated in Penang Island with 41% of the houses are located in Timur laut (mainly the state housing) while 12% of the housing stocks are located in Barat Daya. Other housing stocks of Seberang Jaya located in Seberang Perai Tengah (22%), Seberang Perai Utara (14%) and Seberang Perai Selatan (11%) (MacDonald, 2011).

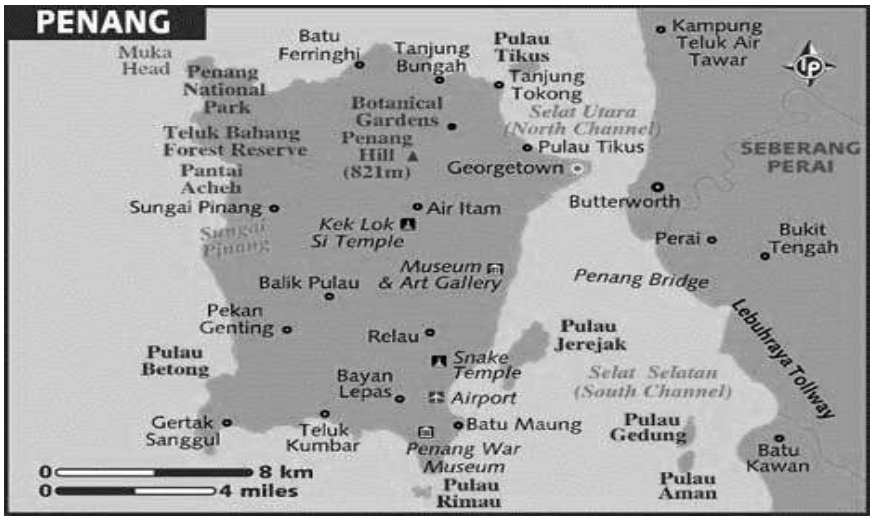


Figure 1. Penang Map

LITERATURE REVIEW

In Malaysia, research on the real estate market has been carried out in different areas, such as land regulation (Bertaud & Malpezzi,2001), customer satisfaction (Chee & Peng,1996), pricing of condominiums (Chau, Chin & Ng, 2004), the effect of regulations and tax on housing subsidy (Malpezzi & Mayo, 1997) and the role of the state in Malaysia housing market (Agus, 2002). There is a lack of research on modelling of relationship between house prices particularly the terrace houses with the cost of renting, inflation and interest rates.

In a developed country such as US, more research has been carried out to test the relationship between rental and house prices. Nevertheless, these researches are mainly focused on rent-price ratio variable. Using US housing data of rent-price ratio, Clark (1995) examined whether the future of rental rate can be predicted by using the rent-price ratio. The author concluded that the changes in rent is negatively related to rent-price ratio. Furthermore, the result of rent-price ratio in the study also indicates that house price will be higher in areas which have large increase in rents (Clark, 1995). Meese and Wallace (1994) examined a time-series data of house prices, rents and the cost of capital in Almaeda and San Francisco, counties in US. The result showed that rents and house prices are co-integrated, yet the short-run adjustment (equilibrium) between these variables has not being determined by the cointegration relationship.

Test on the relationship between house price and rent is further conducted by Case and Shiller (1989). The authors used rent data and house price in estimating the return on housing. However, the study did not examine the capabilities of rent-to price ratio in forecasting the future changes in rents and house price. Gallin (2004) analysed the long-run relationship between house

priceand rent using US housing data. Evidently, the result indicates that house prices do not correct itself to the rents but the rents itself are correcting to the houses prices.

Favilukis, Ludvigson and Nieuwerburgh (2017) examine the impact of fluctuations of price-rent ratio to the housing and equity market in the US from 2000 to 2006. The result shows that the fluctuations of price-rent ratio is due to the response to aggregate shocks. Nevertheless, the authors do not include a rental market. The rent variable used in the study are imputed from distribution of the marginal rate of substitution (MRS) between homeownership consumption of non-durable goods and housing

In the Spain housing market, rental is an important factor in determining house price during higher demand as clearly expressed by Carreras-I, Mascarilla-i-Miro and Yegorov (2004). While in Japan, Kiyotaki, Michaelides and Nikolov (2008) examine the relationship between the price of housing equity and rent. According to the study, the determination of homeownership status of households depends on the size of the shelter service consumed relative to the holding of the shares. The authors concluded that rent is a factor price of the production capital.

DATA AND METHODOLOGY

In Malaysia, the high percentage of homeownership (approximately 72.5% in 2010) are those who are buying a house for their own living. Therefore, the study focuses on examining the terrace house prices through demand factors which include cost of renting, interest rate and inflation. Using multivariate regression techniques, a total of four variables were employed from 2009: Q1 to 2016: Q4.

Interest rate

Many researchers have used interest rate as one of the independent variables to assess the effects on house prices (see Rangel & Pillay, 2007; Roehner, 1999; Thomsett & Kahr, 2007). Cheng, Chen and Mao (2009) described interest rate as a common factor affecting house prices and consumption. Thomsett and Kahr (2007) argued that one of the causes for the rapid increase in house prices is interest rate. The authors explained that when the interest rate is low, many people qualify for mortgages, thus increasing demand for houses.

As illustrated in Figure 2, the interest rates in Malaysia was quite volatile with some decreasing trend starting from 2014: Q3 onwards. This decreasing trend was contributed by all the previous interventions introduced by Bank Negara Malaysia and the government. This study used mortgage interest rates published from Bank Negara website and the data has been normalized.

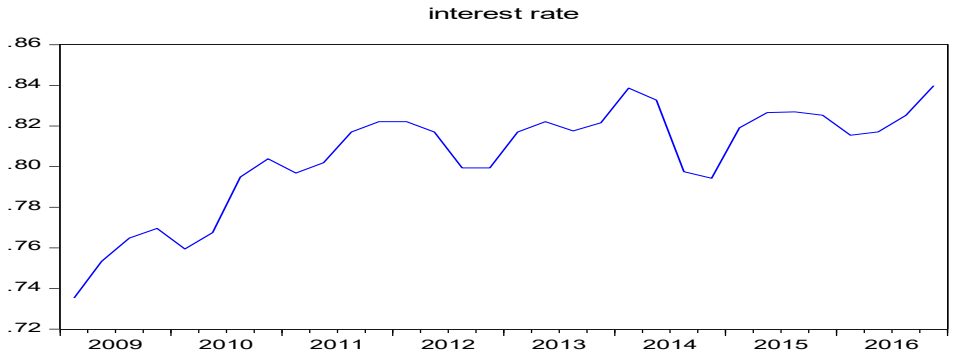


Figure 2: Movement of Interest rates in Malaysia

Cost of renting

As illustrated in Figure 3, the cost of renting terrace houses is stable from 2009 to 2014. However, the slight decrease of rental payment in 2014: Q4 do not last long as a sharp increase in the cost of renting from 2015 to 2016: Q2 occurred. According to Case (1965), the rents indicate an indirect measure of market trends and it will increase at about the same time as increasing real estate price.

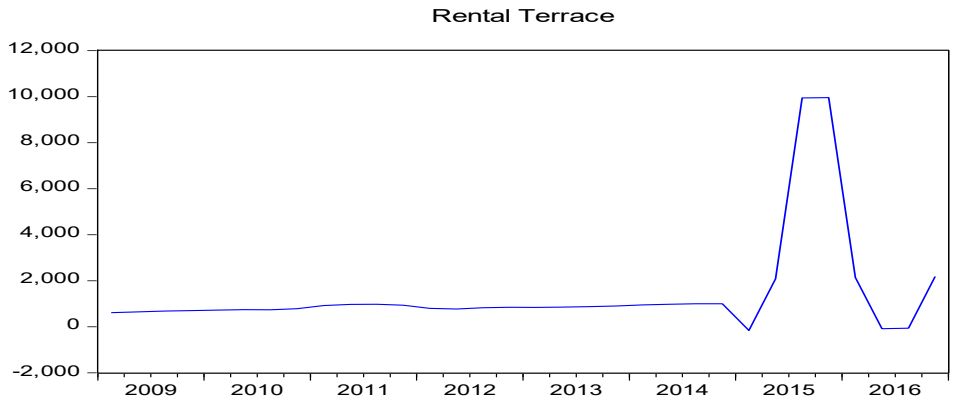


Figure 3: Cost of renting terrace houses in Penang (in RM)

Price of terrace houses in Penang (HPI Terrace houses)

This study used the House price index (HPI) of terrace houses in Penang as a proxy for terrace house price. A house price index I is used to measure changes in price, which is not caused by changes in the quality or quantity of the goods in the index as suggested by Lum (2004). These changes, which include macroeconomic factors, affected the current value of houses as claimed by Lum

(2004). Figure 4 shows the increasing trends of HPI-terrace houses from 2009 to 2014: Q2. The price of terrace houses seems to have decreased in 2014: Q3.

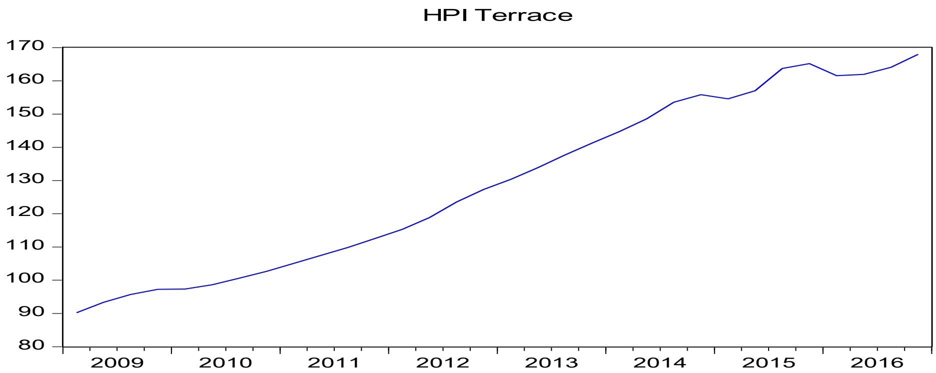


Figure 4: House price index for terrace houses in Penang

Inflation
Macroeconomic uncertainty, such as inflation is included in this study since price instability is one of the sources of uncertainties. Pain and Westaway (1997) suggested the use of inflation as a proxy for people's expectation of a future increase in house price. The increase in house prices signals an inflationary pressure in the economy, which results in decrease in housing demand and lower price of an asset (house price) (Barot & Takala,1998). This study used Malaysia Consumer Price Index (CPI) as a proxy for inflation.

MULTIVARIATE LINEAR REGRESSION MODEL

The Multivariate linear regression model begins with the following equation:

$H_{sgt} = \beta_0 + \beta_1 Intr + \beta_2 Inf + \beta_3 Costr + \varepsilon_t$ .... (1)

Where,
H_{sgt} = terrace house prices in Penang (HPI Terrace)
Int = interest rates
Inf = inflation
Costr = cost of renting
ε_t = error term is assumed to be an independently distributed random variable ε_t iid N (0, σ)

Equation (1) is estimated using Ordinary Least Square (OLS) via Eviews 9.0 software. The parameters (β_1 β_2 β_3) and ε_t the stochastic or residual are components of our model specification.

The OLS regression has been tested in the housing market by several researchers such as Kim (2004) and Labonte (2003). For example, in the Korean housing market, Kim (2005) used an ordinary least square regression to explain the relationship between house prices and economic fundamental variables for the period 1998: Q1 to 2001: Q4.

ANALYSIS AND DISCUSSION

The estimated results of the multivariate regression using Equation (1) are presented in the Table 1 and yielded these estimates:

$$H_{sgt} = -598.96 + 445.96\ Intr + 3.467\ Inf + 0.000\ Costr$$
$$(0.000) \quad (0.000) \quad (0.393)$$

Table 1. Multivariate Regression Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-598.9598	57.33666	-10.44637	0.0000
INFLATION	3.467483	0.402600	8.612718	0.0000
INTEREST_RATE	445.9672	71.68856	6.220898	0.0000
RENTAL_TERRACE	0.000685	0.000791	0.866676	0.3935
R-squared	0.884101	Mean dependent var		129.3125
Adjusted R-squared	0.871684	S.D. dependent var		26.24975
S.E. of regression	9.402996	Akaike info criterion		7.436402
Sum squared resid	2475.658	Schwarz criterion		7.619619
Log likelihood	-114.9824	Hannan-Quinn criter.		7.497134
F-statistic	71.19674	Durbin-Watson stat		0.757028
Prob(F-statistic)	0.000000			

Result indicates that all variables are significant (p-values= 0.000) and have positive signs except for cost of renting (p-value=0.393). Interest rate and inflation have significant results which are consistent with other research on the housing market. The insignificant result on cost of renting to the determination of terrace house prices in Penang is due to the less concrete direct relationship between a house price (the price buyer needs to pay) and rental price (if you were to rent the house). The rental price is driven by the current rents for nearby houses (location) and the amount of mortgage that the owner has to pay. Meanwhile the house prices are driven by the supply and demand factors such as income, mortgage rates, inflation and the stock of housing available in the market.

The estimated coefficient for interest rate is positive and statistically significant at 1% significance level. It can be concluded that mortgage rates have a significant impact on the pricing of a house. As for inflation, the variable indicates a positive relationship and significant at 1 % significance level. The increase of inflation will cause terrace house prices to increase in Penang. Evidently, the movement of house prices (HPI Terrace) and inflation is similar with upward trending. Nevertheless, the inflation did decrease in 2009: Q2 to 2010: Q2.

CONCLUSION

This study examines the relationship between terrace house prices in Penang with interest rate, inflation and cost of renting terrace houses. The result indicates that from 2009 to 2016, the price of terrace houses in Penang is only driven by interest rate (mortgage rates) and inflation variables. Thus, the cost of renting terrace houses has no impact on the price of terrace houses.

The inclusion of the rental factor into the housing model is very important as it could explain more on the different market between rental and homeownership market. The stability of the growth in cost of renting allows future research to be carried out in different states which have more affordable houses such as Melaka, Kedah and Perlis. In addition, different types of residential could be used in examining the relationship between asset prices and economic fundamentals.

ACKNOWLEDGEMENT

The authors are grateful to the Ministry of Education for funding the research from which the study reported here to form part through the grant No 13166.

REFERENCES

Agus, M.R. (2002). The role of the Satet and market in the Malaysian Housing Sector. *Journal of Housing and the Build Environment*, 17(1), 49-67.

Barot, B. & Takala, K. (1998). House Prices and Inflation: A cointegration Analysis for Finland and Sweden, Bank of Finland Discussion Papers, 12/98, 1-43.

Bertaud, A., & Malpezzi, S. (2001). Measuring the costs and benefits or urban land use regulations: A simple model with an application to Malaysia. *Journal of Housing Economics*, 10, 393-418.

Carreras-IS.M, Mascarilla-i-Miro, O. & Yegorov, Y. (2004). The Evolution and the Relationship of House Prices and Rents in Barcelona, 1970-2002. *European Journal of Housing Policy*, 4(1), 19-56

Case, F.E (1965) Real Estate. United State: Allyn & Bacon, Inc.

Case, K.E., & Shiller, R.J. (1989). The Efficiency of the Market for Single-Family homes. *American Economic Review*, 79(1), 152-137.

Chee, L. K., & Peng. (1996). Customer Orientation and Buyer Satisfaction: The Malaysian Housing Market. *Asia Pacific Journal of Management*, 13(1), 101-116Cheng, H.-L., Chen, N.-K., & Mao, C.-S. (2009). Identifying and Forecasting Housing Market Boom and Busts. Journal of Real Estate Finance and Economics, 1-38. Chau, K. W., Chin, T. L. & Ng. F.F. (2004). The impact of the Asian Financial Crisis on the pricing of condominium in Malaysia, J*ournal of Real Estate Literature*. 12(1): 33–49.

Clark, T.E. (1995). Rents and prices of housing across areas of the United States: A cross section examination of the present value mode. *Regional Science and Urban Economics*, 25(2), 237-247.

Favilukis, J., Ludvigson, S.C. & Nieuwerburgh, S.V. (2017). The Macroeconomic Effects of Housing Wealth, Housing Finance and Limited Risk-Sharing in General Equilibrium. *Journal of Political Economy*, 125(1), 140-223

Fieldman, R. (2002). The affordable housing shortage: Considering the problem, causes, and solutions. The Region, 16(3), 7-14

Gallin, J (2004). The Long-Run relationship between House Prices and Rents, Working Paper of the Finance and Economics Discussion Series, 2004-2005, Federal Reserve Board, Washington D.C.

Kim, K.H. (2004). Housing and the Korean Economy. *Journal of Housing Economics*. 13(4): 321-341

Kim, K.H. (2005). Can Only Intelligent People Be Creative? A Meta-Analysis, Journal of Advanced Academics, 16, 57-66. Kiyotaki, N., Michaelides, A. & Nikolov, K. (2008). Winners and Losers in Housing Markets, Paper presented at the Macroeconomic and Policy Challenges Following Financial Meltdowns Conference Hosted by the International Monetary Fund Washington DC, (April 3, 2009). Labonte, M. (2003). U.S Housing Prices: Is There a Bubble? Retrieved, from http:///econ.jhu.edu/people/ccaroll/papers/COS-WealthEffects-Literature/Paper/Labonte.pdf. Lum, S.K (2004). Property Price Indices in the Commenwealth-Construction Methodologies and Problems. *Journal of Property Investment and Finance*, 22, 25-54.

MacDonald, S. (2011). Supply and Demand in Penang Housing Market: Assessing Affordability. Research Paper, Urbanisation & Environment Penang Institute.

Malpezzi, S. (2001). The Long-Run Price Elasticity of Supply of New Residential Construction in the United States and the United Kingdom, *Journal of Housing Economics*, 10(3), 278-306.

Malpezzi, S., & Mayo, S.K. (1997). Getting jousting incentives right: A case study of the effects of regulations. Taxes and subsidies on housing supply in Malaysia. *Land Economics*, 73 (3), 372-391.

Meese, R., & Wallace, N. (1994). Testing the present value relation for housing prices: Should I leave my house in San Francisco? *Journal of Urban Economics*, 35(3), 245-266.

Pain, N. & Westaway, P. (1997). Modelling structural change in the UK housing market: A comparison of alternative house price models, *Economic Modelling*, 14(4), 587–610.

Quercia, R.G., Stegman, M.A, & Davis, W.R. (2002). Does a High-Tech Boom Worsen Housing Problems for Working Families? *Housing Policy Debate*, 13(2), 393-415.

Rangel, G.J., & Pillay, S.S. (2007). Evidence of bubbles in the Malaysian stock market, Chapter 9 in Asia Pacific Fianncial Markets: Interpretation and Challenges. Kim, S-L and McKensie, M.D (eds). *International Finance Reviews*, 175-202.

Roehner, S. (1999). Spatial Analysis of Real Estate Bubbles: Paris 1984-1993. *Regional Science and Urban Economics,* 29, 73-78.

Thomsett, M.C., & Kahr, J. (2007). Beyond the Bubble. New York: AMACON.Socio-Economic and Environmental Research Institute (SERI). (2011). *Penang Economic Outlook* 2011. SERI, Penang.

Received: January 2020. Accepted: 17th May 2020

NOTES TO CONTRIBUTORS AND GUIDELINES FOR MANUSCRIPT SUBMISSION

INTRODUCTION

The Journal of the Malaysian Institute of Planners or PLANNING MALAYSIA is a multidisciplinary journal related to theory, experiments, research, development, applications of ICT, and practice of planning and development in Malaysia and elsewhere.

The objective of the journal is to promote the activity of town planning through dialogue and exchange of views concerning professional town planning practice. PLANNING MALAYSIA will welcome any news, feature articles, or peer reviewed (including book reviews, software review, etc.) articles for publication. All articles should be original work by the authors. **Articles, views and features will not be taken to be the official view of the Malaysian Institute of Planners (MIP) unless it carries the name of MIP as the author.** This is to encourage open discussion on diverse issues and opinion for the advancement of town planning practice. Articles and contributions will be accepted from MIP members and non-members worldwide.

In year 2010, PLANNING MALAYSIA Journal has been indexed in SCOPUS. Previous issues of PLANNING MALAYSIA Journal can be viewed on the MIP website.

SUBMISSION OF MANUSCRIPTS

Manuscript should be emailed to pmjournal@gmail.com. Manuscript should ideally be in the range of 8-10 pages long. Each manuscript should have a title page and an abstract of about 150 words. The title page should contain the title, full name(s), designation(s), organizational affiliation(s), a contact address, and an email address. All manuscripts are received on the understanding that they are not under concurrent consideration at another journal. One copy of the current Journal will be provided for each article. Additional reprints of article can be ordered, at cost, by the author(s). PDF format of the article (if available) can be obtained from the Publisher.

LAYOUT

Manuscript should be typed in single spacing (including footnotes, endnotes and references) on one side of the paper only (preferably A4) with the following margins: right and left - 4.25 cm, top - 5.5 cm and bottom - 5.2 cm (including header – 4.5 cm and footer – 4.3 cm) in 11 point Times New Roman font. Footnotes should be numbered consecutively and placed at the end of the manuscript. Footnotes should be kept to a minimum. Tables and diagrams should be provided in the text. References should follow the APA (6th Edition) referencing format. All foreign words must be typed and transliterated. The Editorial Board reserves the right to change the transliteration of all historical names, titles and non-English terminology to bring them into conformity with its own style.

USE OF FORMULA, FIGURES AND TABLES

Formula (mathematical formula) should be used only when necessary and the CONCLUSION derived must be explained and made intelligible to a non-mathematical reader. Wherever possible, authors are encouraged to place the mathematical parts of the article in an appendix. In cases of empirical articles, authors are expected to make readily available a complete set of data and any specialized computer programs to interested readers.

All illustrations, figures and/or tables in the manuscript must be captioned, in clear black and white (grayscale) and ready for reproduction.

REFEREEING PROCEDURE

Manuscripts will be acknowledged upon receipt. Only selected (preferred) manuscripts will be **reviewed by two (or three) referees** in addition to the editors. Editorial decision will normally be made within **two to six months**, but circumstances beyond control occasionally dictate a longer cycle. If authors are invited to prepare a revision for further consideration, the major issues to be resolved will be outlined and will be forwarded to them as quickly as possible.

ACCEPTED ARTICLES

Authors of accepted articles will be requested to provide a digital copy of the manuscript, preferably in Microsoft Word to the MIP (the Publisher) via email at pmjournal@gmail.com. MIP will not be responsible for the loss or damage of the digital copy.

COPYRIGHT

Contact:

Editor-in-Chief
PLANNING MALAYSIA
Journal of the Malaysian Institute of Planners
B-01-02, Jalan SS7/13B, Aman Seri, Kelana Jaya,
47301, Petaling Jaya, Selangor Darul Ehsan, MALAYSIA
Tel: +603 78770637 Fax: +603 78779636
Email: pmjournal@gmail.com
Homepage: www.planningmalaysia.org

***

[1] Associate Professor at University Utara Malaysia, Kuala Lumpur. Email: zaemah@uum.edu.my

ETHIC STATEMENT

The Journal of the Malaysia Institute of Planners or **PLANNING MALAYSIA** is a peer-reviewed journal. This statement spells out ethical behaviour of all parties involved in the act of publishing an article for this journal, i.e. the author, the peer-reviewer, the chief editor and editors, and the publisher. This statement is based on COPE's Best Practice Guidelines for Journal Editors. URL: http://publicationethics.org/files/u2 /Best_Practice.pdf

DUTIES OF AUTHORS

Reporting Standards

Authors of original research should present an accurate account of the work done as well as an objective discussion of its significance. Data of the research should be represented accurately in the article. An article should contain sufficient detail and references to permit others to replicate the work. Fraudulent or knowingly inaccurate statements constitute unethical behaviour and are unacceptable.

Data Access and Retention

Authors may be asked to provide the raw data in connection with an article submitted for editorial review, and should be prepared to provide public access to such, if practicable, and should in any event be prepared to retain such data for a reasonable time after publication.

Originality and Plagiarism

Authors should ensure that they have written entirely original works, and if the authors have used the work and/or words of others this must be appropriately cited or quoted. Such quotations and citations must be listed in the Reference at the end of the article.

Multiple Publication

An author should not in general publish manuscripts describing essentially the same research in more than one journal or primary publication. Submitting the same manuscript to more than one journal concurrently constitutes unethical publishing behaviour and is unacceptable.

Acknowledgment of Sources

Proper acknowledgment of the work of others must always be given. Authors should cite publications that have been influential in determining the nature of the reported work.

Authorship of the Paper

Authorship should be limited to those who have made a significant contribution to the conception, design, execution, or interpretation of the study, and should be listed as co-authors. Others who have participated in certain substantive aspects of the research project, they should be acknowledged or listed as contributors.

Corresponding Author
Corresponding author is the author responsible for communicating with the journal for publication. The corresponding author should ensure that all appropriate co-authors and no inappropriate co-authors are included on the paper. All co-authors have seen and approved the final version of the paper and have agreed to its submission for publication.

Acknowledgment of Funding Sources
Sources of funding for the research reported in the article should be duly acknowledged at the end of the article.

Disclosure and Conflicts of Interest
All authors should disclose in their manuscript any financial or other substantive conflict of interest that might be construed to influence the results or interpretation of their manuscript.

Fundamental Errors in Published Works
When an author discovers a significant error or inaccuracy in his/her own published work, it is the author's obligation to promptly notify the journal editor or publisher and cooperate with the editor to retract or correct the paper.

DUTIES OF REVIEWERS

Contribution of Peer Review
Peer review assists the chief editor and the editorial board in making editorial decisions while editorial communications with the author may also assist the author in improving the paper.

Unqualified to Review or Promptness
Any reviewer who feels unqualified to review the assigned manuscript or unable to provide a prompt review should notify the editor and excuse himself/herself from the review process.

Confidentiality
Manuscripts received for review must be treated as confidential documents. They must not be shown to, or discussed with, others except as authorized by the chief editor. Privileged information or ideas obtained through peer review must be kept confidential and not used for personal advantage.

Standards of Objectivity
Reviews should be conducted objectively. There shall be no personal criticism of the author. Reviewers should express their views clearly with supporting arguments.

Acknowledgment of Sources
Reviewers should identify relevant published work that has not been cited by the authors. Any statement that had been previously reported elsewhere should be accompanied by the relevant citation. A reviewer should also call to the chief editor's attention any

substantial similarity or overlap between the manuscript under consideration and any other published paper of which they have personal knowledge.

Conflict of Interest
Reviewers should decline to review manuscripts in which they have conflicts of interest resulting from competitive, collaborative, or other relationships or connections with any of the authors.

DUTIES OF EDITORS

Decision on the Publication of Articles
The chief editor of the PLANNING MALAYSIA is responsible for deciding which of the articles submitted to the journal should be published. The chief editor may be guided by the policies of the journal's editorial board subjected to such legal requirements regarding libel, copyright infringement and plagiarism. The chief editor may confer with other editors or reviewers in making this decision.

Fair play
Manuscripts shall be evaluated solely on their intellectual merit.

Confidentiality
The chief editor/editors and any editorial staff must not disclose any information about a submitted manuscript to anyone other than the corresponding author, reviewers, potential reviewers, other editorial advisers, and the publisher.

Disclosure and Conflicts of Interest
Unpublished materials disclosed in a submitted manuscript must not be used by anyone who has a view of the manuscript while handling it in his or her own research without the express written consent of the author

ISSN 16756215
9 771675 621005

PLANNING MALAYSIA
JOURNAL OF THE MALAYSIAN INSTITUTE OF PLANNERS
B-01-02, Jalan SS7/13B, Aman Seri, Kelana Jaya,
47301, Petaling Jaya, Selangor Darul Ehsan, MALAYSIA
Tel: +603 78770637 Fax: +603 78779636
Email: pmjournal@gmail.com or mip@mip.org.my
Website: www.planningmalaysia.org