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HEALTHY LIFESTYLE OF URBAN RESIDENTS. CASE STUDY: SRI PAHANG PUBLIC HOUSING, BANGSAR, KUALA LUMPUR, MALAYSIA

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Abstract

The natural ecosystems are increasingly being replaced by urban built-up area due to fast urbanisation. The urban development pressure brought urban areas to the uncontrolled built environment which, in turn, significantly compromises the quality of public spaces and facilities. Furthermore, the urban environment discourages active living. Thus, research on the relationship between urbanisation and physical health is rapidly coming to the force. Urbanisation can have detrimental effects, particularly on physical health, which further attributed to unsustainable urban development. A study was carried out at Sri Pahang Public Housing (Flat), Kuala Lumpur with the aim to investigate the healthy lifestyle among residents and the relationship with the public facilities available at study area for the physical activity. Data was obtained through questionnaire survey. The relationship between healthy lifestyle particularly the level of physical activity and the facilities in the study area was analysed using correlation test. It was found that most of the respondents were physically inactive and their healthy lifestyle can be related to the planning aspects of facilities in the study area.

***Keywords*:** exercise, facility, physical activity, quality, safety, satisfaction

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INTRODUCTION

Environmental risk factors played a crucial role in contributing more than 80% of the diseases globally (WHO, 2007), especially in urban areas. This is due to the urban settlements are more polluted with lower environmental quality and health condition as compared to rural settlements (Mohamed Musthafa, Ling, Omar, & Subramaniam, 2015; Ling, Mohamed Musthafa, & Mohamed, 2014). Due to the issue of environmental quality, communicable diseases such as Tuberculosis (TB) has become one of environmental health concerns in Malaysia. The notification rate of TB has increased from 72 per 100,000 population in 2011 to 81 per 100,000 population in 2014 (Abdul Rasam, Shariff, & Dony, 2016). Recently, non-communicable diseases (NCD) has also become the latest health concern in Malaysian urban areas. NCD was always associated with unhealthy lifestyle especially physical inactivity (Ling, Mohamed Musthafa, & Omar 2015; Mohamed Musthafa et al., 2015). The urban environment discourages active living due to lack of quality lighting, lack of access to open space, sports and recreational facilities, low quality of houses and neighbourhoods, and poor aesthetics (Edwards & Tsouros, 2006).

Physical inactivity, combined with poor diet, contributed to the unhealthy lifestyle of urban dwellers. Physical inactivity has been identified as the fourth leading risk factor for global mortality (6% of deaths globally) (WHO, 2010), and it increases the risk of NCDs. In Malaysia, 71% of death are NCD related, particularly cardiovascular diseases (CVD), diabetes, cancer, and chronic respiratory diseases. Malaysia has also recorded 17% of the risk of premature death from target NCDs (WHO, 2017a). Furthermore, from 1996 to 2006, Malaysia saw a dramatic increase in the prevalence of behaviour-linked diseases, including a 43% increase in hypertension, 88% increase in diabetes and 250% increase in obesity. The alarming rise of NCDs in Malaysia is largely due to poor lifestyle choices which include unhealthy behaviours regarding food, physical activity, sleep and peace of mind (Anusha, 2016). Only 40% Malaysians adopted healthy lifestyle by making sports as a culture (Bernama, 2016). These factors affected the NCD and affected by lifestyle choices that are often influenced by economic development and urban living (WHO, 2017b).

Urban area, particularly the study area (Sri Pahang Public Housing) was developed with limited public facilities that encourage active lifestyle (physical exercise) among residents. This might affect the healthy lifestyle of residents. Thus, a study was carried out with the aim to investigate the healthy lifestyle among residents and the relationship with the public facilities available at study area for the conduct of physical activity.

LITERATURE REVIEW

Urban areas attract people through the provision of job opportunities, urban services and urban lifestyles. Due to the high rate of in-migration, urban areas are

pressured to provide more houses, more retail and other facilities, more roads to accommodate the increasing traffic volume, and more waste disposal or treatment facilities for the increasing waste volume. All of these demands pressure urban areas to increase their densities as well as their size and reduce the green fields. The natural ecosystems are increasingly being replaced by built-up area due to fast urbanisation (Li, Wang, Paulussen, & Liu, 2005). Rapid urbanisation may also compromises the quality of public spaces. As urban density increases, the mean wind speed exponentially decreases (Zainol, Abdul Razak, Ali, Qi, & Zaki, 2017). It will also affect the thermal comfort among pedestrians, resulting in less people walking as pedestrian., and hence, increasing the level of physical activity. Thus, urbanisation can have detrimental effects, particularly on physical health, which further attributed to unsustainable urban development (Fisher, Andersen, Loft, & Pedersen, 2017).

Globally, research have been carried out in relation to urban land use and activities, healthy lifestyle (especially physical activity), and health/well-being (Richardson, Pearce, Mitchell, & Kingham, 2013; Soga, et al., 2017; Lau, Goodloe, Eatman-Williams, Dudovitz, & Wentz, 2018; Sarkar & Webster, 2017). In New Zealand, for instance, it was found that neighbourhood design and land use pattern affect health where residents of the greenest urban neighbourhoods had significantly lower risks of having poor mental health than those in the least green areas, suggesting a dose-response relationship (Richardson et al., 2013). In fact, individuals residing in neighbourhoods with more than 15% green space coverage had similarly reduced CVD risks. Meanwhile, the least green neighbourhoods have certain other characteristics (*e.g.*, high population density, or urban centres) that also relate to CVD risk (Richardson et al., 2013). According to Schram-Bijkerk, Otte, Dirven and Breure (2018), urban gardens provide opportunities for physical activity and allow people to consume home grown fruit and vegetables. Urban gardens may also reduce stress levels of gardeners and improve social cohesion. In this way, they can help to prevent health problems. Also, research in Japan revealed that allotment gardeners, as compared to non-gardeners, reported better perceived general health, subjective health complaints, mental health and social cohesion (Soga et al., 2017).

RESEARCH METHOD

Study Area

Flat Sri Pahang (Public Housing), is located at Bangsar within the administrative boundary of Kuala Lumpur City Hall. It consists of three blocks of apartment with a total of 768 units of apartment. The main surrounding land uses are commerce and residential (Figure 1). The study area is well connected with roads and public transportation networks. The study area is directly connected via Jalan Maarof and Jalan Bangsar. It is also located adjacent to the Bangsar LRT Station.

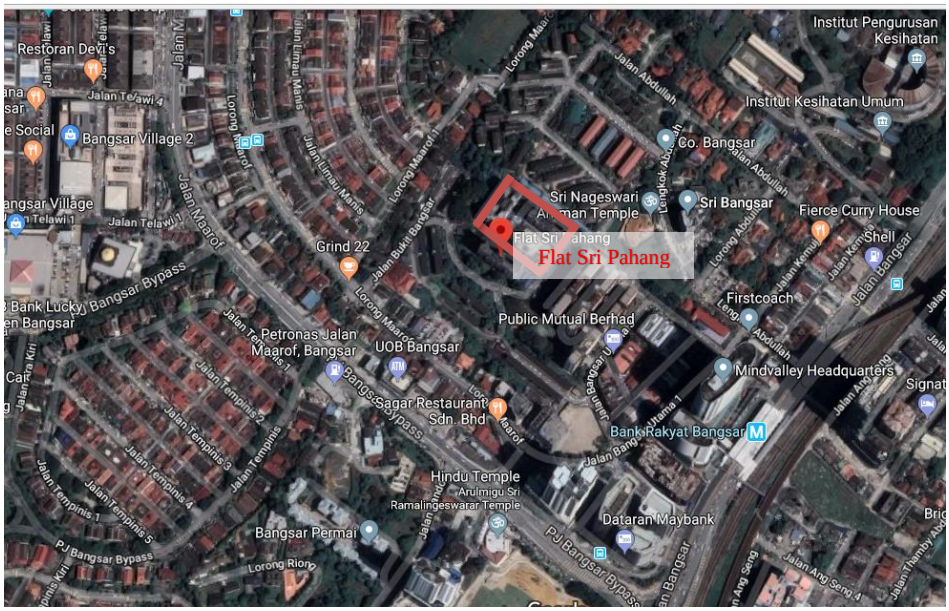

Figure 1: Location of study area (Flat Sri Pahang)

Questionnaire Survey and Sampling of Respondents

The level of physical activity and evaluation of facilities for physical activity were identified through a questionnaire survey. A total of 263 respondents (at 95% confidence level) were selected from the total population of 3,840 in the study area by using systematic, simple random sampling method. The samples covered both male and female respondents, different ethnic groups, and different age groups. The samples were equally distributed among the three blocks of building in the study area (Table 1 and Table 2).

Table 1: Distribution of samples

Block	Estimated Population	Sample size	%
1	1,280	88	33.4
2	1,280	88	33.4
3	1,280	87	33.2
Total	3,840	263	100.0

Note: 5 or 6 samples for every floor of the 3 blocks of flat

Table 2: Background of respondents

Variables	Percentage (%)
Gender	
Male	53.2
Female	46.8
Ethnicity	
Malay	80.6
Indian	14.4
Chinese	4.6
Others	0.4
Age	
< 20 years old	22.8
20-29 years old	22.1
30-39 years old	18.6
40-49 years old	14.8
50-59 years old	12.5
> 59 years old	9.9

Method of Analysis

Level of physical activity was measured based on frequency and duration. The level of facilities provided for conducting physical activities was evaluated based on respondents' satisfaction in terms of quality, cleanliness, adequacy and safety.

The data were analysed using Frequency, Cross-tabulation, Chi-square and Correlation tests available in the Statistical Package for Social Science (SPSS) software. The purpose of the analysis is to find out the level of physical activity among residents in the study area and the relationship with the facilities for physical activities (exercise) and demographic background of respondents.

RESULTS AND FINDINGS

Healthy Lifestyle and Level of Physical Activity

The results in Table 3 show that the majority of respondents were less active in carrying out their physical exercise with half of them did not exercise regularly. Only 7.6% of the respondents exercise more than three times a week.

Most respondents spent their spare time watching TV and those who were carrying out exercise more than 3 times in a week only consist of 7.6%. Most of the respondents were spending their free time by watching TV and access to the internet, especially for those who were less frequent in carrying out their exercise (Table 5). This reflects a scenario of physically inactive and less healthy lifestyle among respondents in the study area. However, the duration of each session of exercise was considered adequate with more than 30 minutes for most of the respondents (>60%). There were only 37.6% of respondents carry out their exercise less than 30 minutes (Table 4). Besides, by looking on the type of

exercise carried out by respondents, it showed that most of the respondents (> 50%) were engaged in the more vigorous physical activity, which were jogging and sports activities (Table 6). There were around one-quarter of respondents engaged in moderate or light physical activity, *i.e.* walking.

Table 3: Frequency of exercise

Per week	Number of respondents	Percentage (%)
Not regular	135	51.3
1	44	16.7
2	36	13.7
3	28	10.6
> 3	20	7.6
Total	263	100.00

Table 4: Duration of exercise

Venue	Frequency	%
< 0.5 hr	99	37.6
0.5 – 1 hr	102	38.8
1 – 2 hr	48	18.3
>2 hr	14	5.3
Total	263	100.0

Table 5: Frequency of exercise and types of most frequent free time activity

Frequency per week	Most frequent activity during free time (% of respondents)				
	Food stalls / restaurant	Watching TV / using internet	Exercise	Others	Total
Not regula	17.7	58.6	1.5	22.2	100.0
1	13.8	59.0	15.9	11.3	100.0
2	8.4	61.1	25.0	5.5	100.0
3	7.2	50.0	32.1	10.7	100.0
> 3	0.0	48.0	52.0	0.0	100.0

Table 6: Type of exercise

Type	Number of respondents	Percentage (%)
Walking	71	27.0
Cycling	15	5.7
Jogging	68	25.9
Sports	74	28.1
Others	35	13.3
Total	263	100.0

Table 7 shows respondents frequency of carrying out exercise and BMI. It is found that obese group was having the highest percentage of no regular exercise (67.3%). This is followed by the overweight group with 59.0% of

respondents were not regularly carrying their exercises. Those who were categorised as normal weight, having the smallest percentage for "no regular exercise". This indicates that physically inactive can be associated with overweight and obese.

Table 7: Frequency of exercise and body mass index (BMI)

Frequency per week	Body Mass Index (% of respondents)			
	Underweight (<18.5)	Normal weight (18.5 – 24.9)	Overweight (25.0-29.9)	Obese (>30)
Not regular	48.4	39.0	59.0	67.3
1	21.2	18.0	17.8	9.6
2	27.2	17.1	10.9	1.9
3	0.0	14.5	8.2	13.4
> 3	3.0	11.4	4.1	7.6
Total	100.0	100.0	100.0	100.0

Another aspect of healthy lifestyle is the cigarette smoking habit of respondents. Only 45.2% of respondents could be categorised as the non-smokers, while 27% were active smoker, 25% passive smoker and 3% ex-smoker (Table 8).

Table 10: Adequacy of facilities for physical activity by type of exercise

Adequacy	**Type of exercise by respondents (%)**				
	Walking	Jogging	Cycling	Sports	Others
Seriously not adequate	38.0	50.3	46.6	33.7	37.1
Not adequate	45.0	30.8	13.3	27.0	37.1
Neutral	5.6	11.7	13.3	13.7	14.4
Adequate	11.2	5.8	26.6	21.6	11.4
More than adequate	0.0	1.4	0.0	4.0	0.0
Total	100.0	100.0	100.0	100.0	100.0

Table 8: Cigarette smoking experience

	Number of respondents	**Percentage (%)**
Active smoker	70	26.6
Passive smoker	66	25.1
Ex-smoker	8	3.0
Non smoker	119	45.2
Total	263	100.00

Table 9: Venue of exercise

Venue	Frequency	%
Internal spaces	64	24.3
Sport centre	24	9.1
Gymnasium	19	7.2
Parks	71	27.0
Roadside	14	5.3
Others	71	27.0
Total	263	100.0

Table 10: Adequacy of facilities for physical activity by type of exercise

Adequacy	Type of exercise by respondents (%)				
	Walking	Jogging	Cycling	Sports	Others
Seriously not adequate	38.0	50.3	46.6	33.7	37.1
Not adequate	45.0	30.8	13.3	27.0	37.1
Neutral	5.6	11.7	13.3	13.7	14.4
Adequate	11.2	5.8	26.6	21.6	11.4
More than adequate	0.0	1.4	0.0	4.0	0.0
Total	100.0	100.0	100.0	100.0	100.0

Planning Aspects and Healthy Lifestyle

Majority of the respondents (more than 70%) carried out their exercise (physical activity) outside of the study area (Table 9). Only 24.3% of respondents carried out their exercise at venues located within the boundary of the study area (the flats), such as at the playground, badminton court and futsal court. Most of the respondents felt that facilities provided were inadequate (Table 10). Similarly, most of the respondents also were unsatisfied with the quality of facilities provided for conducting physical activity (Table 11). Thus, it can be inferred that the quality of facilities provided affects the level of physical exercise by the residents.

Table 11: Quality of facilities for physical activity located in the study area, by type of exercise

Quality	Type of exercise by respondents (%)				
	Walking	Jogging	Cycling	Sports	Others
Strongly not satisfied	38.0	38.2	26.6	37.8	34.2
Not satisfied	36.6	30.8	26.6	25.6	34.2
Neutral	11.4	14.9	20.0	14.8	17.1
Satisfied	12.6	13.2	20.0	17.5	14.5
Strongly Satisfied	1.4	2.9	6.8	4.3	0.0
Total	100.0	100.0	100.0	100.0	100.0

In terms of respondents' satisfaction, Table 12 shows most respondents from all categories of exercise frequency felt unsatisfied the quality of facilities

provided in the study area. Similarly, majority of them were also unsatisfied with the safety of the facilities (Table 13).

Table 12: Quality of facilities for physical activity located in the study area, by frequency of exercise

Quality	**Frequency of exercise (%)**				
	Not regular	1/week	2/week	3/week	>3/week
Strongly not satisfied	36.4	38.8	27.7	39.4	50.0
Not satisfied	35.5	31.8	25.0	25.0	20.0
Neutral	13.3	13.6	22.2	17.8	5.0
Satisfied	14.8	6.8	19.4	17.8	20.0
Strongly satisfied	0.0	9.0	5.7	0.0	5.0
Total	100.0	100.0	100.0	100.0	100.0

Table 13: Safety of facilities for physical activity within the boundary, by frequency of exercise

Quality	**Frequency of exercise (%)**				
	Not regular	1/week	2/week	3/week	>3/week
Strongly not satisfied	10.4	20.5	11.1	14.3	25.0
Not satisfied	28.9	25.0	38.9	21.4	45.0
Neutral	19.3	15.9	27.8	17.9	0.0
Satisfied	40.0	36.4	16.7	46.4	30.0
Strongly satisfied	1.5	2.3	5.6	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0

Correlation test (Table 14) on the relationship between planning aspects (facility provision) and physical activity among respondents showed weak and insignificant relationship even at the 0.05 level for the all the aspects. The relationship between safety aspect and cleanliness with the level of physical activity was negative. It means, there was a higher percentage of respondents who were more active felt public facilities in the study area were unsafe and with poor cleanliness.

Table 14: Correlation between duration & frequency of exercise with the satisfaction of the facilities for physical activity

		Duration	**Frequency**
Quality	r	-0.024	0.039
	sig. value	0.698	0.530
Cleanliness	r	-0.73	-0.040
	sig. value	0.241	0.522
Adequacy	r	-0.056	0.037
	sig. value	0.361	0.548

Safety	r	-0.110	-0.104
	sig. value	0.075	0.093

Demographic Background and Healthy Lifestyle

The level of physical activity conducted by respondents, as measured in frequency of exercise, was found to be significantly associated with gender at 0.01 level (Table 15). The analysis showed that female was less active (less frequent of exercise) as compared to male. Similarly, the correlation test also indicates a significant relationship between age and frequency of exercise at 0.01 level (Table 16). The relationship was negative and weakly correlated with the r value of -0.328. This means that that as one is getting older, one will conduct less physical exercise.

Table 15: Frequency of exercise by gender

Gender	**Frequency of exercise (%)**					
	Not regular	1/week	2/week	3/week	>3/week	Total
Male	41.4	15.7	19.3	12.9	10.7	100.0
Female	62.6	17.9	7.3	8.1	4.1	100.0

Note: Pearson Chi-square value = 17.936 ; sig. value = 0.001 (sig. at 0.01 level)

Table 16: Frequency of exercise by age group

Age	**Frequency of exercise by respondents (no. of respondents)**					
	Not regular	1/week	2/week	3/week	>3/week	Total
13-19 years old	14	17	15	9	5	60
20-29 years old	24	7	10	7	8	56
30-39 years old	28	11	4	3	3	49
40-49 years old	25	6	3	4	1	39
50-59 years old	25	2	2	4	0	33
> 59 years old	19	1	2	1	3	26
Total	135	44	36	28	20	263

Note: Spearman correlation r value = -0.328 ; sig. value = 0.000 (sig. at 0.01 level)

CONCLUSION

To conclude, this study found that most of the respondents in the study area were practicing less healthy lifestyle. Most of them were less active in carrying out physical exercise. Furthermore, most of them like to spend their free time by watching TV and accessing the internet. Besides, there were only 45% of respondents can be categorized as the non-smokers. There were one-quarter of respondents were active smokers, and another one-quarter of respondents were passive smokers. In terms of exercising, the male was more active than female, and younger generation was more active than the elderly. By looking at the aspect of public facilities for physical activity, the study found that majority of the respondents were unsatisfied with the quality, safety and cleanliness of the

facilities. This could be one of the reasons why majority of them conduct their physical exercises at venues outside of the study area.

Further study should be carried out to extend the investigation of urbanisation, planning and design aspects in relation to the healthy lifestyle, especially the physical activities of urban dwellers.

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PRIORITIZING THE PHYSICAL SECURITY ELEMENTS OF GATED COMMUNITY HOUSING USING THE ANALYTICAL HIERARCHY PROCESS (AHP)

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Abstract

The concept of gated community housing is a feature of contemporary housing development. Housing developers promote this concept through an emphasis on security in gated housing. House owners today favour fenced-in residences, not only for their homes, but also for the entire housing development, including recreational areas and other facilities. The aim of this study is to prioritize the elements of physical security in a gated community housing development. The methodology employed a quantitative approach using the Analytical Hierarchy Process (AHP) in ascertaining the weightage for each element deemed important in the planning of secure gated community housing, with focus on the elements of access, fencing, CCTV installation, lighting, guardhouse and landscape, which are the principal elements that serve to enforce security in the protected community. The results of this study showed that two principal elements, namely access to the property (entry/exit points) and protective fencing, were deemed the most important in providing security in gated community housing. Accordingly, these aspects should be accorded particular attention in the planning of gated communities in the future and be factored into the strategy to enhance security. Gated community housing and guarded neighbourhoods employing such a strategy would be quite effective in providing security to residents.

Keywords: security element, gated community, planning, housing, AHP

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INTRODUCTION

The growth of gated community housing has become an urban phenomenon, with such housing schemes gaining popularity in recent years (Furlan & Petruccioli, 2016; Abdullah, Mohd Daniar, Osman, & Bachok, 2017). Gated communities had their beginnings in the 1970s, and they quickly became a contributing factor to social stratification. Feelings of insecurity by residents, fear of crime, and inadequate assurance of safety by the government, all added to the push by housing developers to promote this type of housing lifestyle (Smigiel, 2014). Rising crime rates in the city and fear of being the victims of crime were the main reasons for residents moving into gated community housing. The promise of high security in such guarded communities assuaged the fears of many city dwellers. A community surrounded by protective walls and fences in surroundings free from vandalism generated a perception of safety and privacy (El-Ekhteyar & Furlan, 2016). The notion of enhanced privacy projected an aura of exclusivity that resulted in such property rising in value.

The well-received concept of the gated community led to increasing development of residential areas protected by walls or fences. The gated community concept which restricts access to public traffic is the preferred lifestyle of its residents. It offers them a desirable identity and status while addressing the problems of rising crime rate in the cities. At present, many residential areas that were not originally gated have been converted into guarded properties and communities. Even residents in terrace houses in low-density communities in Skudai and Johor Bahru areas that used to be freely accessible, are now contemplating adopting the gated community concept. Surroundings that encompass both urban living and natural environment serve as a draw to the gated community concept, especially where such a property is also seen as a recreational and vacation retreat (Zurinah & Jalaluddin, 2017). Nevertheless, much of the demand for this kind of housing comes from those who value security, even though other factors such as the facilities and landscaped surroundings provided by the housing developer are also relevant. The physical elements of security are regarded as paramount to the maintenance of safety and the curbing of crime. In this regard, important elements of security, when accorded proper consideration, play important roles in ensuring the development of a community that is safe, robust and sustainable, leading to equitable and desired social development. The present study seeks to establish the priority among the various elements of physical security in a gated community so that such selected characteristics may be incorporated into their development to address the problems of crime that is on the rise in many cities. Elements of physical security in a gated community are important factors in crime control. Several issues frequently arise concerning the physical planning of gated communities and guarded neighborhoods, such as the construction of unauthorised guard houses, the size of fences or the construction of physical

barriers to meet security requirements. Many constructions within gated communities do not incorporate the basic principles of crime prevention through environmental design in drawing up security elements to control crime. Identifying priorities in the planning of physical safety elements in the development of the gated community is essential to increase the level of planning of physical safety and public security in the development of the gated community as a security requirement. Hence the aim of this study is to focus on the planning of physical safety elements in the development of gated community housing.

RESEARCH BACKGROUND

Demand for Gated Communities Cities

The rise in demand for gated communities in cities is due to the perceived superior quality of life associated with such housing (Polanska, 2010). Gated communities are located within fences and walls that serve as barriers, while adequate lighting a security and alarm system, and uniformed security personnel at entrances prevent unauthorized entry complete the picture of a protected and secure haven.

The housing developer examines the security needs of the community and addresses these requirements at the stage when aspects of security are being planned (Wilson-Doenges, 2000). One obvious way to inject high security in a housing scheme is through implementation of the gated community. Blakely and Snyder (1997) note that the developer of a gated community would usually emphasize the concept of a 'community' to promote the project. Many purchasers of properties in gated communities are, in fact, attracted to the concept of living in and being part of a planned 'community' (Wilson-Doenges, 2000). There is the perception that members of a community would be more co-operative in looking after shared property while safeguarding territoriality.

The burgeoning development of gated communities in the country in recent years has resulted in various urban residential areas being closed off to traffic. Clement and Grant (2012) characterize gated communities or settlements by their sharing of private roads while allowing only restricted access. The denial of access to non-residents who have no specific business or purpose to be in the area should deter criminals from targeting the residents. Normally, a security post would be situated at the access gate to enable security personnel to screen visitors. For this purpose, round-the-clock security can be provided by teams of security guards on rotating shifts. The presence of a security post is indicative of the housing developer having taken cognizance of the residents' desire for heightened security in the area.

The security guardhouse is normally located at the main entrance of the gated community with separate lanes for residents and visitors. The guardhouse could be equipped with automatic gates, CCTV cameras and monitors, and

continuously manned by security guards on shift duty to monitor entry into the property (Zurinah & Khadijah, 2011). Residents, on the other hand, would be given pass cards that can activate the automatic gates and doors to the foyers of their apartment buildings. Car stickers affixed to the windscreens of vehicles are another way to restrict unauthorized vehicular traffic. Besides this, each point of entry would be equipped with an intercom system and video camera to monitor the movement of visitors. Although some public roads and other amenities may be, strictly speaking, public-owned, non-residents in a gated community are not allowed to use them. Because of the high costs of maintaining security, it is not uncommon in some places like the United States to have guard posts actually unmanned. The guardhouses and dummy CCTV cameras are installed only as a deterrent to outsiders by giving the appearance of security personnel on duty. Besides deterring crime, regulating vehicular traffic into a guarded community also benefits children in the community by providing them with a safe environment (Blakely & Snyder, 1997). Parents, who would otherwise be apprehensive, can allow their children to be out on their own, on walkways, at playgrounds, swimming pools, club houses and open recreational spaces, without fear and anxiety of their being harmed by outsiders (Zurinah & Jalaluddin, 2018).

Physical Security Elements in the Development of a Gated Community

The elements of security are of utmost importance in planning gated community housing (Zurinah & Jalaluddin, 2017). The foremost principle in designing a gated community is a focus on the elements of security; this involves integrated approaches encompassing the quality of the surroundings, protection of the natural environment, lighting, access and maintenance of pedestrian walkways, open spaces and their upkeep. The design of a gated community should take into consideration overall surveillance, territoriality, social spaces, management and maintenance, and physical security (Armitage, Monchuk, & Rogerson, 2011). The present study is focused on selected elements of physical security in the development of gated communities.

The level of security which a gated community enjoys serves as an indicator of the physical safety of a residential area. Physical characteristics that account for security include the environment (common places), security walls and fences in the gated community. A strategy commonly adopted by the project developer to enhance security is the implementation of physical security measures that restrict access, such as walls, fences, guard houses (Lai, 2016) or electronically operated gates. According to Reynald (2009), opportunities for the commitment of crime depend largely on the dimension of territoriality manifested in the form of actual physical barriers that may also serve symbolically to show that the area within is a protected area. Besides perimeter walls, other dimensions of territoriality, actual or symbolic, also serve as visible deterrents.

With its many security installations such as walls, alarms, CCTV surveillance and security personnel, the gated community arguably provides a safer living environment compared to other residential areas. An intercom system connects residents to the guardhouse so that security personnel can verify the guests arriving at the gate; the security personnel can also be immediately alerted of any emergency or suspected intrusion so that they can come to the assistance of the affected residents. The gated community places emphasis on security by rendering it a private area, out of bounds to non-residents. In an assessment by Landman (2012:249) on the entry into and exit from gated communities, control of the gates is frequently by in-house personnel, although it is sometimes contracted out to commercial security companies. Lighting, another important element of physical security, varies in terms of intensity, colour, direction and contrast. In this regard, the appropriate specifications of physical security can go a long way to improving surveillance and the perception of security to reduce the threat of criminal activity (Ekblom, 2011).

CCTVs increase effectiveness in maintaining security. Security personnel need only to keep tab of activity displayed on the TV monitors, thus cutting down on the frequency of patrols (Zurinah & Jalaluddin, 2017). Normally, cameras are installed at entrance and exit points, but they may also be installed in other locations where people and vehicles are scanned and recorded. Such recordings would assist the police in apprehending the suspect in the event of a crime reported in the gated community. Nevertheless, if the CCTV system is to be used as a preventive measure, rather than as an investigative aid after the event, security personnel would have to be assigned to the TV monitor to detect wrong-doing in real time.

The mechanism involved in crime reduction calls for attention to be paid to physical changes, where necessary, in the re-structuring of the layout of the existing housing area, such as by deviating or closing some roads (Armitage et al., 2010). Nonetheless, such efforts are often insufficient to deter crime completely because criminals shy away from obvious security installations or the eyes of neighbours, preferring routes that provide shelter from detection, such as walls, vegetation and landscape features, poorly lighted areas and so forth. Hence, a battery of more concrete elements of physical security is required to fight crime within the gated community in the city. In their article, Wallis and Ford (1981) listed four principal aspects in living that would help to curb crime. These are a physical infrastructure program, a management plan, role of the police and social interaction. In terms of physical infrastructure, it is necessary to increase lighting in the residential area to remove blind spots that are vulnerable to crime (Witten et al., 2012), set up a guardhouse with CCTV camera facilities, set up a perimeter buffer, to close certain roads traversing the gated community, to erect security fences/walls, to build up the image of the community, and to landscape the surroundings (Zurinah & Jalaluddin, 2017).

METHOD OF STUDY

This study was undertaken using the Analytical Hierarchy Process (AHP) where the principle of comparative value was applied to ascertain the relative importance of each criterion contributing to physical security in a gated community. The AHP approach involves calculating the weightage that is systematically assigned to arrive at the best decision in priority setting when organizing and analysing variables in complex situations. The essential criteria were selected based on previous research and from feedback obtained from 464 questionnaire respondents who were residents in five housing estates in the Johor Bahru area that had adopted the gated community concept, viz. Taman Adda Height, Bandar Dato' Onn, Taman Setia Indah, Taman Setia Tropika, and Taman Seri Austin. The data obtained were collated by five researchers with expertise in the elements of physical security in gated communities. Two of the experts were from the Federal Department of Town and Country Planning Peninsular Malaysia and the Majlis Bandaraya Johor Bahru Town and Country Planning Department, while three others were from housing developer companies with knowledge on security set-ups in gated communities. The AHP technique was used to determine the weightage assigned to each criterion under consideration for the physical security of gated community housing. The determination of the final score for each criterion was based on the outcome of the questionnaires submitted by selected residents of gated communities and their interviews with the panel of experts. Data for the various criteria were then compared using the Pair-wise Comparison Method (PCM), whereby two criteria at a time were picked for a head-to-head comparison.

FINDINGS AND DISCUSSION

Findings from this study provided an indication of the perception of residents towards the six selected elements of physical security in Gated Communities, viz. access, fencing, CCTV installation, lighting, guardhouse, and landscape. Responses received from residents who offered their views on the relative importance of the elements of security in a gated community were processed using the AHP. The results of the analysis were as follows:

Prioritizing the Elements of Physical Security

A pairwise comparison of the criteria was used to determine the weightage attached to each criterion, thereby indicating its relative importance among the criteria studied in the AHP analysis. Each criterion was compared with all other criteria, one pair at a time, and the results were computed with the aid of the Microsoft Excel program. The relative importance of one criterion over another with which it was compared was ranked on a scale from 1 to 9, with rank 1 indicating that the two criteria were 'of equal importance' and rank 9 indicating that one criterion was 'extremely more important' than the other.

The various criteria selected for the Multiple Criteria Decision Analysis (MCDA) need not have the same degree of importance. Hence, the PCM was used to determine their relative importance in relation to the variable under evaluation (in this case, physical security). A PCM matrix was constructed to evaluate the priority among six criteria representing various elements of physical security in all possible pairings (Table 1).

Table 1: Relative importance based on the Pairwise Comparison Method (PCM)

CCTV system	9	8	7	6	5	4	3	2	1	2	3	**4**	5	6	7	8	9	Fence
CCTV system	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	Guard house
CCTV system	9	8	7	6	5	4	**3**	2	1	2	3	4	5	6	7	8	9	Lighting
CCTV system	9	8	7	6	5	4	3	2	1	2	3	4	**5**	6	7	8	9	Access
CCTV system	**9**	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Landscape
Fence	9	8	7	6	5	4	**3**	2	1	2	3	4	5	6	7	8	9	Guard house
Fence	9	8	7	6	5	**4**	3	2	1	2	3	4	5	6	7	8	9	Lighting
Fence	9	8	7	6	5	4	3	2	1	**2**	3	4	5	6	7	8	9	Access
Fence	9	8	7	**6**	5	4	3	2	1	2	3	4	5	6	7	8	9	Landscape
Guard house	9	8	7	6	5	4	3	2	1	2	3	4	5	**6**	7	8	9	Lighting
Guard house	9	8	7	6	5	4	**3**	2	1	2	3	4	5	6	7	8	9	Access
Guard house	9	8	7	6	**5**	4	3	2	1	2	3	4	5	6	7	8	9	Landscape
Lighting	9	8	7	6	5	4	3	2	1	2	3	4	5	**6**	7	8	9	Access
Lighting	9	**8**	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Landscape
Access	9	8	7	**6**	5	4	3	2	1	2	3	4	5	6	7	8	9	Landscape

The weightage of each criterion was calculated on the PCM matrix table (Table 1) by row-column normalization as shown in Table 2. Six criteria were compared for their importance in contributing to physical security in a gated community using the AHP process. The results were derived from questionnaires responses as well as interviews of the respondents by the expert panel. The results showed that 'access' achieved the highest weightage, i.e. 0.2814, indicating that security control at the entrance and exit points was the most important among the six (Table 3). The criterion of second importance was 'fence', which scored 0.2366, indicating that a physical barrier to keep out non-residents was very essential. The other criteria of lesser importance were 'CCTV' (0.1642), 'lighting' (0.1538), 'guard house' (0.1445) and 'landscape' (0.0195).

Table 2: Normalized PCM scores

Criteria	CCTV	Fence	Guard house	Lighting	Access	Landscape
CCTV	1	0.25	4	3	0.2	9
Fence	4	1	3	4	0.5	6
Guardhouse	0.25	0.3333	1	0.1667	3	5
Lighting	0.3333	0.25	6	1	0.1667	8
Access	5	2	0.3333	6	1	6
Landscape	0.1111	0.1667	0.2	0.125	0.1667	1

Table 3: Weightage and relative ranking of criteria

Eigenvector	Ranking	Criteria
0.1642	3	CCTV
0.2366	2	Fence
0.1445	5	Guardhouse
0.1538	4	Lighting
0.2814	1	Access
0.0195	6	Landscape

Since control of access to the gated community appears from this study to be important as an element of physical security, attention should be directed towards making the entrance to and exit from the guarded area more secure. In many guarded areas, separate lanes of entry are allocated to residents and non-residents so that the latter group could be subjected to more thorough checks without inconveniencing the residents. In closed residential areas with multiple entrances and exits, the traffic flow in and out has to be designed with safety in mind, taking into consideration the layout and landscape of the location. Further security features such as road humps to slow traffic and CCTV cameras would be useful additions. In some cases, secondary entrances and exits, even when they are present, are normally kept closed for security reasons. They are opened only on occasions when the need arises, such as during an emergency.

With the erection of barriers such as fences and walls ranking second in importance as an element of physical security in the gated community, effort should be made to enhance this security feature that also fosters harmony within the community without rendering the secured area an entirely covered-up location. A security wall or fence that blends well with the surrounding landscape need not be overly high as such a structure would conjure the impression of an urban environment that is cut off from its natural surroundings. Moreover, too massive a surrounding wall would only emphasize the social gap between residents in the gated community and those in the surrounding areas. The height of the walls needs to follow the specifications of the Uniform Building By-laws 1984 where the maximum height of fences is set at 2.75 meters or 9 feet.

According to guidelines laid down for the construction of walls or fencing of a gated community, these structures have to be 50% open to allow visibility of the housing area from the outside, so that it is not unduly secluded from the rest of the neighbourhood.

The feature that ranked third in importance for security was the close circuit TV camera. Residents in a gated community felt that the overt presence of CCTV cameras served as a good deterrent against criminal activities. Maleficent activities in different locations around the housing area could be monitored in real time and images captured could be used to prosecute wrong doers.

Next, the element of 'lighting' in the housing area was ranked fourth in priority. Good lighting at night deters crime and enhances security, especially for pedestrians. Adequate lighting is especially important in vulnerable places such as back lanes and dark, secluded areas (Witten et al., 2012). Good lighting complements CCTV recording because there needs to be adequate lighting to enable the capture of recognizable facial features from a distance of 10 meters in a video recording.

Further down the list of importance of elements of physical security is the guard house. This is of course related to the criterion of highest importance 'access' since the guard house is commonly located at the access point allowing security personnel to screen visitors to the gated community. Nevertheless, this structure should not be located in such a way that it obstructs free flow of traffic. In this regard, one that is sited on the road shoulder would be functional and practical. The guard house is also used as a base station for surveillance patrols.

In considering physical security, the element of landscape should not be neglected. Gated communities are commonly located in pleasant, green and safe surroundings. In a passive way, a properly planned natural landscape has a calming effect on the residents. The need for security notwithstanding, the housing development should blend into the natural surroundings so that both aesthetics and security are preserved. The layout of the land and the vegetation play a part in the decision to install specific security measures. For example, the topography of the land might give rise to blind spots that, unless remedied, escape the CCTV camera or are off the route of routine patrols. Overly thick vegetation should be avoided as it may shield criminals from the prying eyes of security guards and CCTV cameras. Constant maintenance to take advantage of the existing landscape is a means by which to reduce crime. The topography and vegetation within a gated community should not, therefore, obstruct the view from inside the fence looking out, or from outside the fence looking in. Security personnel should have an unobstructed view of the area under surveillance. Trees and plants should not be located too close to the fencing and they should not be taller than the fence to provide an opportunity for intruders to circumvent the fencing barrier.

CONCLUSION

Incorporating security measures in a gated community encompasses various elements of physical security. Residents in a gated community expect to enjoy a feeling of security and well-being in a well-guarded area with limited access to outsiders. In this regard, particular attention needs to be placed on specific elements of physical security, prioritized according to their relative importance. The results of the present study showed adequate control of access to the housing area to be the most important criterion. This was followed by the need for a physical perimeter barrier such as a fence or wall. Other elements contributing to security, ranked in order of their importance, were CCTV surveillance, good lighting, the guard house, and lastly, the landscape, both natural and planted. The findings of this study would be useful in the planning of gated communities. Such a residential option is likely to continue to gain popularity in the future in view of the demand for living areas that are secure and that provide quality life style. New house buyers expect well-designed houses in an environment that offers quality living where various services and facilities are included in an exclusive package, and where a high level of physical security is assured. This study highlights the important criteria in physical security that need to be taken into consideration when embarking on such developments.

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ILLEGAL HOUSE RENOVATIONS: IMPROVING THE RENOVATION GUIDELINES OF A LOCAL AUTHORITY THROUGH PUBLIC PARTICIPATION

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Abstract

Illegal house renovations have created numerous problems to local councils in Malaysia. Enforcement work have cost unnecessary financial burden to local councils as well as losses to the house owners. Hence, this research is aimed at investigating the issues associated with illegal house renovations in a local council and exploring the responses from the local council's stakeholders on the possibility of involving the public in reframing the house renovation guidelines. A qualitative research method of focus group discussion was held among the related stakeholders in Ampang Jaya Municipal Council (MPAJ). The findings indicated that the problems with illegal renovations are mainly due to the unsuitable guideline itself, the level of understanding of the public, the unrestrained small contractors and the complicated enforcement procedures. The council's stakeholders also agreed that more community involvement is encouraged in restructuring the existing renovation guideline, but not to the extent of giving the public all the rights to decide the final outcome.

Keywords: illegal house renovation, renovation guideline, public participation

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INTRODUCTION

An illegal building renovation is a building refurbishment or extension without approved renovation plans by the local council or a renovation work that does not adhere to the approved renovation plan. Approved building plans are important to confirm the safety and health of the users and public. This paper aims to investigate the issues of illegal house renovations and the role of public participation in reforming renovation guidelines. A case study was conducted in the Ampang Jaya Municipal Council (MPAJ), Selangor, a neighboring local council to the capital city of Malaysia, Kuala Lumpur. MPAJ is a local council that has evolved from a small tin mining town in a Klang Valley to become a locality of 600,000 people in the year 2009 (MPAJ official portal). Being the eight most densely inhabited local Authority in Malaysia (Jaafar 2004), MPAJ was chosen as a case study to investigate the issue due to its diversity in the social and economic status of the residents. To achieve the aim, the objectives of this study are initiated by attempting to investigate whether the building renovation guidelines of the local council reflect the needs of the community. Subsequently, the study seeks to gauge the stance of the stakeholders on the need of public involvement in drawing up the renovation guidelines; and lastly, the study attempts to explore the public participation models that can enhance the process of house renovation guidelines.

RESEARCH BACKGROUND

Studies in several parts of the world on house renovation compliance with the local authority's requirements have found out several reasons for non-compliance. A research conducted in Old Salt, Jordan by Alnsour and Meaton (2009) revealed that the diversity in the social and financial status of a community as well as the level of understanding of the regulation affects the obedience to building regulations. Meanwhile, Rukwaro (2009), in his study in Nairobi, Kenya revealed that incompatible building guidelines with the community's necessity contributed to illegal building works. He also cited that Elaziah (1988) exposed that the ineffective administration of enforcement works within the departments of a local authority also contribute to the public's confusion. Yau and Chiu (2015) however, concluded that rising building penalty and enforcement are more suitable to contain the issues of illegal building renovations in Hong Kong.

While building control is important to protect the safety of the public, some studies suggested that the regulation also causes unnecessary burdens to the people (Burby, Malizia, & May, 1999). The British government had organized a thorough evaluation covering all aspects of building regulations to stimulate the construction industry and to improve the economy (The Guardian, 2012). On the same note, the American president, Mr. Donald Trump has also recognized these circumstances and had issued an Executive Order (EO) 13777 on 24 February, 2017 to the American government agencies to evaluate the existing American

regulations to make them less burdensome to the public (Office of the Federal Register, 2017). The EO subsequently required the relevant departments to conduct public comment inputs. In Malaysia, the government has launched a new program called National Transformation 2050 "TN50" on 19 January 2017. Many of the government agencies have embarked on the new program which calls for more public engagements. For example, the police force has initiated a community engagement programme called "Talk to Us" which has obtained a very good feedback from the community (Bernama, 2017).

Building renovation guidelines in local authorities regulate house renovations in Malaysia. While state authorities in Malaysia have the Town and Country Planning Act (Act 172) for new housing projects, renovation guidelines are mainly left by the state planning authorities to local authorities to formulate. For example, the Manual Guideline and Selangor State Planning Standards (JPBD Selangor, 2010) states the planning requirements of new buildings, but does not state clearly the requirements for building renovations. Thus, local authorities set the renovation guidelines according to the local requirements as long as not to contravene with the Road, Drainage and Building Act (Act 133) and the Uniform Building By-laws (UBBL) 1984.

The state planning department has also incorporated public participation in their planning processes, as required by Act 172. However, the approach has not transformed much, although many new forms of public participation have been developed (Maidin, 2011). Act 172 only allows the public to give opinions and responses while the local authority's committee will decide the final outcome. So, this study will inquire the stakeholders on whether the public should be involved in the framing of the renovation guidelines and to what extent should they be allowed to participate.

RESEARCH METHODOLOGY

A qualitative research of focus group discussion was conducted in MPAJ consisted of stakeholders involved in the approval of house renovation plan. There were five directors and two deputy directors from MPAJ, representing Planning Department, Building Department, Engineering Department, Legal Department, Valuation and Asset Management Department, Enforcement Department and Urban Management Department. Others in attendance were an architect, an engineer, two registered building draftsmen and a MPAJ local councilor. The discussion took place at the MPAJ main office building and the session lasted for about 2 hours and 15 minutes. The medium of discussion is mainly Malay language with English language used intermittently. The group was guided by a set of key themes according to the three objectives of this study. However, the participants were allowed to develop their own views and judgments with minimal intervention along the session. The focus group discussion was aided by a visual presentation and was digitally recorded by using

two audio-recorders and the audio recordings were then transcribed into English language text.

FINDINGS AND RESULTS

From the focus group discussion, several key issues have been discovered in relation to the topics outlined in the focus group process. For the purpose of data analysis, the issues raised throughout the discussion were then rearranged according to the following categories.

Issues Associated with House Renovations in MPAJ

The Renovation Guidelines

There were several problems raised with regards to the existing renovation guideline itself. In the first place, the term "guideline" was questioned by participant A. He argued that a procedure in a local council can only become a guideline if it was endorsed by the State Government. However, participant B explained that as practiced by many local councils, the local rules still apply since local councils have the power to make their own exclusive procedures as vested to them via the Local Government Act 1976 (Act 171). This situation, however, has created conflicting requirements and procedures of house renovation guidelines among the local authorities in Selangor and other states in Malaysia.

When the focus group was questioned whether the renovation guidelines has served the community's need, participant B explained that since the formation of MPAJ in 1992, the current MPAJ's renovation guideline has undergone various changes to accommodate the inspirations of the Yang Dipertua (Mayor) of the council and local councilors of the day, or to rationalize certain irregular issues that emerged. The Mayor and councillors keep changing due to their two-year term appointments and they may be renewed or replaced after they have served their terms on the council. All the renovation guideline's changes were endorsed by the council's full board meeting after reviews and revisions by the planning and building committee of MPAJ which consists of technical departments and local councillors. However, participant C insisted that even though the guideline was endorsed by the local council, it should tally with the state planning guidelines. Nonetheless, as mentioned previously, the state planning guideline is mainly for a new housing scheme, not for renovation of an existing house. Another pertinent issue is all the changes were done without directly involving the public consultation, thus, all the changes do not really reflect the public needs as a whole.

Participant F informed that among the problems that the public normally faced with the current MPAJ's guideline is the regulation on building setback, citing that the current setback requirement for renovation is too stringent. "If the public knows that their proposed renovation can be approved by the council, then

the tendency to submit the renovation plan is higher" he said. He gave an example of the latest renovation guidelines improvement in the Kuala Lumpur City Hall (DBKL), implemented since 1 January 2017. DBKL has now allowed house owners to renovate their house up to the maximum available space within their lot boundary and allowed to add an additional third storey to an existing two-storey terrace house (Figure 1). Further study of the recent DBKL's renovation guideline found out that DBKL has made the revision because the current price of houses is very high in Kuala Lumpur and the increase of family members requires the existing houses to be extended instead of having to buy a new house. The DBKL guideline differs from MPAJ's as it allows more building extension at the front of the building and it also permits for an additional third storey.

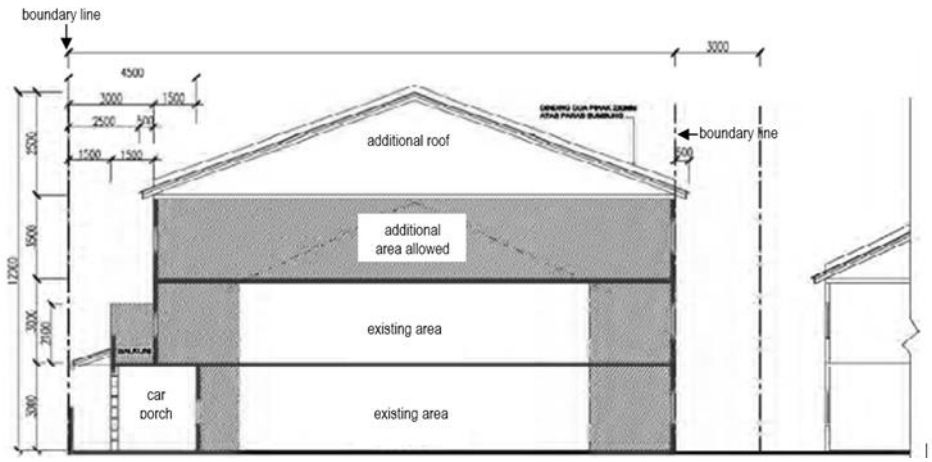

Figure 1: Sectional view of a renovation guideline for a two-story terrace house in Kuala Lumpur
Source: Building Control Department (2017)

Participant D said that some residents complaint that there are too many requirements before a renovation plan can even be accepted by the council. The supporting documents required on top of the building plans are the land title or the sale and purchase agreement of the house, payments of assessment to the council, quit rent to the land office, consents from adjacent neighbours, deposit for compliance with the approved plan, fee for removal of debris and fees for the deposit of building materials on the public area. A study on other local councils in Selangor has discovered similar requirements, although with some variances. Therefore, there should be a re-evaluation whether there are some overlapping, redundant, or superseded documents.

The Community

Some of the members of the community do not even know that they must submit a renovation plan for their building renovation work and those who have done so were often because they were also applying for a renovation loan from the banks or the government, said participant B (the loan institutions normally require the approved plan for a renovation loan approval). However, participant A stressed that ignorance of the law is not an excuse for not abiding the law. He also added that depending on whom the owners happen to meet, if they met a local councillor, most probably the councillor would suggest the owner to submit renovation plans before commencing any work. But, if they met a contractor, probably the contractor would say they will handle everything from applying the renovation approval and the construction work until completion. However, the owners are normally not aware of the status of the renovation plan submission. They are more interested to know that the construction work is progressing uninterrupted. Most of them will only know that the renovation work is without an approved plan after the building construction was completed and received the summons by the court. Most of the contractors would keep the earlier notices issued by the local council to themselves and not informing the house owners until after the work completed. The owner then has to deal with the problem on his own since usually it is difficult to get cooperation from the contractor when the construction payment has been fully disbursed.

The community's level of understanding about renovation plans was also raised. Participant B highlighted that most members of the public are not well versed of the technical jargons of the building plans. Sometimes, they cannot visualise the approved building plan clearly, but as the construction is progressing, they realise that it is not what they have imagined and changes have to be done straight away without informing the local authority.

Having said that, the authority should not always entertain the public complaints, said Participant B. Some house owners have not been sincere in their applications for renovation plan approvals. They applied for small works using standard plans provided by MPAJ but later, they renovated the house not according to the approved plan, usually bigger than the approved one. This situation is mainly due to cost savings, he said. For small renovations such as a simple car porch or kitchen extension, the public can use standard plans provided by MPAJ for a minimal fee, but for normal renovations they have to pay extra for consultation fees to engage an architect or a building draftsman, and for two storey renovations or above, they have to engage a structural engineer as well.

The Contractors

The occurrence of illegal renovations cannot be blamed squarely on the house owners said participant C. He said that sometimes the owners are influenced by the appointed contractor, especially those house owners who are staying in the

same house under renovation. When the owners observe the construction site too often, the tendency to modify the design is higher and the contractors also encourage the changes as they can increase the final construction cost.

Participant F lamented that small local contractors are facing stiff cost competitions from foreign contractors (non- Malaysian). The house owners are attracted to the lower construction costs offered by the foreign contractors even though they know the risks that entail. The foreign contractors are normally a group of tradesmen skilled in building construction, but without proper company registration. They can offer lower construction cost, but when certain problems arise, they can just disband and disappear. To encounter the problem, he suggested local councils must assure that renovation contractors working in their regions are registered with the Construction Industry Development Board (CIDB).

A study on CIDB regulation revealed that it is in fact compulsory for a construction company to register with CIDB no matter how small the company is and the workers must also have green cards. But it seems that only CIDB and not the local authority is responsible to enforce the company registration and the green card regulation.

Talking about costs, participant F added that even though CIDB has produced a standard agreement between a house owner and the contractor to protect the owner against errant contractors or poor workmanship, most house owners still opt to do without it as the contractors will normally charge more construction cost if the standard agreement is used. He also suggested that every local authority should keep a registration system of small contractors working in their areas because there are some house owners who do not have a clue in finding a good and reliable contractor. The registration system would then be very helpful to the house owners and the council since the council can monitor smaller construction companies.

The Enforcement

Issues with building control enforcement were also debated. Participant B stressed that renovation works done by individual house owners are more difficult to control than big projects done by housing developers because the big projects have architects and consultants that can assure the adherence to the approved plan since after the construction work completed they are responsible to issue the Certificate of Completion and Compliance (CCC). Furthermore, the housing developers must build the houses according to the approved plans since they must also abide by the sale and purchase agreements with the house buyers. For small projects, the role of contractors is crucial because the contractors seem to have the upper hand over the main consultant in making most of the decision on the site because they interact more often with the owners. The local authority, however, views the main consultant as the party responsible for the construction.

When there is a discrepancy on the site, the consultants often complaints that their instructions are rarely followed by the owner.

Participant B added that building control enforcements in MPAJ have faced difficulties since there are new and old housing developments, mixed together in the nearby vicinity and there are already many houses renovated even before the existence of MPAJ itself. As opposed to a new local authority in a new area, such as Putrajaya, which since its inception, it has put in place the building renovation guidelines and then the enforcement works can easily be done very stringently since there is not much resistance from the community.

Deviations from the approved plans are quite common because of the problems with enforcement method. Participant E explained that the enforcement staffs will only act if the renovation work does not have the approval permit displayed on the house front. If the approval permit is displayed, but there is a deviation from the approved plan, they generally do not have the expertise to determine such discrepancies. This situation happens because the enforcement rounds are done by general duty enforcement staffs and not building department's technical staff.

Another issue with building control enforcement is when MPAJ decided to bring a case to the Magistrate Court, the Deputy Public Prosecutor (DPP) of the court will normally advise MPAJ to offer a compound to the house owner instead of admitting the case to be heard in the court said participant B. A compound is a form of enforcement, which the offender is offered to pay a certain amount of penalty to MPAJ so that the case will not be tabled in the court. The house owners will usually pay the compound and the case is considered closed, but consequently, the illegal renovation remains standing. Furthermore, the court very rarely issues a mandatory order of demolition for illegal house renovations unless the renovations cause legal complaints from the immediate neighbours or jeopardise the safety of the occupants or neighbours. Further investigation also revealed that some local authorities prefer to issue compounds rather than bringing the case to the court because the council will actually gain revenue from the compounds. If the case is heard in the court and the court decides to fine the guilty owner instead of giving a mandatory demolition order, the proceeds from the fine will go to the court, not to the local authorities.

The Role of Public Participation

The Perception of Stakeholders on Public Participation

Participant D stressed the importance of public awareness because it is easier for everyone if the public themselves are aware of the benefits of having an approved plan for renovation work. He cited an example of an awareness campaign about the strata title management on local television by The Ministry of Housing and Local Government of Malaysia. He said the campaign has been very helpful to

educate apartment owners of the importance of paying maintenance fees. The same can be done to inform the importance of submitting renovation plans. CIDB can also play a role in awareness campaigns, he added. CIDB can educate the small contractors about the procedure, the importance and benefits of having approved renovation plans before commencing works on the site.

Participant A stated that as MPAJ already has local councillors, he questioned whether another public participation process is needed since the councilors themselves are the representative of the public. He also questioned whether the public participation processes are for real or merely for the sake of procedures because he is concerned that in the end, it is the local government law that should also be reviewed. However, he also acknowledged that the current trend of the government today is public engagement. Participant C added that according to the state and federal policies, it is required that public inputs must be included in audit verification reports and innovation competitions.

There was a conflict between the house renovation regulation and the needs of the residents, participant D reiterated. Therefore, he really agreed that the residents should be given opportunities to convey their ideas into the formation of the guidelines. Participant C explained that there are two methods of public participation in the procedure of the local plan formation in MPAJ: 1) Focus group discussions; and 2) Resident involvements through road show exercises. Publicity is also one of the requirements in the preparation of a local plan and it must be advertised in local newspapers for 30 days. She also said that renovation guidelines can also be included in one of the local plan programs by including it in the term of references (TOR) of the focus group discussions. However, she also cautioned whether MPAJ is ready to take the challenges if the renovation guideline was included in the next local plan revision since MPAJ must abide by the decision of the process. Any amendment or variation to the agreed renovation guideline must be referred to the public first and this exercise can be costly and time consuming.

Exploring the Public Participation Models that Can Enhance the Process of House Renovation Guidelines

The focus group participants were explained about the relationship between consultation techniques and levels of impact in the slide presentation. Excerpt of the table is mentioned in Table 1. Shipley and Utz (2012) stated that public participation models have developed over the years and the general guidelines on the levels of community involvement suggests the expected results from different types of public engagements in planning processes. It shows the link between the public participation objectives and the increasing level of public impacts from merely providing information, up to the highest level of total empowerment for the public to make the final decision. Participant D said that at this juncture he thought that MPAJ is not ready to let go the decision-making rights to the public

and he suggested that level 3 (involve) according to the chart is more suitable. Participant B summarized that the public should be consulted and informed of certain issues as well as the alternatives in solving the problems, but in the end, he preferred to maintain that the determining party is still the local authority with the local councillors as the representatives of the public.

Table 1: Relationship between consultation techniques and levels of impact

Inform	Consult	Involve	Collaborate	Empower
Public Participation Goal	*Public Participation Goal*	*Public Participation Goal*	*Public Participation Goal*	*Public Participation Goal*
To provide the public with the balanced and objective information to assist them in understanding the problem, alternative, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public through out the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision, including the development of alternatives and the identification of the preferred solution.	To place final Decision making in the hands of the public.
Increasing Level of Public Impact →				

Source: Shipley & Utz, 2012, adapted from the International Association for Public Participation 2005

CONCLUSION AND RECOMMENDATIONS

The summary findings from the focus group discussion (Table 2) indicated that the problems with renovation guidelines are generally due to the unsuitable guidelines to the current needs of the public, the varying level of understanding of the public towards the regulation and the complicated enforcement procedures as mentioned in the earlier studies of the literature review. Additionally, the focus group discussion also exposed that the role of small contractors doing renovation works is very central since they seem to dictate the course of renovation work over the consultants. This underpinning issue should be studied further by building regulators to comprehend the nature of works for big and small construction jobs and to differentiate the kind of regulations and guidelines suitable for each scale of the works.

The focus group also concluded that public inputs are very helpful to lay down a practical renovation guideline to be implemented and enforced. The public awareness campaign is also crucial since the effectiveness of public participation process depends so much on the level of public's knowledge (Marzuki 2015).

Table 2: Summary findings of issues associated with house renovations in MPAJ

The guideline	The community	The contractor	The enforcement
1.Local councils have exclusive power vested in the Act 171 2. Changes in guideline not involving direct public input 3.Building setback is one of the main problems 4.State planning guideline is mainly for a new housing scheme, not for renovation. 5.Too many requirements for a renovation plan submission	1.Ignorance of the law to submit plan 2. level of understanding about renovation plans technical jargons 3.Some are not sincere in their plan applications	1. Can easily influence the owner 2.Local contractors face stiff cost competitions from foreign contractors 3.Hard to find good contractors 4.Owner rarely uses CIDB agreement form as it incurs more cost	1.Individual renovations are more difficult to control than developers' 2.For small projects, the contractors are more dominant than the consultant 3. Difficulties in mixed new and old housing developments 4.Enforcement method not synchronized among departments 5.Compounds caused illegal structures not demolished

The stakeholders should have a more detail look on the cost and expenditure of the public participation process and also revise acts and regulations that relate to the renovation guideline. Meanwhile, the stakeholders in the focus group seemed comfortable to allow the public to directly involve in giving inputs and deliberation for an enhanced renovation guideline. However, they stopped short of liberating the final decision making to the public and had no desire to change the current status quo. Even so, the acceptance by the local council to more direct public involvement even though the community is already represented by local councilors, is a step forward towards better public participation. Further study shall investigate the public comments on the existing guidelines set by the local authorities to eventually come up with a new mutually acceptable renovation guideline.

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RURAL DEVELOPMENT AND THE LEVEL OF PUBLIC FACILITIES PROVISION FOR YOUTH IN MALAYSIA

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Abstract
The national agenda consistently prioritised the rural development and poverty eradications in Malaysia. The Rural Transformation Programme from 2016 till 2020 outlines six focus areas namely, Rural Infrastructure, Youth Development, Economy, Entrepreneurship, Human Capital and Delivery System. Guided by these principles, the strategies and programmes for rural development and poverty eradication have focused on increasing the productivity as well as improving the quality of life. The objective of this research is to evaluate the level of usage and satisfaction towards facilities provided for youth living in the rural areas. The study areas selected are Jengka, Pahang and Kota Samarahan, Sarawak. The variables for the assessment include adequacy ratio, usage satisfaction, accessibility and maintenance of existing public facilities. The results were analysed to measure the level of provision of public facilities provided for the youth who are living in rural areas. It was found that public facilities including multipurpose hall, public library, mosque, temple and church are provided in both study areas. However, their usage among the youth was rather discouraging, except for mosque, musolla and church.

Keywords: youth, rural development, public facilities, utilisation, satisfaction

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INTRODUCTION

Malaysia has had a long and far reaching experience in developing its rural sector and bringing down the incidence of poverty from 58.7% in 1970 to 1.6% in 2014 (Ministry of Rural Development, n.d.). The rural programmes are considered as efficient, agile and effective. These efforts, together with the continuous growth of the Malaysian economy have succeeded in creating job opportunities that leads to higher income in rural areas. The Rural Transformation Programme with the theme of Rural Modernisation was launched in 2015. The objective was to ensure the rural areas are provided with public facilities and accessibility akin to urban standard. Every village in Malaysia will be connected via roads, 24 hours electricity and treated water by 2020.

Youth is indicated as a person between the age where he/she may leave compulsory education, and the age at which he/she finds his/her first employment (Omar, Omar, Othman, & Mohd Yusoff, 2016). In Malaysian context, there were 13.3 million youth population age between 15-40, representing 46% of the total Malaysian population (Raja Kasim, Zulkharnain, Hashim, Wan Ibrahim, & Yusof, 2014). However, the total number of youth involvement in youth societies or organisation in Malaysia is only 23% or 3,157,900 million (Yeon et al., 2016). Youth should dynamically take part in community programmes in making the society more liveable and efficient to all age group inside the community social hierarchy. The Malaysian Youth Policy (MYP) had replaced the National Youth Development Policy (NYDP) 1997. Gradually, the age limit is now changing from 15 to 30. The Secretary-General of the United Nations Population Fund said, 'The world has the largest younger generation in history. I place great hope in their power to shape our future' (UNFPA, 2015). He mentioned the youth as the hope of future since they see the world with fresh eyes and represent a staggering amount of human potential. Yet too many of them are trapped in poverty, with few opportunities to learn or to earn a decent living.

LITERATURE REVIEW

The public facilities provided for youth in rural areas must be in accordance with the needs of the youth. This will encourage them to visit and utilise public facilities provided near their settlement. Indirectly, this will increase the social interaction among youth in rural areas.

Youth in rural communities also have another set of education-related issues that compound economic factors (Smith, 2014). Because of distance and inadequate transportation, rural youth have fewer opportunities for important unstructured social interaction, creating insufficient social support for healthy behaviours and reliance on accessible, structured public programmes (Edwards, Miler, & Blackburn, 2011). Therefore, rural development is to urbanise the rural area into a conducive area with excellent access to modern infrastructure, entrepreneurship, high income, preservation of environment and cultures

(Sajilan, 2016). In this respect, the location of public facilities in rural areas should be within distance easily accessible by youth. A convenient distance between residential units and public facilities will increase youth satisfaction level towards the facilities provided. Perry (1988) emphasised that a successful planning development is a district with relevant commuting distance connecting residential areas and public facilities. Precisely, it is the main factor contributing to the minimal visit from the rural youth. Most of them have no transportation; a walking distance to public facilities will escalate the number of visitors. Other suggestion is to provide shuttle bus services to connect the rural youth to the public facilities.

According to CSIR (2000), a country should invest in the empowerment, education and employment of their youth. Hence, public facilities provision is generally seen as government responsibility. Public facilities are defined as those basic services, which cannot be supplied directly to the individual dwelling unit and as a result are utilised away from the individual residential dwelling unit within the public environment. Public facilities satisfy specific individual or community needs - including safety and security, communication, recreation, sport, education, health, public administration, religious, cultural and social.

RESEARCH METHODOLOGY

The scope of this study is the evaluation of rural public facilities provision in relation to utilisation and satisfaction by the youth. Data was obtained through questionnaire survey involving 260 randomly selected respondents whose age are between 15-25 years old. The number of respondents were equally divided between the two study areas; which are Jengka Pahang and Kota Samaahan, Sarawak. Jengka, Pahang is located 55 kilometers from Maran District and 127 kilometers from the state capital Kuantan. It was one of the rural development schemes under the *Lembaga Kemajuan Tanah Persekutuan* (Federal Land Development Authority, FELDA). Under the scheme, settlers were awarded with land for cultivation of oil palm or rubber. FELDA Jengka is the largest FELDA scheme in Malaysia and also one of the succesfull government's agricultural projects to eradicate rural poverty. It contains 37 clusters with a total population of 15,000 (FELDA, 2018). Figure 1 shows the location of FELDA Jengka, Pahang.

Kota Samarahan, Sarawak is located in the sub-urban of Kuching. It is the main administrative centre in Samarahan district and has an area of 508.1 square kilometres. The total population was 157,792 in year 2014. The main economic activity in Kota Samarahan is agricultural. Majority of the people work in the coconut, oil palm and pineapple plantations.

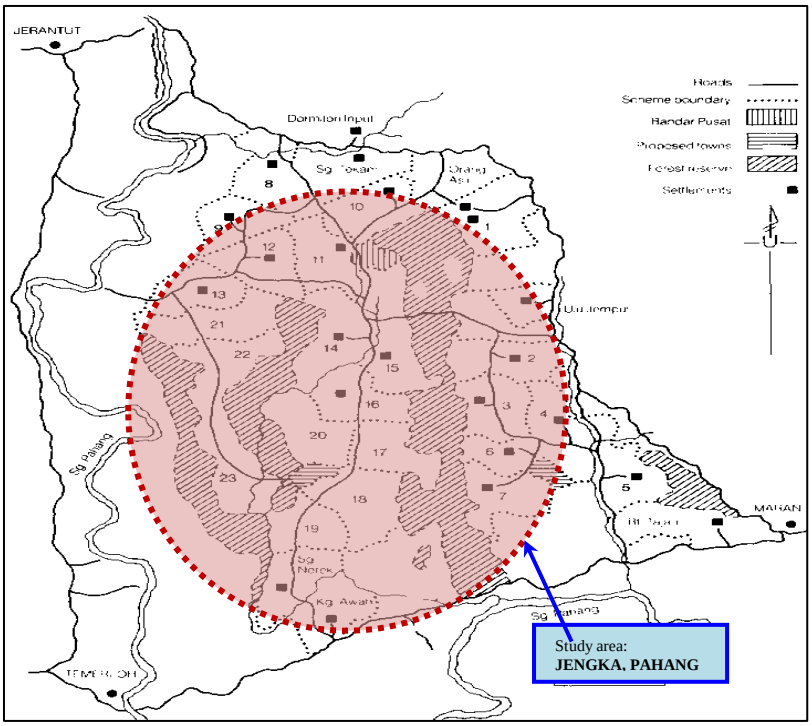

Figure 1: Study area FELDA Jengka, Pahang
Source: FELDA (2018)

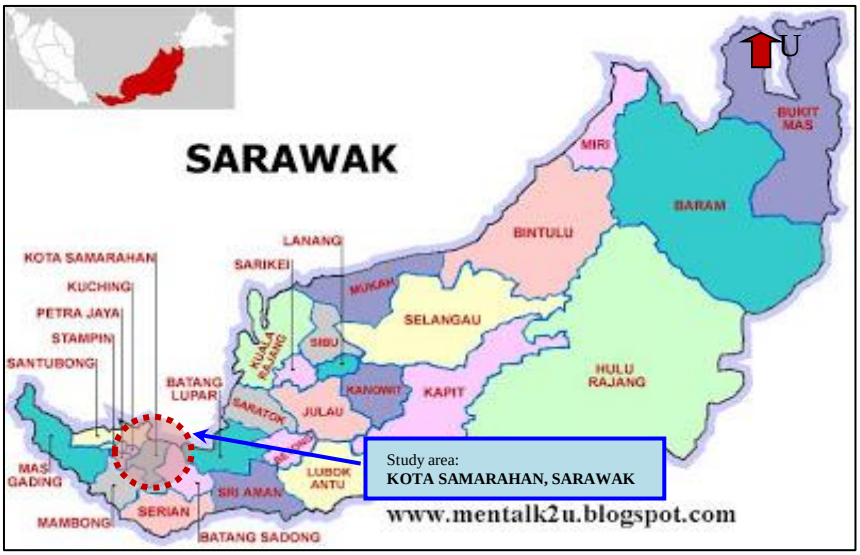

Figure 2: Study area: Kota Samarahan, Sarawak
Source: Viamichelin.com (n.d.)

Respondents from the two study areas were given a questionnaire consisting of two (2) sections. Section A deals with respondents demographic background, and Section B on respondents' utilisation and satisfaction level of existing public facilities in their residential areas. Responses for Section B were recorded based on 5-point Likert scale, with '1' being less satisfied and '5' being most satisfied. Data from the survey were analysed using descriptive statistical tools available in SPSS software to derive frequencies, means and standard deviations.

RESULTS AND FINDINGS

Respondents' Background

In terms of religion, the overall majority of respondents were Muslims (68.1%), followed by Christian (20.4%), Buddhist (6.5%) and Hindu (5.0%). Respondents from Jengka, Pahang were predominantly Muslims (76.9%), while in Kota Samarahan main religions of respondents were Islam (59.2%) and Christianity (40.8%).

148 (56.9%) of respondents were male, and 112 (43.1%) were female. 44.2% of the respondents were students, 37.7% were employed and the remaining 18.1% were unemployed. 3.8% of respondents have household income within the range of RM2,501 to RM3,000 per month, but also 15.8% respondents with monthly household income less than RM500. Youths who work after school were paid lower salary and being employed as labourers, sales person, storekeepers and café servers. However, there were youths who have regular jobs such as teachers, quantity surveyors, accountants, civil servants and police, and commanded better pay. However, the percentage was among the lowest.

Distribution of Respondents based on Residential Areas

Table 1 shows that, in Jengka, Pahang, majority of the respondents were residing FELDA settlement (82). The rest were from the traditional villages (19) and Kampung Baru Cina (Chinese new villages) (18). For Kota Samarahan, most of respondents were from traditional villages (45), longhouses (29) and flats (37).

Table 1: Distribution of respondents based on residential area

Location	FELDA settlement	Estate	Traditional village	Kg. Baru Cina	Long house	Squatter house	Flat	Total
Jengka	82	2	19	18	0	0	9	130
Kota Samarahan	0	6	45	0	29	13	37	130
Total								260

Vehicle Ownership

Table 2 shows that majority of the respondents (42.3%) did not own any vehicle. However, 33.1% owned a motorcycle, 18.1% owned a car/van, and 6.5% owned a bicycle. With majority of youth do not own a vehicle, it is therefore important that public facilities should be located at strategic places to increase youth's accessibility to the facilities.

Table 2: Type of vehicles owned by youth

Types	No. of Respondents	Percentage
No vehicle	110	42.3
Bicycle	17	6.5
Motorcycle	86	33.1
Car / van	47	18.1
Total	260	100.00

Availability and Use of Public Facilities

Table 3 shows the responses from respondents regarding the availability of public facilities in their residential areas and their utilisation of the facilities. For Jengka, the highest score in terms of availability were multi-purpose hall (97.7%) and mosque (97.2%). Mosque also received highest utilisation score in Jengka (85.5%). Despite its high score for availability, only 50.8% of the respondents said that they have used the multi-purpose hall. There are 5 mosques in Jengka including Masjid Jamek FELDA Jengka 16, Masjid FELDA Semarak Jengka 15, and Masjid Huda FELDA Lepar Utara 1, 2 and 4 (JAKIM, 2014).

Table 3: Public facilities availability and utilisation

Types of public facilities	Availability of public facilities (%)				The use of public facilities by respondents (%)			
	Jengka		Kota Samarahan		Jengka		Kota Samarahan	
	Yes	No	Yes	No	Yes	No	Yes	No
Public library	35.4	64.6	37.7	62.3	20.8	79.2	30.2	69.8
Multipurpose hall	97.7	2.3	46.9	53.1	50.8	49.2	35.4	64.6
Mosque	97.2	2.8	83.3	16.7	85.5	14.5	54.6	45.4
Musolla	94.2	4.8	65.9	49.1	77.8	22.2	54.6	45.4
Buddhist Temple	40.5	49.5	18.5	81.5	10.9	89.2	-	100
Hindu Temple	10.8	89.2	9.2	90.8	10.8	89.2	-	100
Church	0	0	64.6	35.4	0	100	45.4	54.6

For Kota Samarahan, mosque also received highest score in terms of availability (83.3%), followed by musolla (65.9%) and church (64.6%). In terms of utilisation, 54.6% of the respondents responded that they have used mosque and musolla and 45.4% have used the church. There are four mosques provided in Kota Samarahan such as Masjid Darul Taqwa, Masjid Ali Fatimah, Masjid Darul Islam Wal Muslimin, and Masjid Darul Naim (JAKIM, 2014).

The high utilisation score for mosque is in line with earlier finding that shows majority of the respondents were Muslims, followed by Christians. In addition, apart from praying, mosques are also used as venues for religious talk (*ceramah*) and community programmes such as *gotong royong*, hence increasing their use among the respondents.

Public library use among the respondents were low in both Jengka (20.8%) and Kota Samarahan (30.2%). This may be related to the generally lower education attainment by the respondents (Table 4). At the same time, library also received low score in terms of availability (Table 3), indicating that many of the respondents were not aware of library being provided, hence, did not use it. Additionally, current Internet lifestyle may also affect the level of library use since references can be easily accessed on the Internet without having to visit the library.

Public library serves as a place for educational purposes and cultural enrichment. A big challenge inn increasing the use of public library in rural areas is the educational background of the rural youth.

Table 4: Cross-tabulation of respondents' education level and employment status

Education level	Employment status				Total
	Students	Employed	Unemployed (Not active looking for job)	Unemployed (Active looking for job)	
UPSR	15	2	0	0	17
PMR	35	3	0	1	39
SPM	49	68	29	10	156
STPM	9	4	0	1	14
Certificate	1	4	0	2	7
Diploma	3	13	0	4	20
Degree	3	4	0	0	7
Total	115	98	29	18	260

Level of Satisfaction on the Physical Aspects of Public Facilities

Table 5 shows respondents' level of satisfaction towards public facilities provided in their areas in terms of adequacy, usage, distance, accessibility and maintenance. In terms of overall satisfaction, respondents in all aspects measured ranked mosque highest. Musolla also scored well, having been ranked 2 in three out of the five aspects measured. Musolla was ranked 3 in terms of usage and distance. Church came third, having been ranked 2 in terms of usage and distance, and ranked 3 in the other aspects measured.

Mosques in Malaysia nowadays are no longer confined as places for performing prayers, but also as venues for a host of other religious and social activities. Mosques are being used as venues for religious talk, wedding reception, studying circle, to name a few. Increased diversity in the activities being held at mosques helps increased their usage satisfaction among youth.

The number of mosque provided in an area ensures its satisfaction level in terms of adequacy, distance and accessibility. As mentioned earlier, there are 5 mosques are provided in Jengka and 4 in Kota Samarahan. This enables mosque locations can be spread out in the areas, resulting in shorter distance between mosque and residential areas, thus increasing its accessibility to the residents.

Table 5: Level of satisfaction on the physical aspects of public facilities

Public Facilities Provided in Both Rural Areas	Adequacy		Usage		Distance		Accessibility		Maintenance	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Library	3.36	5	3.46	6	3.31	6	3.28	7	3.41	6
Multipurpose Hall	3.57	4	3.59	5	3.61	5	3.70	5	3.38	7
Mosque	4.33	1	4.39	1	4.29	1	4.38	1	4.28	1
Musolla	4.23	2	4.22	3	4.16	3	4.22	2	4.16	2
Buddhist Temple	3.19	6	3.69	4	3.69	4	3.81	4	4.06	4
Hindu Temple	3.07	7	3.36	7	3.07	**7**	3.57	6	3.50	5
Church	4.19	3	4.26	2	4.24	2	4.09	3	4.07	3

CONCLUSION

Public facilities including multipurpose hall, public library, mosque, temple and church are provided in Jengka, Pahang and Kota Samarahan, Sarawak. Based on the data collected from the youth population living in these areas, majority of them are aware of the existing public facilities. Nevertheless, only few from this targeted group are interested to participate in using the public facilities. Further studies are required to determine the factors that caused this situation.

Public facilities are related to basic needs. Government and non-governmental organisations are responsible for providing public facilities and make them available for the rural youth. A routine monitoring and maintenance activities are necessary to ensure the public facilities are operating at their full capacities. A multipurpose facility clusters would improve the public facility planning in rural area by located together several public facilities. The number and proportion area of public facilities depend on the demand of the locals. This would allow for easy access and enable them to accomplish various tasks on a single journey.

The local planning authorities and other relevant parties should ensure that public facilities provided in rural areas are in accordance with published planning standards and in accordance with current requirements. To encourage

usage, public facilities must be located at strategic locations, close to residential areas and easily accessible by the public. Stakeholders such as rural youth should be engaged to hear their views to ensure that public facilities provided meet their needs and requirements as well.

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ASSESSMENT OF LEARNING WITH NATURE IN PRESCHOOL

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Abstract

Learning with nature is a form of psychological therapy for all, including children with disability. Beyond the psychological aspect, access to outdoor green space can also improve social, environmental, developmental, emotional and behavioural, and even medical outcomes. In Malaysia, studies of learning with nature remain scarce due to the Malaysian education system's focus on indoor learning rather than outdoor learning. This research aimed at determining perceptions towards the application of learning with nature among preschool educators. Qualitative methods were used for data collection, consisting of structured interview and field observation. Four preschools were selected as sample. Results show that learning with nature contributes to the positive development of the children. The approaches used to instil nature awareness include conducive landscape, environmental activities, outdoor class activities, outdoor free play, formal education and recreational programme outside a preschool. These involved both outdoor and indoor spaces and facilities.

Keywords: learning with nature, indoor learning, outdoor learning, nature awareness

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INTRODUCTION

Connecting children with nature contributes to their positive development. However, children and families nowadays often have limited opportunities to interact with the nature surrounding them. Children in modern families tend to spend more time watching television and playing computer games than playing outside of their houses. Modern societies seem to neglect the value of such environment for the development of children, and even for adolescents. With current development in the pedagogy of teaching and learning approaches in the world, not many studies have been done on outdoor learning in Malaysia (Spalie, Utaberta, Abdullah, Tahir, & Ani, 2011). Most studies have focused on the development of curriculum and the delivery of knowledge, but not many approaches have been made to analyse outdoor learning as one of the alternative methods of learning in school design.

According to Komunitas Sekolah Alam recorded by Spalie et al. (2011), learning with nature is an approach to connect the children with nature. There are some research done in Indonesia that show the increase of understanding and interest up to 40% among the children that were involved with learning with nature teaching method. This research will provide an understanding of learning with nature from the perspective of pre-school educators in Malaysia. There are three objectives of the research: to gain the viewpoints of preschool educators on the importance of learning with nature; to study approaches to instil the awareness towards nature among preschool children; and to investigate the type of facilities and space needed for learning with nature.

LEARNING WITH NATURE

According to Wilson (2011), learning during early childhood progress is characterised by the significance of the child's innate drive to discover and learn. In this phase of early childhood, children develop their sense of affection toward the natural world and their insights into the needs of other creatures. The emphasis on environmental learning at this phase is to inspire children to explore and experience their local environment, and to encourage a sense of curiosity and sense of their place.

Humans have been created together with the natural environment and survive by learning how to use all the elements of the environment. The various components of nature in the earth hold the answer to every question (Hashim & Denan, 2014). Moss added that nature is a tool for the children to explore not just the world, but also to explore themselves. Natural England (2012), stated that the natural environment includes all available outdoor green area where children can play. Such spaces allow for childhood discovery and learning, adventure and escape, or solely know-how about the changing seasons.

IMPORTANCE OF LEARNING WITH NATURE

According to Von Benzon (2017), beyond the psychological, the literature classifies discourses relating to a wide range of benefits, or rationalities, for offering opportunities for access to outdoor green space including the social, environmental, developmental, emotional and behavioural, and medical contexts. According to Ali, Rostam and Awang (2014), plants have an influence on human psychology. Students' interactions with plants could help to lessen the negative emotions, upsurge positive thoughts, reduces physical pressure and develops the students' attention towards learning. Interaction with the outdoor environment without any boundaries could diminish psychological pressure in our daily life. Nature can ease mental stress and illness (Hashim & Denan, 2014). Natural England (2012) stated that children will do better than usual after activities in green settings and that the "greener" a child's play area, the less severe his or her attention deficit symptoms.

According to Hashim & Denan (2014), nature provides a peaceful and motivating environment and stimulate knowledge seeking, curiosity and attentiveness. Nature aids children's imagination in inspire design ideas. Mirrahimi, Tawil, Abdullah, Surat and Usman (2011) added that benefits of contacting the natural environment in learning area include boosting language improvement, improving academic achievement, improved the scores, enhanced opportunities for learning and increased educational performance. Natural environments stimulate social interaction and de-stressing through exercise or communication and provide a peaceful setting (Hashim & Denan, 2014). Wilson (2011), said that experiences in nature can contribute to the healthy growth of a child's body, mind, and spirit. Natural England (2012), added that children could gain lifelong health benefits via exposure to the natural environment. In terms of social, children can learn to work together, take responsibilities, develop self-confidence, cooperate, and develop a relationship between student and teacher during learning with nature (Mirrahimi et al., 2011).

It is important for children to be in an outdoor environment for the development of motor and cognitive skills. In an outdoor environment, children can learn through three modes of learning which are cognitive, affection, and the evaluation of either natural or man-made things (Aziz & Said, 2012). Azlina and Zulkiflee (2010) said that natural environment can be a source for cooperative and imaginative play. This triggers children's curiosity and imaginative association. Learning with nature can develop awareness towards natural environment (Hashim & Denan, 2014). Wilson (2017) added that a feeling of love and empathy towards nature grows out from children's regular contact with the natural world.

APPROACH TOWARDS LEARNING WITH NATURE

According to Mirrahimi et al. (2011), learning does not occur only through formal education in the natural environment. Studies have also shown that informal education could happen in a natural context. Informal education is an important form of learning that occurs without teacher involvement. A school has to play the role of providing children with opportunities to experience a wide range of natural environments. By working together, the educational profession has the potential to inspire and enthuse children, provide them with memorable experiences, and empower them to make the most out of the natural spaces and places locally and further afield (Natural England, 2012).

According to Ali et al. (2014), a conducive landscape will assist directly or indirectly in the learning process. It will bring the children close to nature. Environmentally related activities such as 3K programs as well as campaigns to recycle and reuse of waste materials not only increase security, safety, and cleanliness of the school compounds but also encourage students to love the environment (Ali et al., 2014). It is important to provide environmental education to create awareness about the environment among children (Acar, 2014). Acar added that outdoor class activities such as outdoor play create learning opportunities through trial knowledge and experience. Outdoor learning has been used as early-stage research at several preschool institutions in Indonesia especially in Jakarta (Spalie et al., 2011). According to Wilson (2017), unstructured activities in nature also can develop lifelong conservation values. This can facilitate environmentally informed and active children. Learning with nature also can be engaged in the form of training subjects such as math, science, language arts, environmental studies, and nutrition with the integration of core program standards (Mirrahimi et al., 2011). Wilson (2017) said that the recreational program outside of preschool is considered as part of free-choice learning in which children can absorb the information that they encountered by themselves. Children have to use all their senses to experience and appreciate the natural environment.

FACILITIES AND SPACE NEEDED FOR LEARNING WITH NATURE

According to Mirrahimi et al. (2011), a good design for outdoor learning connecting with nature is important to promote student's abilities in terms of both academic achievement and social behaviours. A designed space for environmental learning can help to create a more childlike atmosphere. Designers pay more attention to shape and space shape combination, rather than the capabilities of the space that are important for people (Oloumi, Mahdavinejad, & Namvarrad, 2012). Children are easily influenced by the surrounding environment. It affects children activities as well as children behaviour. It is important for designers to have deep knowledge about children, the nature of children's relationship with the environment, the needs and demands of children,

and the opportunities that can be offered through the design of the learning environment in order to produce a high quality of learning environment for the children (Acar, 2014).

Ali et al. (2014) have stated that landscapes function in assisting the learning process involves the entire components of the landscape at schools and it includes hard components such as gazebo, pergola, bench, garden tables, fish pond, signboards, flower pots, and soft elements such as shade trees, plants, fruits, grass, herbs, and others. The landscape should include a range of different natural features such as sand, soil, grass, a variety of different plantings and trees. Abbas, Othman, Puteri, Megat and Rahman (2012) added that quality of organization and materialization of the designed physical environment of the premises correlates with the positive developmental results of children. A contemporary design of playgrounds did not necessarily promote greater amounts of educationally desirable social, language, or motor behaviours. Children need to have an environment that addresses them, challenges them, and provides something for them to observe and think about, to make choices, to attract their attention, to engage in their favourite activities and to give them the opportunity to meet friends. They also need the freedom to explore and satisfy their curiosity about the world (Aziz & Said, 2012). Learning with nature should not be limited to outdoors. According to Mccurdy, Winterbottom, Mehta and Roberts (2010), having windows facing towards the vegetation view is also considered as connecting the children with nature.

Oloumi et al. (2012) have stated that children must deal with forms and buildings and also with connection and live inside them feel comfortable, not fear and relax. Spaces with spirited and light colour and often colours with unclear forms (like cases generated in watercolour painting) inspire imaginary topics and inspire feelings like kindness, sense of emotion. Challenges facing the preschool include fear of accidents, costs, and curriculum development (Natural England, 2012). According to Von Benzon (2017), preschools nowadays are designed to limit children's freedom of movement and ensure maximum opportunities for surveillance of children by responsible adults. Children are enclosed by walls and doors which totally separate them from the outside world. When designing a space for learning with nature, high levels of management and surveillance are often deemed necessary due to the potential risks during the learning process.

METHODOLOGY

The methodology employed in this research is a qualitative method. The two techniques used are structured interview and visual study. The visual study included photographing and observation checklists. The data were collected using case studies at four preschools: IIUM Montessori Gombak; Tadika Abim Al-Huda, Bukit Baru, Melaka; Tadika Ceriaku, Sg. Rambai, Melaka; and Al-Baghdadi Playtime Centre, Taman Bandar Senawang, Seremban. For the

structured interview techniques, three preschool educators from each preschool were interviewed. Preschool educators were chosen for the interviews as they have vast and reliable knowledge about preschool education and children. Interview sheet was prepared to assist the interviewer to ask the question to the respondent regarding the topic of research. Observations were carried out by identifying the space and facilities provided for the children and explore nature at preschool. A checklist was prepared beforehand to ensure that all areas concerned are covered and to establish a common baseline to compare between the four preschools.

PERCEPTION FROM PRESCHOOL EDUCATORS ON THE IMPORTANCE OF LEARNING WITH NATURE

The importance of learning of nature consists of emotion and psychology, learning performance, health, social, behaviour, motor and cognitive skills, play and environmental awareness. The table below describes the importance of learning with nature from the structured interview.

Table 1: Explanation of the importance of learning with nature

Importance of Learning with nature	Explanation
Emotion and psychology	• Lessen negative emotion • Upsurge positive thoughts • Ease mental stress and illness • Happier and reduced violence • Reduced depression • Less deficit attention disorder
Learning performance	• Explore new ideas • Develop interest and understanding on learning • Develop creativity • Stimulate thinking • Lift problem-solving skills • Increase focus • Critical thinking • Self-directed learning
Health	• Increase daily physical activities • Reduced childhood stress • Improved myopia and asthma • Prevent obesity • Healthy brain development • Improve chronic pain issues • Increase life expectancy
Play	• Source for cooperative and imaginative play • Diversity in play

Social and behaviour	• Social and constructive play • Increase socialization • Increase cooperation • Develop children-teacher • relationship • Develop responsibility • increase self-confidence
Motor and cognitive skills	• Stimulate children senses • Generate cognitive skills • Improve eye-hand coordination • Improve hearing, seeing, touching and smelling • Improve concentration
Environmental awareness	• Learn and understand nature • Instil awareness and appreciation towards nature • Develop responsibility and sensitivity towards nature

THE APPROACH TO INSTIL THE AWARENESS TOWARDS ENVIRONMENT AND NATURE AMONG PRESCHOOL CHILDREN

Approaches to instil the awareness towards the environment and nature among preschool children were asked about during the interview sessions. These approaches included landscape, environmental activities, outdoor class activities, free structured play, formal learning and recreational program outside of preschool. Table 2 shows details on the approaches to instil awareness towards the environment and nature.

Table 2: Details on the approaches to instil awareness towards environment and nature

Approach	Details
Conducive landscape	• Garden areas that include plantation on the ground, fish pond area and animal care facilities • Open space for unstructured play • Playground area • Rest area like the gazebo
Environmental activities	• Recycle art and craft activities • Video demonstration of recycling materials
Outdoor class activities	• Gardening activities • Nature walk • Finding living things
Free and unstructured outdoor play	• Water and sand play • Free time play
Formal education	• Learning with nature through subjects such as Science, Mathematics, and Islamic Teaching

Recreational program outside preschool-	• Visit nearby parks • Visit Aquaria, KLCC, bread factory and Farm in the City

From the identified approaches, space and facilities needed for learning with nature were identified as follows:

- Garden area that includes plantation and animal
- Open space for unstructured play
- A classroom that integrates an outdoor environment
- Rest area
- Water and sand play area
- Playground area
- Recycle area

THE TYPE OF FACILITIES AND SPACE NEEDED FOR LEARNING WITH NATURE

The types of facilities and spaces needed for learning with nature were described in terms of three aspects, which are children's preferences on the setting of space, the physical aspects, and design concerns. Few guidelines on setting the space have been identified. The tables below show the findings on the types of facilities and space needed for learning with nature.

Table 3: Children preference on the setting of space for learning with nature

Playground vs open space	Children prefer to play at playground since they were exposed more to that type of setting. However, educators prefer to have an open space as a play area. Children can explore and learn more at open space play area.
Natural furniture vs modern furniture	Children are attracted to both types of furniture. Both types of furniture can be designed without sharp edges that can harm children.
Living things vs visual 2-dimension	Children prefer to learn with living things for which they can use their senses of smell, hearing, sight and touch.
Outdoor vs indoor	Children prefer outdoor class rather than an indoor class because they have more freedom outside.

Source: Author

Table 4: Physical aspect needed for learning with nature

Outdoor landscape features	
• Natural - Plants - Animal - Sand/soil	- Various types of plants are needed for outdoor landscaping. This can provide diversity in play and also give shade for children to rest. - Animal facilities should be provided to educate kids to love animals.

	-Sand and soils are needed for children to play with it, as this affords digging and social play.
• Man-made - Benches - Water features - Playground - Flexible or fixed construction tools - Shade area/ Rest area	-Benches should be provided for the children to rest. The benches need to be located under the trees that can offer the children to have an exploratory play habitat. -Water features should be included for the children to participate in water activities for sensory play. -Playground facilities can be included. However, it can be constructed by using flexible construction tools. -Provide rest area such as gazebo for the children to rest during their play time.
Indoor features	
Windows	Windows should be provided at least one in the classroom that is facing the outside. By having windows in the classroom, children will feel more connected to the outside world.
Colour of classroom	The use of nature and light colour such as green, blue, yellow for the colour of the classroom. Those colours can give the sense of calmness.
Nature graphics	A nature graphic on a wall can be included while setting the space. This is considered as a method of learning about nature by observing the graphic on the wall in the classroom.
Materials	
Turf/ Protective mats	Protective mats can be provided around the play equipment as a replacement for sand. The mats surface is suitable for children due to the safety of the material that gave less impact when children fell on it.
Sand	Sand should be provided as flooring material at outdoor play. It can be stimulated by the children sensory through play.
Grass	Grass should be planted at an outdoor play area. Children can feel nature by walking on the grass without wearing shoes.

Source: Author

Table 5: Concern in designing the space for learning with nature

Air pollution	Need to ensure the condition of the site to prevent exposure to poor air quality that is not good for health.
Accidents and injury	Spaces should be designed in such a way that they will not trigger any kind of accidents and injury. Sharp edges need to be avoided. The chosen of flooring must be suitable for children who love to run.
Teacher supervision	Space should be designed to enable teachers to observe. Fewer walls can improve the supervision of the space.
Insect bites and stings	Study is required of the context of the natural surroundings, such as whether there are insect or animal species that are dangerous to people.

Secure barriers	Barriers are needed to prevent children from leaving the allowable area.

Source: Author

CONCLUSION AND RECOMMENDATION

Learning with nature is important for children in many aspects such as emotion, psychology, health, behaviour, social, motor and cognitive skills, play, and environmental awareness. Learning with nature can be applied in both indoor class and outdoor classes. Indoor class involve formal learning, while outdoors involves informal learning. From this paper, the type of space and facilities that support learning with nature were identified. All research questions were answered with the support from the primary and secondary data. The primary data gained from data collection is compared to the secondary data which is the literature review to gain the final output of the research. From the discussion, the author can conclude that learning with nature can be applied in teaching and physical treatment approaches by instilling awareness of nature and environment among the preschool children.

This research has only focused on the preschool educator's views on learning with nature. Educators' views are based on their experiences as educators. However, parents' views are also needed when setting the space and facilities for learning with nature since they are who are going to decide what is the best for their children. Thus, parents' views of learning with nature can be studied for future research. Additionally, the research only focuses on the facilities and space needed for learning with nature for preschool children. The integration of facilities and space needed for nature is not covered in this research. Therefore, future research should examine how to design the facilities and space of a preschool to be integrated with nature.

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SATISFACTION OF RESIDENTS ON THE REDEVELOPMENT OF NATURAL DISASTER AREA. CASE STUDY: KUALA KRAI, KELANTAN, MALAYSIA

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Abstract

Referring to the Malaysian National Security Council, disaster is defined as a catastrophic situation that claimed many lives and caused extensive damage to property and potentially endangers the public peace and security. In Malaysia, there were few natural disaster events that can be said to be among the worst ever in terms of the number of deaths and damages. However, these occurrences were not as severe as overseas. At the end of December 2014, there was a catastrophic flood called as the 'Bah Kuning' was hitting the east coast of Peninsular Malaysia. It resulted in almost 85% of the total Kuala Krai area inundated by flood water. One of the elements in post-disaster recovery is rebuilding shelter for victims. Regardless, it is important to research on residents' satisfaction as it will affect the well-being directly or indirectly. Thus, a study was carried out to evaluate the satisfaction of residents (victims) on the "New Permanent Houses" (*Rumah Kekal Baharu*, RKB) that they received from the redevelopment project. A questionnaire survey was carried out to collect and understand respondents' satisfaction on the redevelopment of their housing area, in specific, the quality of their newly reconstructed houses and the supporting facilities or infrastructure in their area. From the analysis, it was found that majority of the respondents were satisfied with their newly redeveloped houses and the infrastructure. The satisfaction level was associated with the locational and land ownership factors.

***Keywords*:** disaster, flood, house, infrastructure, quality, satisfaction, security

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INTRODUCTION

At the end of December 2014, there was a catastrophic flood called as the 'Bah Kuning' hitting the east coast of Peninsular Malaysia. It resulted in almost 85% of the Kuala Krai area, especially the Kampung Manik Urai, Kampung Manjor, Kampung Karangan, and Kampung Laloh and Dabong inundated by flood water. Due to this massive flood, residents in this Kuala Krai area have lost their properties and belonging. Loss of property, especially their shelters, clothes and vehicles, as a whole has given an impact to the residents of Kuala Krai. Manik Urai was affected the most. All residents of Manik Urai lost their homes.

After the natural disaster, there were various agencies and parties involved in the redevelopment of Kuala Krai. These include government agencies, private companies and non-governmental organisations (NGOs). Redevelopment is one of the things that is very important for an area which has suffered a natural disaster, such as massive flood. However, the issue of quality in redevelopment should not be compromised. Thus, the satisfaction of victims on the new houses and the infrastructure or facilities are crucial to be examined.

LITERATURE REVIEW

According to the National Security Council (2014), disaster is defined as a catastrophic situation that claimed many lives and caused extensive damage to property and potentially endangers the public peace and security. This often requires handling of extensive resources, equipment, frequency and manpower from many agencies as well as effective coordination, especially when complex and long-term actions are needed. Incidents of natural disasters that are included under this National Security Council's directive are floods, storms, droughts, and coastal erosion, landslides or disasters as a result of the storm and heavy rain. In addition, haze events that can cause environmental emergencies that jeopardize public order, government administration, travel and national economic activities may also be defined as a disaster. Disasters can be divided into categories such as air disaster, flood disaster, nuclear disaster, and radiology and marine disasters.

In Malaysia, there were few natural disaster events that can be said among the worst ever in terms of the number of deaths and damages. However, they were not as severe as those occurred in overseas. Malaysian geographical factors that are beyond the line of volcanoes and earthquakes also make Malaysia one of the safest nations from the threat of natural disasters. The number of natural disasters that occur in Malaysia is comparatively lesser than other countries such as countries with active volcanoes, frequent storms and so on. One of the major disaster events in Malaysia was mudflow at Post Dipang, Kampar, Perak State. The incident occurred on 29th August 1996 in an indigenous settlement (Jasbindar, 2017). This catastrophic event was caused by logging activities that had resulted the river flow to be blocked and subsequently causing severe mud floods due to heavy rain. This incident resulted in 44 deaths while 30

houses were damaged. Another major natural disaster was the Tsunami that hit the northern coastal areas of Peninsular Malaysia, including the Penang Island and Langkawi Island ("Mengingati Tsunami 2004", 2014; Bernama, 2014). The tsunami occurred on 26 December 2004. It has shocked the whole country as Malaysian never expected to experience such disaster. The incident has caused 68 deaths in four states in Peninsular Malaysia (Penang, Kedah, Perak and Selangor). However, in Penang alone, there were 52 individuals who lost their lives. A total of 245 families had lost their homes. A total of 450 homes were damaged and repaired. This incident also caused severe damage to fishing facilities as well as affecting the income of fishermen living on the coast of Penang and Kedah.

One of the elements in post-disaster recovery is rebuilding shelter (home) for the victims. Regardless, it is important to research on residents' satisfaction of the recovery as it affects their well-being directly or indirectly. Hui and Yu (2009) in Danquah, Attippoe and Ankrah (2014), stated that residential satisfaction is a reflection of the degree to which the inhabitants feel that their housing is helping them achieve their goals.

Based on the previous study in the Philippines (Carrasco, Ochiai, & Okazaki, 2017), residents' satisfaction with their new house after a disaster was generally associated to the appropriateness to the locality such as thermal comfort and construction quality. In general, the esidents' satisfaction with their new house after a disaster was positive. In another case, a study in Sri Lanka found that residents were satisfied with new post-disaster housing provided for the victims (Wijegunarathna, Wedawatta, Prasanna, & Ingirige, 2018).

Viewing from the housing construction aspects, there were approximately 1,280 houses have been built through the floods' affected areas in Kelantan by the Ministry of Works (Rani, Nifa, Ismail, & Khalid, 2017). However, as of December 2016, two years after the 2014 disastrous flood, 5% of the victims still living in the temporary houses due to issues with land acquisition and ownership, which has delayed the construction of permanent homes by the Federal Government (Rani et al., 2017). With regard to that, it is necessary to find out residents' satisfaction of the 'New Permanent House' in Kelantan as the findings will lead to better enhancement, rapidity and robustness of community resilience.

RESEARCH METHOD

Scope of Study

This study focuses on the evaluation of satisfaction of flood victims in Kuala Krai, Kelantan of the "New Permanent Houses" (*Rumah Kekal Baharu*, RKB) that they received through post-flood redevelopment project. The redevelopment project was aimed to rebuild new permanent houses for the victims of the massive

flood that occurred at the end of the year 2014. The redevelopment of housing area for the victims was carried out by the Malaysian federal government, Kelantan state government and a number of non-governmental organisations (NGOs). The satisfaction of respondents of the redeveloped housing area was studied based on the following aspects:

a) Quality of house
b) Size of house
c) Security aspect
d) Comfort of house
e) Healthy aspect of house
f) Water supply
g) Electricity supply
h) Solid waste management
i) Road condition
j) Accessibility (distance to the main road)

Case Study

At the end of December 2014, there was a catastrophic flood that was known as the 'Bah Kuning' which resulted in almost 85% of the total Kuala Krai area, especially the Manik Urai Village, Manjor Village, Karangan Village, and Laloh and Dabong Village inundated by flood water. Due to this massive flood, residents in this Kuala Krai area have lost their properties and belonging. The losses included houses, house fixtures and fittings, vehicles, and other belongings. Affected housing areas were redeveloped to provide new permanent houses for the victims. Figure 1 shows the views of the study area, Kuala Krai during the massive flood.

Figure 1: Views of study area when it was flooded in December 2014

Questionnaire Survey and Sampling of Respondents

In the year 2017, a total of 896 families had received their new permanent houses (RKB) (Figure 2). Among the recipients of RKB, around 6% (50 nos.) of them were chosen randomly as respondents for the questionnaire survey, which was carried out in the middle of 2017. The 50 respondents were given questionnaire forms to answer with the guidance from the researcher. The purpose of questionnaire survey is to collect and understand respondents' satisfaction on the redevelopment of their housing area, in specific, the quality of their newly reconstructed houses and the supporting facilities or infrastructure in their area. The samples covered both male and female, with different age groups and socio-economic background (Table 1).

Table 1: Background of respondents

Variables	Percentage (%)
Gender	
Male	60
Female	40
Ethnicity	
Malay	100
Age	
< 21 years old	0
21-30 years old	6
31-40 years old	26
41-50 years old	50
51-60 years old	18
> 60 years old	0
Household income	
< RM 1,000	24
RM 1,000 – 1,999	60
RM 2,000 – 2,999	14
RM 3,000 – 4,999	2
> RM 4,999	0
Household size	
1 – 3 members	8
4 – 6 members	70
> 6 members	22

Method of Analysis

The data were analysed using the frequency, cross-tabulation and chi-square tests of association in the Statistical Package for Social Science (SPSS) software. The purpose of the analysis was to find out the level of satisfaction of respondents on their newly redeveloped housing area and the association to the locational and land ownership aspects.

Figure 2: New permanent houses (RKB) in Kuala Krai, Kelantan

RESULTS AND FINDINGS

Satisfaction on Redevelopment

In general, none of the respondents was unsatisfied with the redevelopment of their area after the massive flood in the year 2014 (Table 2). Two-third of them felt satisfied or very satisfied with the redevelopment of their area with the RKB. For the aspect of house quality, there was a high percentage of respondents felt satisfied or very satisfied, which was 74% (Table 3). However, there were 44% of respondents moderately satisfied with the size of their new houses (Table 4). Only 56% of them were really satisfied or very satisfied with the size of the house. That means the size of houses is not really adequate for a large proportion of respondents.

Table 2: Overall satisfaction of the redevelopment

	Number of respondents	%
Very unsatisfied	0	0
Unsatisfied	0	0
Moderate	16	32
Satisfied	15	30
Very satisfied	19	38
Total	50	100

Table 3: Satisfaction with quality of the house

	Number of respondents	%
Very unsatisfied	0	0
Unsatisfied	0	0
Moderate	13	26
Satisfied	27	54
Very satisfied	10	20
Total	50	100

Table 4: Satisfaction of size of house

	Number of respondents	%
Very unsatisfied	0	0
Unsatisfied	0	0
Moderate	22	44
Satisfied	21	42
Very satisfied	7	14
Total	50	100

For the aspects of security and comfort of their new houses, the majority of them were only moderately satisfied (Table 5 and 6). Respondents who were satisfied or very satisfied made up only 24%. There were 6% of respondents were unsatisfied with the level of comfort of their new redeveloped housing (Table 6). For the aspect of health, half of the respondents felt satisfied or very satisfied (Table 7). Another 50% of respondents felt moderately satisfied on the health aspect of the house.

Table 5: Satisfaction of security

	Number of respondents	%
Very unsatisfied	0	0
Unsatisfied	0	0
Moderate	38	76
Satisfied	12	24
Very satisfied	0	0
Total	50	100

Table 6: Satisfaction of the comfort level

	Number of respondents	%
Very unsatisfied	0	0
Unsatisfied	3	6
Moderate	35	70
Satisfied	10	20
Very satisfied	2	4
Total	50	100

Table 7: Satisfaction of the health aspect

	Number of respondents	%
Very unsatisfied	0	0
Unsatisfied	0	0
Moderate	25	50
Satisfied	19	38
Very satisfied	6	12
Total	50	100

For the aspects of utility/facilities for the redevelopment area (Table 8 to 12), a few respondents expressed their dissatisfaction towards the water supply (8%), solid waste management (30%), the road condition (12%) and accessibility (18%). Most of them were only moderately satisfied with the infrastructure/ facilities provided in the redevelopment area except electricity supply. The water supply of the area was provided by Air Kelantan Sendirian Berhad (AKSB). Sometimes, the water supply in the study area was disconnected due to technical problems. Quality of solid waste management, road condition and accessibility aspects were requiring further improvement after the damages due to the massive flood. For the aspect of electricity, none of them felt unsatisfied with the electricity supply (Table 9), and most of them (96%) were satisfied.

Table 8: Satisfaction on water supply

	Number of respondents	%
Very unsatisfied	0	0
Unsatisfied	4	8
Moderate	16	32
Satisfied	27	54
Very satisfied	3	6
Total	50	100

Table 9: Satisfaction on electricity supply

	Number of respondents	%
Very unsatisfied	0	0
Unsatisfied	0	0
Moderate	2	4
Satisfied	48	96
Very satisfied	0	0
Total	50	100

Table 10: Satisfaction on solid waste management

	Number of respondents	%
Very unsatisfied	0	0
Unsatisfied	15	30
Moderate	30	60
Satisfied	5	10
Very satisfied	0	0
Total	50	100

Table 11: Satisfaction on road condition

	Number of respondents	%
Very unsatisfied	0	0
Unsatisfied	6	12
Moderate	25	50
Satisfied	19	38
Very satisfied	0	0
Total	50	100

Table 12: Satisfaction on accessibility

	Number of respondents	%
Very unsatisfied	0	0
Unsatisfied	9	18
Moderate	28	56
Satisfied	13	26
Very satisfied	0	0
Total	50	100

Satisfaction of Location and Land Ownership

The overall satisfaction level of respondents was different among the seven locations of the redevelopment areas in Kuala Krai (Table 13). Data show that all respondents from Kuala Krai Town and Telekong Village were generally satisfied or very satisfied with the redevelopment of their areas and their houses. However, all respondents from Tualang Village were only moderately satisfied with the redevelopment. In other areas, most of the respondents were satisfied or very satisfied with the redevelopment, with some percentage of respondents were moderately satisfied (Table 13). The association between the overall satisfaction level and location was analysed using Chi-square with the *p* value of 0.097. It shows that locational factor does affect the overall satisfaction level of respondents on the redevelopment of their areas and their houses.

Table 13: Overall satisfaction by location

	Moderate (%)	Satisfied (%)	Very satisfied (%)	Total (%)
Manek Urai	42	25	33	100
Sungai Durian	22	28	50	100
Kampung Pahi	33	33	33	100
Tualang Village	100	0	0	100
Karangan Village	33	17	50	100
Telekong Village	0	100	0	100
Kuala Krai Town	0	60	40	100

Note: Chi-square test showed an association between location and satisfaction with p=0.097
No respondents for "very unsatisfied" and "unsatisfied"

For the aspect of health, the association with location was significant at 0.05 level. In most of the areas, most of the respondents only felt moderately

satisfied with the health aspect of their redeveloped houses (Table 14). However, all of the respondents in Tualang Village were satisfied with their new houses. Meanwhile, the majority of the respondents in Sungai Durian were satisfied with their new houses. It showed that factor of location also affects the satisfaction level on the aspect of health.

Table 14: Satisfaction on health aspect by location

	Moderate (%)	Satisfied (%)	Very satisfied (%)	Total (%)
Manek Urai	83	17	0	100
Sungai Durian	28	56	17	100
Kampung Pahi	100	0	0	100
Tualang Village	0	100	0	100
Karangan Village	50	17	33	100
Telekong Village	50	50	0	100
Kuala Krai Town	60	20	20	100

Note: Chi-square test showed a significant association between location and satisfaction on healthy aspect at 0.05 level (p=0.030)
No respondents for "very unsatisfied" and "unsatisfied".

For the redevelopment of the study area, the new houses were constructed on either individual land or government land. The land ownership also affects the level of satisfaction among respondents. However, the association between ownership and overall satisfaction was not significant even at 0.05 level (Table 15). Most of the respondents who were staying at their own new houses or on the government land were satisfied or very satisfied (> 60% for self-owned, >75% for government land). There were 50% of the respondents who were staying on family land. They were only moderately satisfied with the newly redeveloped houses (Table 15).

Table 15: Overall satisfaction by land ownership

Ownership	Moderate (%)	Satisfied (%)	Very satisfied (%)	Total (%)
Self	36	32	32	100
Family	50	25	25	100
Government	22	28	50	100

Note: Chi-square test showed a not significant association between overall satisfaction and ownership even at 0.05 level.
No respondents for "very unsatisfied" and "unsatisfied".

The association between satisfaction on the health aspect of their new houses and land ownership was showing significant association at 0.05 level (p=0.043). It showed a significant effect of land ownership on health satisfaction of respondents of their newly redeveloped houses. Majority of the respondents on family land and government land were satisfied or very satisfied with the health aspect of their new houses

(Table 16). However, the majority of the respondents (68%) who were staying on their own land were only moderately satisfied with the health aspect of their new houses.

Table 16: Satisfaction on the heath aspect by land ownership

Ownership	Moderate (%)	Satisfied (%)	Very satisfied (%)	Total (%)
Self	68	21	11	100
Family	25	75	0	100
Government	28	56	17	100

Note: Chi-square test showed a not significant association between overall satisfaction and ownership even at 0.05 level (p=0.043)
No respondents for "very unsatisfied" and "unsatisfied"

SUMMARY AND CONCLUDING REMARKS

It was found that majority of the respondents were satisfied with their newly redeveloped houses and the infrastructure. A small percentage of respondents expressed their dissatisfaction on the aspects of comfort, water supply, solid waste management, road condition and accessibility. The satisfaction level was mostly associated with the locational and land ownership factors. The level of satisfaction differs according to the areas and type of land.

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DEVELOPING A 3-D GIS MODEL FOR URBAN PLANNING. CASE STUDY: AMPANG JAYA, MALAYSIA

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Abstract

This paper aims to explore the rich potential of interactive visualisation environment integrating GIS for modelling urban growth and spatio-temporal transformation of Malaysian cities. As a case study example, authors consider a 3-D GIS model of Ampang Jaya, Selangor to investigate the techniques of data acquisition, data reconstruction from physical to digital, urban analysis and visualisation in constructing a digital model ranging from low to high geometric content including 2-D digital maps, digital orthographic and full volumetric parametric modelling. The key aspect of this virtual model is how it would assist in understanding the urban planning and design of Ampang Jaya by translating complex spatial information that are currently used by the authorities for planning activities such as maps, plans and written information into responsive, easily understandable spatial information. It could serve as a new platform to disseminate information about Ampang Jaya, bridge gaps among professionals involved in planning processes, improve communications among decision makers, stakeholders and the public as well as support decision making about the spatial growth of Ampang Jaya. Demonstrations of Ampang Jaya will also provide a clearer picture of the importance of ownership and control of 3-D models by local councils in empowering them in decision making, for example, in improving transparency, and avoiding misuse by project developers (Shiffer 1993; Sunesson et al., 2008). Such environment will improve the subsequent digital models and research in the area of urban design and planning in Malaysia where visual communication is pivotal.

Keywords: 3-D GIS, visualisation, planning support tool, communication platform, urban planning

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INTRODUCTION

The general aim of Virtual Ampang Jaya is to assist planning activities in Malaysia and promoting the advantage of a ready visualisation of complex 3-D information. It will suggest how complex city information could be held within a 3-D environment which can be visually seen and made interactive by means of stronger coupling; embedding the 3-D model within the functions of GIS system as a more advanced version of weaker coupling (Batty, 2012). The planning issues and challenges of the urban context would be considered before designing the strategies of developing a case study involving the processes of modelling, data acquisition, data reconstruction, and finally the 3-D visualisation that is effective in serving a sense of understanding of a larger context of the building and its surroundings (Herbet & Xuwei, 2015).

In addressing the spatio-temporal transformation of Malaysian cities and towns, the government through its multimedia agency MDec is called upon to respond to the pressing need to develop expertise in the application of digital media in the Malaysian urban planning (Lee & Ahmad, 2000). Currently, there is a lack of study integrating 2-D GIS and 3-D models in the context of Malaysian planning practices, which are distinctive in terms of their policy, social and cultural context and administration (Abdullah, Abdullah, & Ibrahim, 2009; Rafi & Rani 2008). Set as an experimental test pad in the uptake of digital and multimedia in Malaysia, Virtual Ampang Jaya will explore the GIS analytical and querying capabilities with interactive visualisation environment while demonstrating the usefulness of 3-D visualisation and GIS in planning.

MOTIVATIONS

Cities are highly complex systems and digital media offers a new understanding of urban problems. In understanding how cities operate and informing the planning and design process, various simulation models operating at different spatial scales and over different temporal period have been constructed over the last 50 years (Batty, 2012). Defined as "a city in which ICT is merged with traditional infrastructures, coordinated and integrated using new digital technologies" (Batty, 2012: 481), "smart cities" are amongst ambitious models developed to control the urbanisation processes to avoid future development failure from inefficient urban planning (Thuzar, 2012). While some adopt more sophisticated approaches such as "unified process" for standardise and effective system (Rong, Wu, & Shang, 2017), others use less ambitious technological inventions such as Twitter data in developing a close and up-to-date connection to the city of Amsterdam involving a real-time system based analysis (Arribas-Bel, Kourtit, Nijkamp, & Steenbruggen, 2015). Such responsive spatial information further enriches understanding of urban issues to better facilitate the planning process to produce better result and decisions.

The development of 3-D GIS is large scale and complex multi-dimensional involving many aspects and involving theories and technologies (Rong et al., 2017). Planning information can be easily understood and disseminated to residents as the virtual model translates complex city information that is usually tailored to a specific group of professionals into responsive spatial information that will be more easily understood by layman amongst stakeholders who are not taught to read coded information such as plans and maps. Highly realistic model is a successful method in communicating with the public and have been used in the Malaysian context in advertising new large cities. While visualisation is amongst the most powerful tool for promoting urban changes, city officials, urban planners and the general public must be able to visualise urban plans along with all the infrastructure that already exists (Lopes & Lindström 2012). However, although studies on planning support system using 3-D visualisation and GIS are abundant, their role in the practice of urban planning since their emergence in the 1990s, and despite the long term use of 3-D visualisation tools in planning, is questionable. This could relate a wider range of problems including issues of developer and operator of the models, and whether the models enable new kinds of processes and new levels of engagement amongst users (Lopes & Lindström, 2012), as well as many studies in planning support system are not integrating real-world practice as they mainly involve stand-alone projects (Brail & Klosterman, 2001). Therefore, this study will involve real projects and the local planning authorities to help to demonstrate the true process and challenges of developing a 3-D visualisation and GIS model to enhance methods of current planning and consultation processes by decision makers and communicate with the various stakeholders including the public (Pietsch, 2000).

THE PROPOSED VIRTUAL AMPANG JAYA

As a planning support tool, 3-D modelling and visualisation can offer new ways in addressing thes issues affecting Ampang Jaya. Various scenarios can also be generated to study the urban impact with different sets of design parameters. As analytical tool to study the growth and spatio-temporal transformation of Ampang Jaya in 50 years since 1900, it will demonstrate and evaluate attributes of Ampang Jaya by adopting the Community Taxonomy (Florida House Institute, n.d.), according to four layers: social, economic, natural and the built environment. The interactive visualisation viewer in ArcGlobe® will offer a more meaningful understanding of Ampang Jaya, highlighting its urban layers that would otherwise be limited to the form of 2-D abstract data.

Growth patterns of the city will be traced, displaying the current scenario as well as past development involving historical, environmental and large scale settlement patterns. By understanding the past and the present situation and analysing spatio-temporal transformation of Ampang Jaya, users can measure growth patterns of land use, neighbourhood and regional transportation planning,

landscaping and site planning. This will enable people to visualise the future urban patterns and forecast the future direction of Ampang Jaya. As a predictive modelling tool, it will offer a new way to look at the past, present and future of Ampang Jaya than what is currently only available from photographs and written text (Figure 1).

Figure 1: The development of Ampang Jaya. (Left) In the early 1900's. (Middle) In the 1960's. (Right) In the 2000's

The process of conducting the studies will provide a better understanding for local authorities in planning practices. The empirical knowledge of developing a 3-D GIS model from the studies in Malaysia will reflect on the existing challenges, mainly involving the local authorities including available data, resources and mindset. This will perhaps suggest a more practical use of the powerful 3-D GIS programmes equipped with large automated functions for subsequent digital models of towns and cities in Malaysia, facilitating research in the area of urban design and planning.

Data Acquisition, Reconstruction and GIS

In constructing the virtual Ampang Jaya, the steps will involve acquiring and analysing spatial information through digital means to explore an interactive virtual environment for Ampang Jaya to evaluate the virtual model for urban analysis. It will investigate the techniques of data acquisition, data reconstruction from physical to digital, urban analysis and visualisation. Data acquisition on a higher scale will attempt photogrammetric technologies or 3-D laser scanning from point cloud, such as airborne Light Detection and Ranging (LIDAR), to obtain GIS data and to determine height and building details. For an economical but less accurate approach, data acquisition could rely on the current GIS datasets in MapInfo® and satellite images in Quick Bird® (of up to 0.6 meter resolution) that are readily available from the local authority. Past aerial photographs of Ampang Jaya dating from 1950 to the current date will be accessed from the Malaysian Survey and Mapping Department (JUPEM). Old topographic maps, cadastral maps, street photographs and past buildings, road system and other past information of the city will be sought from the local authority's and libraries' archives. These aerial photographs will be scanned and undergo photogrammetric processes to produce a geo-referenced image or digital orthophoto. This

orthophoto will generate the contour and Digital Terrain Model (DTM) that will provide the base map with real topographic structure and heights.

3-D Modelling

Traditional geometric constructions used by architects are generally based on CAD packages such as AutoCAD®, 3-D Max® which can offer highly precise geometries. The development from physical form to digital data for Ampang Jaya using GIS database and software is contrary to the traditional methods of geometric constructions used in city modelling. 3-D CAD models are often loaded with geometrical details, are heavy, require good operating skills and are time consuming to create. They also do not necessarily guarantee a high level of realism, defined as the mimicry of the physical environment in a virtual setting, as compared to accuracy, defined as correctness of the information utilised, modelled and depicted (Pietsch 2000). On the other hand, modelling methods such as texture mapping are inexpensive and can add realism to the virtual models displaying details in colour, texture and material. Rapid modelling usually utilise texture mapping, from oblique aerial, terrestrial images and panoramic image capturing.

In the last decade, GIS and remote sensing packages such as ArcGIS® and ERDAS® have been extended to generate 3-D content. The proposal for Ampang Jaya could employ the construction process integrating GIS and 3-D as outlined by Salleh (2008) using ArcGIS® desktop software with Sketch-Up® as the modelling software. Sketch-Up® is generally the preferred modelling software for its short learning curve and user friendliness which are essential for modelling process. Currently, ArcGIS® is mostly compatible with Sketch-Up® in complementing with details while maintaining spatial references. Orthophoto that has been imported from ArcScene and ArcMap will be locked at the actual geographic location. Spatial referencing is a distinctive attribute in a modelling software and can be carried out using Shape-file® importer; a plug-in for GIS in Sketch-Up®. This proprietary plug-in enables detailed content to be included, which is entirely compatible to the analytical functionalities and querying capabilities of state-of-the-art GIS. While the objects are geo-referenced, it can also animate scenes, perform multiple spatial queries, view shed and shadow analysis, and various scenario based analysis. Using Sketch-Up®, digitised orthophotos of Ampang Jaya will be extruded into a 3-D model while carrying attribute data. A 3-D model of Ampang Jaya from year 1950 will be developed from the 2-D GIS data layers; social, economic, built form and natural. Other objects, including roads, landscaping elements and street furniture may be incorporated at the actual locations on site.

Visualisation

The visualisation model will incorporate a movie of growing Ampang Jaya, displaying qualitatively and quantitatively responsive spatial data information on a time-line. While modelling software such as Sketch-Up® have enhanced their functions to incorporate geospatial and interactive visualisation, GIS software are becoming more actively engaged in virtual cities. The visualisation can be recorded and played in Windows Media Player® or Quick Time®, or further extended into VRML player such as Canoma®. Visualisation with GIS provides a new approach to urban design and planning in dealing with the problems of site location, large settlement design and community planning, public participation and a myriad of possibilities for offering solutions. Visualisation growth of Ampang Jaya will attempt to animate data layers through spatio-temporal; space and time animation and simulation in ArcMap, ArcScene and ArcGlobe to understand how they change with space and time. However, the data availability is a huge challenge in Malaysia, compared to the experience of other cities like Kyoto in Japan which had old topographic maps (Yano et al., 2006).

Data Layers

Data layers (Table 1) will be animated in ArcScene and ArcGlobe incorporating real time, where simulation scenes will be viewed by users from different angle and height, while users will be allowed to select or hide layers as they navigate through the scene (Figure 2). 2-D map tracking can be viewed simultaneously in ArcMap® to keep users on track.

Table 1: Data layers

Layer	Data
Social	Indicate communal spaces and its serviceability to other parts of the city.
Economic	Animate large scale settlement growth, commercial and business centres to understand the pattern.
Built form	Animate the building development to understand the population increase and boundary changes.
Natural	Animate the changes in the landscape and forest encroachment due to building development.

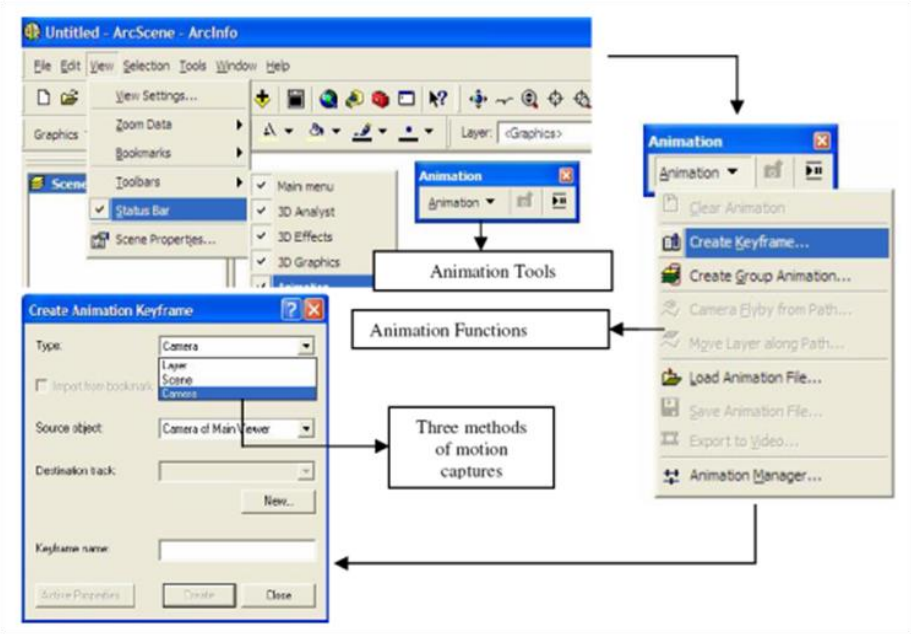

Figure 2: Example of animation development in ArcScene®
Source: Salleh (2008)

CASE STUDY: AMPANG JAYA

Urbanism

Ampang Jaya in Malaysia, like other Southeast Asia cities facing urban challenges of concentration of population and poor environment (Thuzar, 2012), is experiencing economic dynamism with uncontrolled rapid growth that has sprouted beyond the limits of its urban structure, placing the local authorities and stakeholders in a dilemma. Over the last few years since its development in the early 1990s, Ampang Jaya has transformed from a quiet town into becoming a chaotic and a dense place with uncontrolled hillsides development, emergence of foreign towns as well as immense traffic and parking problems as shown in Figure 3 and 4. Changes in the physical environment in Malaysia continue to disturb the urban fabric and alter its sense of place (FDTCP, 2006). Often, changes in the physical setting, the types of uses and the streets' activities would wipe out what is special and significant to the existing individuals and the community, specifically those who have lasting connection to the areas (Shamsuddin & Ujang, 2008). These changes in Ampang Jaya have affected the local community as they feel that Ampang Jaya has lost its sense of place.

Figure 3: (Left) Little Korea. (Right) Hillside development in Ampang Jaya

While the authorities seek for a more comprehensive and meaningful information concerning Ampang Jaya in preparing them in dealing with the current issues and challenges (Ampang Jaya Municipal Council, 1998), the public are demanding more transparency in the planning processes. Apart from public pressure and the urge to gain public confidence, the local council is setting out to reorganise its planning and have a better control of Ampang Jaya.

The one-way traffic road system with ticket kiosks in the business district of Ampang Jaya was designed to replace the two-way system, aimed at reorganising the business areas while resolving the problems involving the sprawling stalls of petty traders. However, this new system results in winding traffic routes as it forces traffic to circle the business hubs and encourage business activities. Massive traffic congestion occurs when long queue of vehicles form along the parking booths as people are trying to pay for their parking tickets and obstruct the traffic flow. After just two years into installation, the authority has found the system ineffective and cannot cope with the increasing volume of traffic within the area. To resolve this, the authority has installed payment machines along the parking spaces to replace the parking booths. However, the one-way traffic route has not been revised to accommodate the new payment system. To make matters worse, illegal businesses soon made their way to fill the vacant booths, adding to the already chaotic traffic condition.

Figure 4: (Left) Traffic congestion along the one-way-traffic route. (Right) idle parking booth beside the new parking machine.

Data Acquisition, Processing and Reconstruction

Like the majority of the local planning authorities in Malaysia which use GIS's MapInfo program, authors were provided the GIS dataset in MapInfo data format (.TAB) that contains restricted data on land use and building lot parameter that covers approximately an area of 20 kilometre wide under the jurisdiction of the Ampang Jaya Municipal Council. The satellite images provided by the local council is considerably poor in resolution compared to those from the Malaysian Survey and Mapping Department (JUPEM). Although detailed current topographic maps, cadastral maps, road system and other information of the city are readily available from the local council, other data layers from relevant departments are insufficient. Past information from the local council's archive is scarce as the local council is a reasonably new municipal. Additional information such as the draft of the amended local plan and other planning documents provide authors with support materials for model development. Authors also carried out photographing the building blocks and the immediate surroundings of a selected commercial area of Ampang Jaya for the purpose of texture detailing. As illustrated in Figure 5, the project utilises ArcGIS desktop software version 9.3, including its components: ArcCatalog, ArcMap and its visualisation tool; ArcScene. SketchUp® is the preferred modelling software for its integrated functionality and compatibility with ArcGIS although its rendering and detailing capability is slightly compromised when compared with several other powerful CAD software.

3-D GIS block model may be automatically generated in ArcScene by extruding building footprints with the height data of each building stored in the GIS building height layer. However, in the case of insufficient data layer, authors develop the entire building blocks using SketchUp®. Since the data only contain the land plot, each building footprint needs to be carefully digitised from the satellite image and its height determined from the shadow cast. Figure 6 demonstrates the process of modelling a block in SketchUp®; from a polygon that has been exported using the Shape-file importer in ArcScene. Elevation photographs are meticulously edited in Adobe Photoshop before they are draped over the building blocks to create a photo realistic image of a row of shop-office. The textured blocks are then exported back into ArcScene for visualising the entire buildings within a realistic site context of the satellite image. Switching between layers from the basic and the textured block enables users to visualise the massing component of the building in relation to the realistic view.

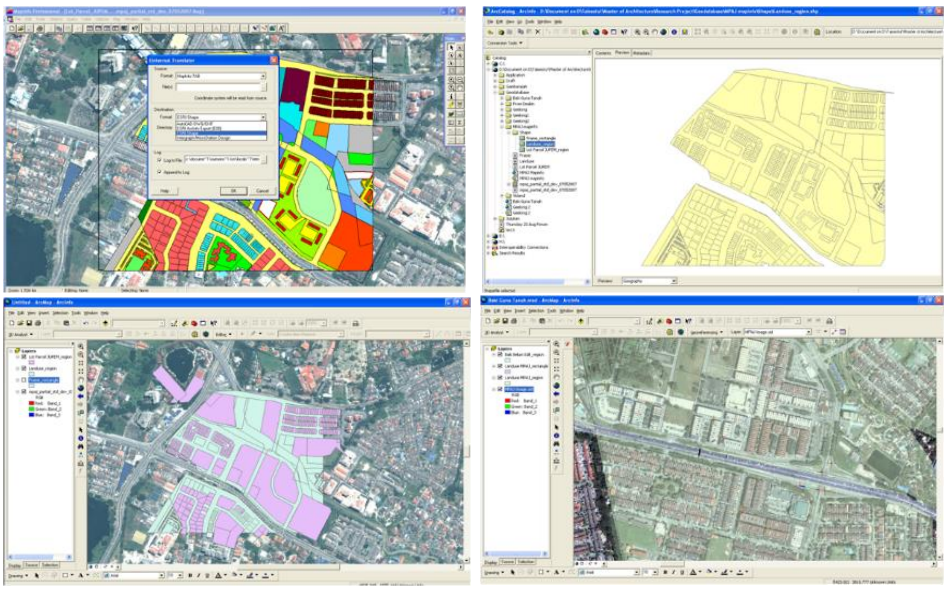

Figure 5: Data conversion from MapInfo to ArcGIS

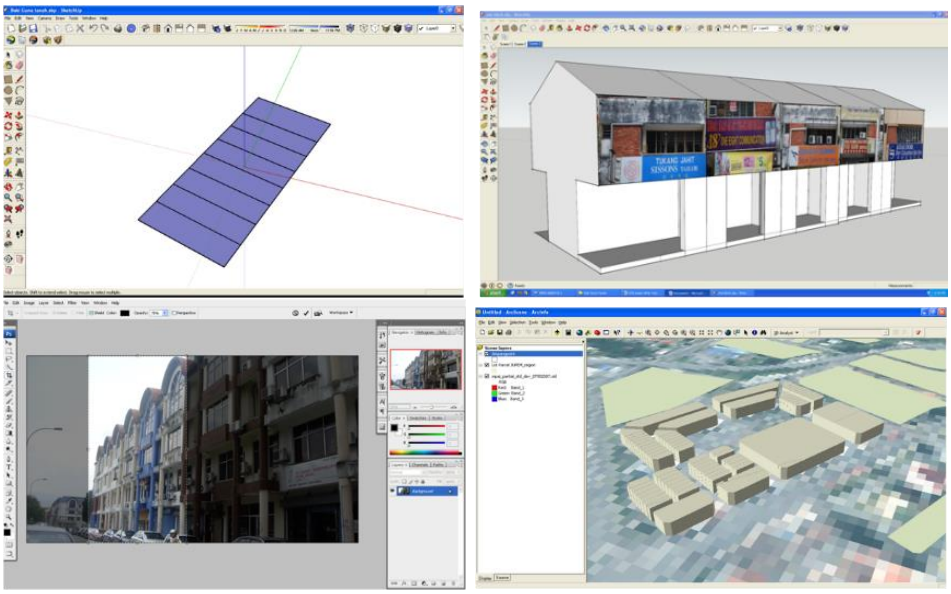

Figure 6: Development of 3-D GIS model.

Analysis and Outcome

Conducting traffic analysis involves field surveys and reports using charts, 2-D maps and drawings, and can be quite difficult, particularly when having to

consider the various urban fabrics of Ampang Jaya. GIS visualisation enables the traffic engineers to predict the pattern of traffic flows in context of the current surrounding buildings (Figure 7), as well as the planned future buildings using 2-D ArcMap. Using its 3-D component in ArcScene, the traffic information is further translated into easily understood form as it merges with spatial 3-D visualisation. As a common tool, it provides the spatial platform to merge building information from the Building Department of the local council with the road and traffic information from the Engineering Department of the council to be further discussed among relevant agencies such as the Road and Works Department, the Traffic Department, the Police Force and the stakeholders that include the shop owners and the affected public.

Figure 7: The 2D view of traffic route marked in red and yellow lines in ArcMap. The 3D view of traffic and parking system in ArcScene

The outcome of the study is expected to support planning decisions and facilitate consultation processes between councils and stakeholders and improve the dissemination and management of spatial information about urban environments. Reframed in a virtual setting, the interactive model has the potential to attract public participation and to develop better understanding among the public about their city. As the web is becoming a common platform for the wider audience, it can provide the interface for Virtual Ampang to disseminate up-to-date planning information as well as to communicate current issues and future plans while generating feedback from the general public.

CONCLUSION

In addressing both urbanism and technological demand, this paper explores the idea of developing a 3-D GIS model to address the needs for modelling urban growth (Brail & Klosterman, 2001; Fragkias & Seto, 2007). The expected outcome of Virtual Ampang Jaya is to support planning decisions and facilitate consultation processes between councils and stakeholders, and improve the dissemination and management of spatial information about urban environments. Involving the local authorities, it provides an insight on how to develop the model

by translating easily understandable spatial information enabling a more comprehensive understanding of Ampang Jaya and helping bridge the gap between different professionals for better planning outcomes. Adopting 3-D modelling and visualisation also correlates with the call for electronic government (e-govt), a flagship application of the Multimedia Super Corridor (MSC) project that aims to redesign the system of the government to bring about fundamental changes from the society level (Lee & Ahmad, 2000), as well as meeting global information technology expectations and future challenges. While it may provide as a guideline for the use of computing in planning for the authorities in Malaysia, the model can be further developed into a prototype that may incorporate GeoImmersive videos into GIS environments. Its use for modelling different scales of urban development can also suggest the appropriate hardware and integration of software that are deem suitable.

While Virtual Ampang Jaya attempts to explore the GIS analytical and querying capabilities with interactive visualisation environment, the case study is an infant project in testing the model for analysis that integrates CAD with limited application of GIS software with the available data commonly maintained by planning authorities in Malaysia. Its effectiveness for urban and planning analysis is heavily challenged by many factors, primarily data availability and accuracy that includes lack of data layers and substandard satellite image. As a result of these, several automated tools designed to facilitate the process cannot be explored, for example, the extrusion technique in ArcScene. Lack of resolution in the satellite image has made it ineffective to conduct 3-D analysis of the buildings in context of its surroundings as the pixelated ground image from perspective views hardly represents a virtually realistic environment.

Another issue that challenges this project is the disciplinary boundary that demands expertise from firstly, the modelling capability that is often related to the architects, and secondly, the GIS software application that are often used by planners. The third expertise which involves geo-referencing; the forte of the land surveyors, may overcome our deficiency as a higher resolution image can be "stitched" and geo-referenced from the Google Maps. While the future of 3-D visualisation and GIS is encouraged by the integration of these expertise, the current developments of GIS among the planning authorities in Malaysia are positive with the support from the Federal and State Town Planning Departments. The future 3-D GIS model will aim to explore GIS's powerful analytical and querying capabilities within the interactive visualisation environment while experimenting future possibilities with "urban parametric". Integrating the evolving technologies in retrieval, transmission and visualisation of 3-D data, it will attempt the future virtual world that is capable of constantly and relatively changing alongside the real world.

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EVALUATION OF INFILL BUILDING BLOCK IN HERITAGE SCHOOLS IN KUALA LUMPUR

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Abstract

In Kuala Lumpur, there are a few heritage schools that are more than 100 years old which have experienced significant infill developments since colonial era. This study evaluates the infill building structures and proposes a suitable design approach of infill development in heritage school. It focuses on the infill development theory, reviews on the physical aspect of heritage school buildings as well as related local policies and guidelines. In order to achieve the research purpose and objectives, the study uses the qualitative methodology. The study found that there are 2 infill design approaches, which is the complementary design approach and contrast design approach and both can be used as long as compatible and in harmony with the existing heritage building and site. Through site observation survey, it was found that although infill development at St John's Institutions and Maxwell Secondary Schools adopted the contrast approach, the outcome were different. Infill development at St John's Institutions was compatible and in harmony, while at Maxwell Secondary School was the opposite. Therefore, this study suggests improvement on the existing infill structures in the heritage school, either through image restoration or transfer of facilities to future development. Other recommendation include the government providing infill development guidelines for heritage site, encouraging private sector to participate in heritage school conservation and development, and controlling the height of new development within 100 meter radius from heritage buildings.

Keywords: heritage school, urban infill, Maxwell School, St John Institution

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INTRODUCTION

Malaysia has diverse heritage buildings that demonstrate the features and characteristics of local and international architecture, as well as outstanding craftsmanship. Some are located in Kuala Lumpur, the capital and largest city in the country. It has been estimated that the number of historical heritage buildings in Kuala Lumpur is 8.4% of the country's total which equals to 1,763 unit number of buildings (Kamarul, 2008 cited by Alauddin, Ishakt, Mohd Isa, & Mohamad Sohod, 2016). There are many colonial heritage buildings with western architecture styles such as Moghul style for institutional buildings and Art deco style for shophouses.

Along with other colonial buildings, heritage schools have long been known for their unique architectural characteristics and contribution to local historical development. They include Victoria's Institution (established in1893), St John's Institution (1904), Maxwell Secondary School (1924), SMK Convent Bukit Nanas (1899), Batu Road Prime School (1930), Methodist Girl's School Brickfield (1896), SMK Confucian Kuala Lumpur (1906) and Methodist Girl's School Kuala Lumpur (1916). These schools are considered some of the finest examples of historical heritage buildings and sites. Thus, they should be studied and preserved as education heritage of Malaysia.

The rapid growth of Kuala Lumpur's population increases the demand for new space for education facilities. Parents have always wanted to send their children to schools with excellent academic reputations. Most of the heritage schools in city centre such as St John's Institution, Maxwell Secondary School and Convent School Bukit Nanas are categorised as cluster schools by the Malaysian Ministry of Education, which have excellent record of educational achievements. This increased demand from parents to enrol their children into the schools has forced the addition of learning spaces and facilities, which were built through infill development within the compound of the existing heritage schools.

According to Center for Urban Policy Research (2006), infill development is a key component of smart growth which usually occurs in central cities and inner suburbs on scattered sites where there is a vacant pocket that can be developed. However, infill development may create conflict between the new and the old buildings or site setting where the new building's scale, details, structure and function are alien to the old's. The heritage schools' infill structures and building blocks seem to have several distinctive architecture approaches and styles or school of thought. The new extension structure or new adjacent building block which is connected to the existing heritage buildings seem insensitive or not respecting the existing heritage building block (Abdullah, Ahmad Zaki, & Syed Subli, n.d). The question is, what are the considerations or variables that are taken into account in designing new infill building blocks of heritage schools?

Moreover, the placement of lateral extension or new infill building block in the school physical planning development also has given significant impact to

the overall heritage school image. The structural massing of infill building blocks also plays a significant role in affecting the whole scenery of heritage school image in which they look bigger, bolder and more prominent compared to the heritage building block. Thus, what are the factors and forces that influenced the heritage school physical planning over the years regarding the building placement and the structural massing? It seems like the development of infill building structure of heritage school does not fit the objective of heritage building conservation set by the government.

Urban Infill Development in Historical Site Setting

According to Rotondo, Selicato, Marin and Galdeano (2018), the word 'heritage' was derived from Latin *patri-monium*, which means 'things belonging to his father'. It can be defined as a set of goods that have been inherited from our fathers or previous generations, and that can be passed on to future generations. The 19th General Assembly of the International Council on Monuments and Sites (ICOMOS) 2017 in Delhi defined heritage as the declaration of human movement and methods for living all through history passed on from generation to generation. In addition, the 11th ICOMOS stated that the heritage or cultural heritage refers to the monuments, groups of buildings and sites of heritage value, constituting the historical built environment.

Schultz and Kasen (1991) define infill as a residential or non-residential development that occurs on vacant land that are scattered among developed areas of municipalities. Meanwhile, Davis (2004) defines that infill is development on empty land in urbanized regions and redevelopment of areas that are adjacent to urban development where all services and facilities are anticipated to have the capacity to accommodate additional demand. Thus, urban infill can be defined as a new development in an empty parcel or a vacant lot within the developed area, which can be a new development, redevelopment or restoration works.

There are two approaches of infill architectural design, which are complementary and contrast approaches. The complementary approach is the architectural approach based on the architectural visual style theory that follow the character of neighbouring buildings. Contrast approach is the architectural approach based on the rationalist or systematic architectural theory which develop the design based on the calculations, functions, moralities and the issues of the present (Alfirevic & Somonovic-Alfirevic, 2015).

RESEARCH METHODOLOGY

This research on infill development was conducted at two heritage schools in Kuala Lumpu, which were St John's Institution (SJI) at Jalan Bukit Nanas and Maxwell School (MXS) at Jalan Tun Ismail. The two schools were selected from nine heritage schools in Kuala Lumpur using Pairwise Comparison analysis technique based on the criteria of 'the most significant infill development' in

heritage school sites. The criteria include percentage of infill building block within the school compound, the impact of architectural design and the block massing comparison between the heritage and infill block.

This study adopted a qualitative research approach. Literature review includes historical and background analysis of heritage colonial schools in Kuala Lumpur, architectural design philosophy associated with the infill design in historical site setting as well as local policies and guidelines on works related to heritage site setting. Data were gathered through observation surveys on the two selected heritage schools in Kuala Lumpur and expert interviews. The observation survey data were photographed and analysed using descriptive and comparative techniques on five criteria which were heritage school external planning context, internal planning arrangement, architectural design approach, construction method and block massing.

Meanwhile, interview sessions were conducted with practitioners and experts in the field of architecture and heritage, which include architects, heritage conservators and the local authority. The interviews were based on semi structured questions related to the respondents' field of expertise.

FINDINGS AND DISCUSSION

Site Observation Survey

This section presents the analysis and findings from site observation survey. This section also includes a short discussion regarding the infill development inside and outside of heritage schools compound. The observation survey evaluated five criteria which are listed in Table 1. The table also summarizes the findings of the survey.

Table 1: Findings from observation survey

The criteria	SJI	MXS	Analysis / comment
External planning context	Is not affected by surrounding urban development because it is located near forest reserve area and within heritage building zone in the city	The heritage school is surrounded by rapid urban development that gives an adverse impact to the overall school development	The location in an urban area is the main factor that influences the heritage schools development

Internal planning pattern/ morphology	The overall school layout planning is consistently developed and projected toward the rear side of the school and erected once per every 16 years on average	The overall school layout planning is developed scattered within school area because of limitation of school space, development cost and external urban development	SJI development planning is more organised compared to MXS because of different external urban force
Architectural infill design approach	Generally, used contrast technique with certain development theme that follows the trend of architecture style at the time it was built	Generally, used contrast technique but somehow does not have major theme for overall development design scheme	Infill development of both schools used contrast approach, but the theme of development creates different results
Construction method	Construction method follows common construction technology of the time. It is due to the school development was not affected by limited time & cost constraint at the time it was built because the infill developments were erected mostly in the colonial era and fully funded by the private sector	Overall development pattern shows that the school emphasised on prevailing technology that can save time and cost of infill project. Infill developments were constructed after Independence, supported by limited government budget within limited time frame	The time period and funding availability affect the construction technology used in infill development
Building massing & skyline	Scales & heights of building blocks are similar. The development skyline looks harmonious and compatible with each other	Building massing scales and heights are inconsistent resulting in the infill buildings overshadowing the heritage building. It resulted in incompatible building skyline	The development skyline result from the forces of surrounding development, the development timeline and construction technology used

Analysis / comment	The development design of SJI infill building looks well organised & does not adversely affect the appearance of the heritage building	The development design of MXS infill building looks disorganised and affected the appearance of the heritage building	The outcome of the infill development is influenced by urban development pressure, site location, development cost and architectural style

Heritage School External Planning Context

SJI is located in an area surrounded by other colonial heritage buildings and forest reserve, which discourage new development in the area. Thus, the internal planning of this heritage school have been developed in a well-organised manner because it has choice and space to arrange the infill building blocks from time to time. MXS, on the other hand, is located in the middle of a rapidly developing area of Kuala Lumpur. Thus MXS received a great urban development pressure compared to SJI resulting with the former losing some land to other urban development. Thus, it affected the MXS lateral planning arrangement due the compactness of school site. Thus, the study found that external development force could give significant influence to the internal development of heritage school (Figure 1).

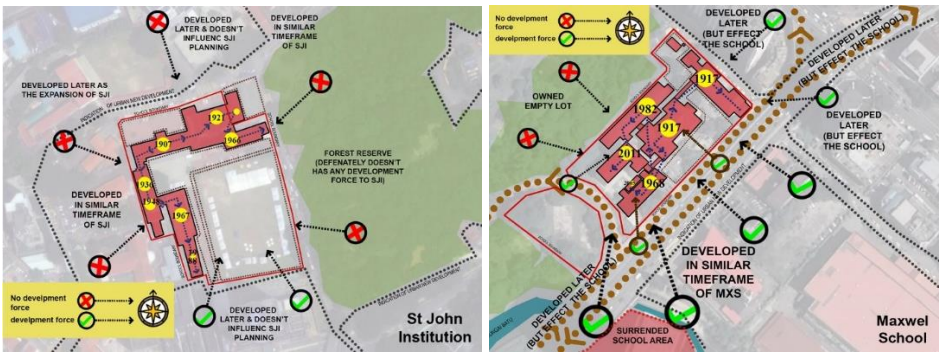

Figure 1: Comparison of the external development force toward heritage school

Internal Planning Arrangement of Heritage School

Generally, both heritage schools development pattern is directed toward the rear side of the school. However, SJI's infill development was more organised and concentrated compared to MXS's whose block placements are scattered. SJI infill development took place once every 16 years, on average. SJI did not receive external urban development pressure from surrounding area, which allowed it to expand the facilities in organised manner. MXS is the opposite; its infill development was not well organised and followed inconsistent timeline. It is due

to the adverse impacts of surrounding development and the limitation of space within the school compound due to its land being taken away by other urban uses.

The Architectural Design Approach of Infill Block

The study found that both heritage schools deployed architectural contrast design approach in which they did not follow their original school block design. However, their development strategy was different to one another, leading to different end results. SJI infill development was developed with a theme whereby every infill bloc was developed by following the periodic architectural style at the time it was erected. On the other hand, MXS development strategy did not have a proper architectural design timeframe. The infill developments in MXS were developed with limited cost, time and space.

Most of SJI infill blocks were erected before the independence of Malaya, and was financially well supported by the colonial government and the church. In contrast, MXS's infill blocks were developed after the independence of Malaya with limited budget. Consequently, it had to follow standard Public Works design which was insensitive towards existing heritage building.

Figure 2: Panoramic view toward Maxwell school

Figure 3: Panoramic view toward the rear of St John's Institution

Construction Method

The study found that the construction of both heritage schools followed the construction technology at the time they were developed. SJI construction method evolved from the load bearing method to the post and beam construction method. Meanwhile, MXS construction method evolved from the load bearing

method to IBS construction method. The construction methods chosen were influenced by the time efficiency of development, the cost of construction and the external urban development pressure. MXS used the IBS method to meet the time and cost efficiency of recent development, but SJI infill development followed mainstream approach of construction method of the time.

Building Block Massing

SJI building massing size is consistent and developed in a similar range of height among the building blocks. However, MXS building massing design is inconsistent where the much taller infill building overwhelmed the heritage blocks (Figure 4). It is due to the difference in space provision within the school compounds at the time they were developed.

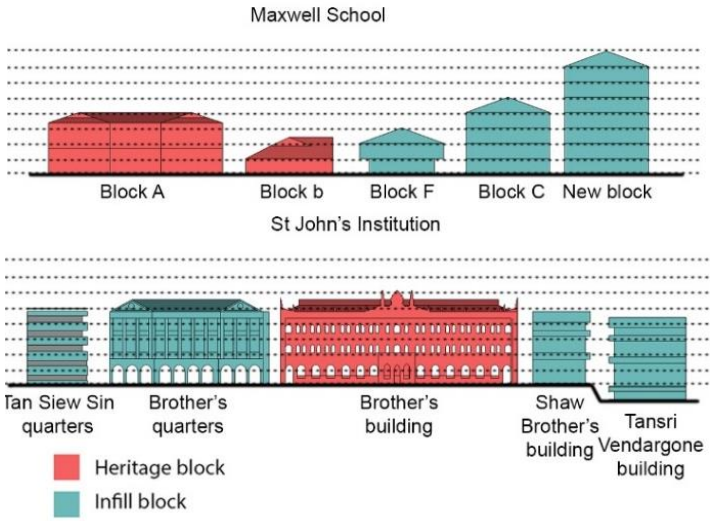

Figure 4: Block massing comparison of SJI and MXS

In summary, heritage building conservation development especially heritage schools faced a multitude of challenges to maintain their heritage significance. There are various factors to be considered which affected the outcomes. These include location of the site, limitation of space, the period of development, the context characters, the technologies of construction and the cost considerations.

Expert Interviews

In the expert interview, two themes of questions were to be answered by the experts. The first theme was about their understanding of architectural design compatibility to the surrounding area and the best infill development approach to

historical site setting. The second theme covered existing policies and guidelines of infill development related to heritage school development in Kuala Lumpur.

The interview results indicate that the architectural design is compatible and in harmony with the site context when the design has a value of 'contextualism' and 'sympathetic' to the site. Both infill design approaches, complementary and contrast approaches, are relevant to be applied in the heritage site setting as long as they respond to the site context, contribute a good impact to the heritage site and fulfil the current needs. In addition, for the infill development that uses the contrast approach, there are four criteria that the development must follow which are: the structure of infill building should be designed in the passive mode, low profile, complementing and do not overshadow the main heritage building. It is to respect the existing historical heritage building, which contributed to the society for so long. Infill block also must not block the majestic view toward the heritage building and does not disrupt the harmony of the site.

Even though the infill is in the passive mode, infill block must have a significant design concept so that it can help enhance the value of heritage site. However, to achieve the value of compatibility to the site context, it does not mean the design of infill block need to replicates or mimics the existing building's. Moreover, every infill development in heritage site must follow the *Garis Panduan Pemuliharaan Bangunan Warisan* (Heritage Building Conservation Guidelines) by the National Heritage Department (JWN) and guidelines of building retention within Kuala Lumpur City Centre by Kuala Lumpur City Hall (DBKL). However, there is no specific guideline for architectural style and feature of a public school. There is only a guideline of spatial programme standard sizes in *Garis Panduan dan Peraturan Bagi Perancangan Bangunan* (EPU) 2015. The policies and guidelines for infill development that involve heritage conservation in Kuala Lumpur generally are well developed and organised but they need to be improved and detailed out on the architectural design criteria for infill development in heritage site.

In terms of the two case studies, the experts were of the opinion that the infill at SJI was better and more sympathetic to the original heritage building compared to that of MXS. While infill in both case studies adopted the contrast approach, the result at SJS has a better contextualism component of development.

CONCLUSION AND RECOMMENDATIONS

There are few conclusion of findings of this study. It found that the external factors do play a role in influencing the heritage school development. Due to this external force of development in surrounding areas the SJI development is more organised compared to MXS. The internal force that influences the infill development are funding availability, construction technology and the time period of infill development. Thus the outcome of the infill development is

influenced by the urban development pressure, site location, development cost and architectural style.

Based on the findings of this research, several recommendations were formulated. These recommendations may also apply to areas with similar characteristics and problems. The recommendation is divided into two sections, which are the recommendation on the internal planning of heritage school and the recommendation on the development adjacent to the heritage school.

Recommendation on the Internal Planning of Heritage School

Ideal Approach to Architectural Infill Design

This study recommends using the *contrast approach* in heritage school infill development. This is to differentiate the old historical buildings with the new infill buildings, to highlight the heritage building and as a compliment or backdrop for the historical heritage building. The building features of infill building design have to be sensitive to the character of existing heritage buildings. The infill building height must be within the range of existing heritage building height, and the building façade colour have to be lighter and 'fade' than the heritage building.

Adjustment to Existing Infill Buildings of Heritage Schools and Future Planning

For the built infill buildings in SJI and MXS, some minor adjustments on the buildings need to be carried out. These are to make the infill building façade look more related to the heritage building. Considering practicality, school operation and the cost of development, the approach proposed is *complementary approach*, in which the large building block or structure that are still in use will not be demolished. The adjustment works can be made either through building façade design features, or the changes in linkage design or roofing design, and building colour.

It is also recommended that future extension or infill development of heritage school can only be developed toward the rear of the school area. No new structure or building blocks should be developed at the front area of the school which will block the view toward the heritage building block. The government should assist the heritage school to acquire the adjacent land to develop new facilities if the space within school compound was limited. Figure 5 shows the recommendation for SJI and MXS for future facility expansion.

A New Guideline for the Need of Significant Architectural Values

The government should add new guidelines particularly for architecture characteristic and style of infill building and development in heritage site where

it must have certain significant architectural values and design direction to enhance the value and ambience of heritage site and building.

Allocating Development Fund for New Development on Historical Heritage Site

The responsible ministry (The Ministry of Tourism and Culture - MOTAC) should intervene any new development that related to the historical heritage matters by providing extra fund and capital to that particular development to ensure the new physical development are not damaging and deteriorating the existing historical heritage building value and image of the site. The fund can be allocated specifically for the façade design of new infill building construction and the improvement of historical heritage facilities and materials. The responsible government bodies such as the National Heritage Department also have to be quick in identifying the potential heritage schools (building and site) to be listed for conservation and gazetted as national heritage.

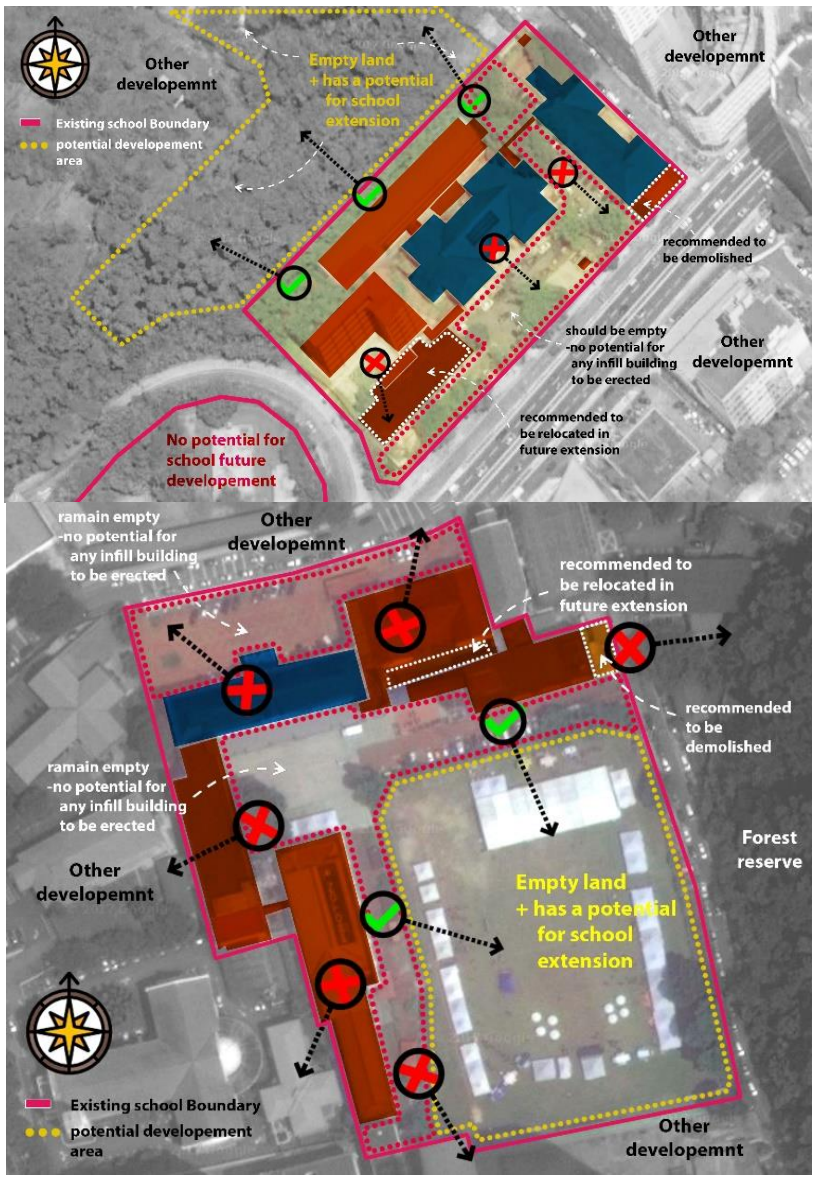

Figure 5: Recommendation of future planning at MXS (top) and SJI (bottom)

Encourage Private Sectors to Adopt Heritage Schools

The government could invite and encourage the private sector to adopt heritage schools. The agreement between the government and the private sector can be made with or without certain profitable interest. Expertise and fund from private sector could help in efforts to ensure future infill development at the schools will not jeopardise the historical value of the schools.

Recommendation on the Development Adjacent to Heritage School

Monitor Design of Adjacent New Development Design

The National Heritage Department and local authority should strictly check and monitor the design of new urban development adjacent to heritage schools, or any heritage sites, to ensure it complies and follows the requirement of conservation guidelines set by government. The new urban development should be sensitive to the existing historical heritage properties. The establishment and interest of a heritage building preservation should not be neglected when it collides with other urban development interest. This is because historical heritage is a national treasure.

Control Height of Adjacent New Development Height

To ensure the historical heritage school building (or other heritage buildings) can be seen from their majestic view angle, new developments that are located within 100meter radius of heritage schools shall not be developed too high to maximise the grand view toward the historical heritage school building. The building can only be erected with a height that is within the height range of the heritage building.

CONCLUSION

This paper has analysed infill development at two heritage schools in Kuala Lumpur. It reviews on the urban infill design approaches in heritage site setting, especially at heritage school, and the related issues. There are two types of architectural infill design approaches that can be applied in heritage site especially heritage schools and both design approaches can be applied as long as they comply with the criteria of a good urban infill development design. The heritage school development and planning arrangement are influenced by the surrounding urban context. Thus, to ensure the sustainability of heritage schools, all related parties should be sensitive and strive to protect and enhance these national heritage treasures.

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GAHAI AGROPOLITAN PROJECT IN ERADICATING POVERTY: MULTIDIMENSIONAL POVERTY INDEX

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Abstract

The planning and development of Agropolitan Project in Malaysia began in 2007 and was aimed at eradicating extreme poverty in Malaysia. This study aims to discuss the design and construction of Agropolitan Project in eradicating extreme poverty among its participants. This study uses the Multidimensional Poverty Index (MPI) found in the 11th Malaysian Plan, which includes the dimension of education, health, living standards, and earning. In addition, this study utilizes a survey involving 45 participants of an agropolitan project from Gahai, Lipis, Pahang. The result shows that only 5 of the respondents fall into the multi-dimensional poverty category, which involves 11.9 percent of the household members. The result of this study shows that the planning and development of Gahai Agropolitan Project, Lipis has succeeded in eradicating extreme poverty among the project participants. Deprivation faced by the respondents based on the MPI analysis can help policy makers in the design and construction of future agropolitan projects.

***Keywords*:** agropolitan, poverty, multidimensional poverty index

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INTRODUCTION

Malaysia's success in eradicating poverty is indeed an amazing feat. However, the phenomenon of poverty is still ascociated with the issue of imbalanced development between the urban and rural areas. At the national level, poverty rate in rural areas is higher than in urban areas, which causes the rural poor to lag far behind in aspects of education, technology, living standard, and social and economic opportunities (Asan, 2008). Therefore, the government has designed and implemented various programs to alleviate rural poverty, including the Rural Mega Leap Program (*Program Lonjakan Mega Luar Bandar* - PLMLB) aimed at eliminating rural poverty by improving income and quality of life and accelerating development in isolated and abandoned rural areas (KKLW, 2012).

The enforcement of PLMLB covers the agropolitan project implemented by the Ministry of Rural and Regional Development (MRRD). To date, in Malaysia, there are 11 agropolitan projects developed since 2007. The implementation of this program enables project participants to earn around RM900 – RM1,800 monthly, thus escaping poverty. Since agropolitan project is a comprehensive development project, it cannot be measured solely based on the Poverty Line Index. Therefore, this paper discusses the planning and the role that the agropolitan project plays in eradicating poverty and measures the poverty of project participants using the Multi-Dimensional Poverty Index (MPI).

LITERATURE REVIEW

The Basic Concept of Agropolitan Planning and Development

The weaknesses in conventional rural development model has led to the development of an alternative rural development program (Buang, Habibah; Hamzah, & Ratnawati, 2011). In 1974, economist John Friedman introduced the concept of agropolitan, which prioritizes developmental planning from the lowest tier which aims to improve the socio-economical status of the rural community. Aside from that, agropolitan also prioritizes the developmental network between urban and rural areas at the community level (Friedmann & Douglass, 1978; Friedman & Weaver, 1979; Douglass, 1981; Hardoy & Satterwait, 1986). Theoretically, agropolitan is a development program aimed at addressing the weaknesses of the conventional development program based on the "*Growth Pole Approach*". This is beacause the conventional development method is mainly a "top-down" approach that prioritizes competition in development rather than cooperation for development (Murdoch, 2000; Akkoyunlu, 2015).

The key features of agropolitan are the intergrated developmental planning which involves a complete physical infrastructure and institution, aside from an optimal resource utilization (Buang et al., 2011). Economic activity around the agropolitan area will contribute to the regional development. This includes access to off-farm, non-farm, and commercial employment opportunities

in the agropolitan area. According to Zulfa, Syamsul, Endang, Tajuddin and Aris (2009), agropolitan is an attempt to establish a developmental model based on "decolonisation", "democratisation", "self-empowerment", and "reaching out". Friedman and Weaver (1978), on the other hand, stated that agropolitan is a paradigm shift that emphasizes the relocation of natural resources production and manufacturing. Now, as an alternative developmental model, agropolitan has become the choice for several developing countries in their rural development plan such as Indonesia, Nepal, and Malaysia (Bishna 1995; Zulfa et al., 2009; Hayroll, Ahmad, Khairuddin, Jegak, & Jeffrey, 2010).

The Role of Agropolitan in Eradicating Extreme Poverty in Malaysia

The planning and development of agropolitan projects in Malaysia focus on the eradication of extreme poverty in rural areas rather than the establishment of an agricultural town as proposed by Friedman (Buang et al., 2011). According to Hayroll et al. (2010), agropolitan aims to eradicate extreme poverty in Malaysia's rural areas. Under the supervision of the Prime Minister's Department, four ministries, including the Ministry of Rural and Regional Development (MRRD), have been tasked to assist the government in eradicating poverty. Out of the 10,000 households categorized as extremely poor, 5,600 have been entrusted to the KKLW while the rest are managed through the economic corridor development projects (Hayroll et al., 2010). To date, there are 11 agropolitan projects developed in five states namely Sarawak, Sabah, Pahang, Kedah, and Perak, known for states having high rates of extreme poverty.

According to MRRD, the Malaysian government has allocated RM960 million for the development of agropolitan projects. The development of these agropolitan projects are managed by various government agencies such as the Federal Land Consolidation and Rehabilitation Authority (FELCRA), Kedah Regional Development Authority (KEDA), South Kelantan Development Authority (KESEDAR), Rubber Industry Smallholders Development Authority (RISDA) and others. In addition, the agropolitan project also focuses on the development of three key components namely physical, economy, and human capital (Table 1). The physical component refers to the provision of basic infrastructure and amenities such as houses, public halls, kindergartens, mosques, business premises, electricity and water supply, etc. The economic component, on the other hand, involves the development of "*Ladang Sejahtera*" with either rubber or oil palm as its commodity crop. The third component is the development of human resources, i.e. the provision of courses and training programs for participants to improve their knowledge and skills.

Table 1: Components of Agropolitan Project Development

Physical	Economy	Human Resource
House	*Ladang Sejahtera*	Religious program
Mosque	Commercial Farm	Family oriented program
Multi-purpose hall		Leadership program
Hall		Entrepreneurship program
Daycare/kindergarted/PPAK		Skills training program
Playground		Educational program
Water supply		
Electricity		
Roads		
Drainage system		

Source: KKLW, 2012

In terms of participant selection, those who are eligible to participate in the Agropolitan Project are households whose earnings fall under the current Poverty Income Line (PLI) and are registered under the hardcore poor (*e-Kasih)* database. Additionally, there are also those who were selected from the state's poverty eradication focus groups. In order to participate in the project, prospective participants must go through three steps, namely the initial name list proposal, the interview process, and the state level focus group consideration before being subsequently accepted as Agropolitan Project participants.

RESEARCH METHODOLOGY

Research Area

This research was conducted in Gahai, Lipis, Pahang, Malaysia. The development of the Gahai Agropolitan Project began in 2007 and ended in 2012. It covered an area of 238.76 hectares, involving 50 participants within the settlements. This project was supervised by an executing agency appointed by the MRRD, namely RISDA. The selection of Gahai Agropolitan Project for this research was based on two criteria. Firstly, because of the poverty issue – the Gahai Agropolitan Project was a poverty eradication project of the state of Pahang, one of Malaysia's state with the highest poverty rate (Economic Planning Unit, 2015). Secondly, the selection was based on projects with a duration of over 5 years that were capable of showing project impacts. The Agropolitan Project was implemented in 2007 and completed in 2012 (KKLW, 2012). Due to the development of over five years, research could be conducted in this area to study the impact of the agropolitan project in eradicating poverty among its participants.

Sampling and Data Collection

This study involves Gahai Agropolitan Project participants. The rational of this selection is that they were involved directly with the project, as hardcore poor

selected to participate in the early stage of the project development. This study uses purposive sampling; this sampling method is able to reach a targeted sample quickly, and proportionality is not the main concern. A total of 45 Agropolitan Project participants consisting of 252 household members were chosen as the sample for this study. The determination of the number of respondents, or sample for this study was based on the number of samples as proposed by Krejcie and Morgan (1970). The data collection was done via in-depth interviews and a questionaire survey which includes the respondent's profile and other questions related to the Multidimension Poverty Index (MPI) such as education, health, living standards, and income. The questions consist of open- and close-ended questions, where all questions have been adjusted to meet the needs of the data form used to calculate the Multidimensional Poverty Index (MPI).

The Application and Measurement of MPI

This study applied the MPI found in the 11th Malaysian Plan (MP-11) (Economic Planning Unit, 2015). Table 2 shows the list of dimensions and indicators stated in the research's MPI. The weight of each indicator is determined based on the number of dimensions and indicators in the MPI. The total weighted amount for the four dimension is 1. Each dimension has a weighted value of 1/4 and this value will be further divided according to the number of indicators. For example, since the education dimension has two indicators, 1/4 will be divided by two, hence each indicator for the education dimension will have a value of 1/8. The weight determination for each indicator is done by assuming that each dimension is equally important in measuring individual poverty. After determining the form and portion of the MPI, the calculation of MPI for each individual is done based on the amount of deprivation of each indicator.

The calculation of MPI for this study is based on Alkire and Foster (2011), and Norzita and Siti Hadijah (2014). These studies outlined the 12 key steps in calculating MPI. The MPI value is the product of two measures: (1) the multidimensional headcount ratio (H), and (2) the intensity of poverty (A). The headcount ratio, H, is the proportion of the population that is multidimensionally poor ($H = q/n$), where q is the number of people who are multidimensionally poor and n is the total population.

$$A = \frac{\sum_1^q c}{qd} \qquad (1)$$

Second, the intensity of poverty, A. The intensity of poverty reflects the proportion of the weighted component indicators, d, in which, on average, poor people are deprived. The deprivation scores for only poor households are summed and divided by the total number of indicators and by the total number of poor persons (Equation 1); where c is the total number of weighted deprivations the poor experience and d is the total number of component indicators considered.

Table 2: Summary of dimensions, indicators, and cut-off line used

Dimension	Indicator	Poverty line Cut-off	Weight
Education	Number of years of schooling	All household members aged 17-60 years old have less than 11 years	1/8
	School attendance	Children between the 6-16 years of age who do not attend school	1/8
Health	Facilities	Distance between home and healthcare facilities exceeding 3 km and no mobile clinics available	1/8
	Clean water supply	In addition to in-house treated water supply and public water pipes/ standpipe	1/8
Living standard	House condition	Old and decrepit	1/24
	Bedroom	More than 2 household member per room	1/24
	Toilet	Other than flush toilet	1/24
	Garbage collection	No amenities	1/24
	Transportation	All household members neither use private transport nor public	1/24
	Basic communication	Do not own a landline or a mobile phone	1/24
Income	Income	Average mothly income of less than PLI*	1/4

*****This study uses Malaysia's 2014 rural PLI = RM840
Source: Eleventh Malaysia Plan (2015)

RESULTS

This section discusses the respondents' profile and the calculation of poverty using MPI. Based on Table 3, the majority of the participants (82.2 percent) were male and the remaining 17.8 percent were female. The breakdown by age of the respondents shows that participants' age between 46-50 years old made up the majority of the respondents with 28.9 percent, followed by participants between 36-40 and 41-45 years old with 22.2 percent each. This is then followed by participants who were 56 years and above with a small percentage of 11.1 percent. The smallest percentage is for participants below 35 years of age, making up a mere 2.2 percent.

The analysis on education level shows that the majority of the Gahai Agropolitan Project particpants have completed their secondary education with 51.1 percent of them having Sijil Pelajaran Malaysia (SPM) while 17.8 percent of them only have a lower secondary level of education (PMR/SRP). Of the total number of respondents, 26.7 percent of them only have primary school education, i.e., the sixth grade. Although this number is quite high, most of them were 50 years old and above. For the number of dependents, the data shows that most of

the respondents have more than four dependents or household members with the highest number of household memberd recorded at 5-6 people per household. Meanwhile, data for respondents with 1-2 household member and 3-4 household member shows values of 11.1 percent and 26.7 percent, respectively.

Table 3: Respondent's profile

Item	n = 45	
	Percentage (%)	Mean
Gender		
Male	82.2	
Female	17.8	
Age		
Below 35	2.2	
36 – 40	22.2	
41 – 45	22.2	(46.22)
46 – 50	28.9	
51 – 55	11.1	
56 and above	13.3	
Education		
Primary school/ UPSR	26.7	
Lower Secondary school/PMR/SRP	17.8	
Secondary school/ SPM	51.1	
Higher secondary: STPM/certificate	2.2	
Number of household members		
1 – 2	11.1	
3 – 4	26.7	
5 – 6	44.4	(5.60)
7 – 8	13.3	
More than 9	4.4	

Source: Field Study, 2017

Table 4 shows the percentage of respondents and the degree of deprivation they faced. The dimension and indicator for Income shows that 4.4 percent of the respondents faced deprivation as their income was below the Poverty Line Income (PLI). On the other hand, the dimension of education shows that there were respondents who were deprived in terms of the number of years of education and school attendance. For the household education indicator, 48.9 percent of the respondents were deprived. Besides, 17.8 percent of the respondents were also deprived in terms of school attendance for household members aged 6-17 years old. These numbers indicate that there were respondents whose household members did not complete the basic number of years of schooling required.

Table 4: Deprivation faced by the household of the participants of the Gahai Agropolitan Project by indicators

Deprivation faced	Number of respondents	Percentage (%)
Income	2	4.4
Family members, Years of schooling	22	48.9
School attendance	8	17.8
Healthcare facilities	0	0
Clean water supply	0	0
House condition	0	0
Number of bedrooms	16	36.6
Toilet	0	0
Garbage disposal	45	100
Basic communication	0	0
Transportation	0	0

Source: Field Study, 2017

For the dimension of living standard, the analysis shows that there were respondents who were deprived in two of the indicators, namely the number of bedrooms and garbage collection service. The result shows that all respondents faced the problem of garbage disposal service indicator. Aside from that, 36.6 percent of the participants were also deprived in the number of bedrooms indicator. For the health dimension, there was no reported deprivation in terms of health facilities and clean water supply.

Table 4 shows the percentage of respondents and the deficiency they faced in the multi dimensions stated, while Table 5 shows the number of deprivation faced by the respondents. To be considered poor in terms of MPI, the maximum number of indicators deprivation faced by the respondents is four. Respondents who experienced deprivation in one or two indicators were the highest percentage at 33.3 percent for both. Meanwhile, deprivation in three or four indicators were at 22.2 percent and 11.1 percent, respectively.

Table 5: Percentage of Gahai Agropolitan Project Household that faced deprivation based on the number of indicators

Number of deprived indicator	Number of respondent	Percentage (%)
1	15	33.3
2	15	33.3
3	10	22.2
4	5	11.1

Source: Field Study, 2017

According to Alkire and Foster (2011), individuals can be classified as multidimensionally poor if they experienced deprivation in more than 1/3 of the total number of indicators found in the MPI. For the purpose of this study, a

respondent is said to be poor when he/she experienced deprivation in four indicators (k=4) or more. Based on Table 5, there were five respondents who fall into the multidimension poor category for experiencing deprivation in four indicators. MPI not only takes into account the number of respondents but also the number of household members. If five respondents were deprived on four indicators, the family members for each respondent were also included in calculating the headcount ratio (H) according to the MPI method. Based on Table 6, 30 out of the 252 household members of the Gahai Agropolitan Project participants were poor with a headcount ratio (H) of 0.119, or 11.9 percent who remained poor after 5 years of the Agropolitan Project implementation.

Table 6: Multidimensional Poverty Index

MPI calculation component	k = 4
Headcount ratio, H (30/252)	0.119
Poverty average (A)	0.333
Adjusted headcount ratio, Mo	0.0396

Source: Field Study, 2017

Another benefit of the MPI measurement is that it not only calculates the poverty rate of the respondents, but also the severity of the situation faced by the household members. To take into account the severity of poverty faced by its household members, the adjusted headcount ratio (M_O) needs to be counted. The adjusted headcount ratio (M_O) represents the share of the population that is multidimensionally poor, adjusted by the intensity of the deprivations suffered. At k= 4, the adjusted headcount ratio (M_o) was 0.0396. Aside from that, at K= 4, the poverty average was 0.333, which means that on average, they experienced a deficiency of 33.3 percent of the overall dimensions and indicators involved.

GAHAI AGROPOLITAN PROJECT IN ELIMINATING POVERTY AMONG ITS PARTICIPANTS

The Gahai Agropolitan Project is capable of eliminating poverty among its participants by improving their income and livelihood. Participation in the Gahai Agropolitan Project has provided them with employment opportunities, i.e. active involvement in *Ladang Sejahtera* (wellbeing farm) and in helping them to generate income. The results of this study show that there were only two or 4.4 percent of the respondents whose earnings fell below the Poverty Line Income (PLI) which is RM840, while the rest earned above the PLI. However, based on the MPI, 11.1 percent of the participants remained poor after 5 years of the Agropolitan Project implementation. They were deprived in several indicators, such as education (in terms of years of schooling of family members, schooling attendence), living conditions (number of bedrooms), amenities (garbage collection), as well as income.

Gahai Agropolitan Project has enhanced the development of the rural hardcore poor community by improving their livelihood. Project participants has enjoyed a much better life since they now own better homes along with complete basic amenities. Human capital development also helped to improve their skills, which makes it useful in their everyday lives. For example, their involvement in entrepreneurship, leadership and skills courses can benefit them in the long run, in terms of widening employment opportunities and access to information and knowledge. Therefore, this project should be continued to remove poverty in total specifically for the Gahai Agropolitan Project.

The success of the Gahai Agropolitan Project in eliminating poverty should be expanded to rural areas particularly in states that show high poverty rate such as Sabah, Terengganu, Pahang and Kelantan. In addition, the selection of project participants should be reassessed whereby participants should not be limited to the extreme poor category alone but also all the households that are categorized as poor. This need is in line with the efforts of the government in eliminating poverty holistically.

CONCLUSION

Since its inception in 2007, participants of the Gahai Agropolitan Project, Lipis have enjoyed a fairly comfortable life through the provision of basic amenities and support in their daily lives. Participants have also earned higher revenue through active participation in the Agropolitan Project. The results of this study show that 11.1 percent of the participants of the Gahai Agropolitan Project experienced multidimensional poverty or only 11.9 percent of the household members remained poor after 5 years of the Agropolitan Project implementation. This clearly indicates that the Gahai Agropolitan Project has been able to eradicate poverty among its participants.

The application of the MPI has been able to provide a more accurate measurement of the participants poverty since it takes into account financial and non-financial aspects, while providing information on the deprivation that the project participants have experienced from the aspects of dimensions and indicators. The deprivation data from the dimensions and indicators are vital to policy makers in their decision making especially in planning and developing future agropolitan and rural development projects in Malaysia.

Additionally, the findings of this study show that future planning and development of the agropolitan project should focus on the dimensions and indicators with the highest degree of deprivation among its participants and their household members, such as garbage disposal facilities, housing, and education. As for garbage collection, since the Gahai Agropolitan Project was located in the rural area, it did not fall under the jurisdication of any urban agencies, and thus such facilities could not be provided to its participants. However, this facilities need to be provided since it is one of the crucial indicators in the Multidimension

Poverty Index as found in the Eleventh Malaysian Plan. Therefore, the proposal for these facilities can be forwarded to the responsible party. Similarly, for other indicators, the necessary step to overcome any shortcomings can be taken since all aspects of deprivation have now been made aware to the policy makers and implementors.

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ASSESSING URBAN PUBLIC TRANSPORTATION INSTITUTIONAL FRAMEWORK IN KLANG VALLEY

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Abstract

This study has a special interest in urban public transportation institutional framework in the Klang Valley, Malaysia. The notions for the topic were developed from issues regarding institutional framework in delivering urban public transportation. Although the current urban public transport in Klang Valley has improved, there are still issues concerning the institutional framework. To date, there is no single regulator or agency with the express and overriding responsibilities for strategic management of the public transport system in Klang Valley. The purpose of this study is therefore to assess the current urban public transportation institutional and governance framework especially towards urban mobility. To achieve this, the study employs the content analysis and case study method, using the purposive sampling approach for expert interviews in gaining the data from participants of related agencies. It examines the importance of public transportation frameworks and present status of current transport development, as well as the roles of urban transportation agencies involved in delivering urban public transport. Results demonstrated that urban public transportation is delivered through multiple agencies with separate roles, not counting the inconsistency of various policies. Hence, the expectation of this study is to suggest practical approaches to improve the current institutional framework of urban public transportation.

Keywords: urban public transportation, institutional framework, governance, Klang Valley

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INTRODUCTION

Issues regarding urban public transportation in Malaysia as reported by many academic researchers, news, agencies and experts in the field have remain as one of the national concerns although the country is heading to becoming a well-developed country by 2020. Trends in urban transportation have constantly changed over the years. Urban dwellers in developing countries require and demand mobility and accessibility at the same rates of growth of these urban areas. Often, this demand is accommodated by the increased number of private vehicles. The traffic issues are always associated with private vehicles especially in developing city such as the Federal Territory of Kuala Lumpur. Development of a country is closely linked with the transportation system facilities and it will have a positive impact on the economic growth and social fabric of a country.

An efficient and a comprehensive network transport system between cities is needed in strengthening the focal points of trade and human. The public perception of the existing public transport system in Malaysia has been declining over the years. The challenges in transforming the public transport system into the mode of choice are not limited in increasing infrastructure and its capacity. The integrated and comprehensive approach is required as it is also about improving the regulatory framework, planning structure and the level of services delivered (Abdul Aziz & Mohd Amin, 2012).

A city like Kuala Lumpur (KL) within the Klang Valley would easily be communicated if the traffic flow ran smoothly and orderly with integration between the public transport systems, and when planning is carried out in accordance with the criteria and guidelines of the existing planning structure (Abd. Rahman & Abdullah, 2016). Cities should be able to provide an efficient urban structure and equitable society which all members can easily gain access to all amenities and enjoy the maximum benefits of city life.

Klang Valley residents, particularly in the City of Kuala Lumpur are expected to reach 10 million people by 2020 when it had attained the status of Greater Kuala Lumpur. This will lead to an increased in vehicle ownership, intensified mobility and accessibility, which potentially result in high urban traffic congestion, fostering travel time, higher demands for parking spaces in city centre and multiplied rates of injury as well as fatality which will all beget to environmental degradation. Hence, many public transport advocators in developing cities would argue for the switch of private vehicles to public transportation to overcome these negative effects of transportation (Economic Planning Unit, 2014).

The context of this paper focuses on the deliverable of public transport management and also on institutional and governance framework for urban public transportation. Institutional and governance framework and their related networks are critical as to how well urban transport infrastructure and services especially on public transport are planned, appraised, delivered and operated.

Well-functioning institutions are essential in creating and maintaining good quality infrastructure and services for urban mobility. The integration of land use and transport planning is also necessary to ensure the efficacy of urban mobility systems (UN Habitat, 2013).

Since transportation infrastructure crosses municipal boundaries, therefore cooperation among federal, state and local government is very important. The public transport planning and enforcement framework are seen fragmented because they involve multiple authorities. All authorities have delivered their large mandates but there is none single regulator or agency with the express and overriding responsibilities for strategic management of the public transport system (Suruhanjaya Pengangkutan Awam Darat, 2012). Currently, there is no single coordinating body for the Klang Valley region or metropolitan region which includes Kuala Lumpur, Shah Alam, Petaling Jaya, Subang Jaya, Ampang, Selayang and Kajang even though the responsibility for transport is shared among various agencies directly or indirectly.

METHODOLOGY

This study focuses on reviewing the concept and practice of urban public transportation management and analysis of the urban public transport institutional framework and governance using content analysis approach. Additionally, it applies case study method to investigate the existing institutional framework for urban transportation and policy, including its delivery and management of public transportation by the government and related agencies in the Klang Valley.

Klang Valley was chosen as a case study because it comprises several cities functioning as satellite city to the capital of Malaysia, Kuala Lumpur (KL). The cities include Shah Alam, Petaling Jaya, Subang Jaya, Ampang, Selayang and Kajang. Klang Valley was also selected because of the challenges it faces to accommodate additional private cars every year with the total cumulative of motor vehicles about 91% of public cars, 1% of public transport and another 8% of others (Ministry of Works, 2014). The upsurge of motor vehicles is faster than the population growth. It was highlighted that Klang Valley requires a suitable and complete network system which provides road accessibility and high quality public transportation service in major routes that provides a seamless transportation system (Abd. Rahman & Abdullah, 2016). In addition, the public transport modal share remains low at 17% as compared to the target of 25% in 2014 (Ministry of Transport, 2014). In supporting the sustainable transport system, these criteria should be emphasised. Hence, the institutional framework structure which encompasses the administration at the federal, state and local levels is crucial in public transport development.

Further to that, the general process of this research contains five stages including preliminary study, literature review, data collection, analysis and findings and recommendation (Figure 1). This research also engaged expert

interviews involving six (6) agencies which are the core agencies in the formation of policy, planning, regulation, implementation and enforcement. The expert interviews exercised the purposive sampling method in selecting the individuals for interviews that are particularly knowledgeable and experienced as participants for the study (Palinkas et al., 2016). Using structured interview, the interview questions were developed consisting of five (5) distinctive parts: Section A- Background of Interviewee; Section B- Background of Agency; Section C- Administration and Policies; Section D- Issues and Problems; and Section E- Suggestion. The data obtained from the interviews were analysed by using IBM SPSS Version 21, as well as descriptive statistics namely percentage and used of mixed method analysis by collecting and analysing both quantitative (closed-ended) and qualitative (open-ended).

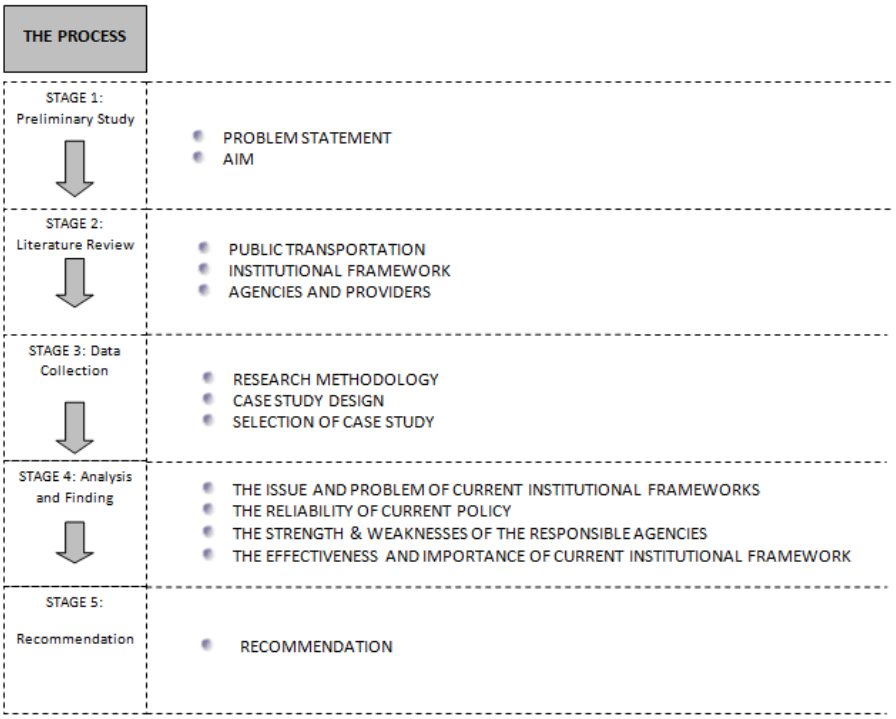

Figure 1: Approach to case study method

DESCRIPTIVE SUMMARY

Urbanization is a key driver of cities' success, but growing challenges in urban mobility threaten to dampen the benefits of cities. In 1985, 51% of Malaysian lived in cities but this had increased to 75% in 2015. Rapid urbanization boosted productivity and access to economic opportunities, raised income and reduced

poverty, but at same time have increased road congestions in Malaysian cities, including insufficient public transit and dissatisfaction of public transport provision (Sander, 2015).

Over the past few years, urban development receives pressure from the economic growth and increasing population growth. Public transport is one of the main problems of the people in cities because it has direct impacts on their daily lives. This is corroborated by the number of articles and news about public transportation published in the media such as Malaysian Digest (2015), TallyPress.Com (2016), The Star (2017) and many more (Abd. Rahman & Abdullah, 2016). A critical issue particularly in the Klang Valley area is the overloading of inward-outwards traffic flow of central Kuala Lumpur that demands for the need of efficient and effective public transport service supply. More than 4 million passengers per week use public transport in Kuala Lumpur and the Klang Valley. It is a concerning pressure towards public transport services and indicates the need for better services (Jaafar, Ponrahono, Bachok, Ibrahim, & Osman, 2014).

Malaysia is also experiencing rapid development in order to achieve *Vision 2020,* thus, an efficient transportation system is needed to enhance the productivity and encourages economic activities, thereby increasing the national output and competitiveness (Economic Planning Unit, 2015). Kuala Lumpur itself is a booming city facing immense challenges in trying to accommodate additional private cars every year and the increased motor vehicles are faster than the population growth (Economic Planning Unit, 2014). The city struggles with air pollution and traffic congestion thus reduces the Quality of Good Life (McKinsey & Company, 2013). It is just not enough to rely on the factors of convenience to encourage the behaviour of using public transport. Individuals, however, still prefer to purchase private car instead of using public transport (Public Transport User Associations, 2010). Public were seen as reluctant of being in a crowded train with strangers (Department for Transport, 2011). It is for these reasons that the policy makers should learn to understand the unique needs of the general public especially in terms of their dependency on private vehicles before committing to new major projects related to transportation.

Public transportation is, therefore, a cornerstone of a nation's economy which provides a transit medium for daily mobility and the link between the people and their jobs, education and entertainment. Service coverage, travel time, reliability, park and ride facilities, comfort and safety are among the determining factors towards encouraging public transportation as a mode of choice (Land Transport Authority, 2014). One of the main causes of traffic congestions in KL is the substantial number of private vehicles with only a single occupant. This happens because of the weakness of public transport system and the problem is generally caused by the lack of coordination between agencies and the lack of integration of public transport services (Abd. Rahman & Abdullah, 2016).

Many agencies that influence or regulate land use have little or no responsibility for mobility policies. The result is a serious institutional land use and transportation disconnection that prevents integrative actions especially in Klang Valley where urban mobility is weak (UN Habitat, 2013). Looking at the Malaysian Government Transformation Programme's (GTP) strategy, the ratio of private and public transport is still below the target with only 12% in 2014 and the government is striving to increase it to 25%, targeting the public transportation as the preferable mode of urban transport (Economic Planning Unit, 2014). The government, with the cooperation of the public, can resolve these issues by improving the driving behaviour, frequencies of public transport services and intensities of buses plying the roads of KL.

RESULTS AND DISCUSSION

The role of institutions in urban public transport is very crucial because cities need transport planning, provision, management and monitoring aspects. The government should provide the enabling frameworks, policies and finances. Not least, urban transport governance is very challenging at various levels; capacity, authority, finances, coordination and so on (Ministry of Urban Development, 2015). Institutions are a set of norms, values and beliefs that have been formed to ensure that targets are achieved while framework is the linkage that supports two or more sub-systems ensuring the easy flow of information or data from one sub-system to another (Wapwera, Mallo, & Jiriko, 2015). Institutions are broadly defined as systems of rules (roles, responsibilities, planning, regulation, service, provision, monitoring and financing) (Figure 2), either formal or informal and those rules define the boundaries of any institution (Ministry of Urban Development, 2015).

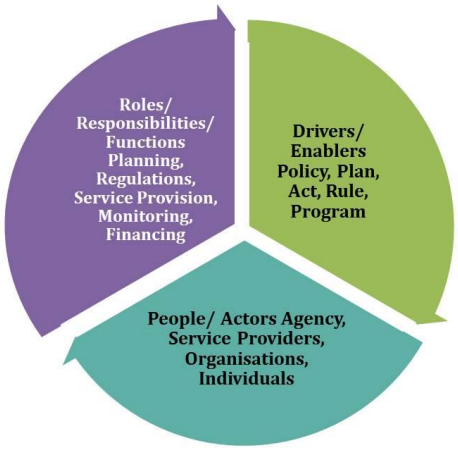

Figure 2: Institutional framework

At present, a range of public and private institutions have their own responsibilities for transportation in the Klang Valley. According to the Land Public Transport Commission (2012), there are many agencies focusing on public transport in Malaysia such as the Prime Minister's Office, Economic Planning Unit (EPU), Ministry of Finance (MoF), Ministry of Housing, Urban Wellbeing and Local Government, Ministry of Transport (MoT), Ministry of Works (MoW), Ministry of Federal Territories, Ministry of Natural Resources and Environment, Ministry of Home Affairs and also the Land Public Transport Commission. These agencies are accountable and form part of the institutional framework for urban public transport in Malaysia whether directly or indirectly.

For now, no single government agency has the authority to plan and deliver solutions for urban mobility across all relevant dimensions (public and private transport mode) and level of government, and administrative geographical boundaries (especially among local authorities and states). The Land Public Transport Commission or known as the Suruhanjaya Pengangkutan Awam Darat (SPAD) has been given the jurisdiction over land public transport only and not including private (car-based) transport planning, which at the national level (federal level) is under the jurisdiction of Ministry of Works. In practice, the overall transport planning between private and public transport is formulated and delivered with limited coordination between agencies (Sander, 2015).

Based on the study, it was apparent that urban public transportation in Klang Valley faces many disputes in relation to its institutional framework, such as discussed below.

Institutional Coordination between Agencies for Urban Public Transportation

The issue of public transportation is related to the complexity of land use and lack of holistic approach in development and planning strategies. Furthermore, lack of comprehensive planning is the key factor which creates connectivity gaps, thus rendering the Land Public Transport (LPT) services as inefficient and not user-friendly. A cohesive effort between the Federal, States and Local Authorities needs to be established and clearly defined roles and responsibilities are critical to ensure a seamless system is put in place (Abdul Aziz & Mohd Amin, 2012).

The development has led to institutional conflicts in several areas especially enforcement, infrastructure provision and use, policy formulation and coordination. Problems of complexity, planning, implementation and enforcement should be viewed seriously because there are different ministries and agencies at the federal and local levels involved in various aspects of public transport in the Klang Valley. It is necessary to create a central responsibility for policy planning and regulatory oversight to achieve successful initiatives (Oni, Okanlawon, & Asenime, 2006). Furthermore, the four (4) thrusts should be carried out especially in ensuring that the transportation efficiency such as

collaborative planning and governance, regulatory strengthening, service quality and excellence and also infrastructure and capacity (Abdul Aziz & Mohd Amin, 2012).

Based on the expert interviews, it was discovered that the lack of foresight on behalf of the government has resulted in a situation where Klang Valley endures high level of car ownership but low level of public transportation usage. A poor public transportation system will only force more people to not choose public transport, more so if they have access to private vehicles. Public transportation in semi-urban and rural areas has suffered the most from these disastrous policies. Worse still is the fact that local authorities have been witnessing this deterioration with the lack of finances and most importantly the jurisdiction to arrest the situation. The poor public transport system costs the Klang Valley people too much.

From the analysis, 80% of the interviewees suggested that the government should focus on coordination between relevant agencies because separate efforts will cause a mismatch and redundancy of services and development. Furthermore, serving the convenient and price point of the public transport is the most important part to shift the culture of high usage of private transport into public transport. According to the World Bank's report, the rates at which roads were being built were unable to match with the expansion rates of car possession. Furthermore, the issue of traffic congestion in Malaysia's cities especially in Kuala Lumpur and Selangor is a result of insufficient public transit as an alternative to car use along with public satisfaction towards public transport are low. These threaten the achievement of public transport usage for Malaysian (Sander, 2015).

The task in transforming public transport in the Klang Valley was led by SPAD in coordination with various agencies. However, lack of coordination among agencies in planning and implementation of various policies and initiatives had resulted in inefficient use of public transport. Although there is an established public transport committee yet there is still a lack of efficacy in carrying out public transport improvements plan. Overseen by different agencies, urban transport planning is not integrated across modes and administrative boundaries. Transport planning does not span to Greater Kuala Lumpur or Klang Valley conurbation, which is often defined differently by different agencies. At the federal level, the Ministry of Transport, Ministry of Works and SPAD are responsible for planning and delivering urban transport (private and public transport) especially at the city level. But in Vancoucer, urban transport planning is done at the metropolitan level (Sander, 2015).

Issues of Policy Implementation for Urban Transportation

Urbanization boosted the economic opportunity especially for big cities and changes the style of development. Road congestions are mainly caused by high

motorization rates and this was proven by the Ministry or Works that car ownership ascends higher annually (Ministry of Works, 2014). The National Automotive Policy does not match with the Eleventh Malaysia Plan (RMK-11), which The National Land Public Transport Master Plan 2012-2030 has set to improve the public transport modal share from 16% to 40% in 2030. Based on the analysis, 60% of the interviewees agreed that relevant agencies should implement the policies formulated and what is needed is that all public transport players commit in delivering good services to the public with continuous improvement and engagement so that relevant agency such as SPAD can start playing a bigger role for policy planning and improvement (Abd Rahman, 2018).

RECOMMENDATIONS

With regards to the results of the analysis, to improve the current institutional framework and transform the planning and delivery or urban transport in the Klang Valley, the government may consider prioritizing the initiatives proposed below.

Establishment of Transport Agency at Metropolitan Level or Regional Level

Successful mobility in cities starts at the very top of the policy-making chain. Government should recognise the importance of urban mobility issues nationally and ensure that they are high up on the policy agenda. It is essential to have a national legal and regulatory framework of public transport to become more viable and stable. Clear roles and responsibilities need to be defined for each stakeholder in the mobility supply chain in delivering real results on the ground. A proposed institutional framework for urban public transportation in Klang Valley is illustrated below (Figure 3):

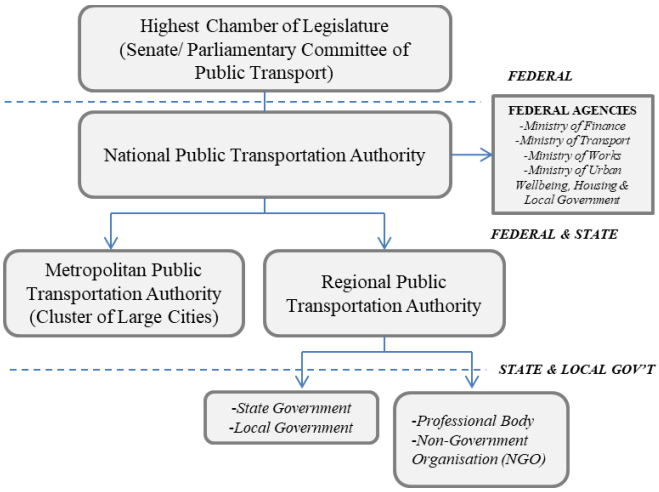

Figure 3: Proposed new institutional framework

Overseen by different agencies, urban public transport is not integrated across modes and administration boundaries. Agencies such as the Ministry of Transport, Ministry of Works and SPAD are the federal level agencies responsible for planning and delivering urban transport at the city level but not in a metropolitan/regional level. This establishment of a new institutional framework can integrate approach towards the policy, planning and delivery of urban transport across different modes and across the administration boundaries.

Policy Alignment and Implementation

Government or agency should emphasized to align all relevant development policies from Vision 2020, National Physical Plan 3 (NPP3), National Urbanisation Policy, Land Public Transport Master Plan, Eleventh Malaysia Plan and also development plans at every relevant city to promote an efficient and effective land public transport. Hence, if we want to achieve a 40% modal share for public transport in urban areas especially in the Klang Valley, the policy makers should therefore focus on major policies. This initiative should consider the transportation infrastructure policy by giving the priority to public transport development and also the land use policy by adopting compact, connected and coordinated cities, in addition to adapting the Transit Oriented Development (TOD) and allowing a maximum plot ratio up to 1:8 for every development that implemented this policy especially in Selangor (JPBD Selangor, 2016).

Based on the analysis, in delivering good public transport services to the public, it should refer to supply and demand system. The government have not encouraged the public enough in using the public transport. It should, at the same time implements policies to support the initiative such as increasing new car price, reconsider when building new road or highways and provide tax exemption for urban public transport (Abd. Rahman, 2018). Furthermore, the government must align all policies to promote public transport incentives to discourage the usage of private transport in congested areas like Klang Valley. By implementing these policies, it will help Malaysia to transform its public transport system and achieve the vision of "Public Transport as Rakyat Choice of Mobility' through physically well connected, affordable and accessible, high level services, convenience, safe, secure, reliable and sufficient information (Suruhanjaya Pengangkutan Awam Darat, 2012).

CONCLUSION

A region like Klang Valley would easily be communicated if the traffic flow ran smoothly and orderly, and when there is integration between the public transport systems. Likewise, this can be achieved through a good public transport planning system and policy implementation through an integrated and across mode and administrative boundaries. Cities should be able to provide an efficient urban structure and equitable society which all members can easily gain access to all

the amenities and enjoy the maximum benefits of city life. Moreover, the implementation of effective public transport system is the key solution in improving people mobility and also to counter the major problem of urban public transportation in Klang Valley. With the right regulatory and institutional framework in place, Klang Valley will have the power to define how they can encourage the people to use public transport and also achieve developing country with efficient and affordable transportation network towards 2020.

Note: During the study, SPAD was still lawful as the responsible commission for land public transport. However, the newly elected government, has announced in June 2018 that SPAD is to be disbanded and replaced by the Agensi Pengangkutan Awam Darat (APAD) or also known as the Land Public Transport Agency. APAD will therefore be responsible in delivering the public transport policies in the country. It is also will be responsible for the planning and development of public transport especially for Mass Rapid Transport (MRT) and Light Rail Transit (LRT). To avoid any conflicts of duties, APAD will have a separate role from the Road Transport Department Malaysia or Jabatan Pengangkutan Jalan (JPJ). JPJ itself will function accordingly based on the Land Public Transport Act 2010. At this point (August 2018), the restructuring of SPAD is still ongoing.

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USE PATTERN AND ACTIVITIES: THE EVALUATION OF MALAYSIAN GREEN OPEN SPACE DESIGN

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Abstract

Numerous studies acknowledged green open space (GOS) as part of the sustainable component which promotes livability and active community. GOS offers the opportunity for people to socialise through appropriate outdoor setting. Acknowledging countless GOS benefits, hence it appears relevant to plan for a good quality of GOS (QGOS). A QGOS ensures park users enjoy maximum utilisation and benefit of outdoor spaces. Having a good QGOS is one of the government strategies included in the 11th Malaysian Plan 2016-2020, to improve people quality of life. Numerous urban related studies had shown that proximity, use pattern, sociability, accessibility and varieties of activities are the significant factors for successful parks design with the consideration of needs and preferences of park users. Hence, this paper will focus on park use pattern to access the quality of the neighbourhood park (QNP) in Malaysia. The objectives are; i) to identify park use pattern among Malaysian, ii) to determine influential factors of Malaysian park use pattern. A quantitative method of questionnaire survey was conducted to obtain the data. Factor analysis results generated from the 1,500 respondents surveyed at 15 Malaysian neighbourhood parks indicated that nature appreciation loads the highest (Eigenvalue = 2.067, Variance Explained = 29.534%), social and active activities (Eigenvalue = 1.270, Variance Explained = 18.137%), followed by passive activities (Eigenvalue = 0.825, Variance Explained = 11.785%). Together, this finding provides essential guidance for park planners to plan for future QGOS and as part of the support to the 11th Malaysian Plan (2016-2020).

Keywords: quality neighbourhood park, use pattern, activities

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INTRODUCTION

Current statistics release by World Health Organization (WHO) indicates minimal level of people involvement in physical activities around the globe. Lack of involvement in physical activities has led to increasing death rate and non-communicable diseases (NCD). Hence, encouraging more people to actively involve in physical activities is included as one of the four global strategies to overcome this shortcoming. In 2015, all countries, including Malaysia, had taken proactive measures by being signatories to the Transforming our World: The 2030 Agenda for Sustainable Development. The Agenda strives to ensure universal health coverage and decreasing health inequities for people of all ages. Apart from that, enhancing people's well being particularly on community health is one of the main strategies listed in the 11th Malaysia Plan (2016-2020).

To date, previous and current studies have been emphasising on the significant benefits of GOS in terms of active participation in physical activities (PA) for all ages. However, GOS offers countless other benefits including health benefits, social sustainability, and environment and psychological improvement (Warburton, Nicol, & Bredin, 2006; Wendel-Vos, Droomers, Kremers, Brug, & Van Lenthe, 2007). Along with these benefits, QGOS is seen as a significant contributor to promote a healthy lifestyle among Malaysian citizen. QGOS encourage active park utilisation through variety of recreational activities. Several studies have documented that maintenance, safety, facilities, accessibility, distance and natural elements are the significant factors that influence park usability (McCormack, Rock, Toohey, & Hignell, 2010; Chen, Liu, Xie, & Marušić, 2016). Moreover, access to parks and GOS brings positive effects to physical, mental health and human well-being (Sugiyama, Healy, Dunstan, Salmon, Owen, 2008; Park et al., 2011; Houlden, Weich, & Jarvis, 2017). However, this paper narrows its focus on park use pattern and activities upon two measures of the user's needs and preferences, particularly in Malaysia neighbourhood park context.

LITERATURE REVIEW

Needs and Preferences Related to Quality Neighbourhood Park

Recent studies on high-quality park have emphasized the essential of park use pattern, perception and user's needs in an outdoor setting (Lee & Maheswaran, 2010; Goličnik & Thompson, 2010). In the past century, the term 'park quality' addressed the relationship between man and space (Carmona, Heath, Oc, & Tiesdell, 2003; Francis, 2003; Ter, 2011). In the 20th century, guided by this concept, parks are designed to offer various recreational activities, with consideration of user's needs and satisfaction. Needs and satisfaction are two essential measures to ensure social sustainability and enhance people well-being through green open spaces (Kweon, Christopher, Leiva, & Rogers, 2010; Hadavi,

Kaplan, & Hunter, 2017). Meanwhile, other studies on parks and green open spaces have also found that people's needs and preferences on activities conducted within the park area influence the level of park utilisation (Iamtrakul, Kardi, Jian, & Kazunori, 2005; Maulan, 2015; Moulay, Ujang, & Said, 2017; Abbasi, Alalouch, & Bramley, 2016; Paul & Nagendra, 2017). Francis (2003) found out that the identification of user's needs helps in the formation of successful green open spaces design and would prolong the time spend in the park itself. Moreover, other studies found that different countries display different needs and preferences (Priego, Breuste, & Rojas, 2008; Schipperijn et al., 2010). Hence, this implicates that the identification of both needs and preference helps designers to ensure good QCOS and generate high park utilisation among users. When user's needs are fulfilled, the level of satisfaction increases.

Parks Usage and Physical Activity Pattern

Prior studies pertaining neighbourhood park usage have outlined several criteria of active park utilisation. Activities conducted, transportation mode, frequency of usage and travel time are among frequently used measures to determine park utilisation (Parks and Recreation Department, 1989; Yuen, 1996; Bahrini, Bell & Mokhtarzadeh, 2017). Indeed, other studies reported that the facilities provided, park sizes and park distance from home profoundly determine park use pattern (Giles-Corti et al., 2005; Kaczynski, Potwarka, & Saelens, 2008). For instance, the closer the neighbourhood area to the park, the more percentage it is likely to be utilised by the residents. However, there are also studies that measure park use pattern by green infrastructure (Mansor, Said, & Mohamad, 2010), park space quantity and quality, facilities condition, social demographic as well as park management (Nasution & Zahrah, 2012).

Additionally, Matsuoka & Kaplan (2008) reported that the outdoor physical setting, particularly nature elements, has a strong influence on the park user's wellbeing and their responses towards the outdoor setting. In other related studies, Hadavi et al. (2017) found that physical activities performed, frequency of walk and visitation are the crucial measures to park use pattern.

Active, Passive and Social Activities

A study conducted by Carr, Francis, Rivlin and Stone (1992) stated that comfort, relaxation, discovery, and user's engagement with the environment are four significant basic needs of people towards open spaces. Passive includes watching people and the surrounding nature. Meanwhile, active activities involve contact with people, socialising and recreational activities. Hari and Kujala (2009) pointed out that social activity occurs when there are at least two or more people connected to each other with interactivity process and encouragement in an outdoor space. Gobster (2002), characterised three types of activities within the outdoor spaces as i) passive activities (PA), ii) active individual (AI), and active

group activity (AG). He further elaborated that passive activities include relaxation, recreation or socialising such as meeting friends, reading and others. Active individual activities include outdoor sports activity done individually such as jogging and walking. Meanwhile, active group activities are similar to the active individual, except it is performed in a group.

STUDY AREA

A total number of 15 neighbourhood parks situated within an urban area in Klang Valley were selected as the study area (Figure 1). The size of each park ranges between 4 to 20 hectares. A total number of 1,500 questionnaire surveys were distributed randomly among the parks users to determine the use pattern of Malaysian neighbourhood park, particularly on the activities conducted.

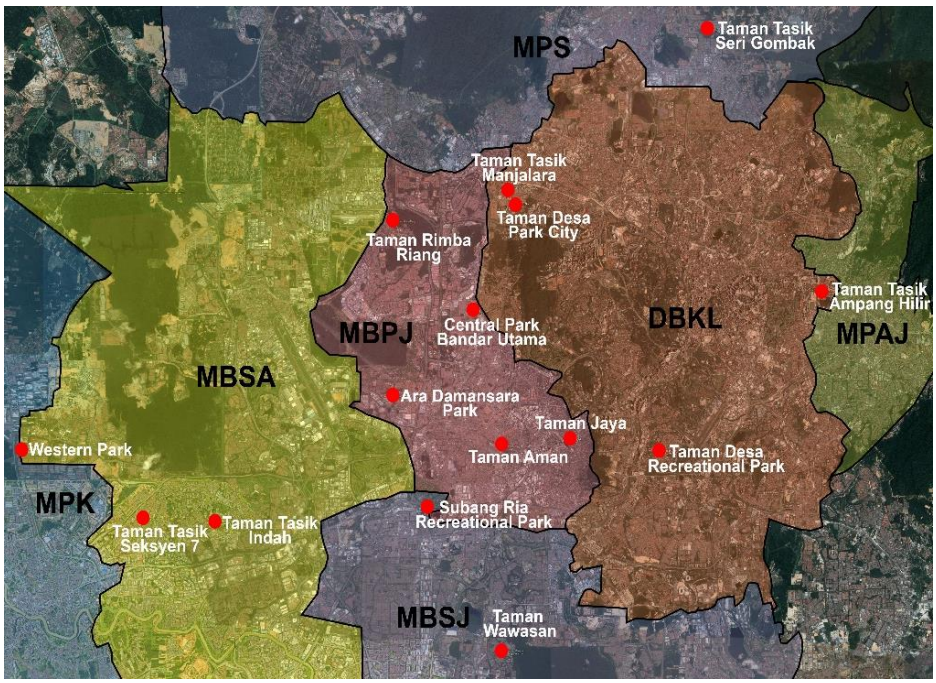

Figure 1: Location of 15 neigbbourhood parks selected as study areas

Factor analysis was computed with principle axis factoring (PAF) using SPSS to answer both objectives of this paper. A series of statistical assumptions were met to ensure data appropriateness for exploratory factor analysis (EFA). Kaiser-Meyer-Olkin (KMO) test determined sample acceptability.

A principal axis factoring was computed using Promax rotation to distinguish the measures of Malaysian park use pattern based on park user's needs. Barlett's test of sphericity ($p = 0.000$) and the KMO measure of sampling

adequacy (KMO = 0.636) all quantified that the data satisfy the threshold for Principle Axis Factoring (PAF) (Table 1). The PAF (with Promax rotation) generated three factors based on Kaiser criterion (Eigenvalue = 1.0). The factors were named as nature preferences (NP), passive activities (PA) and active activities (AA) under park use pattern.

Table 1: KMO and Bartlett's test of sphericity

KMO and Bartlett's Test		
Kayser-Mayer-Olkin Measure of Sampling Adequacy		0.636
Bartlett's Test of Sphericity	Approx. Chi-Square	3978.612
	df	21
	Sig.	0.000

RESULTS AND FINDINGS

Nature Appreciation Associated with Park Use Pattern

The result offers important insights of Malaysian neighbourhood park use pattern where out of three factors generated, nature appreciation indicated the most significant criteria, followed by social and active activities and passive activities. The results shown in Table 2 and 3 below, indicate that sound of water (0.864), the number of trees (0.703), and special events (0.694) are among nature appreciation essential factors for park use pattern in Malaysia.

Table 2: Factor analysis on Malaysian neighbourhood park use pattern

Item	Nature elements	Social & Active Activities	Passive activities	Cronbach's alpha(α)	% of total variance
I do not like the sound of water	0.864			0.790	29.534
I do not like this park as it has too many trees	0.703				
I will only visit the park if some special events are going on	0.694				
I do my jogging here everyday		0.812		0.781	47.671
I only come to this park to meet with my friends		0.804			
I often spend time in the wooded/forest of this park only			0.805	0.695	59.456
I like to fish here			0.670		

Several implications drawn from the findings are; firstly, water is one of the nature appreciation for parks which required certain characteristics. Most of the park users prefer water elements with less sound such as pond or lakes. Secondly, it is essential for parks to have an appropriate number of trees. A possible explanation is that, too many trees will reduce user's visual link from opposite spaces and create sense of enclosure. Indeed, a study conducted by Moulay et al. (2017) on open spaces found that legibility and visibility within park spaces are two essential measures to successful park design in Malaysia. The study further elaborated that too many obstacles such as trees and other objects will delay the visibility process within spaces, hence reduce spatial connectivity. Hence, maintenance, continuous vision, safety and security are part of significant measures related to the theory of defensible spaces for the outdoor environment (Newman, 1972). Bounds (2008) also identified spatial continuity, simplicity, clarity and hierarchy of the elements between spaces as part of the measure of QGOS.

Therefore, the finding indicates that trees location and maintenance are two significant measures in park space design. Other studies emphasised that tree characteristic is another aspect which contributes to park user's safety and security (Mohd. Hashim, Othman Thani, Jamaluddin, & Mohd Yatim, 2016). Meanwhile, Krenichyn (2006) found that majority of female users feel unsafe when utilising dark and enclose spaces.

Natural elements particularly trees are part of the prominent features of successful GOS design (Abdul Malek & Nashar, 2018). Hence, together the findings provide an important insight that, choosing the right trees is a key challenge for park planners and landscape architect in park design. It is because tree characteristics will influence user's behaviour and experience towards outdoor spaces, besides offering recreational opportunities for people to enjoy being outdoor (Rahman, Tuan Hussain, & Mohamad Ismail, 2017).

Activities Related to Park Use Pattern in Malaysia

Different user's have different preferences and needs. The second highest theme extracted was social and active activities (Eigenvalue = 1.270, Variance Explained = 18.137%), followed by passive activities (Eigenvalue =0.825, Variance Explained = 11.785%). Majority of park users in Malaysia prefer social and active activities such as jogging and meeting friends rather than passive activities. The findings also indicate that age strongly influences activities selection. Descriptive analysis computed on age factor indicates that majority of 93% of park users are below 45 years old. Meanwhile, about 17% of park users age from 43 years old and above.

Table 3: Frequency analysis on park user's age

Age	Frequency	Percentage
16-25	643	41.5
26-35	459	29.5
36-45	348	22.4
45 and above	103	6.6

Indeed, this finding is also supported by other studies that suggest it is important for park designers to consider types of activities based on age group factor as it will influence park use pattern (Veitch, Bagley, Ball, & Salmon, 2006; Lloyd, Burden, & Kiewa, 2008; Adams, Harvey, & Brown, 2012). Moreover, a variety of activities offered is one of the criteria for a successful park, where such events will contribute to social sustainability and enhance social interaction through participant involvement.

On the contrary, lack of participant involvement cause challenges for cities to develop a successful park design. This statement is supported by a recent study conducted, which indicates that lack of participant participation, social interaction and common experiences between park users lead to discouraging of social sustainability process and social cohesion (Al-Bishawi & Ghadban, 2011; Harun, Zakariya, Mansor, & Zakariya, 2014). Therefore, it is important for Malaysian park planners to design park spaces for social oriented program or group based activities. Lack of social sustainability among park users is one of the alarming current issues that need to be taken into consideration for future benefits of the society (Neutens, Farber, Delafontaine, & Boussauw, 2013; Feng & Astell-Burt, 2016). Besides, other influential factors such as maintenance, facilities condition and sufficiency are also among successful park planning criteria that need to be taken into consideration (Giles-Corti et al., 2005; Wilhelm Stanis et al., 2009).

CONCLUSION

Figure 2 below shows the summary of park use pattern of neighbourhood park in Malaysia. In summary, the findings shown in Figure 1 provide important information on current park use pattern in Malaysia. The identification on park use pattern will, later on, assist park planners to determine suitable park facilities as well as appropriate design settings which are concurrent to user's needs and preferences. Indeed, it is also evident in other studies that park use pattern is one of the prominent factors to successful neighbourhood park design in Malaysia (Abdul Malek & Nashar, 2018). Park utilisation will increase when user's needs and preferences are met. The findings also support the theory of human needs of open spaces which highlighted two important measures of human needs on nature and recreational opportunities. Therefore, it is hoped that all of the findings

discussed earlier will contribute to planning for better quality of neighbourhood parks, particularly in Malaysian context.

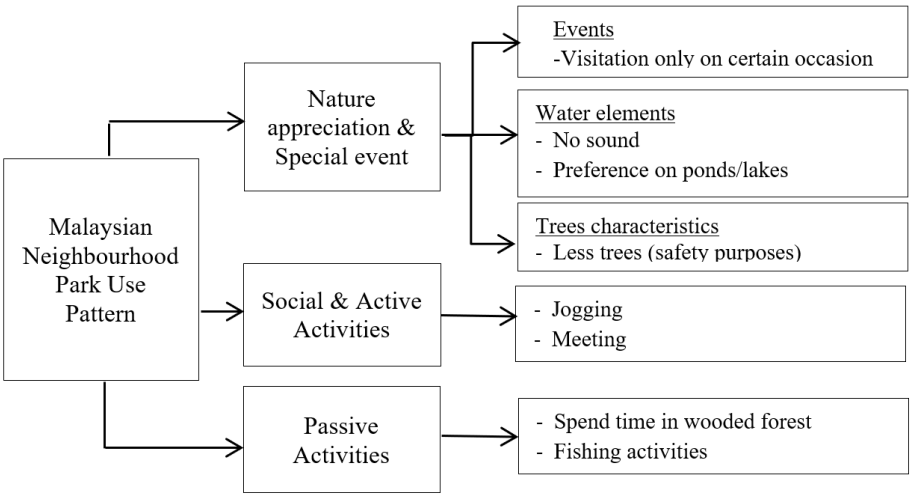

Figure 2: Summary of park use pattern in Malaysia neighbourhood park

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POST OCCUPANCY EVALUATION MODEL: ADAPTIVE MEASURE TOWARDS SUSTAINABLE NEIGHBORHOOD DEVELOPMENT

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Abstract

Sustainable development is key to the strategic sustainability within a society. Sustainable neighbourhood development (SND) is a fundamental element of a sustainable community. However, SND on it own will certainly not permit all stakeholders, particularly the end-users, to efficiently address current or projected future issues that positioned beyond the extent of physical development scope. Thus, this research aims to explore whether pre-occupancy assessment criteria addresses the adaptive measures of sustainable dimension pillars (SDP) upon post-occupancy holistically. The research objective is to identify the post-occupancy sustainable criteria gap of SND. To achieve this, the research applied Stakeholders-Inclusion Approach using Post-Occupancy Evaluation Model (POEM) Handbook as measurement tool. This research seeks to measure and identify SDP gap on economic, social and environmental balance and responsive approach towards incremental improvements in SND at community and individual levels. The findings indicated that there are SDP adaptation gaps in post-occupied SND.

Keywords: post-occupancy evaluation, sustainable dimension pillar, assessment criteria, stakeholder-inclusion approach sustainable neighbourhood development

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INTRODUCTION

ASEAN Scenarios

Since the 1950's, ASEAN region has experienced tremendous levels of urbanization with more than 1,000% increase in urbanisation (Dahiya, 2014). The expansion of city-based economic activities draws human into urban areas and consequently expanding demand for more urban expansion and natural resources consumption. Thus, the urbanization process in the ASEAN region is inextricably linked to economic growth through (rapidly) rising consumption (Dahiya, 2016). This striking rise in the "urban power of consumption" gives impacts at multiple levels. Firstly, it raises the city-based demand for consumable goods and services. Secondly, it increases demand for developed land for residential, commercial, institutional, and other public uses (e.g. transport), along with a plethora of urban infrastructure and basic services. Thirdly, the demand for city expansion at the urban periphery causes an irreversible change in land-use – from agriculture and forests to urban built-up areas – with consequential concerns related to food in-security. Finally, it is quite likely that such a staggering expansion of a "consuming class" spurs demand for private vehicles, which creates an enormous increase in greenhouse gas emissions, with the potential of further exacerbating climate change and its worldwide impacts.

The global greenhouse gas emission statistics by sectors suggests the main emitted gas is carbon dioxide, which made up 70% of total emission (Rauland & Newman, 2015). The main sectors of carbon emission which come from energy and land use manifest in urban development and urban lifestyle (Davies, 2016). Hence, the need to remodel the way of urbanizations either development or lifestyle towards reducing greenhouse gas emission (Ho, Matsuoka, Simson, & Gomi, 2013).

Urban Development & GBC's/GBI's.

Developing an economically productive urban set-up and at the same time sustainable and equally liveable is a world issue. Future projections by 2030 suggest the planet will be a global city and not regarded as global village as previously presumed (Yaman, 2016). Cities and metropolis will be the hub of economic activity and productivity, a centre for human livelihood and economic development. The neighbourhood roles in sustainable cities and as ways to address the UN Sustainable Development Goal No. 11: Make cities and human settlements inclusive, safe, resilient and sustainable, could be achieved via interconnected network of green spaces that helps stop the loss of biodiversity, enabling ecosystems to deliver their many services to people and nature and multiple health benefits (Haase et al., 2017). Urban development should be planned at district or micro level with requiring measurement and benchmark for

it performances. It should be both viable economically and sustainable environmentally, and also socially just.

The concept of greening the neighbourhoods, districts and finally the cities has become momentous challenge. Understanding the criteria frameworks that was learnt from greening the buildings is rightly essential. The ideal green district should emphasize on putting the pedestrian at the centre of planning and designed considerations, while vehicular is regarded as secondary factor (Aghaabbasi, Moeinaddini, Shah, & Asadi-Shekari, 2017). Emphasizing communal walking and cycling distance to access daily need and socially interact is sustainable, the usage of energy is reduced, thus, no greenhouse gas (GHG) emitted to the atmosphere. Community can be connected to nature by accessing to green lungs, such as parks, gardens or playfields. The well-being of the communities is increased through employment and education opportunities within local vicinity, civics engagement and other local amenities (Peters, 2016).

Throughout the region, governments, developers and communities have realized the values of sustainable development, effort need to be consolidated into actions as holistic approach in sustainable built environment, community and economic is rather complex (McGill, Oyedele, McAllister, & Qin, 2016). Green Building Councils/Institutes (GBC's/GBI's) in the ASEAN have recognized the needs of frameworks for sustainable communities, various rating assessment criteria's and tools for sustainable development have been developed and consistently revised. These frameworks have been developed to give clear and consistent direction on sustainable communities. They also act as reference to local authorities with a policy framework, project planning and approval, and for ultimate sustainable development outcomes (Palmqvist, 2015). However, most of the GBC's/GBI's in this region are still lacking on evaluation tools targeting at end-users or households, except Malaysia, Singapore and Indonesia (Table 1), which have pre-occupancy assessment tools (Yaman, Thadaniti, Suntornvongsagul, Adnan, & Ahmad, 2017).

MATERIAL AND METHODS

The Case Study

The case study of this research is certified SND located in the Greater Kuala Lumpur, Malaysia (Figure 1). The certified SND theme is 'the promise of beauty, luxury, nature'. It is an integrated township development in the prime vicinity of Shah Alam, within Greater Kuala Lumpur. This premium urban neighbourhood township development comprises Commercial Centre, 2 phases of landed neighbourhood residences and 2 phases of condominium developments. The green township development plot spread across 60 acres of a freehold prime land. It exudes all the luxury and exclusivity and it is also the first green township in Malaysia that has revolutionized the land-use change of an industrial area into

landscape paradise-like neighbourhood enclave in Shah Alam.

Table 1: Pre-occupancy certification and POEM implementation of SND in the ASEAN region

Country	Pre-Occupancy		Post-Occupancy		Remarks
	Assess. Criteria	SND Certification	Assess. Criteria	Test & Evaluation	
Malaysia Institution: MGBC	GBI Township Assessment Criteria	8 Townships /neighbourhoods -	POEM for SND	3 Townships /neighbourhoods -	Launch in 2011 GBI-TAC Version 1.0
Thailand Institution: TGBI	-Not Available	-Not Available	POEM for SND	1 Township / neighbourhood - Parinyada Village, Bangkok	NO rating criteria for Townships /
Singapore Institution: SGBC)	Greenmark for Districts V2.0	4 Government Land Sales Sites	-Not Available	-Not Available	Launch in 2009, GM for Districts Version 2.0
Indonesia Institution: (GBC Indonesia	Greenship Neighborhood	-Not Available	-Not Available	-Not Available	Green Neighborhood Tools – but no data on certification
Vietnam Institution: VGBC	-Not Available	-Not Available	-Not Available	-Not Available	NO rating criteria for Townships
Philippines Institution: PHILGBC	-Not Available	-Not Available	-Not Available	-Not Available	NO rating criteria for Townships
Cambodia Institution: CamGBC	-Not Available	-Not Available	-Not Available	-Not Available	NO rating criteria for Townships
Laos Institution: No data	-Not Available	-Not Available	-Not Available	-Not Available	NO rating criteria for Townships
Myanmar Institution: No data	-Not Available	-Not Available	-Not Available	-Not Available	NO rating criteria for Townships
Brunei Institution: GBC Brunei	-Not Available	-Not Available	-Not Available	-Not Available	NO rating criteria for Townships

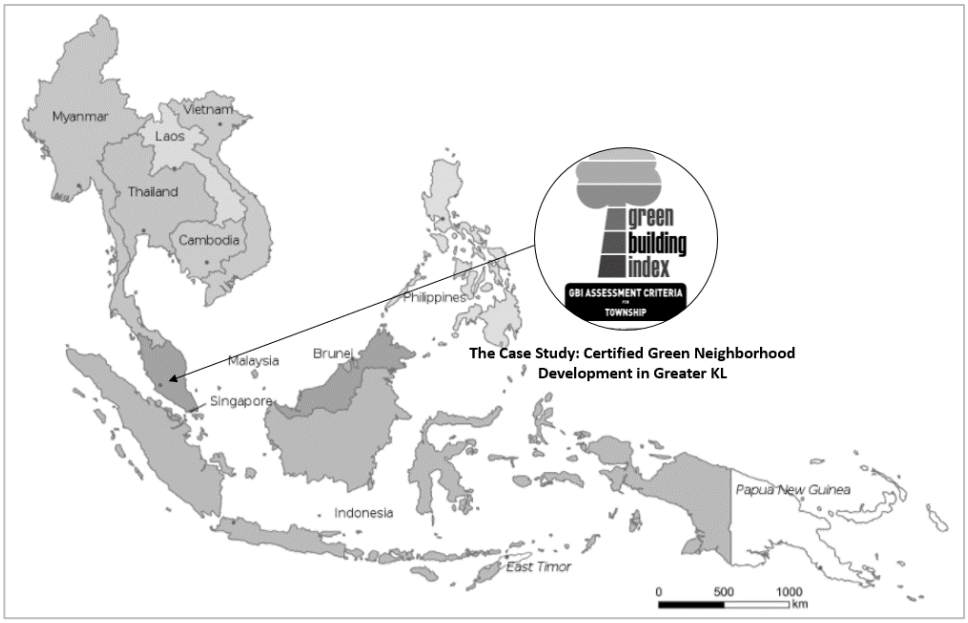

Figure 1: The case study – Green neighborhood development in Greater KL.
Source: ASEAN Map by Wikinews; GBI Township by GBI Malaysia

Research Methodology

The stakeholder-inclusion approached was used in this research in order to gather end-user experience regarding the proposed POEM for Sustainable Neighborhood Development (SND) in ASEAN region. Figure 2 explains the research conceptual framework throughout the study.

POEM Procedures outlines the purpose and process from the perspective of an end-users/households undertaking evaluation process. POEM procedures were developed to find out end-user/household evaluation of SND and its criteria that took place at least a minimum 1 year after occupancy (Yaman, Adnan, Ismail, & Ahmad, 2015). The methodology outlined in POEM Evaluation Guideline was developed as a systematic approach to compare certified neighbourhood outcomes against vision outcomes. The purpose of a POEM Evaluation is to review certified SND outcomes against vision outcomes; disseminate awareness to end-users/households and to inform future review decisions/actions. The POEM process began with identifying the selected case study and the content analysis. Responses from the targeted households of the case study area were collected via questionnaires. The data was then analysed and compared with the case studies pre-occupancy score achieved as baseline. The application of POEM evaluation process may improve the assessment and certification of future sustainable neighbourhood development projects (Figure 3).

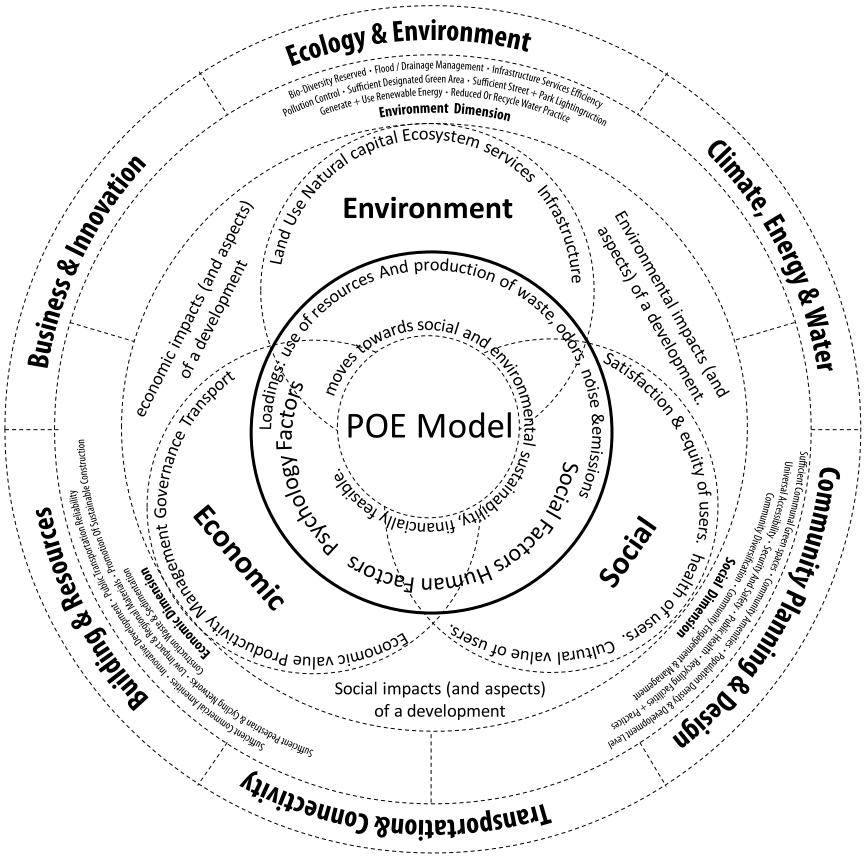

Figure 2: POEM conceptual model
Source: Author, 2017

FINDINGS AND DISCUSSION

As shown in Table 2, the POEM evaluation criteria was categorized into three category, where each pillar consists of 8 evaluation sub-criteria (Environment Dimension Pillar: EnP Q1- EnP Q8; Social Dimension Pillar - SoP Q1- SoP Q8; Economic Dimension Pillar - EcP Q1- EcP Q8).

The results show that one environment sub-criteria, EnP Q5 Bio-Diversity Reserved Availability, scored low at 184/610. Meanwhile, EnP Flood/Drainage Clogging Experience Q6 scored below 50% or failed to fulfill POEM evaluation criteria (304/610). The rest of the environment sub-criteria achieved certified score or 60% (305/610 to 396.5/610) of POEM Evaluation criteria, but none of the environment sub-criteria scored above the certified score.

This study argues that there was low consideration (based on EnP Q5 and EnP Q6 score) to the importance of bio-diversity and flood/drainage systems.

Although these sub criteria represent high significance in Environment Dimension Pillar, there has been low awareness by the developers in conserving or preserving bio-diversity and eco-system. This POEM evaluation also found out that there was still gap in improving green area, efficient public lighting, efficient energy & water practice and pollution control.

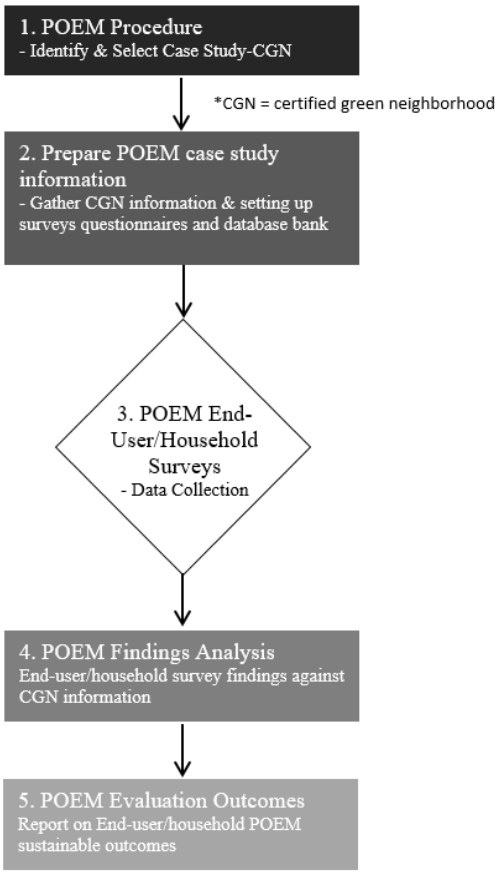

Figure 3. POEM Handbook procedures, evaluation criteria & rating benchmark.
Source: Author, 2017

For social dimension evaluation, none of the sub-criteria scored below 50% or failed to fulfilled POEM evaluation criteria. Most of the score for Social Dimension Pillar was within certified score or 60% (305/610 to 396.5/610) of POEM Evaluation criteria. There were three sub-criteria in Social Dimension Pillar that scored above certified score. These were SoP Q2 Population Density & Development Level (410/610), SoP Q6 Recycling Facilities or Practice (357/610) and SoP Q7 Community Diversification (401/610).

Table 2: POEM Total Dimension Score of the Case Study

POEM Scoring Calculation Master Sheet.				
Q_ No	Criteria Coding	POEM Evaluation Criteria	Available Credits	Scored Credits
Environment Dimension Pillar			Av-Cr	Sc-Cr
1	EnP Q1	Sufficient Designated Green Area	610	311
2	EnP Q2	Sufficient Street Or Park Lighting	610	316
3	EnP Q3	Generate Or Use Renewable Energy	610	315
4	EnP Q4	Reduced Or Recycle Water Practice	610	319
5	EnP Q5	Bio-Diversity Reserved Availability	610	184
6	EnP Q6	Flood / Drainage Clogging Experience	610	304
7	EnP Q7	Infrastructure Services Efficiency	610	368
8	EnP Q8	Pollution Control & Experience	610	307
		Dimension Av-Cr / Sc-Cr	4880	2424
		EnP Dimension Scored Achieved		49.6%
Social Dimension Pillar			Av-Cr	Sc-Cr
1	SoP Q1	Sufficient Communal Greenspaces	610	371
2	SoP Q2	Population Density & Development Level	610	410
3	SoP Q3	Universal Accessibility Availability	610	382
4	SoP Q4	Security And Safety Experience	610	326
5	SoP Q5	Public Health Concerns	610	407
6	SoP Q6	Recycling Facilities Or Practices	610	357
7	SoP Q7	Community Diversification	610	401
8	SoP Q8	Community Engagement & Management	610	365
		Dimension Av-Cr / Sc-Cr	4880	3019
		SoP Dimension Scored Achieved		61.8%
Economic Dimension Pillar			Av-Cr	Sc-Cr
1	EcP Q1	Distance To Community Amenities	610	317
2	EcP Q2	Public Transport Reliability	610	321
3	EcP Q3	Sufficient Pedestrian & Cycling Networks	610	317
4	EcP Q4	Low Impact & Regional Materials	610	210
5	EcP Q5	Promotion Of Sustainable Construction	610	315
6	EcP Q6	Construction Waste & Sedimentation	610	261
7	EcP Q7	Sufficient Commercial Amenities	610	395
8	EcP Q8	Innovative Development	610	368
		Dimension Av-Cr / Sc-Cr	4880	2504
		EcP Dimension Scored Achieved		51.3%
		Total Dimension Av-Cr / Sc-Cr	14,640	7947
		Sc-Cr (72) / Av-Cr (120) x Weighting (100%)		54.2%
		Total Dimension Scored Achieved		54

Based on the end-users/households opinion for Social Dimension Pillar, the overall sub-criteria scored credit achieved was considered good or achieved since the neighbourhood was awarded with 'Certified' certification by GBI Malaysia for sustainable township. In this POEM evaluation, the findings

suggested that improvement can still be made on security and safety of the neighbourhood (based on SoP Q4 lowest score). Additionally, the score of SoP Q6 also suggests that this certified neighbourhood may need a bit more extra effort in improving recycling facilities and practices by the community of the neighbourhood.

Regarding the economic dimension aspects, majority POEM evaluation criteria fulfilled the certified score or 60% (305/610 to 396.5/610) except two. None of evaluation sub-criteria in Economic Dimension Pillar was above the certified score. The two sub-criteria that scored below 50% (below 305/610) or failed to fulfilled POEM evaluation criteria were EcP Q4 Low Impact & Regional Materials (256/610) and EcP Q6 Construction waste & Sedimentation (261/610).

Based on the POEM evaluation, the overall economic dimension sub-criteria scored credit achieved was considered 'achieved'. The exception was EcP Q4 where this criteria was below 'Certified' score, suggesting lacking in optimizing low impact and regional materials in this certified sustainable. Similarly, EcP Q6 score suggests lacking in effort in Construction Waste & Sedimentation. The practical features of 'Australian' louvered windows which allow controllable continuous air flow cross the internal space mentioned in this Neighborhood Pre-Occupancy Sustainable features is the example of out-bound or non-regional materials which was used in this development. Other measures that can be stressed in promoting sustainable economic dimension are further considerations on sustainable transportation & connectivity; and sustainable materials & resources. More efforts can be further highlighted in transportation & connectivity by improving pedestrian and cycling networks and more awareness on materials and resources by promoting construction waste management & sustainable construction.

The overall POEM findings, for this case study was rated as 'Certified' where the total POEM score was 54, the overall dimensions scored credit achieved was considered 'low achieved' since this neighbourhood was also awarded with 'Certified' (50-65 score achieved) certification by GBI Malaysia for sustainable township. This indicates that this case study's post-occupancy score is similar to what it has achieved during planning and completion or during pre-occupancy assessments.

CONCLUSION

POEM evaluation on-site testing of the certified sustainable neighbourhood case study have presented diverse narratives of how sustainable urban neighbourhood / township development has been developed in the Greater KL in the last half decades. The results derived from the previous on-site study pointed out that the selected certified SND have resulted in a rather lower dimension score achieved in post-occupancy evaluation based on end-users/households opinion compared to pre-occupancy evaluation criteria during planning assessment or completion

and verification assessment of SND. The obtained results have established that the certified SND has been evaluated with an adaptation gap and recognition of the three dimensions of the proposed POEM that include different SDP aspects. The difference in score between post- and pre-occupancy evaluation was due to design and planning envisaged functionality were slightly dissimilar from end-users/households perception on the occupied space.

The findings indicate that a comprehensive Stakeholder-Inclusion Approach method in developing POEM for SND (Figure 2), supported by key issues of SDP understanding in sustainability neighbourhood development and guided by clear and comprehensive POEM procedures, can oversee and foster the SND and its communities towards an enhanced, balanced and holistic sustainability in the Greater KL. The results generated in this study have verified that the function and significance of post-occupancy evaluation has become as one of the important issues that should be taken into consideration by the related institutions or authorities in charge for the urban development and community well-being in the urban area. Pre-occupancy sustainable assessment may lay the foundation for the vision of sustainable goals but the sustainable post-occupancy evaluation is the actual measure in rating the sustainability level as it is based on the actual physical built environment instead of on drawings on papers, the actors are real as it engaged all related stakeholders instead of projected statistical numbers of occupants, and finally it also considers the local context of culture, customs and religions.

Thus, this study claims that the adoption and implementation of POEM for SND in the Greater KL will facilitate efforts to enhance the sustainability of current and future urban neighbourhood development by delivering a clear interpretation of the present sustainable dimension of post-occupied development and providing insights towards the forthcoming progression in order to achieve the sustainable urban growth of Klang Valley/Greater KL. There is no doubt that pre-occupancy sustainable assessment criteria is necessary and served its purposes in sustainable urban development. However, the intent of POEM for SND is to further facilitate the continuation and improvement in sustainable urban development be it at individual, community, neighbourhood or township level, it is for betterment in sustainable agenda as whole.

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TEMPORARY PLANNING PERMISSION IN DEVELOPMENT CONTROL SYSTEM FOR URBAN DEVELOPMENT

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Abstract

Planning permission is prerequisite in development control process as it acts as one of the most significant and effective factors that determine the quality built environment and physical planning. This paper focuses on the temporary planning permission, which is a short-term approval and is only permissible for temporary use of land and buildings. The potential advantages of temporary planning permission have yet to be explored by the planning authorities in Malaysia. This study is aimed at exploring the implementation of the planning permission delivery process in controlling the development of land and building on a temporary basis. Thus, the objectives are intended to examine the process and procedure of temporary planning permission for urban development in relation to Act 172, to ascertain the role and function of the local planning authority, and reviewing the provision of law related to the temporary planning permission as in the Act 172. Comparative analysis between Act 172 (West Malaysia), Planning Act (Cap. 232) (Singapore) and Town and Country Planning Act 1990 (UK) in terms of decision making process has been made to explore the best practices in temporary planning permission. This study is anticipated to enhance the temporary planning permission delivery process and the development control system in Peninsular Malaysia.

Keywords: development control system, local planning authority, planning law, temporary planning permission, urban development, urban governance

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INTRODUCTION

Town planning is envisioned in shaping a good quality of living and working environment, to facilitate the economic development, as well as promoting health, safety, convenience and general welfare of the people through development control and the use of land (Hong Kong Planning Department, 2015)(Hong Kong Planning Department, 2015). Town planning key roles are to perform forward planning (for the future), presently controlling the development, and pondering upon the development that has taken place as guidance for current and future gain (Arshad, 2015) (Arshad, 2015) (Figure 1).

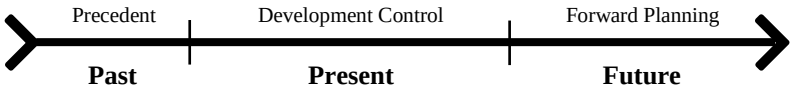

Figure 1: Planning Time-Frame
Source: Adapted from Arshad (2015)

The term 'town planning' itself embraces two important keywords; planning and development. Basically, planning was introduced to assure a good living environment and wellbeing of the people (Zainol, 2009)(Zainol *et al*., 2009). Subsection 2(1) of the Town and Country Planning Act 1976 (Act 172) defined the term 'development' as *the carrying out of any building, engineering, mining, industrial or other similar operation in, on, or under land, the making of any material change in the use of any land or building or any part thereof, or the subdivision or amalgamation of lands: and 'develop' shall be interpreted accordingly*. From the above definition, development can be divided into three categories, which are operational work, material change of use and land matters (Arshad, 2015) (Table 1).

Table 1: Act 172 category and scope of development

Category	**Scope**	
Operational works	• Building • Engineering • Earthwork	• Mining • Industrial
Material change of use	• Physical • Substantial	• Relevant
Aspects in land administration	• Conversion of use • Change of conditions • Subdivision	• Amalgamation • Partitioning

Source: Arshad (2015)

The operational work is defined as any work that involves physical changes and taken place on land and/or buildings (Arshad, 2010), and classified into building works, engineering works, earthworks, industrial works and mining

works. Building works operation is making changes or construction of the structure whichever involves the whole or part of the building and it is either attached or detached to the ground and also including demolition of buildings (Arshad, 2010). However, in Malaysia, the definition of mining work operation is still not clearly specified in the National Land Code Act 1965 (Act 56) and Act 172. Thus, to make it clearer, the definition of mining work operation for this paper is adapted from the Physical Planning and Development Control Act (No. 25 of 2002) (Act 25) of Grenada that defined 'mining operation' as *the carrying out in relation to any mineral or substance (including oil and geothermal energy) in or under the land of any activity with a view in searching for, removing by underground or surface working, carrying away, treating or converting that mineral, and including the removal of beach sand, quarrying, drilling and boring operations*. On the other hand, the material change of use involves a change to the use of land and/or buildings or any part thereof defined by Arshad (2010). The term 'material' can be divided into three; physical, substantial (massive and clear changes to the land and/or building) and relevant (related to planning). Finally, the land administration aspect involves the conversion of use, change of conditions, subdivision, amalgamation and partitioning. In essence, there are five criteria in determining an activity executed or material change as development, and therefore require planning permission (Arshad, 2010) (Table 2).

Table 2: The criteria of development

Criteria	Justification
Type of use	• More relative because the classification is clear and can be distinguished according to the law
Intensification of use	• The situation in which activities or uses being performed as an ancillary or incidental to the parent use
Abandonment	• Comprising the discontinuation of use
Multiple uses	• Consists of more than one ancillary use of parent use
Development unit	• Can be recognized as a single development unit

Source: Arshad (2010)

In planning and development, having an excellent development control system is the key towards the competency of the local planning authority (LPA) in deciding over the physical development of its area. Development control, therefore, is required for every physical development that took place on land and/or buildings. It is a method used by LPA in controlling the development within its administrative area (Zainol, 2000). Hence, it can be said that development control is the process of assessing and processing planning application before granting the planning permission for any land development (Yusup, 2013)(Yusup, 2013).

Planning permission, according to Subsection 2(1) of Act 172, is expressed as permission granted, either with or without conditions applied, to carry out development. It is a legal document issued by the LPA of the area, which allows specific development at a particular site (Leicester City Council, 2015)(Leicester City Council, 2015).

DEVELOPMENT CONTROL: THE INSTRUMENTATION IN DECISION-MAKING PROCESS

The development control approach consists of two main mechanisms, namely statutory and non-statutory planning instruments (Arshad, 2010). The statutory development control mechanisms are formed by the legal provisions and the approval procedures by the authority of the respective areas. It is the gazetted and approved documents according to the legal procedure and usually prepared by systematic procedure and approval period. However, the non-statutory development control mechanisms are the non-gazetted documents exercised for the purpose of the planning and development control. This type of development control mechanism helps in supporting the statutory development control mechanism and facilitates the implementation of development control functions by LPA. This shows that development control can be in various forms of approaches and the main aim is to control the development of land and buildings.

PLANNING PERMISSION: WHY IS IT NECESSARY?

The requirement for planning permission by the Act 172 is spelt out under Section 18 to Section 31A of Part IV - Planning Control. Planning permission can be seen as the process in allowing any activity to take place on land and buildings or to permit any change on the use of land and buildings (Arshad, 2015). The planning permission is indeed necessary so as to control proper development of land and buildings and to implement the proposals of the development plan accordingly.

LPA Roles in Planning Permission Process

The local authority is the lowest level of the government administration system and this position allows them to regulate and monitor the development process within their respective territory (Yusup, 2013)(Yusup, 2013). Subsection 5(1) of Act 172 affirms that every local authority shall act as the LPA within their administrative area. While, any other area that is not under the jurisdiction of the local authority, Section 5(2) of the same Act provides the legislative power to the State Director as the LPA of the area and perform such functions as the LPA as stipulated in Section 6(1) of Act 172. These include to regulate, control and plan for the development and the use of all land and buildings within their respective administrative area. Moreover, LPA also carried out functions like undertaking, assisting in, and encourage the collection, maintenance, and publication of statistics, bulletins, and monographs, and other publications relating to town and

country planning and its methodology. The LPA also perform such other functions as assigned by the State Authority or the State Planning Committee from time to time as well as functions specified in Section 6(2).

Section 4(4) *(aa)* of Act 172 also points out that the SPC is also responsible in regulating, controlling, plans and organises all development activities within the state administrative area. Thus, the role of local authority as LPA is shared or duplicated with the SPC with regard to development control matters. In addition, Section 22(2A) of the same Act states that SPC may request advice from the National Physical Planning Council (NPPC) regarding certain types of development whose planning application are submitted to LPA.

The Planning Permission Process and Procedure

Figure 2 shows planning permission process and procedure as stipulated in Act 172. In short, any new proposed development, either permanent or temporary, must conform to the existing development plan of the area. Irrespective whether or not the plan has been gazette, planning applications must refer to the said development plan. However, the period when development plan has yet to be gazette tend to put the LPA in a dilemma when it comes to deciding on planning applications. The question is how to decide on the planning application at this period of time?

There are several ways in enhancing the decision-making process that can be performed by the LPA which include through the issuance of temporary planning permission (TPP) especially for a short-term time-based development of land and building that may not give obvious impact towards its physical, social and economic aspects of the surrounding area. Alternatively, LPA development control system could adapt to use a non-statutory approach or informal method by creating procedures to formalise the non-statutory or informal instruments such as applying elements of participation, consultations with professional agencies and adoption by the councils.

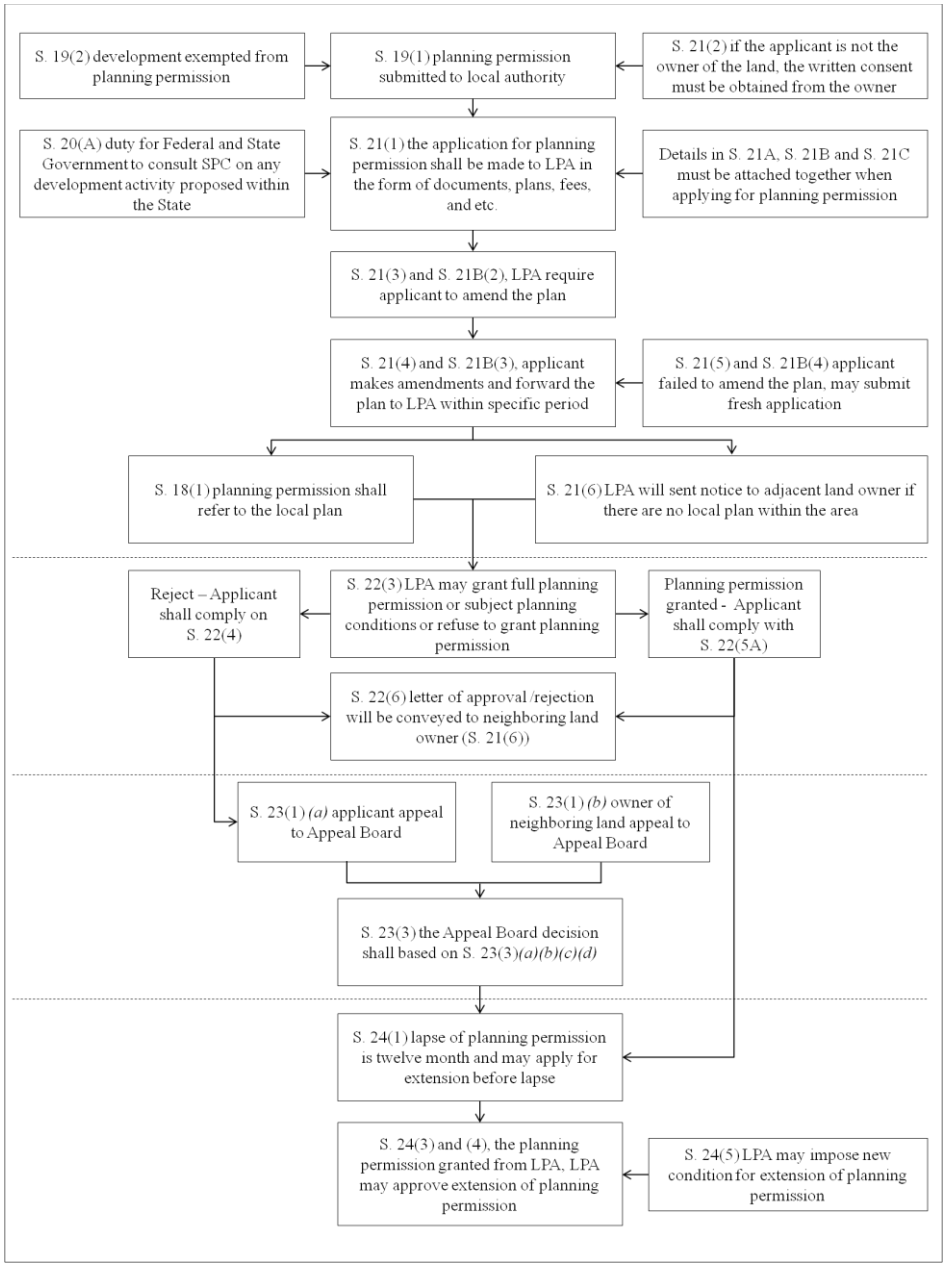

Figure 2: Planning permission process and procedure as stipulated in Act 172
Source: Adapted from Arshad (2012)

TEMPORARY PLANNING PERMISSION (TPP) AND ITS PROVISION IN ACT 172

The temporary planning permission (TPP) is basically a short-term, time-based planning permission, which can be extended or revoked by the LPA at any time which the LPA thinks necessary for the protection of public interest in the area (Arshad, 2015). Usually, the TPP period can be up to a maximum of five years. The approval for this type of planning permission is granted by the LPA for a fixed time period on which it will expire based on the stipulated planning conditions (Arshad, 2015). The LPA may grant the TPP due to the proposed structure or the use of land and/or building is impermanent and the LPA might also remove the structure or stop the use of land and/or buildings when it is no longer necessary(Magrath Insight, 2012). Additionally, the LPA can also grant the TPP if they are uncertain regarding the impact of the use of land and/or building and intended to give the development a 'trial run'(Magrath Insight, 2012). As an example, coastal reclamation can be considered as a 'new land'. After the reclamation has taken place, the area should not straight away be developed with permanent development as the land is still unstable and takes time to be stabilised. Therefore, during that period, the LPA can propose or grant any temporary development on the land as a 'trial run' to see the impact and effect in carrying out development on the land. This 'trial run' also can be an effective way to see the strength, weakness, opportunity and threat of the area in order to plan for a long-term future development.

There are various areas of development or categories of land use and building use that TPP can be applied such as commercial (kiosk, car showroom), industrial (futsal arena), agriculture, residential, recreational, public facilities, public infrastructure (telecommunication tower), utilities, amenities and archaeological site based on its suitability with the requirement where the TPP can be granted. The practical used for the TPP can only apply for development that categorises in the operational works and material change of use (Arshad, 2015).

After independence from British in 1957, Malaysia has opted to adopt the British planning system as primary guidance to develop the nation. There are similarities pertaining to three main aspects of planning system (planning authority, development plan system and development control system) between Malaysia (Town and Country Planning Act 1976) and United Kingdom (Town and Country Planning Act 1990). In United Kingdom, approval of local development order is made by the local authority as stipulated under section 61A of Town and Country Planning Act 1990. Before local authorities granted approval for a development order, the applicants are responsible to carry out pre-application consultation according to section 61W of Town and Country Planning Act 1990. Temporary development order in United Kingdom is to allow flexibility in granting the development order to cope with the complexity of the

development without neglecting the needs of having a conducive decision-making process in planning approval.

The Process of Obtaining Temporary Planning Permission

The process of obtaining the TPP is basically similar to the normal planning permission as in Figure 2 and follows the planning control process under Part IV of Act 172 and other related provisions. The only difference between TPP and normal planning permission are the time and scale of the development that should be allowed by LPA. Even though the TPP is just for a small scale, short-term development, the planning permission for this type of development must abide the same process including giving notice to adjacent landowners, planning appeal, development charge, revocation of planning approval, and planning enforcement. Yet, there is no extensive provision for the TPP mention in Act 172 except in Section 22(5). Further explanation will be described below.

Provision to Use Temporary Planning Permission Based on Act 172

The TPP has no extensive provision stipulated in Act 172 aside from Section 22(5) on the use of planning conditions, which states that planning permission granted on the use of land or building for a limited time and the use of such land and building will be reverted to its original use after the period expires. This is to ensure that the development of such land will be in accordance with the approved layout plan. As so, it is prohibited to carry out any development that may destruct land and environment in terms of physical, natural topography and landscape. The development should be sympathetic and integrated with surrounding architecture. Section 22(6) states that the copy of planning approval must be served to the persons that make objections to the proposed development according to Section 21(6) of Act 172.

Requirements in Submitting Applications for Temporary Planning Permission

The requirements for TPP submission shall be as mentioned in Section 21 of Act 172:

- Layout plans, building plan, elevations, perspectives and etc.
- Planning proposal reports, environmental and social impact assessment
- Internal and external technical departments feed-back
- Supporting letters, power of attorney and documents
- Public and neighbouring landowner objections (Subsection 21(6))
- Processing fees for planning submission

Appeal on the Planning Decision Based on Act 172

The rights for planning appeal as in Section 23 is provided to the statutory person to forward an appeal to the Appeal Board, which are either the applicant of the planning permission or the rightful person that make objections under Section

21(6) who are upset by the decision or the condition imposed by the LPA. The Appeal Board shall hear the appellant and the LPA regarding the appeal and make a decision. The Appeal Board shall make decisions either by accepting the LPA decision and reject the appeal; allow the appeal and request of the LPA to grant approval or comply with conditions decided by the Appeal Board; allow the appeal and revoke the planning approval; allow the appeal and request the LPA to delete or amend the planning conditions or replace with conditions set by the Appeal Board.

Revocation of Planning Approval

The revocation or modification of the planning permission and approval by LPA usually being executed based on reason of public interest such as infrastructure development (highway, railway, etc.), which benefitted the public more than the individual or a small group of interest. The process of revocation is specified in Section 25(1) to Section 25(8) of Act 172. In overall process of revocation or modification, Section 25(9) states that any person that is upset by the amount of any reimbursement or compensation offered or paid, the respective person can appeal to the Appeal Board and the Board is responsible to assess the amount that shall be paid.

Requisition Notice

Requisition notice can be issued by the LPA or the owner of the land as in Section 30 of Act 172, based on the relevancy of the purpose of the requisition notice presented. Still, a person that aggrieved by the requisition notice submitted, with manners, shall appeal to the Appeal Board and then the process will go through as in Subsection 30(3) to Subsection 30(8) of Act 172.

Planning Offences

The categories of planning offences are highlighted in Section 26 to Section 29 of Act 172. The offences include development that is not in accordance with the local plan of the area, development being carried out without obtaining planning approval from the respective LPA of the area beforehand, development undertaken is not in accordance to the planning approval, carrying out development with approval being revoked, and development undertaken does not comply with the amended approval.

Decision-Making in Granting Temporary Planning Permission in Act 172, Planning Act (Cap. 232) and Town and Country Planning Act 1990

Section 22 of Act 172 provides on the treatment of applications. The LPA shall grant the planning permission within the capacity for its local authority area. However, in certain situation, the LPA needs to seek advice from the SPC and the NPPC regarding the application submitted, before granting or rejecting the

application. The approval must be in accordance with the local plan of the area and if the proposed development is located in the area that has no local plan, the LPA shall notice the owners of the neighbouring land regarding the proposed development and the owners has the right to object, thus Section 21(7) applied. In addition, certain planning application may require following procedures according to Section 22(2), (2A) and (2B) together with the specified planning conditions as in Section 22(3) to Section 22(6).

In Singapore, the decision in granting the TPP falls under the jurisdiction 'competent authority', with the TPP provisions are set out in Part III: Development and Subdivision of Land of the Planning Act (Cap. 232). For the UK, it is the LPA who is responsible in granting TPP in accordance to the provisions under the provisions of Part III: Control Over Development of the Town and Country Planning Act 1990.

Instruments Use to Grant Temporary Planning Permission

There are several instruments that can be used as medium and guidance in granting TPP. These include the existing policies and local plan of the area, compliance to planning standard, use class order (land and building), notice to adjacent landowners as pointed out in Section 21(6) of Act 172 (if applicable) and informal discussion by the LPA related to the planning application submitted.

Similarly, numerous instruments can be used under Planning Act (Cap. 232) to facilitate the process of TPP including obligation toward the provision in Master Plan and temporary levy as stipulated under Section 40(A). This section explains the needs of applicant to pay to the competent authority a tax known as temporary levy in respect of every development of land authorised by any planning permission or conservation granted for a specified period of 10 years or less.

In the UK, according to the Town and Country Planning (General Permitted Development) (England) Order 2015, Schedule 2, Part 4 Class D, "development consisting of a change of use of a building and any land within its curtilage; (a) from - (i) a use falling within Class A1 (shops), Class A2 (financial and professional services), Class A3 (restaurants and cafes), Class A4 (drinking establishment), Class A5 (hot food takeaways), Class B1 (business), Class D1 (non-residential institutions) and Class D2 (assembly and leisure) of the Schedule to the Use Classes Order, or , (ii) a use as a betting office or payday loan shop; - (b) to a flexible use falling within Class A1 (shops), Class A2 (financial and professional services), Class A3 (restaurants and cafes) or Class B1 (business) of that Schedule. A temporary development order may be granted for a single continuous period of up to two (2) years beginning from the date the building and any land within its curtilage began to be used for the flexible use on the date given in the notice under paragraph D.2(a), whichever is earlier.

Measures to Grant Temporary Planning Permission

In granting TPP for any development of land and buildings, there are numerous aspects that need to be taken into consideration. Even though the TPP is just a short-term time-based development approval, it could have the possibility to affect the surrounding areas at an unpredictable time. There are possibilities of impact on planning standard and guidelines, existing and planned land use, local economy, the general public and socio-cultural, existing buildings, roads and traffic system, ecosystem and infrastructure and amenities.

According to Planning Act (Cap. 232), power to make rules relating to temporary development levy is provided under section 40D. The minister may make rules and for any matter which is required under this part to be prescribed and, in particular, for or with respect to all any of the following matters, including; (i) rates and methods of calculation; (ii) exemption of any particular development or class of developments from being subject of any temporary development levy; (iii) deferment of liability to pay any temporary development levy; and (iv) the refund, wholly or in part, of the temporary development levy paid by any person. This practice allows balance of power amongst the government authorities in the process of development control. Strict rules and regulations are needed to avoid any possible misconduct by both authority and the applicant in order to ensure effective planning control in Singapore.

Pre-consultation as in section 61W in Town and Country Planning Act 1990 requires the application to be informed to relevant stakeholders to ensure thorough process in issuance of TPP. Additionally, section 62 further strengthens the power of LPA as responsible authority in facilitating the whole TPP process. This section elaborates the need of applicant to obligate towards the rules and regulations made by the LPA as part of stringent decision making process.

Determination of Time Limit of Temporary Planning Permission

Normally, the granting of TPP is based on the circumstances and considerations including existing planning policy, nature of the development activity based on time-frame, stipulated planning condition, a breach of the building use and the planning enforcement. Whereas, determination of time limit of the TPP is based on considerations such as the reversion to its original use, revocation of planning approval and the extension of planning approval (LPA may impose new planning condition and fees). For instance, Subang Jaya Municipal Council (MPSJ) imposed a maximum three-year limit for each TPP it approved. The decisions were made based on case-to-case basis and LPA has full jurisdiction over the decision on granting the planning approval subject to compliance to the rules and regulations made by the LPA.

The limit for TPP in Singapore is 10 years. Section 40C explain the meaning of temporary planning permission as “a planning permission or conservation permission granted for a specified period of 10 years or less”. Also,

the Minister may, in his discretion and subject to such terms and conditions as he may determine, remit, wholly or in part, the temporary development levy payable by any person if he is satisfied that it is just and equitable to do so.

Use of Planning Conditions

The use of comprehensive planning conditions by LPA is important to help in enhancing the efficiency of the current planning approval conditions. The criteria of planning conditions comprise:

- Necessity – consideration of the current and future demands and needs;
- Relevancy – pertinent to the current situation and conditions;
- Precision and clarity – transparent and understandable by people affected;
- Justice – seek fairness in every aspect of the decision-making process;
- Reasonableness – practicable, and
- Enforceable - long-term implementation.

CONCLUSION

TPP allows flexibility in the physical development, and undeniably required in the present planning and development control process as it is an important element in the urban planning system. It is, therefore, important that provisions regarding TPP in Act 172 are expanded in detail especially regarding time frame, type of development, development fees, and so on. The provisions related to TPP are also important for the purpose of planning legal system. The process and procedures, the process of decision-making, the use of formal and informal instruments and other measures need to be considered and should be uniformly formulated to be implemented by the LPA. Systematic and formal TPP process and procedures is an important measure that can help improve the competency of the delivery system of local authority in the development control process, particularly on submission for planning approval.

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LOST SPACE IN URBAN CORE AREAS OF KUALA LUMPUR IN RELATIONS TO PHYSICAL URBAN ENVIRONMENT

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Abstract

The process of urban development today treats buildings as isolated objects, not as part of the larger fabric of streets, squares, parks and viable open space, and without an understanding of human behaviour. What emerges in most environmental settings is unshaped antispace. The essence of this research seeks to establish a better understanding towards the local perception of lost space in the urban core areas of Kuala Lumpur and identify the appropriate tools to improve the usability of the space. The research has been designed with the aim of seeking effective ways of designing a space in the urban core to minimize the undermanaged space. For this reason, the research focuses on the definitions and characteristics of lost space before the process of designing the space. A qualitative analysis is made on selected parameters in the theory of lost space by Trancik (1986); activities, accessibility, connectivity, maintenance and design aspect. Through a qualitative approach, the result indicates that there were various new perceptions of descriptive lost space includes economic and social activity, connectivity, and accessibility as these are an important strategy for maintaining the vitality and robustness of urban space. It is proposed in this paper that more attention should be given to urban areas to continue to give cities' life and vitality, and the most significant result is to achieve holistic sustainable planning and management of urban space.

Keywords: lost space, environmental settings, local perceptions, vitality

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INTRODUCTION

In most of the cities today, designers are faced with the challenge of creating holistic environments in an urban core particularly as collective, unifying frameworks for new development (Krier, Ibelings, Meuser, & Bodenschatz 2006). Too often the design's contribution becomes an after the fact cosmetic treatment of spaces that are ill-planned for public use in the first place. The process of urban development treats buildings as isolated objects, not as part of the larger fabric of streets, squares, parks and viable open space, without considering the relationship between buildings and spaces, and understanding of human behaviour (Loukaitou-Sideris, 1996; Carmona, 2010). Hence, what emerges in most environmental settings today is unshaped antispace. It is centred on the concept of urbanism as an essential attitude in urban design, favouring the spatially connected public environment over the master planning. This approach knows for making figurative space out of the lost landscape. Architects, urban planners, urban environment, and landscape architects have a major responsibility to meet the challenge and to reintegrate the lost spaces in the urban core into the effective urban fabric.

According to Trancik (1986), lost space is a leftover unconstructed landscape. They are the undermanaged areas between districts, buildings, or roads emerge without anyone realizing it until its being done physically on the ground. It is the undesirable urban space that is accidentally formed during the planning stage (Sommer, 1974). In other words, lost space can be seen as an inadequate use of space in urban area, isolated from the walking flow (Montgomery, 1998 and Tibbalds, 2001). It is abandoned and left area that has lost their functions (Franck & Stevens, 2006). Trancik (1986) notices that space such as a park can be considered as lost space if space does not serve its intended purpose. Lost space becomes a place when it is given a contextual meaning derived from cultural or regional content (Azhar & Gjerde, 2016). Therefore, in the effort to recapturing the lost space and imbue it with a sense of place, designers need to focus on the needs and wants of the users.

Mobility and communication have increasingly dominated Kuala Lumpur, which has consequently lost much of its cultural meaning and human purpose especially today, the spaces between buildings are rarely designed. The results of this can be seen all around us. The disjointed lacking visual and physical coherence in Kuala Lumpur has resulted to the more utilitarian in their organization, the notion of function was gradually displaces from the external space to the organization of internal space. A building tended to become more of an object, separate from its context.

Under the logic of lost space and how the theoretical understanding contributes to user perception, this research attempts to seek a better understanding towards the local perception of lost space in the urban core areas of Kuala Lumpur and seek the appropriate tools to improve the usability of the

space. The aim of the study thus was to implement a methodology: (i) to define lost space in the context of urban space in Kuala Lumpur, (ii) to identify the factors contributing to lost space, and (iii) to recommend several effective approaches to improve the usability and redesigning lost spaces that have emerged over the last two decades.

For that reasons, 10 respondents were interviewed, as the samples in qualitative research as are often small. Their responses and understandings as the end users help the contribution to design the efficient urban space that incorporates respondents' value meaning.

A THEORY OF LOST SPACE

Since 1986, many scholars began to study a particular kind of lost spaces and provided many definitions and suggested several interpretations such as loose space, cracks, vacant, in-between, transitional, liminal, neglected spaces, deteriorated and indeterminate space (Figure 2.1). Trancik (1986) first used the term of lost space to describe spaces that are in need of re-design, antispaces, making no positive contribution to the surrounds or users. According to Trancik (1986), lost space is a leftover unconstructed landscape or under managed space. It is the undesirable urban space that is accidentally formed during the planning stage (Sommer, 1974).

Table 1: Definitions of lost space

Year	Scholars	Terms	Definitions
1974	Sommer	Tight space, hard space	Offerings possibilities for different activities, unrelated to the original designed purpose for a particular space.
1986	Roger Trancik	Lost space	Space that makes no positive contributions to the surrounding and people.
1996	Loukaitou-Sideris	Cracks in the city	Spaces that are abandoned and left deteriorate, which eventually be filled with trash and human waste.
2001	Hajer & Reijndorp	In-between spaces	As an ephemeral object, a site – yet not only space, but also a possible future, and disparate activities.
2007	Franck & Steven	Loose space	Spaces that only allows certain regulated activities, unrelated to the original designed purpose for a particular space.

Lost space can be car parking, the edge of highways which are being planned without maintenance and management, the base of high-rise tower, abandoned waterfronts, unused sunken plaza, vacated military sites and deteriorated parks (Trancik, 1986). Trancik (1986) argues that the blame for

creating lost spaces lies squarely with the car, urban renewal, the privatization of public space, the functional separation of uses and the modern movement.

In placing more emphasis, lost spaces or leftover spaces are mostly found in between two buildings, in front, at the sides or at the rear of buildings, and rooftops. These spaces loss their values and meanings, functions and a sense of belonging. Leftover spaces, usually publicly owned but without any assigned function, are often located right next to spaces with fixed and restricted functions (Franck & Steven, 2007). Examples include the spaces under bridges and next to highways. These exist beyond the boundaries of organized social space, having no intended use and often lacking conventionally appealing features, as shown in Figure 1.

Figure 1: The underutilized spaces in urban areas that accommodate unexpected and unintended activities.
Source: Azhar & Gjerde (2016)

Tibbalds (2001) argued that public space is too often littered, piled with rotting rubbish, covered in graffiti, polluted, unsafe, congested by traffic, full of mediocre and ugly poorly maintained buildings, and populated at night by homeless people living in cardboard boxes. What a failure to deal with minor signs of decay within an urban area could bring a rapid spiral of decline. Tibbalds (2001) advocated the use of good design as a means to reverse the issues of a threatening and uncared for public realms, and also identified the vital role of public space management – caring about litter, fly-posting, where cars are parked,

street cleansing, maintaining paved surfaces, street furniture, building facades, and caring for tress.

Loukaitou-Sideris (1996) writes about 'Cracks in the City' and define cracks as the 'in-between spaces, residual, under-utilised and often deteriorating'. She thus argues that poor management is also to blame for the state of many plazas, car parks, parks and public housing estates, where abandonment and deterioration have filled vacant space with human waste and trash.

Figure 2: Neglected space filled with trash
Source: Carmona (2010)

What are the best characteristic to describe the factors contributing to lost space? According to Trancik (1986), there are four (4) major factors contributing to lost space, which are (i) increasing dependency on the automobile, (ii) modern movement in design, (iii) land use zoning policies, and (iv) unwillingness of institution to assume responsibility for the public realm.

The increasing automobile dependency has caused the city form to change from time to time. Streets are no longer essential urban open spaces for pedestrian use. Open spaces are slowly replaced by highways, thoroughfares, and parking bays which are consider as predominant types of open spaces in the modern urban planning perspectives. These highways, parking bays and similar to it cuts through cities and created huge areas of lost spaces.

The modern movement has created buildings more practical and functional in their organization, spaces between buildings are rarely taken into consideration as architects and planners tends to make building as a formal object separated from its context. Architects and urban planners in the twentieth century failed to understand the needs and desire of pedestrian towards a space (Tibbalds, 1992). This has resulted what once used to be external space of an organization gradually turns into private internal space of the organization (Peterson, 1980)

As mentioned by Trancik (1986), the zoning policy was initiated by the planners with the purposed to promote health, safety and social welfare through the segregation of land uses. However, the zoning policies adopted hardly take consideration towards the spatial structure and community existence. The value imposed by zoning has rejected the elements of old town that were built around a network of street-level public spaces in response to traditional planning. This has resulted towards an increasingly unliveable environment, vehicular and pedestrian system became confusing, the relationships of building and public spaces were ignored, and undeveloped spaces were turned into parking lots. Zonings has subdivided cities into homogeneous districts, and created a major lost space in the urban fabric.

The privatizations of public spaces are closely related to the modern architectural movement which does not pay much attention to the public realm. The framework of common public realm concern has lost along the way of modern architectural movement, the minimal investment in maintaining public spaces and lack of interest in controlling the physical form and appearance of the city has created monumental problems for not only the public spaces in the city but also the image of the city.

ANALYSIS AND DISCUSSIONS

Analysis sections were divided into three (3) stage; (i) stage 1 Analysis of relationship between the characteristics of lost space and the physical setting, (ii) stage 2 Analysis of Characteristics between prescriptive and descriptive lost space, and (iii) stage 3 Analysis of prescriptive vs descriptive lost space. Prescriptive lost space refers to the definitions as explain in the theory of lost space, and using codes and themes to group the definitions, while descriptive refers to local perceptions that may contrast with the definitions by theory. Both descriptive and prescriptive reflects the question how theoretical approach of lost space may differs how local perceive and understand the lost space.

The Relationship between the Characteristics of Descriptive Lost Space and the Physical Urban Environment

In this analysis, the physical urban environment, such as streets, public spaces, parks, government reserve, buildings and parking, has unique characteristics needed in enhancing its quality. Physical settings in the urban area become a part of city attractiveness elements because of its ability to attract newly-emerging businesses and social interactions. In particular, not only the city but the people have recognised that attractive physical settings of the city can enhance city uniqueness and improve urban environment.

The results found that there are three (3) most characteristics mentioned by the respondents; social activity, economic activity and design (Table 2). Cafes, buskers, picnic, exhibitions, music festivals, and other events are types of social

activities identified by the respondents. If space was poorly managed and declined either physically, or in the activities (social, cultural and economic) it offers, the vicious cycle of decline may all too easily set in. Carmona, Heath, Oc and Tiesdell (2010) describe "if people use space less, then there is less incentive to provide new spaces and maintain existing ones. With decline in their maintenance and quality, public spaces are less likely to be used, thereby exacerbating the vicious spiral of decline".

The second characteristic of descriptive lost space as perceived by the selected members of the creative class is economic activities. Retail locations, restaurants, cafés, street food stalls, are some of the economic activities that were identified by the respondents. The third characteristic of descriptive lost space as perceived by end users' is the connectivity. According to the respondents, connectivity refers to the relative location and types of elements in the physical setting. Connectivity also refers to the availability of public transportation in the area. Accessibility, according to the respondents, refers to safety, convenience, and permeability. Some respondents have been denied access to it, prominent among which are the rich, elderly and youth. Exclusion of fear and inability to consume, the most written about being sporting and skateboarding, which is regarded by some as anti-social because of the conflict it creates with other groups. In such places, youth experience problems of safety and security and feelings of exclusion, while what they desire in a public space is social integration, safety and freedom of movement. All these describe failures to manage shared public spaces in a manner that allows their equitable use by all groups without diminishing the welfare of others.

Analysis of characteristics of descriptive lost space is very important as to compare with the characteristics of prescriptive lost space explained in the theory. As an example, the variety of public spaces in Kuala Lumpur such as KL Bird Park, Orchid Garden, Merdeka Square, and Perdana Botanical Garden, includes those that are planned for certain assigned functions; both legally and physically, accommodate other activities as well. It also includes other kinds of spaces currently without assigned functions that accommodate unintended and spontaneous activities. Many of these spaces possess particular features that invite people to appropriate them for their own uses.

Table 2: Characteristics of descriptive lost space based on the physical urban environment

Physical Urban Environment	Comments by Respondent	Characteristics of Descriptive Lost Space
Streets **Public Spaces** **Urban Parks** **Government Reserve** **Commercial Buildings** **Parking Lots**	No activities No proper path Unfriendly Not accessible for public use Climatic No activities Unattractive Poor maintenance Dangerous No linkages Poor management Unusable space Single use space No other activities Unsafe Poor connectivity No signage Lack of various activities Lack of safety elements Expensive Nothing interesting No special attraction Not easily accessible Boring Parks too large Blind spots No feeder bus provided for locals Does not lead to anywhere Nothing much activities to do Poor infrastructure No interesting gesture No events/programs Dumping ground Trapped space (dead end) Building not maintained properly No retails Lack of public facilities Serves no purpose No function Not habitable Non-functional design	**Social Activity** **Economic Activity** **Connectivity** **Accessibility** **Climate** **Design** **Maintenance** **Scale** To identify what respondents perceive lost space Important factors to improve sense of place

Three respondents have mentioned urban core areas of Kuala Lumpur is lacking social and economic activities, connectivity, accessibility and design. The respondents have highlighted that there are no significant attractions or interesting activities that attract people to come. The following quotation shows how the importance of having a synthetic gesture in an urban area:

> *"…it is important to have a synthetic gesture to attract density towards an area. However, in the case of Perdana Botanical Garden and its surrounding, there is no strong attractors that may attract people to visit*

> *the area often. Having activities alone does not make the area lively. The support of public transportation and better connectivity helps to capture the density in the area…"*

The poor physical state of Perdana Botanical Garden seems to rest with the fact that it is rarely clear who should be managing it after it is built, or after it has declined. As a result, it is being neglected, with Hajer and Reijndorp (2001) explaining that more attention needs to be given to such transitional space.

In addition, the study area consists of a large recreational park surrounded by various cultural and eco-tourism areas. However, local people did not find any attractions to visit. This brings us to the second characteristic, which is poor in connectivity and accessibility that contributes to lost space as mentioned by the respondent.

> *"I have been living in Kuala Lumpur for 30 years. I can count how many times I have been to Perdana Botanical Garden. Hardly reachable, unfriendly pathways and bicycle lane, and no public transportation access to the area except the Hop on Hop off Bus, which only caters for the tourists only".*

The design of the area also influences people to utilise the space. Two respondents perceived that Perdana Botanical Garden is unsafe due to many reasons such as robbery and vandalism. The massive development around the park contributed to the feeling of unsafe due to the lack of natural surveillance.

Characteristics of Prescriptive and Descriptive Lost Space

Most of the respondents expressed the negative perceptions towards the term lost space as defined by Trancik (1986), Loukaitou-Sideris (1996), and Franck and Steven (2006). People are aware of the negative side of the space and the need of redesigning towards the area. This shows that most of the respondents' definitions of lost space are somehow similar to Trancik's (1986).

For descriptive definition of lost space, this study synthesizes the key themes discussed by selected end users' when asked to define their individual perceptions of lost space. In general, respondents perceived descriptive lost space as underutilized, abandoned, wasted, unused or hidden spaces. Descriptive lost space, however, has the potential to become a positive space if it benefits the aesthetics of the surroundings. The characteristics of prescriptive lost space are activity, connectivity, accessibility, design, maintenance, orientation, and scale. From a prescriptive perspective, activity refers to unused sunken plazas, abandoned waterfronts, and edges of freeways. Connectivity in prescriptive perspective refers to parking lots when they cut the city's urban fabric. Meanwhile, accessibility mostly refers to wide roads if they limit access to surrounding districts. From a prescriptive perspective, design refers to

unstructured landscape at the base of high rise towers and marginal public housing, and maintenance includes the edge of freeways and deteriorated parks. Finally, orientation in a prescriptive perspective refers to large parcel development, large blank walls, large government structures, and mega structures. When spaces in the physical setting lack characteristic such as the activity or design, they are considered as lost space in prescriptive perspective.

The descriptive lost space results can be concluded by combining the descriptive definition and characteristics of lost space, meaning that for a place to be defined as descriptive lost space, it must lack of at least one of the four (4) common characteristics of descriptive lost space; activities, connectivity, accessibility and maintenance.

Prescriptive vs Descriptive Lost Space

In discussing the lost space in Kuala Lumpur, the respondents mentioned Taman Tasik Perdana, streets, roundabout, waterfront, Kompleks Daya Bumi, viaduct of Jalan Kuching - Jalan Tun Perak, and parking space. Examples of each area mentioned by respondent will be discussed in the following section. For the purpose of determining whether an exact location conforms to the characteristics of prescriptive and or descriptive lost space, these specific areas of Kuala Lumpur mentioned by the respondents were fit into the typologies of prescriptive lost space.

Table 4 summarizes the understanding of respondents of lost space in Kuala Lumpur. The results show there is the conflict between the characteristics of prescriptive and descriptive of lost space. Respondents reported that the parking lots are not a lost space because it is a park facility since everybody drives a car to go to the park.

People create loose space through their own actions (Krier et al., 2006). These urban spaces possess physical and social possibilities for looseness, being open to appropriation, but it is people, through their own eyes and understanding, who fulfil these possibilities. From the results, the emergence of a lost space depends upon; people's perspective of the potential within the space, and second, varying degrees of creativity and determination to make use of what is present, with possibility of modifying existing elements or bringing in additional ones.

Table 3: Comparison between characteristics of prescriptive and descriptive lost space

Typology of Prescriptive Lost Space		Characteristics of Prescriptive Lost Space	Characteristics of Descriptive Lost Space
Trancik	Unstructured landscape in high rise buildings	Activity	Activity
	Unused sunken plaza		
	Edge of freeway	Connectivity	Connectivity
	Abandoned waterfronts		
	Abandoned blight clearance sites	Accessibility	Accessibility
	Deteriorated parks		
	Marginal public housing	Design	Design
	Surface parking lots		
Loukaitou-Sideris	Large parcel developments	Maintenance	Maintenance
	Edge of large transportation projects (wide roads)		
Franc and Steven	Large blank walls	Orientation	Prescriptive
	Large governmental structures	Scale	Scale
	Mega structures		

Figure 3: Lost spaces identified by the respondents. (i) Roundabout in Jalan Kuching, Kuala Lumpur; (ii) Viaduct of Jalan Kuching - Jalan Tun Perak; (iii) Panggung Anniversari

Table 4: Comparison between areas of prescriptive and descriptive lost space according to the definitions

	Typology of Prescriptive Lost Space	Areas	Prescriptive Lost Space	Prescriptive Characteristics	Descriptive Lost Space	Prescriptive Characteristics
Trancik	Unstructured landscape	Kompleks Daya Bumi	●	Activity, connectivity, accessibility	○	1
	Edge of freeway	Jalan Kinabalu	●	Activity, connectivity, accessibility	●	Activity, connectivity
	Abandoned waterfronts	Along Klang River and Gombak River	●	Activity, connectivity, accessibility	●	Activity, connectivity, accessibility
	Deteriorated parks	Taman Tasik Perdana	●	Activity, connectivity, maintenance	●	Activity, connectivity, accessibility, maintenance, scale
Loukaitou-Sideris	Off-street parking	Parking space	●	Connectivity	○	2
	Large parcel developments	Taman Tasik Perdana	●	Connectivity, accessibility	●	Activity, connectivity, accessibility, scale
	Edge of large transportation projects (wide roads)	Jalan Kinabalu	●	Activity, accessibility	●	Activity, accessibility
Frank and Steven	Large blank walls				○	
	Large governmental structures				○	
	Mega structures				○	

Notes:

1. Only one respondent highlight the issue of lack of activity in area of Kompleks Daya Bumi
2. None of the respondent report that the parking areas in KL Historical Zone was lack of connectivity. Most of the respondent indicate that parking are necessary to facilitate their daily life, therefore they assume it as not a lost space. However, one respondent report that due to the single use of the space, it has been caused to be as a wastage of space instead of lost

● Yes

○ No

○ Not mentioned

Figure 4: Respondents highlighted the Perdana Botanical Garden is well-maintained. However, due to the lack of interesting activities, poor connectivity and accessibility, thus contribute to lost space

Figure 5: Jalan Lembah, Kuala Lumpur, a street that found lack of activities and pedestrian infrastructures. A greater variety of streets and land uses stimulate the emergence of loose space

Figure 6 The vacant lots and abandoned spaces turn into parking lots which has no necessary relation to ownership, size, type of use or even landscape characters.

CONCLUSION

Having the understanding on the differences between prescriptive lost space and descriptive lost space, it is apparent that the respondents in this research perceive Kuala Lumpur to be lacking activity, connectivity and accessibility, and therefore, has descriptive lost space potential. The respondents also perceive that more social economic activity would help prevent descriptive lost space, especially if those activities had better connectivity and accessibility with the surrounding.

It is crucial to trigger the relevant bodies' interest by highlighting certain basic principles in planning for a better space design and planning in urban core areas. As conclusion, both political commitment and public investment are required. It is not the planning system per se which is at fault. We need a strong planning system. It is possibly the way that it is operated that needs review. There needs to be greater sensitivity in the application of planning laws to better control over the location of high buildings, infrastructures, public spaces, greater regard for historic areas, better understanding of the organic growth of urban core and a striving for higher quality in building and space design.

Additionally, there has always been a strong relation between commerce and urban public space, and strong exclusionary tendencies among those with management and ownership responsibilities. It is surprising that corporate interests are determined to take responsibility for public spaces when the public sector has often done such a poor job in managing the spaces for which they are responsible, spaces that still make up the large majority of the public realm.

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PREFERENCE OF RESIDENTIAL TYPOLOGIES OF URBAN MALAYSIANS

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Abstract

This paper seeks to understand patterns of residential preferences of urban Malaysians when seeking to purchase residential properties. Data was gathered through sampling surveys targeting potential house buyers in property fairs in three urban centres in Malaysia, namely Kuala Lumpur, Georgetown and Johor Bahru. Results highlighted significant presence of young purchasers and first-time buyers; majority seeking to purchase properties priced RM600,000 and below; and taking very long tenure to finance the properties. Double-storey terrace and condominium, accumulatively garnered higher popular choice, but both fell short of 'Most Preferred' category. Factor analysis discovered that overall landed properties fared better than multi-storey buildings as preferred residential typology across the board regardless of socio-economic backgrounds. Family situation and circumstance, referring to marital status, number of family member, and whether they previously owned a property, were found to be the most crucial factors governing their choice on the preferred type of residential properties.

Keywords: housing typology, housing preference house choice, residential typologies, family factors in housing, landed housing, multi-storey housing

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INTRODUCTION

The research on housing or homeownership can be approached from different angles and subject to diverse influencing factors. Home ownership is a result of many determinants, including housing characteristics (house types and property types), employment and income trends, and socio-cultural and demographic descriptors. This paper seeks to understand preferences in types of residential properties, and factors determining the decisions in choosing them, based on feedback from potential house-buyers in three urban centres in Malaysia, namely Kuala Lumpur, Georgetown and Johor Bahru. These three cities were chosen as they represent the three largest cities in Malaysia with the highest concentration of urban population, highest transaction of properties and most affluent housing markets and high living costs. The typologies of residential properties included in this paper are based on commonly found housing typologies in Malaysia. Factors influencing choices of residential properties include profile of buyer, i.e. investors vs. genuine buyers and first time home buyers; socio-marital background, e.g. age, gender, family situation, occupation and other factors related to finance arrangement and payment methods.

LITERATURE REVIEW

Residential Building Typology and Character in Malaysian Cities

The definition of housing typology itself can be referred to the classification of residential buildings, according to its association with physical composition, intensity of development and degree of formality. There are many types of residential properties in Malaysia. In this study, the categorisation is based on the most commonly found housing typologies in Malaysian cities using the Malaysian National Property Information (NAPIC)'s house price index categorisation as a basis. NAPIC categorised the residential properties into only four, namely terrace, high-rise, semi-detached and detached house. For this study, these were further divided them into townhouse, apartment, condominium, flat, shop-house/shop-apartment, terrace house, semi-detached house and detached house/bungalow, for a more meaningful understanding on the commonly found residential typologies in Malaysian cities.

The diversity in the residential typologies in Malaysia cities is a combined result of historical trends, contemporary market forces and the regulatory demands. The colonial heritage in the past, which merged with local traditional forms of housing, resulted in housing types of 'terrace house', 'shop-house' and 'bungalows' (Ju & Omar, 2011). 'Shop-house' for instance, is a hybrid residential-commercial typology, traditionally found in South-east Asian colonial cities. 'Terrace house' can be taken as the most economic type of landed property, while 'semi-detached' type has bigger private compounds, but do not have the luxurious amount of open spaces like the 'bungalow'. Another type of

landed property is townhouse, which is an individual stratified unit with separate entrances for the upper and lower units.

Other than this, the high-density and multi-storey types of housing, such as 'apartment', 'condominium' and 'flat' are more popularly found in urban centres in Malaysia. The housing landscape of Malaysian cities reflects the increased demand in urban population and the regulatory regimes governing urban planning and housing development. Planning controls restrict the amount of land available for housing, and determine the density as well as the types of development activity of the location or zonation. Planning standards specifying the allowable units per acre or in plot ratio, building height, land set-backs, amount of land for open space and amenities, and in the cases of low-cost and affordable units, the unit size. As a result, high-density development can be synonymous to the high-rise typologies, including apartment, condominium and flat, with densities of 60 to 128 units per acre. Low-rise units refer to cluster, terrace and townhouse (20 to 35 units per acre), while detached, semi-detached and bungalow houses can have very low density, as low as 15 units per acre.

Factors Influencing Preferences on Types of Residential Buildings

Research on residential housing choice and preference are wide and multi-faceted. There has been a tradition of explaining housing preference based on homebuyer demographics such as age, household composition, income, and current housing situation (Rossi & Weber, 2010). Empirical studies relating housing choice and socio-demographic backgrounds have shown that home ownership is strongly related to stages in the life cycle (Clark & Onaka, 1983), the presence of children (Coulson, 1999; Goodman, 1990; Haurin & Kamara, 1992) and employment types and location (Levine, 2007)

In a study of factors affecting buying behaviour of apartment in Amman Jordan, significant constructs such as aesthetic, economic, marketing, geographic, and social factors were found. The study concluded that there were significant differences in terms of respondents' gender and age, but no significant differences according to the marital status or educational level (Haddad, Judeh, & Haddad, 2011). In a study on house purchase intention of consumers in Kota Kinabalu, Malaysia, it was found that house features, financing, distance, environment and superstition-numbers have significant positive relationships with house purchase intention (Chia, Harun, Kassim, Martin, & Kepal, 2016).

Indeed, house preferences are not only influenced by social-demographic descriptors, but equally important are buyers' intentions and their finance situations. In understanding reasons of homeownership factors in Malaysia, Tan (2009) uncovered six factors, namely local amenities and social capital investment, properties maintenance and improvement, length of tenure, children's educational needs and financial benefits in understanding buyers' motivation as considerations in buying homes in Malaysia.

In a study of factors affecting the purchase decision of investors in the residential property market in Malaysia, it was revealed that locational, financial and structural factors affect property investors in making their purchases (Tan, 2012), while Kohler (2013) revealed that investors generally prefer smaller properties especially apartments and flats as these properties have always been more popular among tenants. In identifying drivers behind housing preferences of first-time home buyers, Reed and Mills (2006) confirmed that "financial" issues accounted for approximately 30 percent of the actual decision by first-time buyers to purchase housing, while decisions relating to the timing and choice were dependent on "site-specific" factors.

Most literature found relate housing preferences to the socio-demographic attributes and reasons behind certain choices were made, but seldom correlate to the different housing typologies. Only one finding from a recent study of young Malaysians in Subang Jaya, Selangor, Malaysia which revealed that young urbanites preferred landed housing with more bedrooms compared to high-rise housing. They preferred to live in urban area so as to be close to workplace and services. They targeted high priced houses despite facing affordability issues (Ling, Mansur, & Musthafa, 2016).

METHODOLOGY

Sampling and Questionnaire

Primary data using a face-to-face convenient sampling survey was conducted in three major Malaysian cities, namely Kuala Lumpur in the central region of Peninsular Malaysia, Penang in the northern region, and Johor Bahru in the southern part of Peninsular Malaysia. The surveys were conducted at five major property fairs in year 2016. These property fairs are Malaysia Property Expo (MAPEX), The Star Property Fairs, and Malaysia Secondary Property Exhibition (MASPEX). A total of 1015 valid samples were analysed. The survey targeted visitors to the property fairs. The survey questionnaire included 66 questions concerning respondents' socio-demographic backgrounds, current family and living conditions, payment and financial arrangements, and housing type preference. For this paper, 27 questions grouped under the following categories were analysed:

- Respondents' socio-demographic data: marital status, living condition, number of family member, occupation, education level, age, gender, ethnicity, religion, household income, currently own any property.
- Preferred type of house: flat, apartment, townhouse, condominium, shop-house, single storey terrace, double storey terrace, semi-detached, and bungalow.
- Purpose of purchase: payment method, loan tenure, percentage of income for property, house price, floor size, etc.

All questions related to house type preference were measured using a five-point Likert Scale and respondents were asked to state the level of their agreement on preferred house types.

Analytical Method

Statistical analysis was carried out using the IBM Statistical Package for the Social Science (SPSS) for Windows version 22.0. Exploratory factor analysis was used to investigate the relationships between the factors and to identify the unspoken concerns of the respondents behind purchasing a type of residential property. Principal Component was used as an extraction method and orthogonal Varimax rotation to optimize the results.

General Characteristics of the Respondents

Referring to Table 2, in terms of age group, majority of respondents (77.5%) consists of youth aged between 20 to 39 years-old, with 58.3% males and 41.7% females. For ethnic background, 67.6% were Chinese, followed by Malay (26.3%) and Indian (4.8%). Majority of the respondents were from higher income occupations i.e. 'businessmen, managerial and professionals' (78.2%) and they were mostly highly educated.

'Family and living situation' data shows that 33.8% of respondents were singles who live with their parents, singles who live with friends (17.7%), while married couples with and without children consist of 34.5%. On marital status, a significant portion was singles (53.9%) as opposed to 46.1% married. Small households with one or two persons consist of a whopping 43.5% of respondents, compared to households with three to four persons (36.7%); while larger households with five and six members only occupied 19.8%.

With regard to main intention to own the property, majority purchased mainly for own stay (59.2%) as opposed to 40.8% for investment. Slightly more than half of the potential buyers have owned a property (59.1%) while equally significant numbers (40.9%) were first-time buyers. On the types of property, whether they prefer 'new property', 'sub-sale' or 'do not mind either', about half of the respondents choose 'new property' while a significant portion (45%) did not mind both. In terms of unit size preference, majority (87.2%) choose sizes between 750 to 2000 square feet.

Majority or 74.5% of the potential purchasers indicated they prefer house priced below RM600,000, out of which 45.1% were not willing to pay higher than RM400,000. This was understandable judging from the same data which pointed out that a significant number or 55.6% of the respondents has household income of RM6,000 and below. In a property survey data from Q3 2016, the average house price in Kuala Lumpur was around RM772,126 (NAPIC, 2016) and the average costs of a 1000 sq. ft. apartment in a typical Malaysian city was between RM516,700 and RM1.2 million (Numbeo, 2017) Our data revealed that

the price that most people were willing or could afford to pay is much lower than the average prices of housing in the market. Under such circumstances, it was not surprising that nearly all respondents have to get a mortgage from bank (94.3%), and more than 45% respondents allocate more than 30% of their income to finance the property, and commit to long-term mortgage tenure, whereby 63.5% have to take a loan longer than 26 years, and 35.7% have to commit to a loan period longer than 30 years.

Table 2: Respondents' socio-demographic profile

Variables	%	Variables	%
Age		Currently own any property	
20 - 29 years old	22.1	Owned a property	59.1
30 - 39 years old	55.4	First time buyers	40.9
40 - 49 years old	14.7	Preferred type of property	
50 - 59 years old	3.6	New property	49.3
Above 60 years old	4.2	Sub-sale	5.7
Gender		Either	45.0
Male	58.3	Preferred floor size (Sq. Ft.)	
Female	41.7	Below 750sf	6.7
Occupation		Below 1,000sf	25.6
No permanent employment	4.8	Below 1,250sf	27.7
Retiree	2.2	Below 2,000sf	33.9
Labourer & administrative	14.9	Above 2,000sf	6.1
Businessmen	21.7	Preferred house price	
Managerial	15.7	Below RM200k (USD46,087)	8.6
Professional	40.8	RM200,001 to RM400,000 (USD46,088 to USD92,174)	36.5
Education Level		RM400,001 to RM600,000 (USD92,175 to USD138,261)	29.4
Lower secondary and below	3.4	RM600,001 to RM800,000 (USD138,261 to USD184,348)	16.9
High school	14.8	RM800,000 to RM1 million (USD184,349 to 230,435)	4.7
Certificate & Diploma	23.8	Above RM1 million (Above USD230,435)	3.9
Bachelor degree	46.2	Preferred payment method	
Postgraduate degree	11.7	Cash	5.7
Living Condition		Cash & Mortgage	94.3
Single with parents	33.8	Household Income	
Single staying alone	9.5	RM6000 (USD1,382) & below	55.6
Single staying with friends	17.7	RM6001 - RM10,000(USD1,382 to USD2,304)	25.0
Married without children	19.0	RM10,001 - RM14,000 (USD2,304 - USD3,226)	14.1
Married with children	15.5	Above RM14,001 (USD3,226)	5.3
Others	4.5	Willing to allocate percentage of income to financing the property	

Marital Status		Below 20%	18.6
Single	53.9	20.1% - 30%	36.3
Married	46.1	30.1% - 40%	21.4
Number of Family Member		40.1% - 50%	15.5
One person	33.8	Above 50%	8.2
Two persons	9.7	Preferred loan Tenure	
Three persons	17.7	Below 10 years	6.6
Four persons	19.0	11 - 15 years	17.8
Five persons	15.5	16 - 25 years	12.1
Six persons	4.3	26 - 30 years	27.8
Purpose of Purchase		Above 30 years	35.7
Own stay	59.2		
Investment	40.8		

Source: Own survey data

RESULTS AND DISCUSSION

Respondents' Preferences on Various Types of Property

Respondents were asked to state their preferences on the types of residential properties in 5-level Likert Scale ranged from Least Preferred to Most preferred. Among various types of property, flat and shop-house have the lowest popularity where 69.9% and 65.6% of the respondents chose 'Least Preferred' and 'Not likely' respectively (Table 3). Townhouse was also not favoured as it manly occupied the lower tiers of the preference scale.

Accumulatively, double-storey terrace and condominium seemed to be quite popular among the buyers, with 82.3% and 82.1% potential purchasers chose "Most Preferred', 'I Can Consider' or 'Do Not Mind' respectively. In particular, double-storey terrace and semi-detached types scored the highest in 'Most preferred' category, with 25.9% and 24.8% respectively. Interestingly, condominium scored the highest in 'I can consider' category with 36.3% compared to 22.8% in the 'Most preferred' category. This is similar to double-storey terrace, where more respondents chose 'I Can Consider' (34.7%).

As for apartment and single-storey terrace, data seemed to suggest that there was a mixed reaction and no strong preference on either extreme ends, with higher percentage of respondents concentrates in the middle, choosing 'I don't mind' and 'I can consider'. For bungalow type, the preference level seemed to spread quite evenly between those who prefer and not prefer. This suggests that as much as there were people who prefer bungalow, there were those who do not fancy them. This may be attributed to affordability concerns.

Table 3: Heat map indicates preference level on different types of property

	Least Preferred	Not Likely to Choose	I Don't Mind	I Can Consider	Most Preferred
Townhouse	33.7%	20.8%	24.9%	16.9%	3.6%
Apartment	18.0%	17.0%	29.8%	24.9%	10.3%
Condominium	8.2%	9.7%	23.2%	36.1%	22.8%
Flat	41.6%	28.3%	18.7%	8.9%	2.5%
Shop-house	41.5%	24.1%	17.7%	11.8%	4.9%
Terrace Single	17.3%	14.3%	25.5%	28.4%	14.6%
Terrace Double	8.1%	9.7%	21.7%	34.7%	25.9%
Semi D	12.6%	14.0%	22.8%	25.7%	24.9%
Bungalow	20.1%	19.4%	21.0%	18.9%	20.5%

Source: Own survey data

Based on the heat map in Table 3, it is observed that landed properties are generally more popular than multi-storey properties, except for condominium. This coincides to an earlier study of young people living in Subang Jaya, Kuala Lumpur, which pointed that most respondents still preferred landed properties albeit a generous supply of high-rise housing in that area. (Ling et al., 2016). This observation is re-examined using factor analysis in the next section.

Unspoken Concerns of Potential Buyers

Exploratory factor analyses (EFA) were employed to investigate the hidden construct of the factors. Note that 'living condition' was excluded from EFA because it had perfect relationship ($r = 1.0$) with the number of family member. This suggests that, for example, one person households equate singles either staying alone, with friends or with family members; whereas households with more than one person refer to 'married couples with or without children'. EFA with principal components extraction method and Equamax rotation resulted in nine components (Table 4) that had eigenvalues contributed accumulative 58.57% of variance explained and its KMO measure of sampling adequacy is 0.673 (p-value <0.001).

The most important component, named as 'Preference on landed property' accounted for 11.56% of the total variance explained or the total information. This finding confirmed to an earlier finding by Ling et al. (2016). This component has positive relation to factors such as single-storey terrace, double storey terrace, semi-detached and bungalow. The second most important component represents 'Family Situation' accounted for 9.82% of the total information that includes factors such as number of family member, marital status and whether the respondents owned a property. This suggests that married

respondents who owned property, has more family member, and hence their family size is larger. The 'family Situation' factor can relate to the importance of household composition mentioned by Rossi and Weber (2010), and to certain extent, the effects of life cycle as discussed by Clark and Onaka (1983).

Table 4: Nine components resulted from factor analysis with Equamax rotation (only coefficients relevant to the component are indicated)

	Latent Components								
Factor	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**
Semi-D	0.832								
Terrace-double	0.782								
Bungalow	0.758								
Terrace-single	0.550								
Marital status		0.843							
Number of family member		0.830							
Currently own any property		0.673							
Apartment			0.766						
Condominium			0.650						
Flat			0.566						
Townhouse			0.537						
Shop-house			0.517						
Occupation				0.767					
Education level				0.714					
House price					0.691				
Floor size					0.604				
Ethnicity						0.843			
Religion						0.813			
Age							0.731		
Household income							0.543		
Payment method							**-0.454**		
Loan tenure							**-0.411**		
Gender								**-0.729**	
Percent of income for property								0.387	
Purpose of purchase								0.280	
Property type									0.758
% of Variance Explained	**11.52%**	**9.82%**	**8.29%**	**6.89%**	**5.46%**	**4.42%**	**4.28%**	**3.99%**	**3.89%**

Note: C1: Preference on landed property, C2: Family situation, C3: Multi storey property, C4: Occupation & education, C5: Preferred pricing & size, C6: Ethnic & religion, C7: Financial arrangement, C8: Purchasing preference, C9: Property type.

The third component represents other types of property contributed 8.29% of the total information. This include apartment, condominium, flat, townhouse and shop-house. This result revealed that the potential house-buyers placed higher preference on landed properties than multi-storey properties. Other components are 'Occupation and Education' refer to occupation and education level of the respondents; 'Preferred Pricing and Size' (preferred house price and floor size); 'Ethnic and Religion' (ethnicity and religion of the respondents); and 'Financial Arrangement' represents respondent's age, household income, preferred loan tenure and payment method. The last two components are 'Purchasing Preference' consists of gender, purpose of purchase, and percentage of income for property, and 'Property Type'.

While most factors have positive relations with the respective hidden components, 'payment method', 'loan tenure' and 'gender' showed negative relations. The explanation could be that for example, an older house buyer with higher household income tends to get shorter loan tenure by paying with cash, and hence the 'financial arrangement' level was lower. Also, it was observed that the 'purchasing preference' was higher for male who intended to buy house for own stay will allocate higher portion of income for property.

CONCLUSION

As this study has chosen a sample population from potential buyers at property fairs, it only represents a segment of Malaysian urban population that has intentions to purchase properties. Hence the data will not be generalised to the entire population. This study has tried to discover factors leading to housing preferences and to make distinctions on the types of residential typologies most preferred by urban Malaysians. The findings confirmed the issues of mismatch between preferred house price and affordability, and high reliance on long term mortgage arrangement. It was also discovered that there were high interests among younger purchasers despite them facing financial challenges. Factor Analysis highlighted that landed property remained the most preferred choice as compared with multi-storey types regardless of respondents' backgrounds. Double-storey terrace and condominium seemed to garner higher accumulative positive preferences. In addition, our data also showed that 'family situation' was the second most important component in the factor analysis, specifically 'family size', 'marital status' and 'whether previously owned a property' were the major deciding factors. Owing to this trend, it is suggested that future housing development could devote resources to assess and match the socio-demographic profiles of potential purchasers with the types of residential property to offer.

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PROMOTING RURAL TOURISM IN PERAK TENGAH DISTRICT THROUGH THE EXPANDING OF HERITAGE INTERPRETATION AND PRESENTATION

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Abstract

The State of Perak is known for its richness and uniqueness in history and cultural heritage. However, the State's tourism promotion has been focusing more on the popular destinations, leaving out those with heritage significance especially those located in the rural area. This is due to limited knowledge on method to interpret the cultural resources in the rural area, as well as unorganized interpretation programmes. This research has two aims, which are 1) to identify potential cultural heritage significance in Perak Tengah; and 2) to outline an interpretation plan of the potential cultural heritage as new tourist attraction of Perak. This research involves three stages; observation and inventory of resources, focus group interview and interpretation proposal. Results from the focus group discussion indicate the need to customize the interpretation and presentation of rural heritage especially on physical experience in community cultural activities. In the end, this study outlines interpretation guidance for heritage site operators on how visitors can experience the cultural heritage in the rural area.

***Keywords*:** cultural, heritage, interpretation, rural, visitor

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RESEARCH BACKGROUND

The rural area has a lot of cultural heritage resources in the form of unique culture and art, traditional knowledge, natural beauty and others. The traditional activities of rural community do not only benefit the image and appearance of tourist attractions, but also could be used as resources to increase the income of the community and as motivation to preserve socio-cultural activities (Susyanti, 2013). The importance of rural cultural resources is recognised in some of the national policies. For instance, the National Key Result Areas (NKRA) has identified tourism, as well as agriculture, farming and cottage industry, as areas to be emphasised in its goal of promoting economic revitalization and thus prevent migration of population as well as creating a strong encouragement for rural youth to remain in the village. The National Physical Plan 2 (NPP2) also highlighted cultural heritage and tourism as important to support the realization of the New Economic Model and the 1Malaysia Concept (FDCTP, 2016). The plan's policy 11 and 12 state that natural tourism resources, the authentic multi-cultural and historical heritage of the country shall be conserved. Tourism development zones in each state shall focus on specialized regional niche products based on their locational advantages and availability of resources. Similarly, the Ministry of Tourism and Culture also highlights the importance of cultural heritage and tourism. Its main vision is to develop Malaysia as a world-class tourist and cultural destination as well as to build the national identity based on art, culture, and heritage.

The State of Perak is known for its richness and uniqueness of history, tradition and cultural heritage especially the traditional Malay village. Figure 1 shows the most visited destinations by domestic tourists in Perak for year 2011-2013 (IDR, 2015). It can be seen that these were all leisure and entertainment destinations. Meanwhile, none of the cultural heritage destinations such as cultural community activities and traditions made the list. The Districts of Perak Tengah, Kuala Kangsar and Hilir Perak have lots of cultural heritage potential to be promoted especially on village life, arts, culture and agriculture activities. Therefore, programmes to attract tourists to these cultural heritage destinations should be encouraged, and the new attractions should be defined and interpret wisely especially in the rural area so that they can beneficial to the community. It would take some effort to create effective interpretation – but if it is done right, it would not only help visitors understand the resources but also contribute to better management of the tourist attractions and at the same time can generate more revenues.

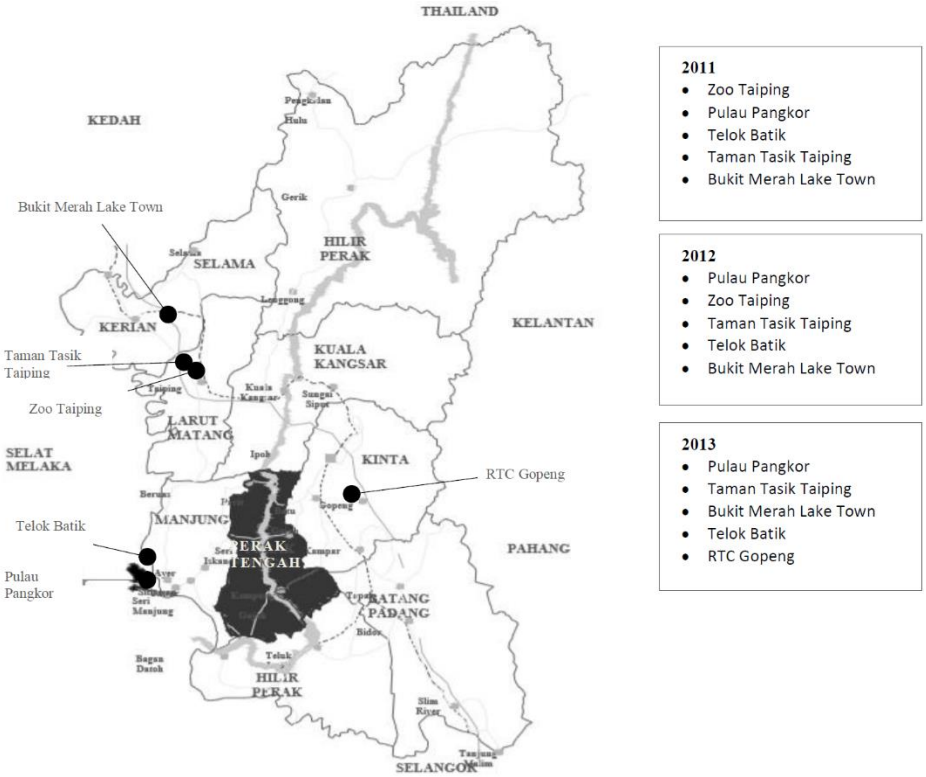


Figure 1: Most visited destination by domestic tourist in Perak
Sources: IDR, 2015

LITERATURE REVIEW

Heritage can be classified into two categories: tangible cultural heritage (TCH) and intangible cultural heritage (ICH). Both are the national treasure that should be preserved and conserved for future generations. TCH is synonymous with physical objects that can be touched and seen as historic architecture, monuments and buildings. Meanwhile, ICH includes any form of expressions, languages, songs, folk songs, oral traditions, poetry, music, dances, martial arts, that may have existed or exist in relation to the heritage of Malaysia (National Heritage Act 2005). To increase awareness towards cultural heritage, the interpretation and presentation of cultural heritage elements should be highlighted and shared with the locals and visitors (Lenzerini, 2011). It is easy to describe the "tangible" things; the physical characteristics of resources. However, it is tougher to link those things to "intangible" things; the ideas and emotions behind it. The goal of interpretation is to engage visitors' senses while challenging them to think about what things mean – to look at them in entirely new ways. Interpretation can create

memorable and meaningful experiences for visitors, and inspire them to learn more (Lancaster County Planning Commission, 2002).

The cultural heritage resources are widely available in the rural area in the form of a unique culture and art, expertise and traditional knowledge, natural beauty, ecological resources and others, and very representative of the community culture. They enhance the image and appearance of tourist attractions, and also could be used as resources to increase the income of the community and as motivation to preserve socio-cultural activities (Susyanti, 2013). Tourists are very interested to see how life or culture and heritage interpretation that can help enrich their experience. They are seeking to understand the sense of place in communities which are unique personalities. All these can be seen in the rural area. According to Saidatulakmal (2012), the terms rural tourism and heritage tourism are commonly used in tourism industry to refer to any form of tourism that showcase the rural life, art, culture and heritage at rural location, thereby benefiting the local community economically and socially as well as enabling interactions between tourists and locals for more enriching tourism experiences.

Interpretation Principles

Interpretation is an informational and inspirational process including educational activities that aim to reveal meanings of our cultural and natural resources. Tilden (1977) established six principles of interpretation, which have been referred to in preparing interpretation programme of heritage sites worldwide. These principles are:

i. Any interpretation that does not somehow relate what is being displayed or described to something within the personality or experience of the visitor will be sterile.
ii. Information, as such, is not interpretation. Interpretation is revelation based upon information.
iii. Interpretation is an art, which combines many arts, whether the materials presented are scientific, historical or architectural.
iv. The chief aim of interpretation is not instruction, but provocation.
v. Interpretation should aim to present a whole rather than apart and must address itself to the whole man rather than any phase.
vi. Interpretation addressed to children (say, up to the age of 12) should not be a dilution of the presentation to adults, but should follow a fundamentally different approach.

To fit today's world on interpretation, Knudson, Beck and Cable (2003), and Beck and Cable (2011) have updated Tilden's principles by adding new principles that provide a more elaborate interpretative philosophy that focuses more on the interpreter's role and method of interpretation. According to Beck and Cable (2011), every place has a history, and interpretation can bring the past

alive to make the present more enjoyable and the future more meaningful. To achieve this, interpreters must concern themselves with the quantity and quality of information presented. Focused and well-researched interpretation will be more powerful than longer discourse. Quality interpretation depends on the interpreter's knowledge and skill, which must be continually developed over time and at the end of the interpretation should instil in the people ability, and the desire, to sense the beauty of their surroundings and could provide spiritual uplift and to encourage resource preservation. International Council of Monuments and Sites (ICOMOS) Charter (1999) gives a guiding direction on what heritage interpretation programmes should be considered. The main aspects are retention of the heritage authenticity and culture experiences which include:

i. Enhance the appreciation and understanding of that cultural heritage;
ii. Present the significance of the culture in a relevant and accessible manner;
iii. Use appropriate, stimulating and contemporary forms of education, technology, and personal explanations;
iv. Encourage high levels of public awareness and support of heritage;
v. Encourage visitors to experience the wider cultural/natural heritage of the region; and
vi. Involvement of all parties, including the local and/or indigenous community representatives is necessary to achieve a sustainable tourism industry.

Interpretation can be used to promote cultural heritage to build national, regional, and community identities. Many visitors want to learn about the places they visit and interpretation can convey factual material, for examples the history of the buildings, their architectural styles and their building technique (Aplin, 2002; Timothy, 2011). The goal of interpretation is not instruction but to change attitudes and behaviour, to motivate and inspire, and to take information and make it meaningful and exciting. Interpretation is not just glossy brochures, appropriate signage, and well-edited videos; it is the art of telling a story of a community. The interpretation story can inspire and will provoke people to broaden their knowledge (National Trust of Australia, 2014). The daily life also can be subjects of interpretation for the visitors. The experiences of spending a few days immersed in a village's way of life will stay with tourists for longer than if they had spent the time looking at the monument or building. The tourist seeks various physical experiences and satisfaction. The nature of these will largely determine the destination chosen and the activities enjoyed (Goeldner, 2000).

Interpretation Practices

Studies on heritage interpretation and presentation worldwide, commonly highlight the issues and challenges of managing tourist in heritage sites. How to

do the best interpretation of heritage and give the best experience to the visitors? A lot of unfavourable factors have been identified by Asfaw and Gebreslassie (2016), like the limited capacity of heritage interpreters and lack of organized interpretation and presentation. Most of the heritage interpretation and presentation manuals and guidelines by European countries have structured and organized interpretation practice into three steps (Lancaster County Planning Commission, 2002; FI NTDA, 2012; Tilkin, 2013). The first step is to make an inventory of heritage resources, next is to define significance and third is the development of the story through an effective media. To achieve good interpretation, Binoy (2011) emphasised that the role of interpreters at heritage sites must provoke curiosity, attention, and interest among the visitors to listen, participate and actively involved in the heritage interpretation process. However, Leanza, Porto, Sapienza and Cascone (2016) highlighted that the tourist itineraries are seen as good opportunities for the development of tourism in the rural areas that possess natural or cultural resources. According to Leanza et al. (2016), heritage interpretation-based itinerary is able to influence tourists who visit famous rural heritage site, to extend their stay in the related rural area and, as a consequence, consume more tourist products. Tourist itinerary needs to be supported by suitable interpretation media and connects several heritage attractions located in a given rural area with a heritage site selected as a tourist catalyst.

The important criteria in creating interpretation are to know the audience. Interpreters must know who are the visitors; will they understand and appreciate what they are told through the interpretaion? The best way to tell a story is to depend on the physical features that are connected with the story. Good interpretation is about "show and tell", for example, if we discuss how to make traditional food, the visitors will want to see a demonstration of the cooking process. Good interpretation will inspire future exploration.

Harun (2007) has explored the different interpretation between two historical sites in Perak; Kellie's Castle and Pasir Salak Historical Complex. The interpretation of Kellie's Castle came from the building itself which displays the architecture and history of the castle. However, interpretation of Pasir Salak Historical Complex is through the creating of interpretation elements, which associates the site and the history of Malay heroes against the first British Resident of Perak, J.W.W. Birch whom was assassinated in 1875.The interpretation elements including the diorama at the historical time tunnel gallery, traditional Perak house, and memorial monuments.

Ahmad (2012) applied interpretation concepts towards restoration work of heritage buildings. He found that historical buildings have intrinsic values that need to be explored through suitable interpretation medium. He also suggested that it is necessary to establish authentic assessment and validated interpretations of heritage resources. Authenticity in heritage is very important because the

genuine historic building preservation will provoke the visitor's intention and gives distinctive experiences.

STUDY AREA

The District of Perak Tengah has a lot of cultural heritage potentials which can be developed as tourism attractions and destinations. The Perak Tengah District Local Plan 2013 has proposed the strategies to strengthen and utilise all tourism potentials in the rural area, especially the activities that are based on history and water (Perak River). The plan also specifies that all tourism activities need to be supported with appropriate infrastructure for visitors convenience. The Plan's main proposal of tourism strengthening includes current cultural resources; promoting Pasir Salak Historical Complex, promoting handcraft industries and developing royal tombs as tourist attraction. Other tourism resources needed to be improved are Terrapin Wildlife Conservation Centre, Dato Sagor Motor Sports Circuit and Parit Town. Additionally, the Plan proposes the development of a tourist information centre in the District.

Based on authors' observation and interviews, potential cultural heritage attractions in the District have their own identities and located on route that can be linked to allow easy exploration by visitors. Unfortunately, these attractions are not being promoted sufficiently and lacking on-site support facilities especially in terms of interpretation and presentation. This included incomplete tourist itinerary document, limited interpreters, unclear tourist trail and lack of information on heritage resources.

The study area for this research involves the 69 *kampung* (villages) along Perak River in Perak Tengah District. The villages along Perak River are very attractive with unique and pleasant panorama of village and farming areas. The communities are also active with their culture activities. All these represent the rural heritage image that should be given priority to be highlighted as new tourism products.

RESEARCH METHODOLOGY

Data collection was carried out through inventory and mapping of cultural heritage significance, and focus group interviews. The focus group consisted of 21 tourist operators and homestay owners in Perak Tengah District (Table 1). The interviews sought to identify which cultural resources should be highlighted in Perak Tengah, what are the existing interpretation medium, what should be the interpretation programmes to promote rural cultural heritage resources, and what would be the threats and challenges.

Table 1: List of homestay/accommodation in Perak Tengah District

No.	Homestay/Accommodation	Address/Location
1	Green Village Resort	Pasir Salak

2	Insan Chalet	Kampung Bendang Besar, Bota
3	Rumah Rehat Kampung Gajah	Kampung Gajah
4	Lanai Casuarina Rest House	Pekan Parit
5	Yeop Temah Lodge	Kampung Bidara, Parit
6	D'River Lodge	Kampung Aji, Bota Kiri
7	Impinana J& Z Homestay	Kampung Gajah
8	Homestay Kampung Gajah	Jalan Pejabat Pos, Kampung Gajah
9	Parit Homestay	Kampung Bandar Lama, Kampung Gajah
10	Homestay Pendiat	Tanjung Tualang
11	Homestay Cikgu Mat	Kampung Pendiat, BotaKanan
12	Homestay Faris	Kampung Gajah
13	D'Waris Inap Desa	Kampung Gajah
14	Al-Qayyum Homestay	Kampung Bandar Lama, Kampung Gajah
15	Razak Homestay	Taman Murni, kampung Gajah
16	D'Cahaya Homestay	Kampung Sadang, Parit
17	Tasha Homestay	Taman Cahaya, Kampung Gajah
18	KPK Homestay	Taman Setia, Parit
19	Setia Homestay	Taman Parit Setia, parit
20	Damai Homestay	Kampung Pasir Putih, PulauTiga
21	Homestay Bajet Pasir Salak	Kampung Gajah

The result of focus group interviews would help to identify the interpretation that will influence and capture the visitors' interest to visit and experiences culture heritage in the study area. Subsequently, this study proposes an interpretation guidance that focuses on the development of visitor's expectation and experiences. The proposal is a process of heritage interpretation and involves three main stages; 1) Identifying rural cultural heritage significance; 2) Subject of interpretation – what story to tell and how to tell, and 3) Interpretation medium.

RESULTS AND FINDINGS

Cultural Heritage Significance

Based on observation and mapping on existing cultural heritage potentials along Perak River, the resources were found to be unique and project a beautiful image of the rural community of Perak Tengah District, with some offering three categories of resources – natural, culture and visual. These would be the best for heritage interpretation because they present the whole image of Perak Tengah District. For example, both banks of the Perak River have not only become the sites of historical events, but also the sites of growth and expansion of national culture (Ghozali, 2010). Along the river banks, there are many traditional *Kutai*

houses with unique architecture and remain in sturdy condition. According to Abd Rashid (2015), there are about 40 *Kutai* houses that still survive but only 30 in intact condition. The beautiful view of paddy fields, durian orchards, and farms would become interactive information that can be used for interpretation. A nature guide or cultural guide of these resources will not only be providing information but can reveal the deeper meaning of cultural heritage in rural areas and can attract visitors.

The existing Pasir Salak Historical Complex at Kampung Gajah is already a well-known tourism product in Perak Tengah. However, the interpretation for visitors was limited to the gallery and not fulfilling the expectation of visitors. Based on interpretation principles, interpretation should aim to present a whole rather than a part, giving full range of experiences to visitors and building a relationship with the heritage site, especially to the rural community. Based on the results of the focus group interviews, the homestay managers suggested and agreed on six main cultural heritage resources that associated with the cultural heritage of Perak Tengah (Table 2). These cultural heritage resources can be categorised into heritage buildings, traditional crafts, historical sites, rural culture and natural heritage. From the list of main cultural heritage resources in Perak Tengah; Pasir Salak Historical Complex, traditional *Kutai* house, *labu sayong* craft and royal mausoleum trails were agreed by the focus group members as the most distinctive attractions and destinations for tourism in Perak Tengah.

Table 2: Main cultural heritage resources in Perak Tengah

Cultural Heritage Resources	Location	Categories	Remarks	Rank (n=21)
Pasir Salak Historical Complex.	Pasir Salak	Heritage building	The historical complex is housed in traditional Malay house. It features various memorials erected to honour Malay heroes.	1 (28.57%)
Traditional *Kutai* house and panoramic view of traditional village.	Bota Kiri, Padang Tenggala, Parit	Heritage building	There are about 40 Kutai houses with 30 still intact.	2 (23.80%)
Labu sayong.	Kampung Pulau Tiga, Kampung Bidara, Kampung Gajah	Traditional craft	*Labu sayong* or water container made of clay.	3 (19.05%)

Royal tomb (mausoleum).	Bota, Belanja, Pulau Tiga and Kampung Gajah,	Historical site	They are about 14 royal tomb sites along Perak River in Perak Tengah.	4 (14.28%)
Terrapin Wildlife Conservation Centre.	Bota Kanan	Natural heritage	An informative visitor centre on river terrapin species.	5 (9.52%)
Pekan sehari (day market).	Bota Kiri, Parit, Lambor, Kampung Gajah	Rural culture – daily life of community	Malay traditional market – selling daily needs.	6 (4.76%)

Heritage Itinerary

According to Leanza et al. (2016), the planning of tourist itinerary should have occurred within an appropriate heritage interpretation strategy as a working method, which could facilitate the understanding and social use of the heritage sites. The mapping of heritage itinerary for Perak Tengah District was done based on the cultural heritage categories, the location, the route (trail) and linkages between resources. An example of heritage itinerary is shown in Figure 3. The itinerary begins with a starting point, a heritage site that is already well-known based on the rank of tourist attractions in Table 2 above. Several other tourism products were selected for each *mukim* in Perak Tengah. The mapping of tourist attractions shows that most of the cultural heritage locations were concentrated in three small towns; Pekan Parit, Pekan Bota, and Kampung Gajah-Pasir Salak. Based on this mapping, the tourist route or heritage trail can be developed including the development of heritage interpretation strategy.

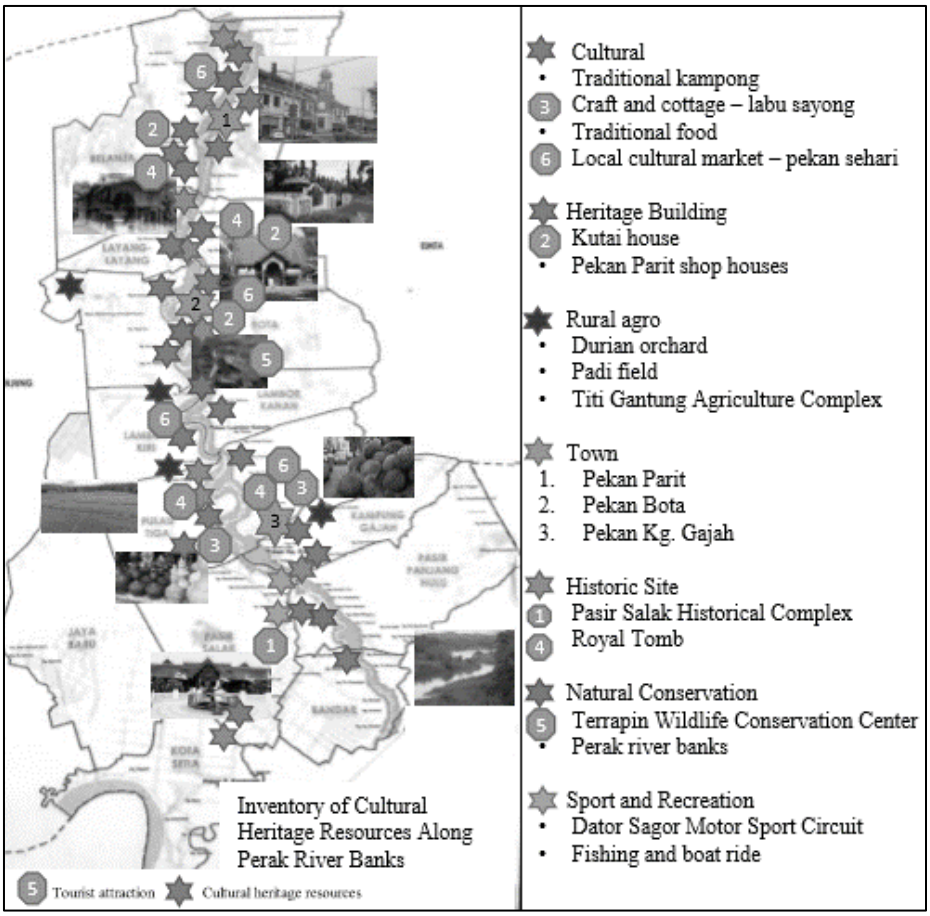


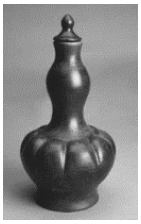
Figure 2: Area of Itinerary for cultural heritage tourism in Perak Tengah District

Interpretation Proposal

Heritage interpretation is an educational process that aims to reveal the meanings of our culture. Good interpretation enhances our understanding, appreciation, and therefore, protection of natural and cultural sites. Interpretation is an integral part of conservation (Beck & Cable, 2011). Interpretation guidance of Perak Tengah cultural heritage as proposed by this research was developed based on interpretation principles advocated by Tilden (1957), ICOMOS (1999), Beck and Cable (2011), and Tilkin, G. (2013) and manual of heritage interpretation by Lancaster County Planning Commission (2002) and FI NTDA (2012). In short, interpretation is a process to know and understand the meaning of cultural heritage. Besides the guiding principles on how the culture can be presented and what story to tell, interpretation is also an engagement programme between visitors and the heritage subjects. The interpretation guidance of cultural heritage

presented in this paper (Table 3) focuses on main resources, which were found (through focus group interviews) as most distinctive attractions and destinations for tourism in Perak Tengah District. It involves cultural heritage interpretation located in outdoor context.

Table 3: Interpretation guidance for cultural heritage in Perak Tengah District

Cultural Heritage Significance	Subject of Interpretation & Development of Story		Interpretation Medium
	What story to tell	How to show and tell	
Traditional Craft: *Labu sayong* Location: Kampung Pulau Tiga  Traditional water pitchers known as *labu sayong*	1. The history of *labu sayong* should associate with the place and people. E.g: *Labu* means pitcher while *Sayong* is a name of a small village near the river in the royal town of Kuala Kangsar. 2. The philosophy/ culture/ folks behind the craft making. E.g: it is believed that the drinking water stored in the *labu sayong* has certain health properties to cure common ailments like cough and fever. 3. How to make *labu sayong* pottery. Explain the steps and the design elements - clay motifs/decorations	1. A potter demonstrates his skills in the art of traditional pottery, using a table top hand-wheel to create a *labu sayong* 2. Visitors try their hands at making their own *labu sayong* 3. Activities for children – art clay project. Interpretation for children should stimulate children active participation in the theme	1. Printed materials - hand-outs, brochures, visitor guides on pottery making 2. Panels and banners – interpretive contents to attract visitors to take photo of before leaving the site. 3. Short video on *labu sayong* pottery 4. Souvenirs and handicraft for visitors
Heritage building: Traditional *Kutai* House  Impressive Malay architecture of *Kutai*	1. The history of *Kutai* house. E.g: The traditional Malay house in Perak is called '*Rumah Kutai*'. '*Kutai*' means old. 2. Background and origin of *Kutai* house. Who built it? Who lived	1. Visitor guide explaining the "what story to tell" to visitors. Architectural details of the house can be interpreted to tell a story	1. Printed materials - hand-outs, brochures on *Kutai* house 2. Signage, interpretive map/plan showing the interior or layout of *Kutai* house

house mainly located on the banks of Perak River	there? How did the building change over time? What factors led to the changes? 3. The architecture style and typology. What philosophy has influenced the design and space? What are the materials and construction methods of the house?	2. Living history interpretation – stay or spending a few days to experience the life in *Kutai* house and *kampung*	3. Gift and handicraft for visitors
Historical Site: *Makam DiRaja* or royal tomb (mausoleum)  The tomb of the Perak Sultanate is one of the heritage monuments that still exist and preserved	1. The history of Perak Sultanate and the ruling system 2. Tell about the settlement along Perak River and relationship with the tombs	1. Historical trail of royal tomb starting from Bota to Kampung Gajah 2. Story telling by interpreter/tourist guide	On-site installation or tailor-made interpretation 1. Information signage on history of the sultanate 2. Continuous way finding along Perak River to the tombs. The signage or way finding should be of distinctive design that associates with the history of the royal sultanate and can become a prominent landmark for the site

CONCLUSION

The purpose of interpretation is to make visitors see the place visited in a wider perspective. However, this research has identified several issues in heritage interpretation such as lack of organized interpretation programme in the rural area, incomplete tourist itinerary document, limited number of interpreters, unclear tourist trail, and lack of information and interpretation on heritage resources. Although the District of Perak Tengah has many cultural heritage resources, unfortunately without proper guidance on interpretation and presentation, the resources could not be promoted as tourist attractions. This paper has presented that effective interpretation plays the main role in promoting heritage tourism in the rural area. Interpretation plan is a document that provides

the process and strategies for interpretation and presentation of heritage. The plan identifies the heritage itinerary, key themes, storylines, and audiences and provides recommendations about interpretation media. It includes practical and specific advices on how to implement the plan. There is no doubt that formulating the interpretation plan will be a challenging one for those involved, but the results will be rewarding.

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THE DEMAND OF RECREATIONAL FACILITIES IN NEIGHBOURHOOD PARKS: VISITORS' PERSPECTIVES

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Abstract

The role of neighbourhood parks is becoming more significant to visitors as a recreational place. However, some recreational facilities are far from being preferred, thus become idle and unutilised. This study determines the demands for recreational facilities from the standpoint of the visitors. Hence, the objective of this study is to evaluate the demand for recreational facilities in a neighbourhood park. This study applied quantitative approach by using questionnaire survey to obtain data from visitors at five neighbourhood parks in the Petaling District. The findings showed that most respondents preferred "slightly agree" to "agree" and "slightly satisfied" to "satisfied" in regard to the demands of active and passive recreational facilities in neighbourhood parks. It is hoped that the findings of this study offer viable information for policymakers and planners in providing recreational facilities that are conducive in neighbourhood parks.

Keywords: active activity, demand, facility, neighbourhood park, passive activity, recreation, visitors

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INTRODUCTION

The development policy of open space and recreation has been applied in the public parks by the relevant national authority. However, this planning and development policy has been interpreted in a different way, causing inconsistent execution at the state and local authority levels. This has created queries concerning the development of public parks, including the provision of a public park. The provision of a public park is still at a low standard and insufficient to cater to the demand of visitors due to its inappropriate placement. To resolve this predicament, the planning guidelines for open space and recreation need to be enhanced so as to ensure that the development of open space is more organised and meets the principles of urban planning and development. According to the Department of Town and Country Planning (2013), the scope of this guideline is more detailed on the aspects of the design principles, while the general guidelines are meant for the provision of open space and recreational areas. The provision of open space, including areas allowed to be used in all public parks, is under the supervision of local authorities. However, these guidelines are not specific to the recreational facilities mainly in the neighbourhood park, hence the question related to the demand for recreational facilities. This topic has been probed by several researchers, such as Cohen et al. (2007), Sakip, Akhir, and Omar (2015), as well as Anuar, Ahmad, Nasir, and Zainuddin (2016).

A number of neighbourhood parks are abandoned due to the lack of facilities desired by visitors. Lindberg and Shipperijn (2015) found that several facilities failed to match the needs of the users. This is because the facilities provided do not meet the visitors' expectations (Anuar & Muhaidar, 2018). Those who participate in outdoor recreation activities expect to achieve specific outcomes, and subsequently evaluate if their recreation experiences are met (Oliver & DeSarbo, 1988; Graefe & Burns, 2013). Visitors typically favour specific park location, along with supporting facilities that best provide their preferred activities (Wolf, Wohlfart, Brown, & Lasa, 2015). These show that facilities in the park are a motivation to visit the park. Thus, studies on demand are essential to bridge the gap of knowledge pertaining to recreational facilities, particularly in neighbourhood park. Hence, the objective of this study is to evaluate the demand for recreational facilities in neighbourhood park.

LITERATURE REVIEW

As community awareness of healthy lifestyle increases, the usage of public parks as recreation centres is also increasing. Therefore, the development of a public park should consider the needs of the community as to maximise its usage. The local authorities have reserved 10% of the development area to develop a public park. These include botanical gardens, urban forest, and other public parks for active and passive recreational purposes. There are hierarchies of public recreational parks, which fall under the supervision of local authorities, such as

national parks, district parks, urban parks, local parks, and neighbourhood parks (Department of Town and Country Planning, 2013). The public park development needs to consider various factors of planning and management based on safety, comfort, and accessibility aspects (Anuar et al., 2016). The park management needs to ensure the cleanliness of the surrounding area and to control environmental pollution. Public parks should also be placed in accessible areas to facilitate the users. Besides, a public park must be functional as a buffer or separator zone from natural disasters. At the same time, the planning principles also advocate the need to create green environment in urban areas, as well as to create harmonious society by encouraging social interaction among the people. All these criteria should be incorporated in developing a neighbourhood park. Although the neighbourhood park is smaller than other public parks, the function remains the same; for the visitors to perform leisure and physical activities, as desired by the visitors and based on the facilities made available.

A neighbourhood park is an attraction for visitors to undertake physical activities and relieve stress after a hard day's work. Several researchers agreed that parks contribute not only to physical activities, but also in terms of the social well-being of their community, enhance property value, and improve public health (Kaczynski & Henderson, 2008; Sakip et al., 2015). Apart from that, parks give valuable significance to the image of the city, wherein urban green spaces create and strengthen the positive image of the community and the entire city (Jerke, Porter, & Lassar, 2008; Schwab, 2009; Balch, 2011; Chan, Peters, & Marafa, 2015). The importance of neighbourhood parks to visitors is always related to improving the aspect of social interaction amongst the community. Sakip et al., (2015) claimed that accessible parks can improve social cohesion and interaction as more people patronise them. Therefore, the recreational facilities in neighbourhood parks must meet visitors' expectations, as it is also a focal point for leisure and social bonding. There is a requirement of a neighbourhood park to always supply recreational facilities in line with visitors' requirements. According to Wolf et al., (2015), parks need to supply experiences and facilities consistent with the demand to satisfy visitors' expectations and to protect natural resources from oversupply. Park facilities must meet the visitors' demand to utilise the space sufficiently. In order to avoid a park from being abandoned, the public park planning must be sensitive and adhere to the visitors' demands. Therefore, it is essential to provide preferable facilities to maximise space utilisation.

RESEARCH METHOD

Study Area

This study focused on several neighbourhood parks located in the Petaling District of Selangor, Malaysia. Five neighbourhood parks under the supervision

of local authorities of Shah Alam City Council, Petaling Jaya City Council, and Subang Jaya Municipal Council, were identified as the sample (Table 1).

Table 1: Location of study areas

No.	Neighborhood Park	Local Authority	Size
1.	Section 7 Recreational Park	Shah Alam City Council	18.5 acre
2.	Section 10 Public Park	Shah Alam City Council	3.52 hectare
3.	Aman Park	Petaling Jaya City Council	19.85 acre
4.	Jaya Park	Petaling Jaya City Council	19.48 acre
5.	Sri Serdang Park	Subang Jaya Municipal Council	4.0 acre

Questionnaire Survey and Sampling of Respondents

The quantitative approach was used to evaluate the demand for recreational facilities in the selected neighbourhood park from the standpoint of the visitors. This approach was selected based on the retrieved data. Therefore, a purposive sampling technique under non-probability sampling had been used in this research. A total of 250 visitors from the five neighbourhood parks in Petaling District were chosen as respondents in this study.

Method of Analysis

The data from the quantitative survey were analysed using SPSS version 20.0. The ordinal and nominal data were scrutinised to obtain results in terms of frequency, percentage, and mean score, so as to meet the outlined objectives.

RESULTS AND FINDINGS

Demand of Recreational Facilities in Neighbourhood Park.

The types of recreational facilities were evaluated based on active and passive activities. The highest mean represents the preferable facilities provided to the visitors. However, the list of recreational facilities provided in the neighbourhood park differed between each neighbourhood park. The results without mean score signified the absence of facilities in the studied neighbourhood parks.

Active Recreational Facilities

The jogging track is the main active recreational facility that met the demand of visitors in three neighbourhood parks (Table 2). The total mean scores for jogging track were 3.52, 3.76, and 3.84, which ranged from "slightly agree" to "agree" amongst visitors at Section 7 Recreational Park, Jaya Park, and Sri Serdang Park.

This result shows the awareness towards healthy living among the community in Petaling District. However, the integrated playground was the highest active recreational facility that met the demand of visitors in Section 10 Public Park with a mean score of 3.25. Aman Park, equipped with a reflexology path, had the highest active recreational facilities that met the demands of the visitors with a mean score of 3.98. Most of the visitors agreed with the active recreational facilities provided by the local authority ranging from "slightly agree" to "agree". These mostly motivated the visitors to spend time at the neighbourhood park.

Table 2: Active recreational facilities provided in neighbourhood park

Active Facilities	Section 7 Recreational Park (Mean)	Section 10 Public Park (Mean)	Aman Park (Mean)	Jaya Park (Mean)	Sri Serdang Park (Mean)
Outdoor gym	3.48	-	3.62	3.46	-
Integrated playground	3.34	3.25	3.80	3.42	3.26
Reflexology path	3.06	2.75	3.98	-	3.20
Tai chi plaza	2.86	-	-	-	-
Jogging track	3.52	2.85	3.90	3.76	3.84
Multipurpose court	-	2.55	-	-	-
Swing	-	3.00	3.12	3.54	3.14
Basketball court	-	-	3.72	-	3.28
Takraw court	-	-	3.08	-	2.68
Parcouse	-	-	3.44	-	-
Amphitheatre	-	-	3.42	-	-
Exercise Equipment	-	-	-	-	3.44

Note: (-) means not available in that particular neighbourhood park

Passive Recreational Facilities Provided in Neighbourhood Park

Table 3 shows the highest mean scores of 3.26 and 3.64 for passive recreational facilities at Section 7 Recreational Park and Section 10 Public Park. The results showed "slightly agree" and "agree" concerning the gazebo facility in this type of neighbourhood parks. This facility obtained the highest score amongst the passive recreational facilities because the visitors were more interested in health-related activities, apart from releasing stress. The Aman Park benches received the highest mean score as the passive recreational facility with a mean score of 3.62. This is similar to two other neighbourhood parks; Jaya Park (mean score 3.90) and Sri Serdang Park (mean score 3.72). Most of the visitors selected "slightly agree" and "agree" for these facilities as they preferred more relaxing activities after work.

Table 3: Passive recreational facilities provided in neighbourhood park

Passive Facilities	Section 7 Recreational Park (Mean)	Section 10 Public Park (Mean)	Aman Park (Mean)	Jaya Park (Mean)	Sri Serdang Park (Mean)
Gazebo	3.26	3.65	3.48	3.72	3.18
Picnic table	3.06	-	-	3.88	3.60
Benches	3.16	3.40	3.62	3.90	3.72

(-) means not available in that particular neighbourhood park

The Condition of Recreational Facilities Provided in Neighbourhood Park

Table 4 shows the condition of active recreational facilities provided in the neighbourhood park. The condition of the outdoor gym obtained the highest mean score of 3.40 at Section 7 Recreational Park. However, the integrated playgrounds in Section 10 Public Park and Jaya Park were in a satisfying condition with mean scores of 3.20 and 3.70. The Aman and Sri Serdang Parks, which had jogging tracks, had the highest mean scores of 4.02 and 3.92. The condition of the facilities was "slightly satisfied" and "satisfied" for the neighbourhood parks, respectively.

Table 4: The condition of active recreational facilities provided in neighbourhood park

Active facilities	Section 7 Recreational Park (Mean)	Section 10 Public Park (Mean)	Aman Park (Mean)	Jaya Park (Mean)	Sri Serdang Park (Mean)
Outdoor gym	3.40	-	3.64	3.42	-
Integrated playground	3.30	3.20	3.66	3.70	3.30
Reflexology path	3.04	2.80	3.96	-	2.84
Tai chi plaza	2.72	-	-	-	-
Jogging track	2.98	2.85	4.02	3.46	3.92
Multipurpose court	-	3.05	-	-	-
Swing	-	2.95	3.38	3.54	3.16
Basketball court	-	-	3.40	-	2.94
Takraw court	-	-	3.60	-	2.66
Parcouse	-	-	3.64	-	-
Amphitheatre	-	-	3.42	-	-
Exercise Equipment	-	-	-	-	2.90

Note: (-) means not available in that particular neighbourhood park

Table 5 presents the condition of passive recreational facilities provided in the neighbourhood parks. Section 7 Recreational Park and Sri Serdang Park, equipped with gazebos, secured the highest mean scores of 3.20 and 3.44. As for

Section 10 Public Park, Aman Park, and Jaya Park, most of the visitors were slightly satisfied with the condition of benches with the highest mean scores of 3.40, 3.76, and 3.98. The visitors were indeed satisfied with the facilities provided in these neighbourhood parks, either "slightly satisfied" or "satisfied". Based on the observations made, the condition of the facilities, sometimes, appeared challenging to maintain due to vandalism and constricted budget from the local authorities.

Table 5: The condition of passive recreational facilities provided in neighbourhood park

Passive Facilities	Section 7 Recreational Park (Mean)	Section 10 Public Park (Mean)	Aman Park (Mean)	Jaya Park (Mean)	Sri Serdang Park (Mean)
Gazebo	3.20	3.30	3.56	3.78	3.44
Picnic table	3.08	-	-	3.72	3.22
Benches	3.04	3.40	3.76	3.98	3.38

(-) means not available in that particular neighbourhood park

The Quantity of Recreational Facilities Provided in Neighbourhood Park

Table 6 shows the quantity of active recreational facilities provided in the neighbourhood parks. The quantity of the jogging tracks in Section 7 Recreational Park, Aman Park, Jaya Park, and Sri Serdang Park is reasonable and adequate with mean scores of 3.50, 3.96, 3.58, and 3.76. Most of the visitors "slightly agreed" and "agreed" with the quantity of jogging tracks provided as they were sufficient, adequate, and fulfilled the demands of the visitors.

Table 6: The quantity of active recreational facilities provided in neighbourhood park

Active facilities	Section 7 Recreational Park (Mean)	Section 10 Public Park (Mean)	Aman Park (Mean)	Jaya Park (Mean)	Sri Serdang Park (Mean)
Outdoor gym	2.92	-	3.36	2.98	-
Integrated playground	3.08	3.05	3.62	3.40	3.04
Reflexology path	2.78	2.85	3.42	-	2.78
Tai chi plaza	2.98	-	-	-	-
Jogging track	3.50	3.15	3.96	3.56	3.76
Multipurpose court	-	3.20	-	-	-
Swing	-	3.28	3.22	2.86	2.98
Basketball court	-	-	3.30	-	2.88
Takraw court	-	-	3.32	-	2.42
Parcouse	-	-	3.72	-	-
Amphitheatre	-	-	3.62	-	-

Exercise Equipment	-	-	-	-	3.10

Note: (-) means not available in that particular neighbourhood park

Table 7 illustrates the quantity of passive recreational facilities provided in the neighbourhood parks. Section 7 Recreational Park had picnic tables, thus was awarded with the highest mean score of 2.90 due to its quantity. Next, Section 10 Public Park and Jaya Park had most of the visitors to slightly agree with the gazebos made available with the highest mean scores of 3.25 and 3.86. In Aman and Sri Serdang Parks, most of the visitors slightly agreed with the number of benches provided with mean scores of 3.68 and 3.82. Therefore, most of the visitors appeared to "slightly agree" and "agree" with the number of passive facilities, except in Section 7 Recreational Park, as they felt that the number of passive facilities should be added based on their preferred activities.

Table 7: The quantity of passive recreational facilities provided in neighbourhood park

Passive Facilities	Section 7 Recreational Park (Mean)	Section 10 Public Park (Mean)	Aman Park (Mean)	Jaya Park (Mean)	Sri Serdang Park (Mean)
Gazebo	2.88	3.25	3.54	3.86	3.38
Picnic table	2.90	-	-	3.64	3.24
Benches	2.78	3.15	3.68	3.80	3.82

Note: (-) means not available in that particular neighbourhood park

The Placement Recreational Facilities Provided in Neighbourhood Park

Table 8 presents the placement of active recreational facilities provided in the neighbourhood parks. Most of the visitors favoured the placement of jogging tracks with the highest mean score for all types of neighbourhood parks in Petaling District. This shows that most visitors "slightly agreed" and "agreed" with the placement of active recreational facilities provided by the local authority. In Table 8, most of the visitors "did not agree" with the placement of sports facilities, such as reflexology path, tai chi plaza, multipurpose court, and takraw court. They felt that these sports facilities are inappropriately placed and unused.

Table 8: The placement of active recreational facilities provided in neighbourhood park

Active facilities	Section 7 Recreational Park (Mean)	Section 10 Public Park (Mean)	Aman Park (Mean)	Jaya Park (Mean)	Sri Serdang Park (Mean)
Outdoor gym	3.28	-	3.78	3.68	-
Integrated playground	3.28	3.05	3.86	3.66	3.04
Reflexology path	2.96	3.15	3.70	-	3.06

Tai chi plaza	2.96	-	-	-	-
Jogging track	3.38	3.25	4.24	3.70	3.86
Multipurpose court	-	2.95	-	-	-
Swing	-		3.56	3.60	3.56
Basketball court	-	-	3.40	-	3.22
Takraw court	-	-	3.70	-	2.64
Parcouse	-	-	3.68	-	-
Amphitheatre	-	-	3.70	-	-
Exercise Equipment	-	-	-	-	3.28

(-) means not available in that particular neighbourhood park

Table 9 illustrates the placement of passive recreational facilities provided in the neighbourhood parks. These passive facilities are an option for visitors to relax and appreciate nature. Thus, it is a priority to place these facilities in an appropriate and accessible area. Therefore, Section 7 Recreational Park revealed the highest mean score of 3.58 for its placement of picnic tables. Meanwhile, in Section 10 Public Park, Jaya Park, and Sri Serdang Park, most visitors selected the benches placement with the highest mean scores of 3.40, 4.02, and 3.80, respectively. The results in Aman Park showed that a majority of the visitors agreed with the placement of the gazebos with a mean score of 3.94. This showed that most of the visitors "slightly agreed" and "agreed" with the placement of passive recreational facilities in the five studied neighbourhood parks.

Table 9: The placement of passive recreational facilities provided in neighbourhood park

Passive Facilities	Section 7 Recreational Park (Mean)	Section 10 Public Park (Mean)	Aman Park (Mean)	Jaya Park (Mean)	Sri Serdang Park (Mean)
Gazebo	3.06	3.20	3.94	3.84	3.36
Picnic table	3.58	-	-	3.50	3.56
Benches	2.86	3.40	3.58	4.02	3.80

Note: (-) means not available in that particular neighbourhood park

SUMMARY AND CONCLUDING REMARKS

This study determined if the recreational facilities provided by the local authorities in the neighbourhood park met the demands of the visitors. The challenge of providing sufficient facilities in the neighbourhood park is to ensure that the recreational facilities are in line with the visitors' expectations. Some parks have overlooked the provision of recreational facilities suitable as a recreation spot to the local community. Recreational facilities in the

neighbourhood park should suit the area and support the activities frequented by its visitors to meet their recreational demands. The respondents defined recreational facilities based on active and passive activities. The findings for Section 7 Recreational Park showed that the respondents demanded more active recreational facilities. As for the Section 10 Public Park, the respondents preferred passive recreational facilities, such as a rest area, to release stress. The findings in Aman Park were more towards active recreational facilities with reflexology path and a jogging track, which appeared to be the highest demands from the visitors. The results for Jaya Park showed that the respondents preferred passive recreational facilities as the highest demand, while the Sri Serdang Park visitors were happy with active recreational facilities as the highest demand. The results are further supported by the following statement provided by the respondents:

> *"At section 7, most of the residents are young people. They like jogging most of the time when visiting the neighbourhood park" (25 years old, Malay).*

> *"Supposedly, more facilities in this park can be used by all age groups. It will offer a variety of games in the public park" (34 years old, Malay).*

Therefore, the type of recreational facilities differs depending on the needs of the visitors. The availability of the recreational facilities, such as condition, quantity, and placement, is related to the park use and park visitation. Overall, this study contributes in extending the knowledge and practice in the field of park and facility management.

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EXPLORING POSSIBLE USAGE FOR ELEVATED HIGHWAY INTERSTITIAL SPACES: A CASE STUDY OF DUKE AND AKLEH, KUALA LUMPUR

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Abstract

Kuala Lumpur has seen rapid development of mass amount of highway infrastructure. Although elevated urban highways in Greater Kuala Lumpur may have relieved the intercity and interstate traffic, the presence of this urban infrastructural landscape promotes the creation of lost spaces. The construction of the highways, primarily the elevated ones, often create spaces underneath the structure that are often neglected in mainstream planning and design. This paper aims at investigating typologies of interstitial spaces and its characteristics beneath elevated highway based on available literature as well as to explore the possibilities of usage for spaces below the elevated highway. This research employs qualitative method that involves primary and secondary data collection. The primary data were gathered through site observational study at two major elevated highways in the Greater Kuala Lumpur area -DUKE 1 Highway and AKLEH Highway. A review and content analysis of documents related to urbanization and planning transportation provide secondary data. Findings from this study suggest that [1] although the highways enhance connectivity and ease traffic movement, it also leads to abundance of wasted land and spaces [2] an improved understanding of the typologies and characteristics of these interstitial spaces shall aid in the improvement of their future usage.

Keywords: infrastructural landscape, interstitial spaces, elevated highway

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INTRODUCTION

Studies and research in landscape urbanism field have focused on infrastructure as the most important generative public landscape. Mossop (2006) describes that these omnipresent urban environments have been considered and evaluated solely on technical criteria and somehow exempted from having to function socially, aesthetically, or ecologically. In a study by SWA Group (2011), it was highlighted in the context of our rapidly changing urban environment, infrastructure is experiencing a paradigm shift where multiple-use programming and the integration of latent ecologies is a primary consideration. Redefining modern infrastructure requires a multi-disciplinary team of landscape architects, designers, engineers, architects and planners to fully realize the benefits to our cultural, social and natural systems. Such a re-examination of infrastructural space involves the recognition that all types of space are valuable, not just the privileged spaces of more traditional parks and squares, and they must therefore be inhabitable in a meaningful way. Hence, the mono functional realm of infrastructure requires new approaches and more sustainable design concepts for difficult spaces particularly under elevated highways and as well as complex transit interchanges must therefore be explored and examined. These spaces make up a large proportion of urban land and are of interest to many stakeholder groups. While they are often viewed as dangerous or unsightly, they can be an economic, social, and ecological resource (Kremer & Hamstead, 2015; Anderson & Minor, 2016).

Like most cities in the developing world, Kuala Lumpur has experienced rapid development which has left the city, in many respects, disjointed and lacking in spatial coherence in both visual and physical aspect. Described briefly in the Kuala Lumpur Structure Plan 2020, major roads primarily highways and rail infrastructure, have in many places effectively divided adjacent spaces and areas or neighbourhoods that remain physically close but virtually inaccessible to each other. Elevated highways are described as pieces of infrastructure, which seldom attract people's affection and pose a constant provocation, although practical and financial reasons suggest to simply accepting their presence. (Harnack & Cohler, 2011). Following this, Crisman, (2012) stated that the resulting interstice, "a space that intervenes between one thing and another," often generates seemingly uninhabitable zones and problematic discontinuities in the physical and social fabric. Issues relating to the formation and unclear function of these lost spaces has mostly been discussed in the western world and still limited within surrounding region (Qamaruz-Zaman et al., 2013; Clements, 2013; Sanches & Pellegrino, 2016).

Scholars, designers and planners, spanning multiple fields of practice, have noted that the issue is a result from of a lack of integration during the planning and design process, and that the problem of left over spaces is indeed a gap that is to be addressed (Trancik, 1986; Mossop, 2006; Crisman, 2009;

Prasetyo & Iverson 2014; Akinci, Demir, & Demirel, 2016). Barter's study (2004) disclosed significant issues about highways in Kuala Lumpur which demonstrates the high ratio of highways as compared to the number of population (68 meters per 1000 population). Therefore, to address the issues at hand, there is a need to understand the current situation of the existing left-over spaces under the elevated highways in Kuala Lumpur. This paper aims at investigating typologies of interstitial spaces and its characteristics beneath elevated highway based on available literature as well as to explore the potential of usage for spaces below the elevated highway.

LITERATURE REVIEW

Elevated Highways and the Emergence of "Lost Spaces"

Regarded as the most commonly used and economical mode of human transportation, highway transportation is the most important connection in the landscape between rural and urban areas. The creation of 'Elevated highway' or 'flyover' as commonly referred to in the United Kingdom and most Commonwealth countries (Akinci et al., 2016) has been mentioned as one of the major drivers of landscape change worldwide. Adding to this, landscape fragmentation caused by transportation infrastructure has a number of effects on almost all components of landscapes, including aesthetic, ecological, historical, and recreational qualities (Forman et al., 2011).

Elevated highways have often been built in the following urban areas: surround urban periphery, river bank, industrial area and the one that cut through the low-income housing (Biesecker, 2015). The development of this kind infrastructure would primarily increase the accessibility and mobility of urban dwellers but at the same time become barriers that separate district or neighbourhood. Saouma (2008) conducted a thorough analysis of the impact of elevated highways in Bourj Hammoud, Beirut. Her findings revealed six types of impacts as shown in Figure 1. During the early phase of the construction of elevated highways, this infrastructure has not only promoted growth and development of cities, it also became a symbol of progression, increased accessibility, and mobility to urban residents (a). Because of its efficiency that have shortened the travelling distances, elevated highways have dominated the urban fabric (b). Such intrusion of urban structure has given bad impact in which it creates physical and psychological barrier that segregates neighbourhoods (c). Additionally, the undefined spaces under the elevated highway have often been misused (d) as it only allows minimum natural lighting and poor ventilation (e). Due to its poor quality and accessibility, the underpass spaces became lost spaces without functional activities (f).

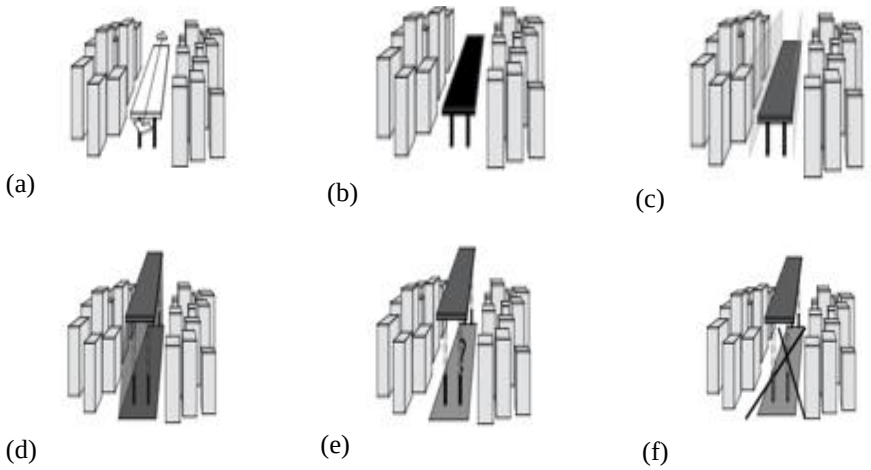

Figure 1: The six impacts of elevated highways in Beirut
Source: Saouma (2008)

As a result from increasingly fast high performance infrastructural development particularly highways that dissects through urban spaces, empty and leftover spaces would present within the urban fabric. The emerging of undefined spaces along and under elevated highways affect the way we experience the city. They disconnect neighbourhoods, produce undesirable views, and act as physical and psychological barriers making the pedestrian experience unpleasant (Trancik, 1986). The unclear and inappropriate use of the vacant spaces under elevated highways can lead to social and economic problems. In addition, these unwanted spaces may lowering the value of adjacent properties (Halprin, 1966).

Elevated highways are described as pieces of infrastructure, which seldom attract people's affection and pose a constant provocation, although practical and financial reasons suggest to simply accepting their presence (Harnack & Cohler, 2011). Adding to this, Crisman (2012) stated that the resulting interstice, "a space that intervenes between one thing and another," often generates seemingly uninhabitable zones and problematic discontinuities in the physical and social fabric. The author furthermore explained that these edges and leftover spaces are rarely considered worthy of design attention for they are ugly, ordinary and out of the way, they present difficult existing conditions and unglamorous realities.

The by-product of massive infrastructural development particularly elevated highways often results in residual spaces considered as mere voids and lost opportunities (Anuar & Ahmad, 2017), which have always emerged as the number of highways increased due to the needs and demands. The areas under highway viaducts and bridges are defined as dead spaces. Wall (2011) described several key characteristics can be examined in relation to the features of

interstitial spaces generally located between or under elevated highways: they are small, irregular and enclosed. These spaces are often made as small as possible, in order to balance with the need to minimize the area of land for the high capacity infrastructure while maximizing the efficiency of the system. The spaces are also enclosed on at least one side, and in this case it is clearly apparent that the space is dominated on one side by the expressway.

In addition to the general characteristics of interstitial space as discussed by Wall (2011), the authors furthermore highlighted that left over spaces also generally appears to be undefined in use, ownership, management and function. These leftover spaces often project a sense of abandonment in contrast to the highly managed and planned infrastructure above it (Anuar, Saruwono, & Said, 2014). Landscape architecture sees them as part of urban space's landscape system, land use, traffic and public areas (Akinci et al. 2016). These interstitial spaces they are often overlooked, and are often relegated as 'wastelands', 'derelict areas' and 'urban voids' as described by Doron (2000). They represent socio-economic abandonment and dereliction and are excluded from the ideal, as they run contrary to the dominant desired image of the city. Interstitial, dilapidated, dis-used and marginal sites punctuate the often highlighted and controlled formal public spaces, parks and the everyday spaces of the modern city. They are referred to in various literatures and discussions from the realms of architecture, planning, design and urban theory as 'lost space' (Trancik, 1966), 'dead zones' (Doron, 2000) and 'the shadow' (Malterrre-Barthes, 2011).

RESEARCH METHODOLOGY

Scope of Study

This study focuses on the impact of elevated highways with regards to the creation of lost spaces and how an improved understanding of the characteristics of these spaces can help designers and planners to better utilize it. It is based on the perception and observation of the authors during a period of site visits.

Case Study

This research employs a case study which allows the authors to examine contemporary phenomenon within the real-life situation using the qualitative method. Site observation and data collection of the left over spaces on site were guided by a systematic framework established by Franck (2011). The framework allowed the authors to document systematically the six variables *vis-à-vis* activities, location, time, characteristics, site adaptation as well as the status of the activity within the studied site. The observed variables were analysed and summarized as represented in Table 2. Duta Ulu Kelang Expressway or abbreviated as DUKE expressway was selected as the first case study. It is elevated, primarily parts that run across dense urban communities and

neighbourhoods resulting in the presence of multiple interstitial spaces. Diverse in form, these spaces share the common conditions of enclosure, emptiness and in some parts unclear function. Along the expressway, these by products are enclosed by large scaled infrastructural forms in contrasting scale to the void it holds below. The site of the case study is located underneath the DUKE highway near the Jalan Pahang ramp and Sentul Pasar Interchange (Figure 2). Presently, the surrounding major site context includes religious institutions - Jamiul Ehsan Mosque, commercial lots as well as a newly built mix residential tower – The Reach @ Titiwangsa.

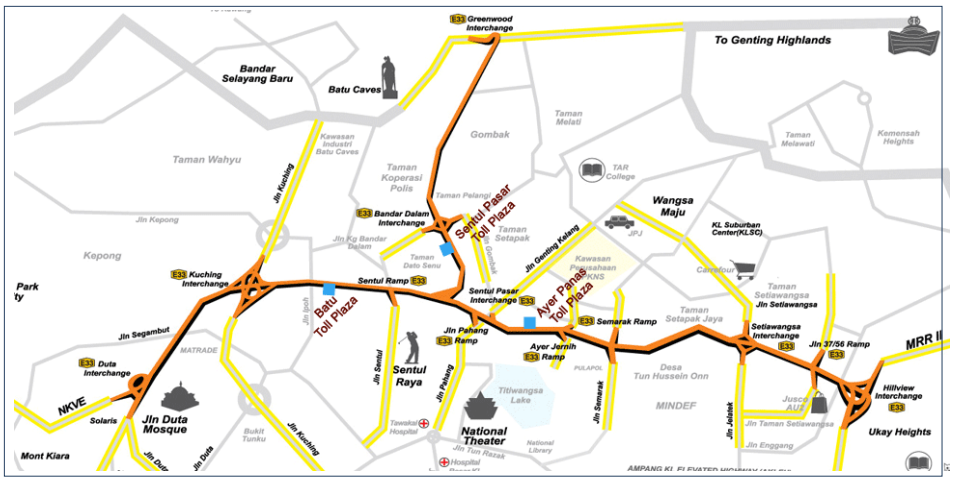

Figure 2: DUKE Highway showing route of Jalan Pahang Ramp and Sentul Pahang Interchange
Source: klia2.info

The second case study is the areas underneath the Ampang Kuala Lumpur Elevated Highway (AKLEH), ranging from Kampung Kuala Ampang MRR2 interchange to the Dato' Keramat interchange. The two case studies were selected as both of them possesses some of the largest amount of lost spaces underneath elevated highways in Kuala Lumpur and were deemed appropriate to be selected as case studies.

Case Study 1: DUKE Highway Phase 1: Jalan Pahang Ramp – Sentul Pasar Interchange

The activity recorded showcases various formal as well as informal activities within site. Sidewalks and roadside curbs were seen being used as informal spaces for commercial activities. Many of the social and spatial characteristics by the selling of food and beverages showcased a publicly owned, flat surface with a constant flow of passer by pedestrians (Figure 3). The activities usually occur in

the morning until late in the evening as the site gets relatively dark and the number of pedestrians in the area dwindles.

The commercial activity within site was deemed as informal and temporary as it lacks proper amenities such as kiosk, proper sitting area or tables. It is regarded as illegal hence the "*dilarang berjaja*" signage. Apart from the space being used for selling of food products, the nature of the space which is covered by the overhead deck of the highway allowed the space to be utilized as a temporary shelter by pedestrians and motorcyclist from the rain (Figure 3).

Figure 3: Selling of food and motorcyclists taking refuge underneath DUKE near the Jalan Pahang – Sentul Pasar Interchange
Source: Author

Other activities and use of space included informal but allowable parking sites; since no marking of proper parking lots was observed during the time of the fieldwork and vehicles were observed and recorded being parked in unmarked open spaces as shown in Figure 4. Vehicles were seen being parked here primarily during the daytime, and as night falls, the space would be left empty, unused and unattended. The unclear function of the space also attracted illegal activities, as some parts of the spaces was recorded being utilized as illegal dumping sites (Figure 4).

Figure 4: Ambiguity and vagueness of specific function is represented in these two photographs underneath DUKE.
Source: Author

Case Study 2: Ampang Kuala Lumpur Elevated Highway (AKLEH). Kampung Kuala Ampang -

Several key characteristics can be examined in relation to the features of interstitial spaces generally located between or under elevated highways: they are small, irregular and enclosed (Wall, 2011). These characteristics can be associated with the spaces present under several areas of the AKLEH. In the case of AKLEH, the notion of Wall's characteristics was present, the spaces were indeed small, irregular and enclosed. These spaces are made as small as possible, in order to balance with the need to minimize the area of land for the high capacity infrastructure while maximizing the efficiency of the system.

Through observation, it was also apparent that the available spaces under the structure are also irregular in form as they are definite to the forms of the above structure. The elevated structure also echoes the flow of the Ampang River in which the structure is built on top of (Figure 5). The spaces are also enclosed on at least one side, and in this case, it is clearly apparent that the space is dominated on its overhead plane by the expressway and in most areas flanked by retaining walls along the river bank. The sense of scale between the infrastructural network and the human activity is a contrasting site to view. Human scaled activities present at this site remains insignificant if it was to compare with the function of the massive structure positioned overhead. The discontinuation between the interstitial spaces is furthermore accentuated by the contrast in scale between the structure and the adjacent neighbourhood. Moreover, the massive form and high paced nature of the AKLEH intensifies the juxtaposition of scale. Wall (2011) furthermore highlighted that left-over spaces also generally appear to be undefined in use, ownership, management and function. As observed, the spaces underneath AKLEH suggest the same (Figure 5). Vacant spaces still suggest vagueness in terms of specified use as well as function.

Figure 5: The neglected vacant space below AKLEH negligence devoid of specific function
Source: Author

These leftover spaces project a sense of abandonment and lost opportunities in contrast to the highly managed and planned infrastructure above it. The spaces underneath AKLEH were in contrast to the spaces observed underneath DUKE, where activities observed were limited to [1] people using the concrete bank of the river as passage ways and [2] people sat and fished for aquatic life on some parts of the riverbank (Figure 6).

Figure 6: Spaces underneath AKLEH are visually more attractive as compared to the one at DUKE, but they are rather less functional and utilizable
Source: Author

RESULTS AND FINDINGS

The case of DUKE and AKLEH puts forth multiple key issues and challenges, the fragmentary nature of these lines of infrastructure has sealed off the urban fabric that has minimal connection to the adjacent spaces. The summary of the six variables that were observed and analysed at DUKE and AKLEH is shown in Table 2.

Table 2: Summary of site observation of DUKE [D] and AKLEH [A]

Activity	Location	Time	Site Characteristics	Adaptation	Status
[D]Selling of food items	Near roadside, on road shoulder	Daytime only, from mid-morning to late evening	Adjacent to passing road (Jalan Pahang) and pedestrian ways	Temporary, modular and non-permanent tables and stools	Illegal but sometimes tolerated. Unclear
[D]Vehicular parking	Inner part of the space underneath DUKE	Daytime only. Morning until late evening.	Expansive, unobstructed surface, somewhat secluded, dark.	Some areas have wire fencing, but no parking lot markings	Tolerated, legal. Unclear as space is not formal parking area
[D]Temporary shelter from weather	Near roadside (Jalan Pahang)	During rainy weather.	Open space, permanent sitting near elevated highway's columns.	Permanent sitting made from galvanized steel pipe set up	Tolerated, legal

		Day and night		by the local council to be used as sitting/waiting area for pedestrians	
[D]Waste dumping	Inner part of the space underneath DUKE	-	Open space, secluded area of the site.	-	Illegal
[A]Walking, Pedestrian route	Along concrete riverbank	Daytime	Flat concrete riverbank	-	informal
[A]Fishing	Along concrete riverbank	Daytime	Flat concrete riverbank, sheltered overhead by highway	-	informal

Source: Author

Based on Table 1, the characteristics of the spaces under DUKE and AKLEH resemble Sola-Morales' (1995) descriptions in which these are the spaces with unincorporated margins, interior islands, void of activity, oversights that often un-inhabited, unsafe and un-productive. In a nutshell, they are foreign to the urban system, mentally exterior in the physical interior of the city, its negative image, as much a possible alternative. Apart from that, findings from both case studies spot three similarities with the Saouma's (2008) six impacts of the elevated highways in Beirut. First, the underneath space at DUKE has allow minimal day light, making this space pretty gloomy, dull and less attractive. Second, the presence of AKLEH creates both physical and psychological barriers which segregate and minimize accessibility within the adjacent neighbourhood. Finally, the characteristics of undefined spaces underneath DUKE and AKLEH are rather similar to the underpass spaces in Bourj Hammoud, Beirut. It is fuzzy, misused and unwanted by the communities which could to a certain degree be associated with potentials of unhealthy and illegal social activities (Halprin 1966; Branas et al., 2011).

As described in the Kuala Lumpur Structure Plan 2020, infrastructure has caused adjacent spaces and areas or neighbourhoods to be divided and that they remain physically close but virtually inaccessible to each other. This key issue is significantly apparent through the observation of these case studies. The lack of continuity at the ground level in terms of support activities, scale as well as a definitive space function has caused severe fragmentation of adjacent spaces primarily effecting the surrounding areas. This physical and visual fragmentation is furthermore intensified with the issue of ownership as well as permissible use.

Further observations and analysis of the site could be suggested as a measure for a better understanding of how people actually utilize these seldom seen spaces. Most of the activities observed were temporary and informal in nature. The challenge is now for both designers and planners to understand how people adapt to these lost spaces and develop a plan that is systematic and practical for these spaces but still, in the words of Franck (2011), allow citizens opportunities to imagine and create their own scenarios.

CONCLUDING REMARKS

Findings from this study suggest that location and characteristics are the most significant variables which determine types of activities and level of users' adaptation towards the ambience of undefined spaces created by the elevated highways. Underneath spaces at DUKE illustrate the more accessible the spaces within the adjacent neighbourhood, the more likely temporary activities take place, particularly during day time. In sum, the presence of undefined and less functional spaces under the elevated DUKE and AKLEH are certainly foreign to the overall urban system. The occurrence of leftover spaces in urban fabric should be minimized. Urban intervention which could transform negative spaces into a more usable and multifunctional public spaces, primarily under the elevated highway shall be embraced by urban designers and other stakeholders. In the New Urbanism Paradigm, the tactical approach inspired from urban experiment has become paramount. It intended to temporarily or permanently transform underused spaces into outdoor eating areas, park-like spaces or gathering place through beautification. The phrase use in the Project for Public Spaces "lighter, quicker, cheaper" shall be adopted to promote various intervention for positive change in neighbourhood and communities. The suggested approach through tactical urbanism seems feasible as an effective remedy for redesigning the unused spaces which could be transform into a meaningful place with a sense of ownership and attachment.

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GIS-BASED REGRESSION ANALYSIS OF THE RELATIONSHIP BETWEEN ECOLOGICAL FOOTPRINT AND ECONOMIC DEVELOPMENT OF SELECTED COUNTRIES

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Abstract

Ecological footprint is an innovative concept to present the consumption of natural resources and generation of waste in terms of the Earth biological carrying capacity in a standardized format. The Earth overall sustainability can also be measured with the idea of ecological footprint and bio-capacity. The aim of this paper is to analyse the interactive spatial relationship between economic development and ecological footprints of selected nations. The GIS-based spatial regression tool Ordinary Least Square (OLS) and Geographically Weighted Regression (GWR) are used for fulfilling the purpose. Individual components of ecological footprints - cropland, grazing land, fishing ground, forest land, built-up land and carbon footprints - are also analysed against the per capita GDP of the nations in order to understand the interrelationship between them. The analysis has found a significant relationship between ecological footprint and economic development and the OLS model can explain approximately 64% of the variation in the dependent variable with the explanatory variables. The study has also found that nation's economic development contributes much in increasing the carbon footprint. The resulted outcome is significant enough to warrant a study on the spatial dimension of environment and economy in order to analyse the individual nation's economic growth and its relationship with environmental degradation, which can ultimately influence the global environmental sustainability.

***Keywords*:** ecological footprint, economic development, sustainability, regression analysis

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INTRODUCTION

There is always an integrated relationship between economic growth and environmental impact on the development of human civilization. Natural ecosystem is one of the major components of the environment that has an inevitable connection with the economic activities (Wang, Kang, Wu & Xiao, 2013) and the needs of human are supposed be met through balancing the ecological components without compromising the health of ecosystems (Callicott & Mumford, 1997). However, overconsumption of natural assets can turn into the degradation of ecological system services in general and leads towards the depletion that can hardly be restored (MEA, 2005). In this situation, the sustainability of the environment cannot be ensured. In order to seek balance between these two factors, a considerable interest in analysing this interrelationship has been geared up among researchers over the past decades and the idea of ecological footprint was developed.

Ecological footprint is an important concept that estimates the Earth biological carrying capacity required to support the resource use of human and their produced waste in a standardized format (Venetoulis & Talberth, 2008). According to Wackernagel et al. (2005), ecological footprint measures how much of the annual regenerative capacity of the biosphere is required to renew the resource input of a defined population in a given year. The total productive land area is calculated on Global Hectare (GHA) unit that supplies the natural resources and processes the wastes of a particular entity. Ecological footprint is most commonly used to estimate a nation's consumption in National Footprint Accounts (NFAs), consisting the aggregate result of six individual sectors made up of cropland footprint, grazing footprint, forest land, carbon footprint, fish footprint and total built up land (Lin et al., 2016).

The NFAs determine whether a particular country exceeds its ecological limits by consuming more renewable products than could be sustainably produced on the available land area of that country that is called "bio-capacity". Although, the NFAs of countries are measured every year to show total bio-capacity reserve and deficits, particular study is required to represent the specific relationship between a country's economic growth as well as particular socio-economic development indicators and the ecological footprint. Geographic Information System (GIS) can efficiently exhibit both of the statistical and spatial interrelationship between these ecological variables with the economic components using regression analysis (Anselin, 1998). Thus, the primary aim of this study is to analyse and visualize the relationship between ecological footprint and economic factors using the ArcGIS spatial analytics tools to understand the environmental sustainability of the countries. The first objective of the study is to analyse the relationship between per capita Gross Domestic Product (GDP), Human Development Index (HDI), income inequality and total population with the ecological footprint of some selected countries. The second objective is to

measure the interrelationship of cropland, grazing land, forest land, carbon, fish ground and total built up land footprints with the per capita GDP of the selected countries.

DATA AND METHODS

This study is based on the fundamentals of linear regression analysis. The specific data regarding ecological footprints and other economic and socio-economic factors of the countries are collected from online sources. National Footprint Accounts (NFAs) Data Package of the global nations calculated by Global Footprint Network (GFN) organization is downloaded from www.footprintnetwork.org. In the year 2012, the NFAs calculated the Footprints of 232 countries, territories, and regions from 1961 to the present. This Data Package contains ecological footprint and bio-capacity data including cropland footprint, grazing footprint, carbon footprint, fish footprint, total built up land and total EF and bio-capacity data for year 2012; HDI and total population of the countries; per capita GDP; level of income group of the countries within the year 2012. Again for the indicator of income inequalities, the latest Gini Index of the respective countries is downloaded from World Bank's website (World Bank, 2017). The world vector map consisting the shape files of each country is downloaded from Thematic Mapping Website (thematicmapping, n.d.).

The GIS-based multiple regression analysis is the key analysis of this research. The data analysis of this study is based on Ordinary Least Square Regression (OLSR) as well as Geographically Weighted Regression (GWR) for fulfilling the first objective. Statistical and spatial analysis are done on both the software of ArcGIS and MS Excel. For that Ordinary Least Square Analysis and Geographically Weighted Regression Analysis tools are used. Only 203 out of 232 countries are analysed for OLSR and GWR, due to missing data in the other 29 countries. For the multiple regression analysis on MS Excel, only 161 countries are considered.

Ordinary Least Squares (OLS) linear regression is a global regression model that can generate predictions and model the relationship of a dependent variable in terms of a set of explanatory variables. It determines the heteroscedasticity or non-stationarity of the global data and confirms the applicability of GWR for further steps. The basic equation is as follows:

$$Y= \beta_0+\beta_1X_1+ \beta_2X_2+\dots\dots \beta_nX_n+\varepsilon \quad (1)$$

Here, *Dependent variable (Y):* Ecological Footprint; and *Explanatory variables (X):* Per Capita GDP, HDI, Gini Index and total population. The values are computed by the regression tool that expresses the relationship and strength of each explanatory variable with the dependent variable. The sign for the

respective coefficient is positive if the relationship is positive whereas negative relationships is expressed with negative signs of the coefficients.

Global OLS calculates various statistics and makes the validity of transferring in GWR analysis through the model performance assessments, assessment of each explanatory variable in the model (coefficient, probability or robust probability, and variance inflation factor (VIF), model significance assessment, stationarity assessment, model biasness assessment and residual spatial autocorrelation assessment). If the model proven to be non-stationary or spatial heterogeneity, then GWR can be applied for the next analysis. The spatial heterogeneity is then analysed using the sophisticated tool of ArcGIS, which is known as Geographically Weighted Regression (GWR). It is local regression model for analysing the spatial heterogeneity. If the modelled structure of the process varies across the study area, the spatial heterogeneity occurs.

RESULTS AND DISCUSSION

Relationship between Per Capita GDP, HDI, Income Inequality and Total Population with the Ecological Footprint

Ordinary Least Square (OLS) tool was used for performing global regression analysis in ArcGIS. The shapefile of the global map including the necessary attribute table was given as input feature class. The Unique ID Field was given as UN, which is a unique integer number of the attribute table. Countries' total ecological footprint was the dependent variable whereas HDI, Per capita GDP, Population size and Gini Index were explanatory variables.

The OLSR was operated on the variables of total 203 observations and produced detail analysis report on the observations and operation. According to the values of coefficient of the explanatory variables, intercept and standard residuals, an equation of the model was formed as follows;

$$EF=1.295+2.702HDI+0.000071PER\_CAPITA\_GDP-.000228POPULATION-0.024569GINI\_INDEX \quad (2)$$

It provided various information and interpretation techniques for the generated statistics. Firstly, it shows the Akaike Information Criterion (AIC) value. The AIC (Akaike Information Criterion) is an estimator of the relative quality of statistical models regularly used as a means for model selection. It estimates the quality of each model, relative to each of the other models. Lower AIC value is preferred over higher one. For this model, the AIC was quite small (718.5).

The OLSR was also used to analyse several statistical results and assess the model performance and validity. For example, both the Multiple R-Squared and Adjusted R-Squared values are measures of model performance. Here, Table

1 shows that, the multiple R-squared value was 0.656 and adjusted R-Squared value was 0.649. These indicate that the model explains approximately 65% of the variation in the dependent variable. This value will be increased if more explanatory variables were added. Again, the coefficient for each explanatory variable reflects both the strength and type of relationship it has with the dependent variable. Table 1 shows that among the four explanatory variables, HDI and Per Capita GDP have positive correlation with the dependent variable. That means if either the HDI or per capita GDP of the countries risen, the ecological footprint of the countries would also increase. On the other hand country's total population and Gini coefficient have slightly negative relationship with the ecological footprint (-0.000228 and -0.024569). That can be interpreted as, if the Gini coefficient values and number of population increased, the ecological footprint will decrease.

Table 1: Outcome statistics of OLSR analysis in ArcGIS

Multiple R-Squared:	0.656298			
Adjusted R-Squared:	0.649354			
	Variable Coefficient	StdError	t-Statistic	Probability
Intercept	1.295228	0.236144	5.484916	0.000000*
HDI	2.702377	0.443108	6.098690	0.000000*
PER_CAPITA_GDP	0.000071	0.000006	11.952686	0.000000*
PopN	-0.000228	0.000730	-0.312380	**0.755089**
*GINI_INDX_*	-0.024569	0.005932	-4.141744	0.000056*
	Robust_SE	Robust_t	Robust_Pr	VIF
Intercept	0.322608	4.014860	0.000091*	--------
HDI	0.534588	5.055069	0.000001*	1.696252
PER_CAPITA_GDP	0.000012	5.908000	0.000000*	1.438774
PopN	0.000522	-0.43696	**0.662625**	1.019191
*GINI_INDX_*	0.006030	-4.07422	0.000072*	1.270796
Joint F-Statistic:	94.519982	Prob(>F) (4,198) df:	0.000000*	
Joint Wald Statistic:	198.275551	Prob(>chi-squared), (4) df:	0.000000*	
Koenker (BP) Statistic:	35.294129	Prob(>chi-squared), (4) df:	0.000000*	
Jarque-Bera Statistic:	*137.154598*	*Prob(>chi-squared), (2) degrees of freedom: 0.000000**		
Moran's Index:	0.033611			
Expected Index:	-0.004950			
Variance:	0.000394			
z-score:	1.942703			
p-value:	0.052052			

T-test was used to assess whether or not an explanatory variable was statistically significant. In this model, for three explanatory variables (HDI, Per Capita GDP and Gini index), the p value of the t-statistics was less than 0.05, which indicates that these variables were statistically significant for explaining ecological footprint. On the other hand, total population of the country did not have significant statistical relationship with the total ecological footprint; the possible reason has been discussed in the previous section.

In addition, the variance inflation factor (VIF) measures redundancy among explanatory variables. In this model, there was no such variable with the VIF value greater than 7.5. So, none of the variables needs to be excluded from the model.

Both the Joint F-Statistic and Joint Wald Statistic are measures of overall model statistical significance. The Joint F-Statistic is trustworthy only when the Koenker (BP) statistic is not statistically significant. If the Koenker (BP) statistic was significant, the Joint Wald Statistic should be consulted to determine overall model significance. Table 1 shows that the probability values for all three of the F-statistics, Wald statistics and Koenker (BP) statistics were less than 0.05, which means the model is statistically significant and has a statistically significant heteroscedasticity or non-stationarity. As, regression models with statistically significant non-stationarity are especially good candidates for GWR analysis, from the OLS model, it can be preferred that GWR analysis will have a significant result using these three variables except country's total population.

The Jarque-Bera statistic indicates whether or not the residuals are normally distributed in the model. From Figure 1, it can be seen that the histogram of the standardized residuals of this model depicts a form of normal distribution with a classic bell curve, meaning that the model is not biased. Likewise Jarque-Bera statistic, the Spatial Autocorrelation (Moran's I) tool on the regression residuals ensures that they are spatially random and the statistically significant clustering of high or low residuals indicates a key variable is missing from the model (misspecification) and the model is under and over predictions. OLS results cannot be trusted when the model is misspecified. Here, results from running the Spatial Autocorrelation tool on the regression residuals indicates they were randomly distributed and the z-score was not statistically significant. So it can be accepted the null hypothesis of complete spatial randomness. Given the z-score of 1.94, this indicates that there is a less than 10% likelihood that this clustered pattern could be the result of random chance.

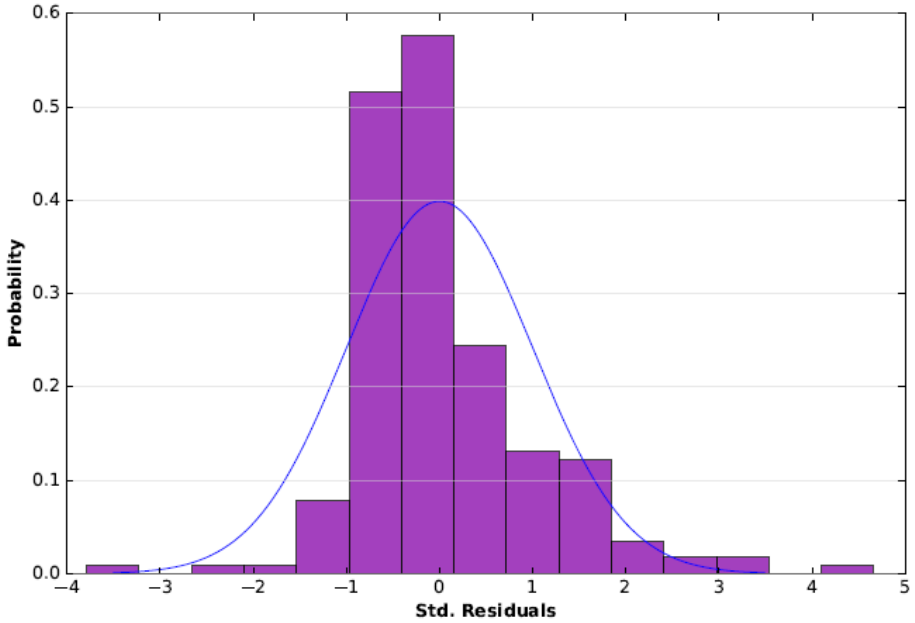

Figure 1: Histogram showing the normal distribution of standardized residuals

The outcome of OLS model indicates that the GWR analysis will have a significant result using the three variables HDI, per capita GDP and Gini index, except country's total population. The following section discusses about the result outcome of GWR analysis and the interpretation of it.

Once the OLSR was done, GWR analysis was quick and easy to calculate. It is the local regression analysis which shows the spatial heterogeneity and non-stationarity. The geoprocessing tool is found in the same spatial statistics toolbox along with OLSR. In this study, GWR applied the AICc method using 30 neighbours to calibrate each local regression equation to yield optimal results by minimizing biasness and maximizing model fit. The AICc is the AIC estimator corrected for small sample sizes to address potential overfitting. The Adjusted R^2 value was higher for GWR than it was for the OLS model (OLS was 65%; GWR was 67.77%). The higher AICc value of the GWR model indicates that the model is better run in OLSR than GWR. So, in this case GWR did not have much significance on the outcome.

Identifying the Interrelationship between the Components of Ecological Footprint and Economic Development of the Selected Countries

In order to find out the relationship between the components of ecological footprint, including cropland footprint, grazing footprint, carbon footprint, fish footprint and total built up land, with economic development, linear regression

analysis was conducted on MS Excel with the spreadsheet format of the data of Global Footprint Network. Among the six types of footprint, only carbon footprint showed the significant correlation with per capita GDP. The other five types of footprint did not have noticeable R^2 values. Therefore, the following equation shows the Carbon Footprint regression with per capita GDP of the countries.

$$Carbon\ Footprint = 0.715 + 0.08001\ PER\_CAPITA\ GDP \quad (3)$$

The carbon footprint of a nation measures the area of forest land required to sequester total carbon dioxide emissions of the nation. As per the regression result, countries have significant correlation of carbon footprint with their income level. From Table 2, it can be seen that for 161 observations, the Multiple R value was much higher than cropland footprint, which was 82%; R square and Adjusted R square values were around 67%, having standard error 1%. Again, the coefficient of correlation value was positive at 0.08, which means that the increase in per capita GDP contributes to greater amount of carbon emission and thus larger amount of forest land is required to sequester carbon dioxide.

Table 2: Output of regression analysis statistics of carbon footprint vs per capita GDP

Regression Statistics				
Multiple R	0.822601			
R Square	0.676672			
Adjusted R Square	0.674639			
Standard Error	1.09065			
Observations	161			
	Coefficients	Standard Error	t Stat	P-value
Intercept	0.715309	0.104006	6.877609	1.32E-10
X Variable 1	0.08001	0.004386	18.24174	7.96E-41

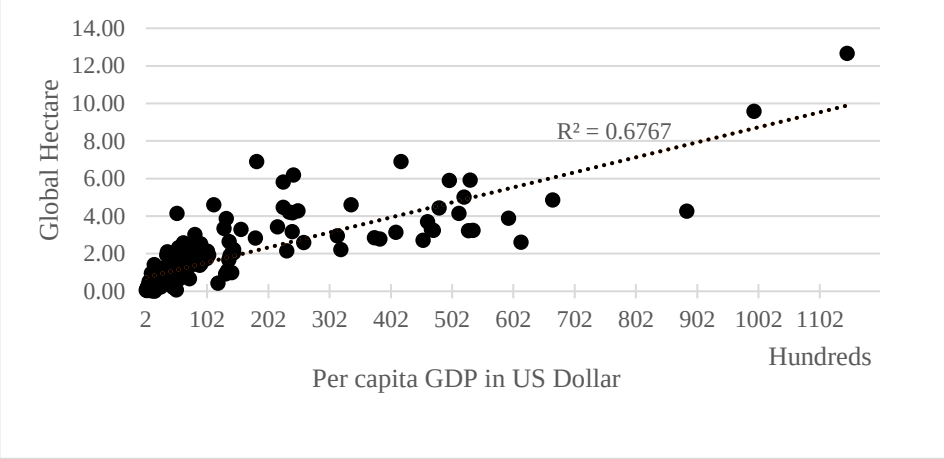

Figure 2: Scatterplot of the relationship between carbon footprint and per capita GDP of the nations

Figure 2 shows the relationship of carbon footprint and per capita GDP of the nations. It is clearly visible that countries with higher GDP have higher amount of carbon footprint. As, the higher income countries have greater demand for energy consumption due to the economic development, they contribute more to the carbon emission and global warming. The five other footprints like cropland footprint, grazing footprint, fishing ground footprint, forest land footprint did not have mentionable correlation with the per capita GDP. The overall result is exhibited in Figures 3 and 4, which present the relationship graphs of individual footprints and the per capita GDP.

Figure 3 shows the scatterplot graph of each footprint according to the level of GDP. The figure illustrates how the total ecological footprint of the countries increases with the increase in per capita GDP and the carbon footprints exceed all other footprints. Same scenario can be found on the average values of per capita GDP of the nations and their footprints as shown in Figure 4. From this figure it is easy to realize that lower income nations have lower percentage of total ecological footprints along with less percentage of individual components of it, whereas, the average total ecological footprint was greater in percentage for the higher income nations than the lower or lower middle and upper middle income countries.

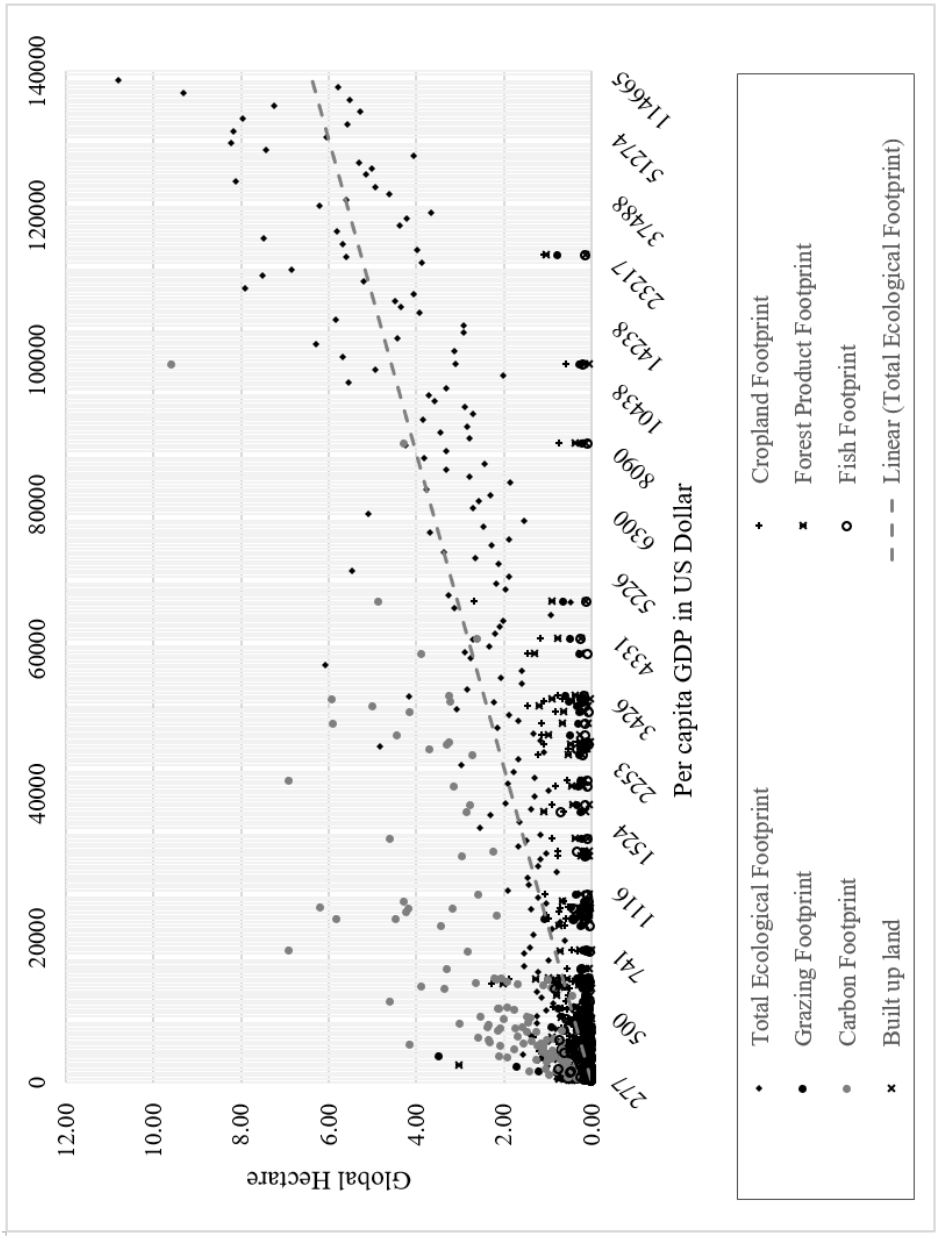

Figure 3: Relationship between footprints and per capita GDP of nations

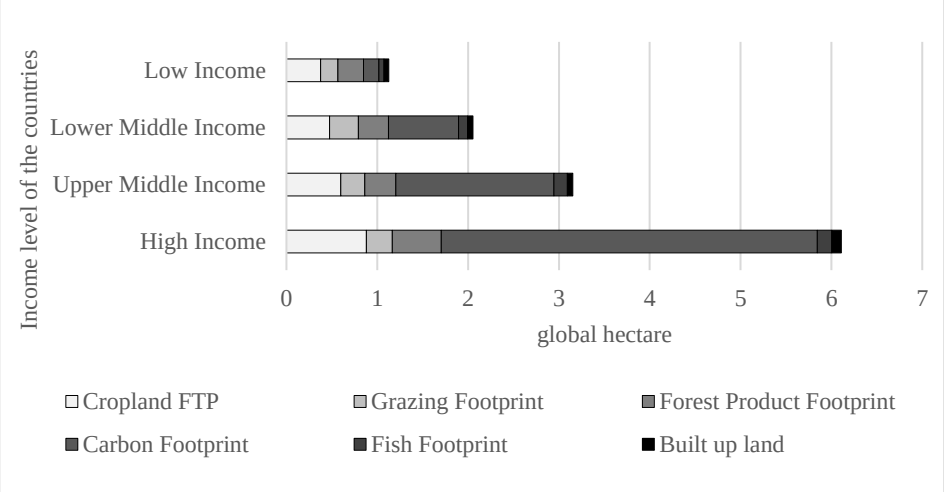

Figure 4: Relationship between each footprint and per capita GDP according to the country income

CONCLUSION

Examining the relationship between ecological footprint and economic development indicators, it was found that ecological footprint of a country is directly proportional to its economic development. Per capita GDP of the nations was found to have significant correlation along with HDI. The other two variables, total population and income inequality, were found to have negative correlation with economic development, though their coefficients were very minor to be analysed. These mean that per capita GDP and HDI can better explain the change in ecological footprint compared to total population and income inequality. Countries with higher per capita GDP and HDI are more economically flourished and consume more resources. Their carbon emission is also greater than the lower income nations. As a result, carbon footprint represents a significant portion of the total ecological footprint than any other footprints. From the GWR, the OLSR model was modified and strengthened.

This study has a significant impact on understanding the interlink and variations among the ecological and economic factors to allow for further investigation of the way towards achieving sustainable environment. It provides the background information and conceptual framework for future studies related to economic development and environmental sustainability.

In conclusion, it can be inferred from the findings of this study that high economic development and wanton exploiting of natural resources have direct negative impacts on the ecological balance that also reduces the bio-capacity of nations. Thus, there must be a balance between the consumption of natural resources for economic growth and their conservation in order to achieve environmental sustainability.

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EVALUATING TRAVEL TIME AND PASSENGER RIDERSHIP OF UNIVERSITY SHUTTLE BUS SERVICE

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Abstract

Poor service adherence to the scheduled timetable and less service frequency during peak hours have contributed to unreliable shuttle bus services in International Islamic University Malaysia. As a result, students use either private vehicles or walk on-campus rather than riding the shuttle buses. This paper analyse travel time and passenger ridership of shuttle bus services from field surveys on journey time, running time, dwell time and passenger volume along Mahallah Ruqayyah and Mahallah Salahuddin shuttle bus routes. One of the key results on travel time indicates poor service adherence by bus service providers. In terms of passenger ridership, there was a huge gap between Mahallah Ruqayyah and Mahallah Salahuddin route where Mahallah Salahuddin has recorded a low passenger ridership even during peak hours. The findings also show that the service frequency of shuttle bus during peak hours cannot accommodate all students and therefore students either walk or use private vehicles to commute within campus area. Recommendations on the improvement of shuttle bus services are also discussed in this paper.

Keywords: shuttle bus, passenger ridership, travel time, IIUM, dwell time

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INTRODUCTION

One of the main roles of public transportation is to provide adequate mobility and wide connectivity to major land uses at an affordable fare to a larger population at both urban and regional level. The use of public transport depends very much on how efficient, reliable, quick, comfortable and economical that the transport services provided for to a larger population. The high use of public transport is seen as an advantage to the society in terms of reducing traffic congestion, decreasing parking demand, and reducing noise and air pollutions. The public transport services for an University campus is very important because it provides not only better accessibility to a wider University population but also help to serve in mitigating the increased number of private vehicle use. Shuttle bus service is one of the public transportation system provided in International Islamic University Malaysia (IIUM), Gombak campus to serve students from students' residential areas on-campus to the main academic and administrative centres. Presently, the services are provided along two routes, one connecting female residential (Mahallah) areas to the main academic and administrative centres and other connecting male residential areas to main academic and administrative centres. Since the introduction of the shuttle bus services on-campus, the use of these services has been declining due to decrease in service performance related factors such as increase in travel time and low service frequency. As a result, many students on-campus either walk or use motorcars and motorcycles for their daily travel between residential areas and main academic and administrative centres.

The purpose of this paper is to investigate the travel time and passenger ridership of the two shuttle bus service routes in IIUM. It is to ascertain the existing service performances of these services along the two selected bus routes. The findings of this study are expected to shed lights on the application of measures to improve public shuttle bus services on-campus and as a result help decrease the use of private transport.

SHUTTLE BUS AND SHUTTLE BUS SERVICES IN IIUM

The advantages of public transport system are obvious in the sense that it transport large number of people from one place to another in a less number of vehicles. Public transport is intended to provide passenger transport services operating on established schedules along designated routes with specific stops and available to any individual in a community for a fare. Optimal organizational structure should be established to maximize the use of public transport, non-motorized transport and minimize the use of private vehicles for the benefits of less energy consumption, greenhouse gas emission and use of urban spaces (Shibayama, 2011).

Shuttle service is normally provided between two major points of interest. "Point to point shuttle and line renders demand for travel between

different activity centres such as shopping centres, tourism areas and airports (Vuchic, 2007). Buses, vans and rail transit are generally used to transport people between these activities. Generally, non-stop services are provided between these activities. However, the routes may have stops in between if demanded by the passengers.

One of the important indicators for the success of the shuttle bus services is travel time. Travel time is broadly defined as the time required to traverse a route between any two points of interest (Turner, Eisele, Benz, & Holdener, 1998). Travel time can be directly measured by traversing the routes that connects two or more stations along the route. Travel time is usually related to several factors such as characteristics of the driver, the vehicle, traffic incidents, traffic management system, and weather patterns (Turner et al., 1998). Travel time consists of running time and stopped delay time (Turner et.al., 1998).

- *Running Time* – the travel time when the vehicle is in motion.
- *Stopped Delay Time* – time when the vehicle is stopped (or moving sufficiently slow as to be stopped)
- The other travel time related to public bus vehicle-trip are (Neils, 2011):
- Driving time – actual driving time from stop to stop including unplanned stopping time between stops.
- Dwell Time – time involved for boarding and alighting at stop.

Passenger ridership is another important service performance indicator to determine the success of a shuttle bus service. Generally, it is known that higher the passenger ridership, greater the acceptability of the services by the passengers. It is important to take note that "identifying significant passenger load points helps indicate whether services are excessive or deficient and thereby assisting service planning and schedule adjustment" (Healy, 2001).

Shuttle Bus Service in IIUM

The shuttle bus services are provided to serve student population who live in the residential areas on-campus to the academic and administrative centres. The total number of buses serving the IIUM community is four covering two different travel routes. One of them connects female Mahallah Ruqayyah (residential area) to academic and administrative centres and the other connects male Mahallah Salahudding to academic and administrative centres. The following sub-sections highlight some of the characteristics of the shuttle bus services provided on-campus.

Bus Exterior and Interior capacity and Seating Design

The IIUM's shuttle bus has a single-channel door with 44 person seated capacity. The initial design consideration of the vehicle's interior is to maximize the amount of gross area to be used by the passengers. The shuttle bus has two

double-seat (2 + 2) on each side of the bus with approximately 50 cm aisle width. A bus provided with two double-seat arrangement on each side should not normally be used for carrying passengers with standees to avoid discomfort to the bus users (Vuchic, 2007). On the other hand, a bus provided with 2+1 seating arrangement is ideally considered as a better layout for carrying passengers with standees (Vuchic, 2007). Hence, the design layout of the IIUM's shuttle bus is not appropriate and suitable to transport people on-campus. To add further, the buses are not provided with holding bars for the standing passengers while traveling in the bus.

Distance and Stops of the IIUM Shuttle Bus Routes

IIUM shuttle bus services are provided along two different routes, one serving female residential areas to the core academic and administrative centres and other male residential areas to the core academic and administrative centres. These two routes are named Mahallah Ruqayyah (female residential area) and Mahallah Salahuddin (male residential area). The total distance (one-way) covered along each of the two routes is slightly different. The distance covered by Mahallah Salahuddin (Salahuddin) is slightly longer than Mahallah Ruqayyah (Ruqayyah).

Shuttle Bus Operation

The schedule of bus service is actually based on demand. The schedule of bus services for both routes (Ruqayyah and Salahuddin) is the same. During peak-hour, the bus is scheduled at every 15 minutes and during other hours, more than 15 minutes. It is obviously due to higher demand during peak-hour than other hours. During weekdays, the buses operate 2-3 trips per hour in the morning, evening and night. But on Saturday, the buses operate only in the morning starting at 8 am and ending at 1 pm with less frequency of services. The shuttle bus services for the two routes were operated from Monday to Saturday but no services on Sunday. As indicated earlier, each route was served by two buses to cater for the increased number of passengers especially during peak-hour.

RESEARCH APPROACH

For this study, field surveys on travel time and passenger ridership of shuttle bus services along the two selected routes were administered. Travel time survey was applied to collect data on travel time starting from origin to the destination of the shuttle bus services. Passenger ridership was collected by applying passenger count survey. The details of each of these surveys are explained in the following sub-sections. The details of on-board data collection on travel time and passenger ridership are given in Table 1.

Table 1: Details of field survey

Day	Tuesday and Wednesday (typical days having classes at respective Kuliyyah during weekdays)
Time of data collection	Peak Hour (8.00a.m. – 9.00 a.m.) Off-Peak Hour (9.00 a.m. -10.00 a.m.)
Number of Enumerators	4 enumerators (2 enumerators each for Mahallah Ruqayyah route & Mahallah Salahuddin route.) For on-board survey, one enumerator records the travel time data and another one records the passenger ridership data.

Travel Time Survey

Travel time survey was administered to measure travel time of the shuttle bus users along each of the two selected routes. The survey was conducted by employing on-board enumerators. The enumerators recorded the travel time of shuttle bus users by using a digital watch. Travel time was measured starting from the first bus stop of each shuttle bus route. Travel time that were measured includes running time (without delay) and journey time (with delay). A standard digital watch showing time in hh:mm:ss was used to measure the travel time of the users. The time taken by the shuttle bus starting from the first stop of the route to the last stop including stoppage time at every bus stop along the route was measured. The stoppage time includes amount of time stopped at the junctions, allowing boarding and alighting of passengers and traffic congestion.

Passenger Ridership Survey

Passenger ridership survey was conducted to count the number of passengers boarding and alighting at each bus stop along the two routes. Enumerators were given the task to count the number of passengers at the starting point of the bus services and whenever passengers boarded and/or alighted at every bus stop along the route. Each enumerator was given a pre-prepared passenger ridership form to record the passenger ridership data. The passenger ridership survey was administered on Tuesday and Wednesday during both peak and off-peak periods. This survey was conducted concurrently with that of travel time survey.

Observational Survey

In this study, observations on the movement of shuttle bus services were made to record immobility of buses that caused increase in travel time along the journeys of the respective selected bus routes. The observations were made by the enumerators on-board when measuring travel time and passenger ridership of shuttle bus services. The observational survey was conducted to account for the variability in the bus service performances especially travel time which contributes to the service reliability and punctuality of the bus services. It account for factors such as location of on-street parking, boarding and alighting of passengers, congestion especially during peak hours and other concomitant

factors that contribute towards increase in travel time of the shuttle bus services. The factors that cause delay in running shuttle bus services were recorded in a travel time survey form.

Method of Analysis

Univariate analysis technique was applied to describe the variables such as journey time, running time, dwell time and passenger ridership. Some of the techniques used to describe variables are frequency distribution and mean. The findings of these variables were summarized and presented in the form of tables and figures. This study also applies bivariate analysis technique to discern the relationship between selected variables of interest. Cross-tabulation technique was used to identify relationship between schedule and observed travel time and distance of bus stops, dwell time and passenger boarding and alighting. T-test was also applied to test the differences in the journey time of the bus services during peak and off peak hours statistically.

ANALYSIS AND FINDINGS

Travel Time

The travel time on each of the two selected bus routes was analysed to determine and compare journey time, running time, average travel time, delay time, and reliability of time between the two routes. Table 2 shows the travel time of the shuttle bus services along Ruqayyah bus route. Travel time was measured for two runs on Tuesday and Wednesday during both peak and off peak hours. The travel time taken along this route showed longer journey and running time during peak hour than off-peak hour. A total journey time of 21 minutes was taken for a complete run along this route on Tuesday during peak hour. It is due to increase in dwell time during peak hour because of longer delay en-route such as prolonged stopping of the bus at the bus stops to cater for increase in the number of boarding and alighting passengers. The lowest travel time was observed on Wednesday during off-peak hour. It has taken a total journey time of only 14.66 minutes to complete one trip from Ruqayyah to the main academic and administrative centre. The average journey time during peak hour was higher than off peak hour. Thus, it causes high percentage of delay during peak hour than off peak hour. Again, the likely reason for this trend is due to increase in dwell time to allow for increased number of passenger boarding and alighting at specific bus stops, drivers waiting for students to board the bus at few bus stops along this route.

Table 2: Travel time of Ruqayyah shuttle bus service (Route 1)

Time	Peak Hour				Off-Peak Hour			
Day	Tuesday		Wednesday		Tuesday		Wednesday	
Run	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Journey Time (With Delay) in minutes	19.3	20.93	19.95	16.98	16.86	17.23	14.66	16.55
Running Time (Without Delay) in minutes	13.4	14.48	15.56	12.93	13.68	13.98	11.53	12.8
Total Dwell Time in minutes	5.9	6.45	4.39	4.05	3.18	3.25	3.13	3.75
Mean Journey Time in minutes	20.115		18.465		17.045		15.605	
Mean Running Time in minutes	13.940		14.245		13.830		12.165	
% of Delay from total Travel Time	30.6	30.8	22.0	23.9	18.9	18.9	21.4	22.7

Source: Field survey 2014

Table 3 shows travel time of shuttle bus service for the other route namely Salahuddin route. It is noticed there exists a considerable gap in the overall travel time in terms of journey and running time between Salahuddin and Ruqayyah. Salahuddin bus route has recorded lower travel time for each run than Ruqayyah. The total journey time including delay time along this route was not more than 15 minutes on each of the two runs on both Tuesday and Wednesday during peak and off peak hour. The highest average journey time was 14.405 minutes on Tuesday during peak hour and the lowest average journey time was 11.6 minutes on Wednesday during off-peak hour. One of the reasons is the number of male users near Salahuddin was lower than the number of female users near Ruqayyah.

Table 3: Travel time of Salahuddin shuttle bus service (Route 2)

Route	Peak Hour				Off Peak Hour			
Day	Tuesday		Wednesday		Tuesday		Wednesday	
Run	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Journey Time (With Delay) in minutes	14.31	14.5	13.6	13.43	12.56	13.23	11.6	11.95
Running Time (Without Delay) in minutes	11.13	10.9	10.03	10.7	10.25	10.35	9.55	9.71
Total Dwell Time in minutes	3.18	3.6	3.57	2.73	2.31	2.88	2.05	2.24
Mean Journey Time in minutes	14.405		13.515		12.895		11.775	

Mean of Running Time in minutes	11.015		10.365		10.300		9.630	
% of Delay from ∑ Travel Time	22.2	24.8	26.3	20.3	18.4	21.8	17.7	18.7

Source: Field survey 2014

Observed and Scheduled Travel Time

Figure 1 and 2 illustrate the comparison between observed and schedule travel time of the two shuttle bus services. The bus on-board survey was administered to record observed time at each of the bus stop along the two bus routes. The data collected for each route is based on the timing of IIUM shuttle bus schedule during both peak and off-peak hour. The on-time performance analysis is one of the ways to identify the compliance of service adherence to the actual schedule of bus services. The data was collected for two runs during peak hour at 8:15 a.m. and 8:45 a.m. and another two runs at 9:15 am and 9:45 am during off-peak hour. Referring to travel time of Ruqayyah bus route as shown in Figure 1, it can be seen that the shuttle bus departs late in the morning by 19 minutes, where it was scheduled to depart at 8.15 a.m. but the bus departs at 8.34 a.m. This trend is the same for each of the two runs. This difference in the scheduled and observed departure time far exceeds the permissible time differences that can be allowed in achieving the reliability and punctuality of the bus services. One of the reasons for the delay in the departure time of the bus service was due to significant number of passenger boarding and alighting at the bus station. On the other hand, it was noticed that there exists almost no differences in the scheduled and observed time of the shuttle bus services along Salahuddin bus route.

The findings also showed that the bus departs early than the actual scheduled departure time. In one of the runs, the bus departs at 8:31 a.m. from the actual scheduled departure time at 8:45 a.m. Overall, it can be seen that the shuttle bus services are not reliable where at times, the bus departs early or late from the scheduled departure time. Figure 1 and 2 show that the gap between scheduled and observed travel time along both Ruqayyah route and Salahuddin route is small during off-peak hour. However, it is not the case during peak hour especially along Ruqayyah bus route. The unreliable departure time is due to less number of buses being operated especially during peak hour.

Dependent T-Test

The total journey time of bus between peak hour and off peak hour is different due to many number of passengers boarding and alighting at bus stops during peak hour. This difference in journey time during peak and off peak hour for both selected bus routes was tested for statistical significance by using t-test. The results of the t-test for Ruqayyah is shown in Table 4 and for Salahuddin in Table 5.

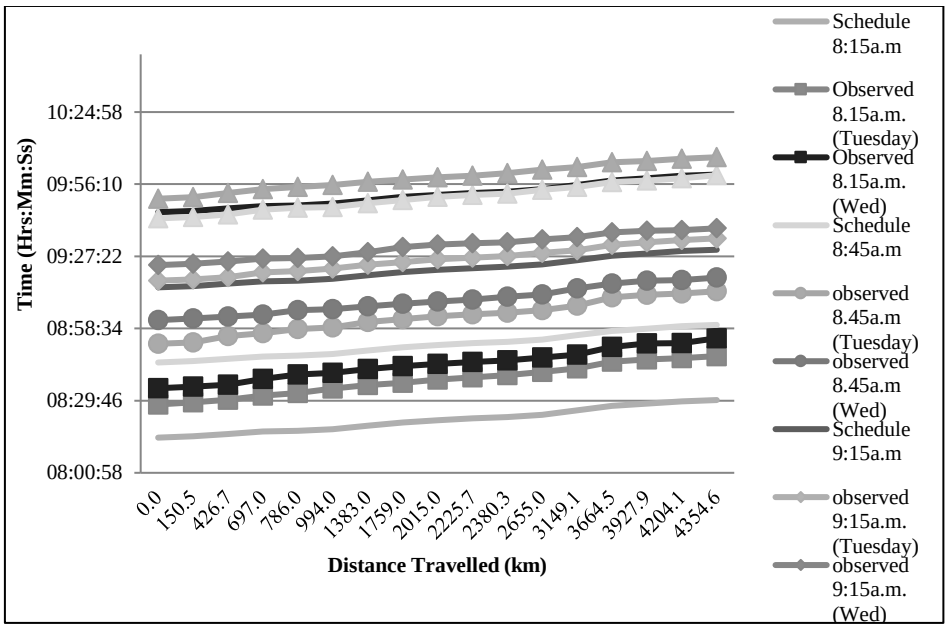


Figure 1: Observed and scheduled travel time vs distance Travelled along Ruqayyah bus route

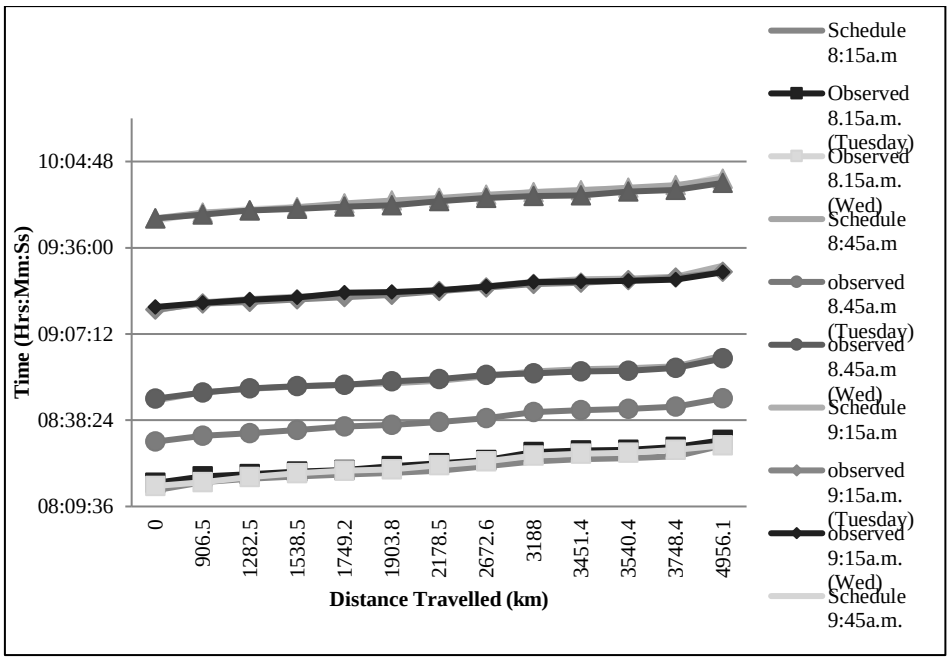


Figure 2: Observed and scheduled travel time vs distance travelled along Salahuddin bus route

Table 4: Paired Sample T-Test (Ruqayyah)

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. deviation	Std. Error Mean	95% Confidence Interval of the Difference.				
				Lower	Upper			
Ruqayyah Peak Ruqayyah Off Peak	.18118	.34018	.08251	.00627	.35608	2.196	16	.043

Table 5: Paired Sample T-test (Salahuddin)

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. deviation	Std. Error Mean	95% Confidence Interval of the Difference.				
				Lower	Upper			
Salahuddin Peak Salahuddin Off Peak	.12769	.27641	.07666	-.03934	.29473	1.666	12	.122

The results show that the difference in journey time between peak and off peak hours for Ruqayyah was statistically significant at 95% confidence interval. The *t* value is 2.196 and *p* value is 0.043 which is less than 0.05. The findings shows that there exists significant differences in journey time between peak and off peak hour in the case of Ruqayyah bus route.

In the case of Salahuddin bus route, the differences in journey time between peak and off peak hour was statistically insignificant at 95% confidence interval. The t value is1.666 and p value 0.122 which is greater than 0.05. The findings shows that there exists no significant differences in the total journey time between peak and off peak hours in the case of Salahuddin bus route.

Passenger Ridership

Passenger ridership helps to identify the number of passengers boarding and alighting at each bus stop along the route. It also helps to identify overloading and underloading of bus services during each operating schedule of bus service.

Table 6 shows passenger ridership for both Ruqayyah and Salahuddin bus routes. Overall, the findings show that the number of passengers using Ruqayyah route is higher than Salahuddin route during both peak and off peak hour. It is important to note that Ruqayyah route mainly serves female passengers and Salahuddin route male passengers. It shows the number of female passengers using the shuttle bus services is higher than male passengers. The average number of passengers per trip using Ruqayyah bus route was 74 on Tuesday and 64 on

Wednesday whereas it was 23 and 24 respectively in the case of Salahuddin bus route.

Table 6: Passenger Ridership along Ruqayyah and Salahuddin route

Hour	Peak hour				Off Peak hour			
Day	Tuesday		Wednesday		Tuesday		Wednesday	
Run	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Total Passenger Ridership (Ruqayyah)	62	86	81	46	22	24	23	24
Average Passenger Ridership	74		64		23		24	
Total Passenger Ridership (Salahuddin)	22	25	21	23	15	17	15	13
Average Passenger Ridership	24		22		16		14	

Source: Field Survey, 2014

Relationship between Passenger Ridership and Dwell Time

Figure 3 to 10 shows the relationship between passenger ridership and dwell time of bus services along Ruqayyah bus route. In the case of Ruqayyah bus route, it can be seen that the passenger ridership and dwell time is high at the first stop on Tuesday and Wednesday both during both peak and off peak hour. It has taken 2.5 minutes for 60 passengers to board the bus at the first stop. The findings show that the number of passengers alighting at bus stop 4 and bus stop 13 was generally higher than the other bus stops along this particular route. Bus stop 4 is located close to Kulliyyah (faculty) of Engineering and bus stop 13 close to another Kulliyyah, which is Kulliyyah of Information and Communication Technology. Hence, the time taken for the passengers to alight at these two bus stops was higher than the other bus stops along this route. The findings also show most of the passengers were using this shuttle bus service between bus stop 1 and 13 and very few passengers were using the services from bus stop 14 and bus stop 17. As a result, the dwell time also drops and become almost zero from bus stop 14 to bus stop 17.

Figure 11 to 18 show the relationship between passenger ridership and dwell time along Salahuddin bus route. The trend in each graph shows that passenger ridership and dwell time are closely related with each other. The graphs show that increase in the number of passengers boarding and alighting at bus stop has induced increase in the dwell time and vice versa. The demand to use the bus services was found almost similar at each of the bus stop except bus stop 1 along this particular route. The number of passengers boarding at bus stop 1 was much higher than other bus stops along this route.

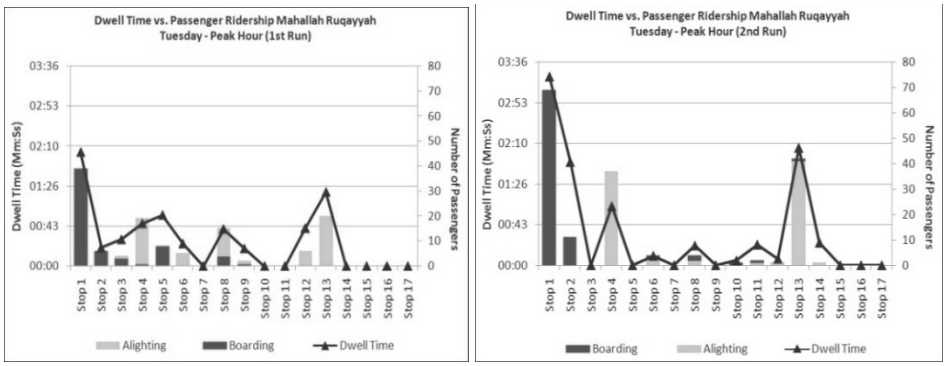


Figure 3 & 4: Dwell time vs. passenger ridership Ruqayyah Tuesday peak hour (Run 1 & Run 2)

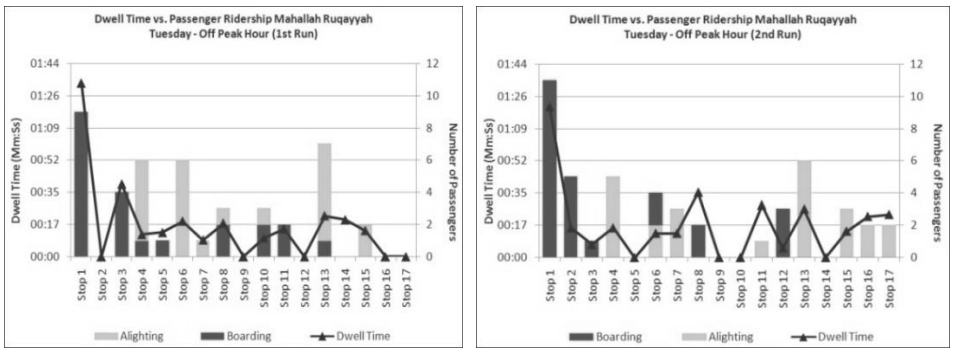


Figure 5 & 6: Dwell time vs. passenger ridership Ruqayyah Tuesday off peak hour (Run 1 & Run 2)

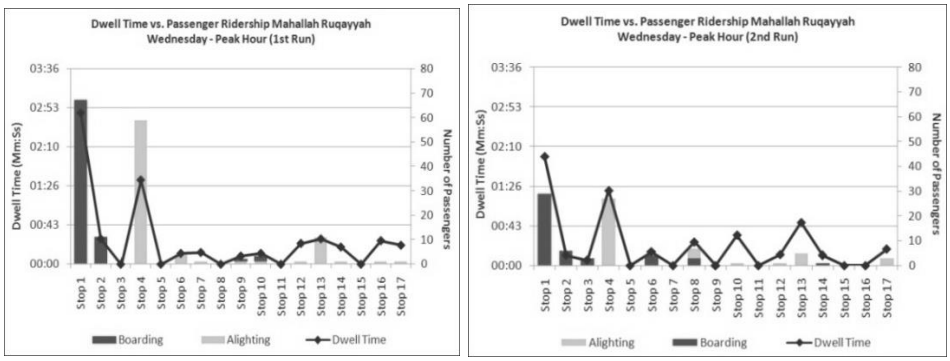


Figure 7 and 8: Dwell time vs. passenger ridership Ruqayyah Wednesday peak hour (Run 1 & Run 2)

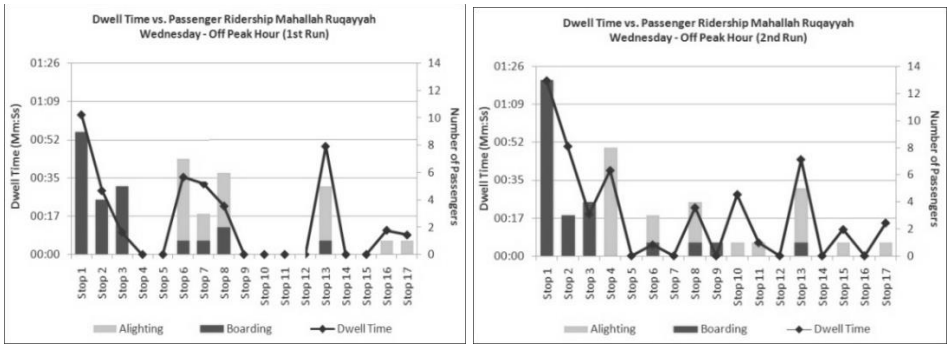


Figure 9 & 10: Dwell time vs. passenger ridership Ruqayyah Wednesday off peak hour (Run 1 & Run 2)

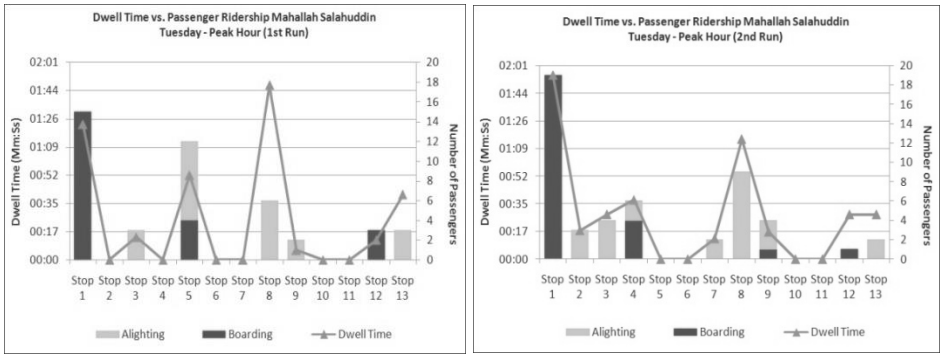


Figure 11 & 12: Dwell time vs. passenger ridership Salahuddin Tuesday peak hour (Run 1 & Run 2)

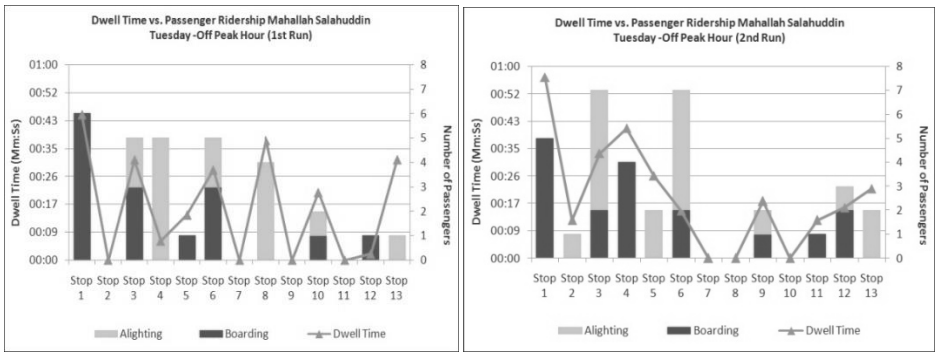
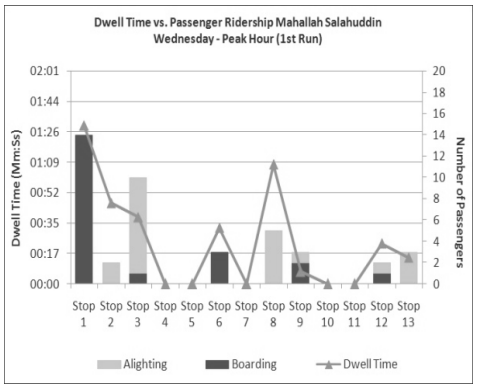


Figure 13 & 14: Dwell time vs. passenger ridership Salahuddin Tuesday off peak hour (Run 1 & Run 2)



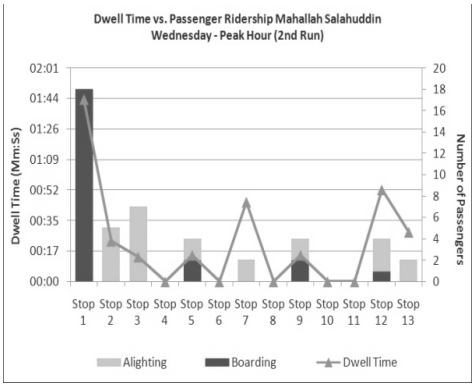
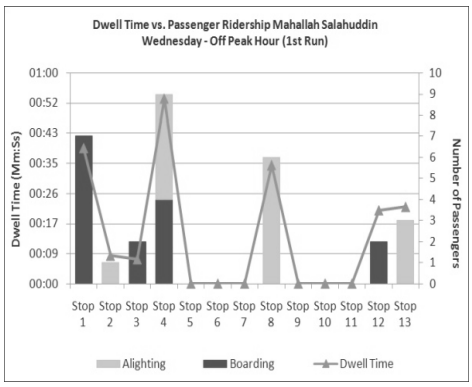


Figure 15 & 16: Dwell time vs. passenger ridership Salahuddin Wednesday peak hour (Run 1 & Run 2)



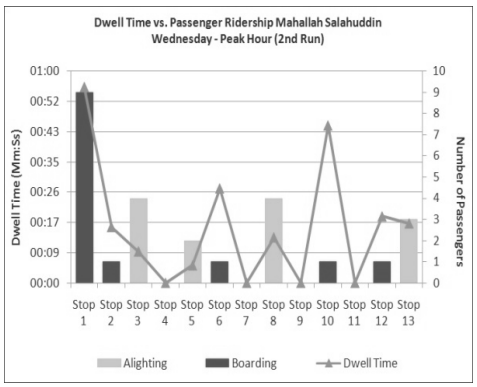


Figure 17 & 18: Dwell time vs. passenger ridership Salahuddin Wednesday off peak hour (Run 1 & Run 2)

DISCUSSION AND CONCLUSION

It is important to run shuttle bus services on-campus especially when the size of campus area is large for the benefits of University population to travel from one place to another. It also facilitates in reducing the number of cars and motorcycles use on-campus. However, the reduction in the number of private cars and motorcycles on-campus depends on how effective, frequent, punctual and comfortable that the operation of shuttle bus services are in attracting the users to use shuttle bus services. The two bus routes selected for this study, one serving mainly the female residential areas and other male residential areas are mainly intended to serve student population living on-campus to travel from their residential areas to the main academic and administrative centres. It is noticed from this study that, in general, the use of shuttle bus services was at a low level at both the bus routes. However, by comparing each route, the use of the bus services serving female residential areas was higher than male counterparts. It

shows the number of female students using the shuttle bus services was higher than male students.

The general observation shows that many male students were found using motorcycles to travel from their residential areas to academic and administrative centres than female students. Provision of frequent and fast bus services on-campus will actually increase the passenger ridership of bus services.

The analysis on the departure time of bus service according to actual schedule time shows that there exists a considerable gap between actual and observed time schedule of bus services. That makes the total time taken to reach a place longer than what is actually planned for. It is one of the indications showing less number of passengers using the services especially along Salahuddin bus route. To increase the passenger ridership for making the bus services attractive and successful, the adherence to the actual scheduled departure time is highly important which in turn makes the services reliable. Considerable efforts should also be taken to reduce the overall dwell time at each bus stop through application of appropriate measures to reduce the total travel time of the bus services. Unless these proactive measures are taken to increase the reliability of the bus services, the number of users especially students using the bus services will be low and thus it would make the use of motorcars and motorcycles on-campus more attractive.

Some of the measures that can be applied to improve the services of shuttle bus on-campus are: increasing the frequency of shuttle bus during peak hour; installing transit information display board at bus stops to make known real time departure and arrival time of the buses to the users, introducing mini bus services; and lastly applying strict enforcement on the adherence to departure and arrival time at every bus stop by the enforcement agency. These measures are expected to improve the services of shuttle buses on-campus for the purpose of providing reliable and attractive bus services to the campus community. As a result, it improves the environment of the campus area towards realizing sustainable transport on-campus.

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DEVELOPING MALAYSIAN ROADSIDE TREE SPECIES SELECTION MODEL IN URBAN AREAS

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Abstract

Urban trees are living organisms and vital elements of a city's infrastructure; thus, they should be considered at every stage of planning design and development. In Malaysia, rapid changes in the environment have indirectly influenced the roadside tree condition such as fallen trees. This is reflected with the statistic increment of public complaints by 39% from 2014 until 2016 regarding the roadside tree problems, which are very worrying for the local authorities. This study aims to develop a Malaysian Roadside Tree Species Selection for guidance in selecting the right tree species for a sustainable city. The objectives of this study are (i) to determine additional attributes in roadside tree species selection, (ii) to examine the relationship between existing and additional attributes and (iii) to develop a Malaysian Roadside Tree Species Selection Model based on these attributes. This research applied the quantitative and qualitative approaches. The results produced a Malaysian Roadside Tree Species Selection Model.

Keywords: roadside tree, public complaint, tree species selection model

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INTRODUCTION

Urban roadside trees have been introduced to the city areas since early civilization for functional and aesthetic purposes. Trees have been fostering many valuable functions in our lives from giving shade, providing a source of food and producing economic benefits. The right roadside trees species selection is important to create an exciting environment, provide shades, protection from vehicle light glare, sound barrier, and reduce dust pollution. As reported by Sreetheran, Adnan and Khairil Azuar (2011), the popular tree species planted in Malaysian urban areas are *Peltophorum pterocarpum* (yellow flame), *Samanea saman* (rain tree), *Cinnamomum iners* (wild cinnamon), *Lagerstroemia speciosa* (pride of India), *Ficus benjamina* (weeping fig), *Mimusops elengi* (tanjung), *Millettia atropurpurea* (purple millettia), *Delonix regia* (red flame) and *Swietenia macrophylla* (mahogany). The aim of this study is to develop a Malaysian Roadside Tree Species Selection for guidance in selecting the right trees species. The objectives of this study are (i) to determine additional attributes in roadside tree species selection, (ii) to examine the relationship between existing and additional attributes and (iii) to develop a Malaysian Roadside Tree Species Selection Model based on these attributes.

UNDERSTANDING VALUES OF ROADSIDE TREE FOR HIGH QUALITY URBAN LIFESTYLE

Benefits of roadside trees are continuously discussed in previous research in terms of environmental, social, economic, health, and aesthetic benefits (Hasan, Othman, & Ismail, 2016; Vogt et al., 2017; Kondo, Han, Donovan, & MacDonald, 2017; Salmond et al., 2016; Mullaney, Lucke, & Trueman, 2015; Roy, Byrne, & Pickering, 2012). All the benefits are contributed to creating an urban fabric and improving the quality of urban lifestyles. However, some of the current landscape practices lack the basic knowledge that underlies the science and art of incorporating trees into an urban area (Wiseman, 2017). Some planting design standards show that little is known about the basic needs of trees and the selection of the tree planting. In addition, space constraint in cities means that there are only limited opportunities for increasing tree density within the existing urban fabric and it is unclear whether the net effect of increased vegetation in street canyons is beneficial or detrimental to urban air quality at local scales (Salmond et al., 2013).

PROBLEMS OF MALAYSIAN ROADSIDE TREE SPECIES SELECTION

Rapid urban growth changes in the environment have indirectly influenced the roadside tree conditions (Krzyżaniak, Świerk, Walerzak, & Urbański, 2015; Battipaglia et al., 2010; Sieghardt et al., 2005; Moore, 2009). According to the statistics of public complaints (*Sistem Talian Aduan Rakyat*, 2017 and IResponz

system, 2017), four selected local authorities namely the Kuala Lumpur City Hall, Petaling Jaya City Council, Subang Jaya Municipal Council and Selayang Municipal Council have shown nine issues of tree problems such as fallen trees (1,662 cases), brittle branches (2,142 cases), obscure visibility (1,493 cases), dead leaves and debris on the road (1,610 cases), heavy branches obstruct traffic (1,471 cases), old and dead trees (1,300 cases), clogged drainage system due to debris (1,596 cases), close proximity of trees to houses (181 cases) and leaning tree trunk (1,191 cases). As supported by Yan and Jung (2018), certain trees planted in urban areas are species with vigorous growth habit, fragile stems, weak bifurcation and are susceptible to diseases. These problems occur when several factors such as site, economic and social factors are not considered during the tree species selection practice (Miller, Hauer, & Werner, 2015). The increasing number of public complaints caused the local authority to spend more than a hundred thousand Ringgit Malaysia to pay for the compensations (Yaman, Jamil, & Yaakob, 2011).

The findings of the survey conducted by the author in 2016 concluded that there the level of knowledge in tree species selection practice in Malaysia is considered as low. This is because the landscape practices are more concerned about landscape design and aesthetical values compared to the function of tree species. As reported by Nor Azah (2015), the selection of tree species at local authority faces problems in terms of lack of expertise and experience to decide on the right tree species. Because of that, many of roadside trees have caused problems and the total number of public complaints related to the roadside tree have increased over the years.

THE ATTRIBUTES INFLUENCING THE TREE SPECIES SELECTION

Miller et al. (2015) established a model to explain the urban roadside tree species selection. The model classified the factors contributing to the appropriate tree species selection for urban areas into three distinct categories which are site factors, social factors and economic factors. The site factors consist of cultural and environmental constraints. Miller et al. (2015) listed the physical limitation aspects on the site such as activities created by humans, utilities, structures, surface cover and pollution, which are referred to as cultural constraints, while insects, disease, soils, edaphic, physiographic, climate and microclimate are referred to as environmental constraints. As explained by Pauleit et al. (2002), edaphic constraint refers to soil conditions such as texture, drainage and chemical properties. The climatic constraints (Schroeder, Flannigan & Coles, 2006) are clearly identified as part of the model. The social factors focus on aesthetic values, functional utility and negative externalities. Finally, there are economic factors which include establishment costs, maintenance cost and removal costs.

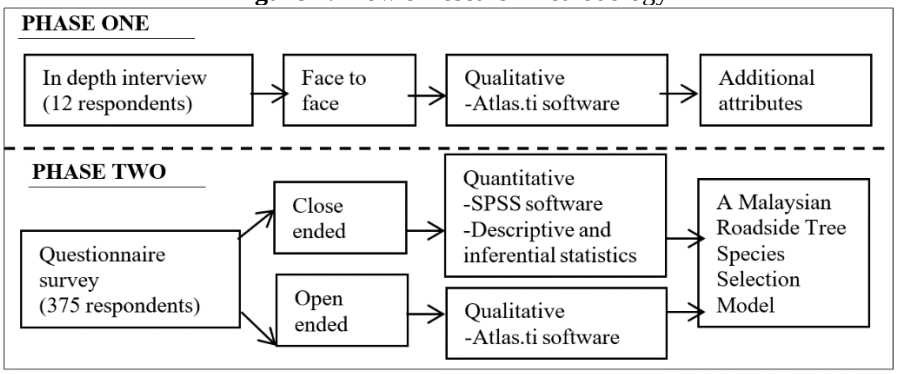
The conflict between bio-physical issues (ecosystem services and site factors) and socio-economic issues (institutional framework and culture, cost and

residents expectation) of the species selection has been reported by Australian tree managers and council officers at City Councils in South-East Queensland, Australia. Roy (2014) added 'institutional factors' which include legislation, framework and culture to Miller et al. (2015) model to recognise the impact of these new factors on roadside tree species selection. The sets of factors have been clustered as socio-economic factors. Roy (2014) also added 'tree characteristics' including ecosystem services, disservices, performance and tolerance of proposed tree species, as well as the aspects of structure, diversity and performance of the existing roadside tree populations to the site factors to explicitly state and emphasise their importance among the selection factors. In addition, Roy (2014) revised the 'social factors' mentioned by Miller et al. (2015) model with 'socio-cultural' factors to incorporate the effect of perception, attitudes and preference of tree managers, residents, politicians and stakeholders on species selection.

RESEARCH METHODOLOGY

This research applied the quantitative and qualitative approaches (Figure 1). During Phase 1, in-depth interview was conducted with 12 senior landscape architects in selected local authorities; Kuala Lumpur City Hall, Petaling Jaya City Council, Selayang Municipal Council and Selayang Municipal Council. The choice of local authorities in this research was based on the approval for data sharing from their landscape department. The selection of the respondents was based on expertise, experience and knowledge in roadside tree selection. The data were analysed in ATLAS.ti software. During Phase 2, a questionnaire survey was developed, tested and distributed among 500 registered landscape architects of the Institute of Landscape Architects Malaysia (ILAM). However, only 375 sets of the questionnaires were filled by the respondents. Responses to close-ended questions were analysed using the Statistical Package for Social Sciences (SPSS) version 21 software, while open-ended ones were analysed using the ATLAS.ti software.

Figure 1: Flow of research methodology



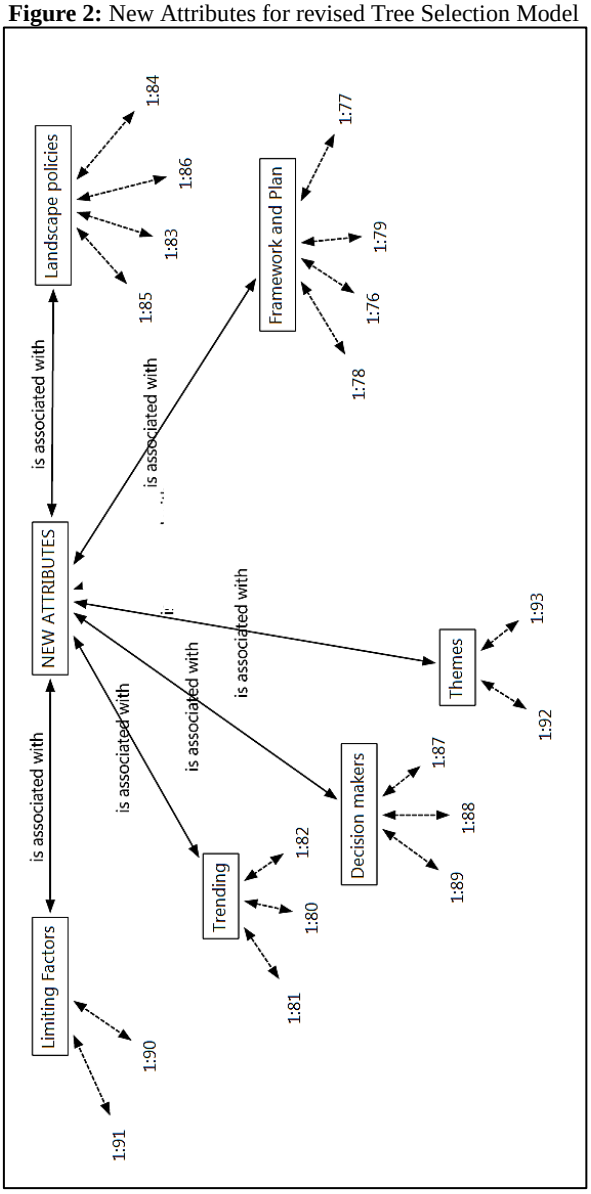
Source: Authors

RESULTS AND DISCUSSION

Interview Results with Senior Landscape Architects to Define the Additional Attributes in Roadside Tree Species Selection Model

The analysis of the interview results with 12 senior landscape architects in the local authorities is shown in Figure 2. Interviewees mentioned that six additional attributes that contribute in selecting roadside tree species are; framework and plan, trending, landscape policies, decision maker, limiting factors and themes. All the respondents stated trending, landscape policies and decision maker as the most important attributes that govern the selection of urban roadside tree species. Responses related to framework and plan (N=2) were also categorised according to the standard operation procedure (SOP), roadside landscape plan, list of roadside tree species and planting plan. Trending (N=12) was categorised according to the characteristics of the urban tree such as flowering trees, aesthetical values and tree forms. For the landscape policies (N=12), the elements highlighted by respondents were the National Landscape Policy (NLP), National Urbanisation Policy (NUP), Environmental Policy (EP) and Landscape Planning Guidelines (LPG). Respondents explained that decision makers (N=12) refers to people who have the authority to make decisions for selecting roadside tree species. Respondents stated that three groups in charge of selecting tree species are landscape architects, arborists and people in the top management level. Three of the respondents stated that important elements for limiting factors (N=3) are spaces and location of the planting trees. These elements will determine the conditions of tree growth. Attributes for themes (N=6) included types of tree species and suitable tree species for a variety of road types. Themes of tree species were determined based on the road hierarchy; main road, secondary road and highway. The identification of additional attributes showed the difference in views between Roy's (2014) and Miller et al. (2015) models. These different outlooks by the Malaysian local authorities suggest that revision to the Tree Species Selection Model proposed by Roy (2014) is necessary. The revised Tree Selection Model is to add the additional attributes in selecting roadside tree species. Via the improvement of this model, it can be used for local authorities as a guide for the selection of tree species, especially in Malaysia. This is because the conditions of Malaysia and others countries are different in terms of tree species, technology, climate conditions, weather and topography.

Figure 2: New Attributes for revised Tree Selection Model



Note: **Limiting Factors:** 1:91=Space, 1:90=Location
Trending: 1.80=Flowering tree, 1:81=Aesthetical value, 1:82=Tree form
Decision makers: 1:89=Landscape architects, 1:88=Arborist, 1:87=Senior officer
Themes: 1:92=Type of tree species, 1:93=Suitable tree species
Landscape policies: 1:85=National Landscape Policy (NLP), 1:83=National Urbanisation Policy (NUP), 1:86=Environmental Policy (EP), 1:84= Landscape Planning Guidelines (LPG)
Framework and Plan: 1:78=Standard Operation Procedure (SOP), 1:76=Roadside Landscape Plan, 1:79=List of roadside tree species, 1:77=Planting plan

Ranking of Mean Results for Additional Attributes

Table 1 shows the ranking of mean for additional attributes influencing roadside tree selection. The analysis shows the most influential attribute based on the ranking of mean is trending (mean = 4.70, rank 1). The second influential roadside tree selection is landscape policies (mean = 4.50, rank 2). The third influential selection of roadside trees is decision maker (mean = 4.41, rank 3). Next is the limiting factor (mean = 4.08, rank 4). This is followed by framework and plan (mean = 3.94, rank 5) and lastly, themes (mean = 3.82, rank 6). As mentioned in the literature review, trending is one important attribute in selecting trees. As supported by Key, Warner, McGraw and Fajvan (2001), 'trending' is the selection of tree species based on deciduous tree species and hardwood tree. The selection of tree species based on 'trending' is due to the continuity of the existing tree that has been planted before. The site condition such as climate factors and soil condition has been taken into account in selecting the appropriate tree species for the area. In the Malaysian context, the flowering tree (*Tabebuia rosea, Peltophorum pterocarpum* and *Xanthostemon chrysanthus*) has become 'trending' for roadside tree planting (Ahmad Nazarudin, 2016; Sreetheran et al., 2011). Zainudin (2008) reported that flowering species with fragrant floral (*Michelia champaca*) have dominated the roadside in Kuching, Sarawak. Sreetheran et al. (2011) also mentioned that five main roads in Kuala Lumpur were widely planted with flowering trees such as *Peltophorum pterocarpum* and *Pterocarpus indicus*. The 'trending' of flowering tree planting in roadsides has been in vogue since 1778 when they were planted in Malacca and continued to be planted in Penang in 1802 (Ahmad Nazaruddin, 2016; Sreetheran et al., 2011). Ahmad Nazaruddin, Tsan, Normaniza and Adzmi (2014) concluded that flowering trees species are capable of tolerating low soil moisture content, low soil fertility and sites with relatively high soil penetration resistance.

Table 1: Mean analysis for additional attributes influencing roadside tree selection

Additional Attributes	Mean	Std. Deviation	Rank
Trending	4.70	0.50	1
Landscape policies	4.50	0.71	2
Decision maker	4.41	0.75	3
Limiting factor	4.08	1.11	4
Framework and plan	3.94	1.39	5
Themes	3.82	0.84	6

Note : Likert Rating Scale: 1-Strongly disagree, 2-Disagree, 3- Moderate, 4-Agree, 5- Strongly agree

The Relationship between Existing and Additional Attributes

This section elaborated on the relationship between additional and existing attributes influencing the selection of roadside trees (Table 2). Economic factors showed that the maintenance cost against trending displays a very high

correlation and very strong relationship (tau=0.917**, p<0.01). The trending attribute against economic attributes showed that maintenance cost against landscape policies showed a significant difference p<0.01, high correlation and marked relationship (tau=0.788**). For the cultural constraints, pollution attributes indicated high correlation and marked relationship (tau=0.820**, p<0.01). Utilities against limiting factors indicated a very high correlation and very strong relationship (tau=0.938**, p<0.01) followed by structures and surface cover which showed high correlation and marked relationship between limiting factors (0.082**, p<0.01) and (tau= 0.710**, p<0.01). For the environmental constraints, attributes for physiographic showed a high correlation and marked relationship between limiting factors (tau=0.702**, p<0.01).

Table 2: Correlation coefficient between existing and additional attributes

Attributes	Framework and plan	Trending	Landscape policies	Decision maker	Limiting factors	Themes
Economic Factor						
Maintenance costs	0.517**	0.731**	0.559*	0.587	0.397	0.233**
Establishment costs	0.917**	0.036**	0.180	0.246*	0.541	0.249**
Removal costs	0.788**	0.076	0.342*	0.158	0.206**	0.419*
Cultural constraints						
Utilities	0.624**	0.310**	0.527	0.200**	0.938**	0.678**
Structures	0.777**	-0.040**	0.071**	0.577*	0.802**	0.206**
Surface covers	0.299**	0.043	0.148**	0.367	0.710**	0.251**
Pollution	0.820**	0.215**	0.349	0.163*	0.182	0.540**
Environment Constraints						
Climatic	0.362*	0.589*	0.413*	0.209	0.310**	0.377*
Edaphic	0.095**	-0.060	0.019	0.467**	0.267**	0.153**
Physiographic	0.223	-0.053	0.052**	0.603*	0.702**	0.288**
Biologic	0.589**	0.782**	0.513**	0.177	0.099	0.642**
Social Factors						
Aesthetics	0.785**	0.748**	0.401	0.904**	0.317	0.894**
Negative externalities	0.620*	0.313	0.823*	0.203	0.141**	0.676*
Functional utility	0.230**	0.874**	0.029	0.819**	0.406**	0.290**
Community values	0.308	0.044**	0.745**	0.370*	0.706**	0.260**

Note: Correlation coefficient is calculated using Kendall's tau –b , ** Correlation is highly significant at the level 0.01 (2-tailed), *Correlation is significant at the level 0.05 (2-tailed)

For the social factors, aesthetics attributes displayed a marked relationship with high correlation against framework and plan (tau=0.785**, p<0.01). High correlation and weak relationship existed between the aesthetic attributes against

trending (tau = 0.748**, p<0.01) and high correlation and marked relationship between functional utility against trending (tau = 0.874**, p< 0.01).

Analysis on Open-Ended Questions

In the final section of the questionnaire survey, the researchers asked for the opinion of the respondents regarding additional factors for selecting the right tree species. 214 responded that education factors are important in selecting tree species. By having a complete knowledge in trees species, landscape architects should choose the right tree species in the right place. Other than that, the skill, expertise and experience are also needed during the selection of trees species. Someone must have the expertise and skill to ensure the tree species is appropriate and not threatening to the public and properties. Past experiences in selecting trees need to be considered in selecting new tree species.

DEVELOPING MALAYSIAN ROADSIDE TREE SPECIES SELECTION MODEL

This section discussed the Malaysian Roadside Tree Species Model (Figure 3). The research findings indicate that roadside trees species selection among Malaysian landscape architects is a more complex process than the ones demonstrated in the literature (Roy, 2014; Miller et al. 2015). The researchers found that education factors including knowledge, experience, skill and expertise influence the selection of roadside tree species. Institutional factors including landscape policies, decision makers and framework and plan could influence the way urban roadside trees species are selected, managed and maintained. Limiting factors including space and location also seem to have influenced the Malaysian landscape architects regarding roadside tree species selection practices. Additionally, the researchers found that four new attributes for tree characteristics which are trending, flowering tree, tree form and themes have strong influence in selecting roadside trees, as well as budget constraints including establishment costs, maintenance costs and removal costs.

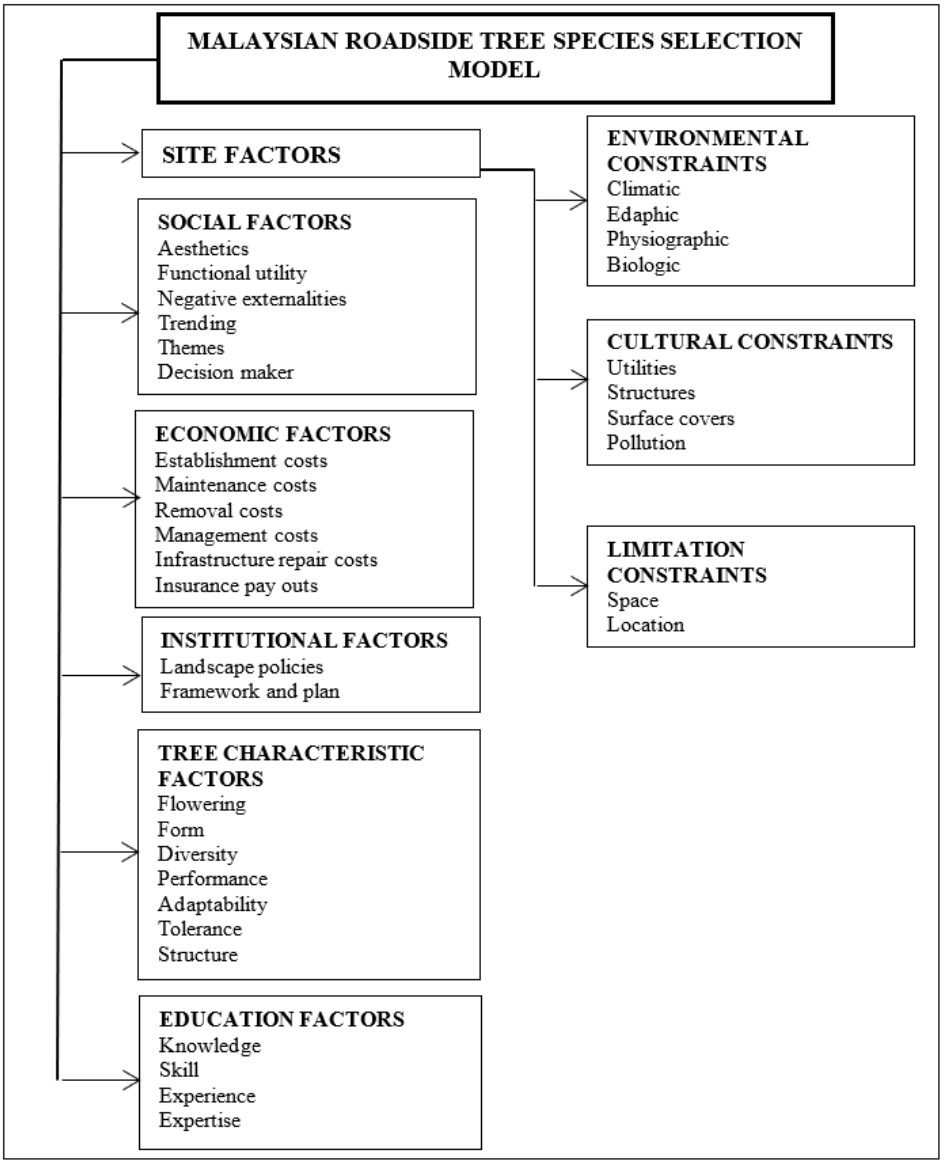


Figure 3: Proposed Malaysian Roadside Tree Species Selection Model

The model (Figure 3) identifies the site factors, social factors, institutional factors, limiting factors, economic factors and tree characteristics factors of roadside tree species selection as reported by Malaysian landscape architects. As part of the tree species selection based on institutional factors mentioned in Roy's (2014) model, the researchers have included landscape

policies, decision makers, framework and plan of the proposed roadside tree species as reported by Malaysian landscape architects. The researchers added a new factor to the model, namely limiting factors which comprise space and location. These elements influence the selection of tree species as reported by landscape architects, where the limiting space and location features affect tree growth.

CONCLUSION

In conclusion, six main attributes in selecting roadside trees species were derived from in-depth interviews with 12 landscape architects who were authorised in giving approval for the Landscape Planting Plan and proposing the tree species at the local authority stage. The attributes include framework and plan, trending, landscape policies, decision makers, limitations constraints and themes. All the attributes reported by the interviewer were based on the current practices during the selection of trees species. The findings reported that the majority of additional attributes indicated a positive correlation and have a relationship with existing attributes from the Tree Species Selection Model by Roy (2014). Therefore, all of the additional attributes are appropriate to fit into the Malaysian Roadside Tree Species Model.

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ASSESSING A WALKABLE ENVIRONMENT IN JALAN TUANKU ABDUL RAHMAN, KUALA LUMPUR, MALAYSIA

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Abstract

There is currently a wide discussion on promoting a walkable environment and improving walkability especially in city centre. Walking in the city is meant to solve numerous problems ranging from the city vibrancy, traffic congestion, environmental injustice, social isolation to the human health issues related to obesity crisis. This paper aims to examine the walkable environment of Jalan Tuanku Abdul Rahman as one of the busiest pedestrian urban places in the city centre of Kuala Lumpur, the capital city of Malaysia. It investigates the pedestrians' perception on their walking experience based on the walkable environment elements i.e. comfort, safety and levels of enjoyment. A participant observation and questionnaire survey technique were employed whereby the former involved with the researchers general physical evaluation of the site and the latter engaged a random sample of 120 pedestrians of Jalan Tuanku Abdul Rahman for a paper-based on street questionnaire survey. The findings suggested that the majority of the respondents were satisfied with the existing conditions of comfort and safety and hence, regarded Jalan Tuanku Abdul Rahman as a walkable area. However, their level of enjoyment was generally minimal suggesting that there are rooms for further improvement in the pedestrian area to create a better and more conducive walkable environment.

***Keywords*:** walkable, enjoyable walkway, pedestrian walkway

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INTRODUCTION

Recent studies have confirmed that car culture is on the decline in the city centre and that increasing attention is being paid to walkable spaces and walkability to make cities more vibrant and attractive, sustainable, healthier and safer. Walking is the elementary means of people moving around, integrating and living the urban space and accomplishing a salutary physical activity. Many benefits have also been associated with walking, ranging from reducing traffic congestion and pollution to controlling health crisis related to obesity. Walking can also be regarded as an essential factor in the creation of liveable communities. Walkability is usually linked to the quality of the built environment and connected by the quality of the pedestrian environment. A walkable environment is often attractive because it is lively and sociable, pleasant, clean and full of interesting people. Creating walkable environment for pedestrians can improve urban conditions. It is also seen such environment will be able to promote environmental preservation, maintaining social equity components of sustainable urban form as well as providing a more sustainable transportation options. These save energy and provide opportunities for those who cannot use cars because of age, income and disability. With such associated benefits, critical questions are normally posed to researchers, particularly the urban planners: how best to promote walking and to what extent our built environment is able to encourage people to walk. This paper, therefore, aims to examine the walkable environment of Jalan Tuanku Abdul Rahman as one of the busiest pedestrian urban places in the city centre of Kuala Lumpur, the capital city of Malaysia. This paper is structured into six sections. The subsequent section is the research background comprising the literature review of the study. Section three and four explains about the study area and research methodology respectively. They are then followed by the results and discussion section and finally, a section on conclusion and implications of the results.

RESEARCH BACKGROUND

A walkable environment is often multidimensional in terms of means and these dimensions are normally measureable. According to Rahaman, Lourenco and Viegas (2012), a pedestrian space should have some essential elements in order to meet the needs and comfort of people. Besides, it needs to be managed efficiently and effectively to promote a conducive environment, sustainable and eco-friendly to be used by multiple ages of users with a different ability. Meanwhile, Shamsuddin, Hassan and Bilyamin (2012), and Llewelyn-Davies (2000) argued that the street design must be a sign of its street activities whereby for a the specific commercial street, the design of the street must be able to reflect the on-going the commercial activity.

Much has been written on the elements necessary for a supportive pedestrian environment. Sarkar and Janardhan (1997) have used similar criteria

for evaluating how well streets can serve pedestrians. Both assigned grades to streets based on how successful they were in the following categories: safety and security, continuity of the pedestrian network, system coherence, convenience and comfort, and attractiveness. The enhancement of a liveable street will also able to promote a safer urban environment. From the environmental point of view, walking is a "green" mode of transport, as it has a low environmental impact, without air and noise pollution. The presence of a walkable environment and transit systems will create a smart alternative to private car usage, thus reducing traffic congestion, noise, and emissions.

One of the thrusts of development in a rapid city is to utilise resources in an efficient manner in order to achieve sustainable development. It is translated in the principles of sustainable urban design by creating a walkable environment to encourage and facilitate communities in the city to walk. To materialise the idea of a sustainable city, a network of safe and comfortable pedestrian area through physical design in cities should be planned, implemented and monitored (Shamsuddin et al., 2012).

Many factors have been considered to be limitations or constraints to walking in an urban area (Handy, Xinyu, & Mokhtarian, 2005). The limitation factors include stressors, like crowding, noise, traffic congestion, community violence and crime and physical features that reduce the sense of place. The safety factor (as in fear of crime) has been frequently cited as the highest constraint to walking by the more vulnerable groups and the people who rely more on walking (Evans 2009). Meanwhile, travel behaviour theories have been useful in understanding the factors that influence people to walk and what do people value most in any of their walking experience. Travel behaviour is influenced by situational and personal factors (Bouscasse, Joly, & Bonne, 2018). Socio-psychological factors like attitudes towards the environment and certain modes of transport or the importance of moral obligation and environmental beliefs are the main influencing variables for daily travel. People with high environmental concern have a better perception of "green" mode transport like cycling and walking.

THE STUDY AREA

With a population of over 1.5 million, Kuala Lumpur is the largest city in Malaysia and growing rapidly. Being an international commercial and financial centre, the city has put in a tremendous and concerted effort to enhance its attractiveness and this include improving selected street in Kuala Lumpur for pedestrians. The Kuala Lumpur Structure Plan 2020 has identified Jalan Tuanku Abdul Rahman (TAR) as one of the major spines and part of the City Centre Commercial (CCC) Zone. It is designated as such to promote broad range of commercial activities to be conducted within walking distance and therefore, providing the highest potential in supporting Kuala Lumpur's economic growth.

This promotes walking in the area to be safer, faster and more efficient, thereby helping to strengthen the economic viability of the city in terms of commercial activity, retailing and tourism. At present, there is a wide range of facilities available along the 1.9km length of the road including public transport system, shopping complexes, education and business centres offering a broad range of pedestrian activities including shopping, leisure, working and commuting transit. On the shoulders of this road are pre-war buildings, retail shops and modern shopping complexes (Sogo and Maju Junction). On Every Saturday between 5pm to 10pm, part of the road will be closed for vehicles to make room for the night market that offers a variety of domestic items, clothing and food at attractive prices. This Jalan TAR night market is now seen as one of the KL icon and valued as a tourist attraction in Malaysia. Figure 1 shows the location of the study area and the divisional zones for observation survey (explained in section 4).

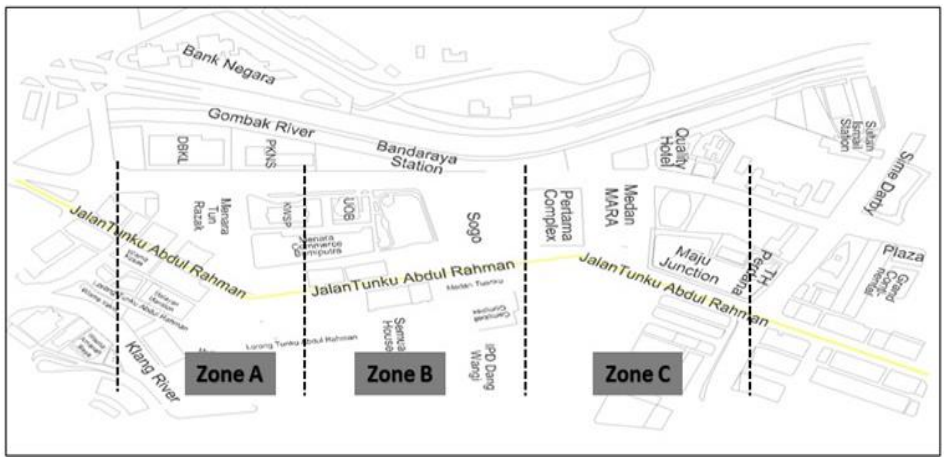

Figure 1: Map of the study area

THE METHODOLOGY

The assessment of the walking environment has been conducted by employing participant observation (physical survey) and on-street questionnaire survey techniques. Site evaluation was carried out at different stations and time (weekday and weekend, peak and off peak) to observe the physical aspects of Jalan TAR. The observation was done according to these three parameters i.e., comfort and image, safety, uses and activities. A checklist, zonal mapping and series of photographs have been used to record information gathered. Two separate groups of researchers (two members for each group) have been assigned at three different locations (Zone A, B and C as shown in Figure 1) to conduct the observation survey to ensure validity, conformity and more coordinated results. The results from the observation survey was also used as a guidance to develop the questionnaire for the second stage of data collection.

For on-street questionnaire survey, a total of 120 respondents were selected randomly among the pedestrians around Jalan TAR sidewalk. The survey was carried out during afternoon peak hour on both working weekdays and weekends. The respondents were provided with a paper-based survey form with several sub-item tests to gauge their walking experience based on walkable and enjoyable elements. Respondents were also asked to assess the pedestrian facilities, security level, and accessibility linking to other various mode of transportation. They were also asked to provide their future recommendations on strategies to further encourage walking, making walking to be more attractive, efficient and enjoyable activity and more importantly, create a more conducive and walkable environment.

RESULTS AND DISCUSSION

Observation Analysis on Jalan TAR Walkable Environment

The pedestrian walkway and quality of sidewalk network is seen as comfortable enough to link users to and from adjacent places. The observation results indicates that the size of the pedestrian walkway was acceptable and at a satisfactory level to accommodate high number of pedestrian with minimal clashes during the non-peak hours. However, during peak hours, when the number of pedestrian increases and the situation gets busier, there was a slight obstruction in the walkway due to the existence of street vendors which often impedes pedestrian movements and creating conflicts between pedestrian space and walkways with vehicular movements. This also hampered the optimization of a walkable public space, which limits the size of sidewalk at both sides leading to other problems associated with the pedestrian traffic.

The result from the observation also shows that the street was generally safe with the presence of auxiliary police and security guards. At some points however, the pedestrians were at risk of petty crimes such as snatch theft as the walkway was located too close to the main road. However, at certain areas, improvements have been made to the pedestrian walkway like the provision of the guardrail as a safety element and crime prevention from vehicle and snatcher. In term of cleanliness, it could be considered as at moderate level whereby some areas were littered. Some areas of the pedestrian walkway had been vandalised and were not well maintained, and these could cause danger to the pedestrians.

In term of uses and activities, part of the pedestrian area functions as place for the exchange of goods or place to do business. The street vendors used the pedestrian space as a place to display their products and this has attracted the pedestrians to stop by, thus disrupting the pedestrian traffic flow. The pedestrian walkway, besides being a public space, has traditionally served as a place to do conduct commercial transactions. Besides the use of the walkway as a place for trading, numerous other forms of economic-based informal street activities, such

as petty traders, push carts, street vendors and street musicians have occupied most part of the pedestrian space. It was also observed that the area was highly used by people with disabilities. A number of people walking with walking sticks and crutches, and group of people who were visually impaired could be seen, benefitting the traffic free environment.

The road networks mainly serve the outer section of the area. A network of narrow alleys, approximately 1.5 to 3 meters wide, serves most of the area of Jalan TAR. However, on some days especially weekends and peak hour during weekdays, conflicts between pedestrians and vehicles could be traced at some parts of the pedestrian area. It was also observed that there was no sheltered walkway provided along the pedestrian walkway. The perennial heat and rainy conditions of Kuala Lumpur give rise to high humidity which makes strolling along the streets of Jalan TAR a "hot and sticky" affair. However, even without visible design landscape in the street, the observation concludes that users would still continue walking despite the weather affecting them. This clearly illustrates that the pedestrian walkway was functioning well and its physical characteristics act as a mode of movement for users (refer to the first photo in Table 1).

Table 1: Summary of the observation survey

Elements	Subjects observed	Results	Photos
Comfort and Images	Pedestrian walkway Quality of sidewalk Linkages/Crossing Accessibility	*Satisfactory* except at certain points in Zone B (incoherent between pedestrian crossings)	
Safety	Personal safety Feeling safe Dark areas and lighting	*Somewhat satisfactory* (certain points in Zone A were not well lit and may pose danger to pedestrian especially at night)	 

Uses and Activities	Conflict of activities Size of walkway	*Somewhat satisfactory* (there was a clash between different types of uses at all zones observed)	

Pedestrians' Perception on Jalan TAR Walkable Environment

Elements of Comfort

Comfortable walking has been associated with higher travel rates (Alfonzo, 2005). Slater (1985) described comfort as "the physiological, emotional and physical harmony between the human body and the environment." Facilitators of physical facilities (line, seating and adequate protection from the weather) can minimize the required effort. Sarkar and Janardhan (1997) defined comfort of walking as "to do activities and thus make the walk fun".

Because comfort can create good and positive images in place (Lynch, 1960), providing comfort in the interior of the city is important for a tourist experience. It is said that the quality of the running environment affects people on foot (Southworth, 2005). Parks and Schofer (2006) mentioned that network design helps determine the ability of pedestrians to reach their destinations, which corresponds to the state of the built environment. The importance of connectivity has been discussed by Brown, Werner, Amburgey and Szalay (2007). They mentioned that walkable environment must be able to provide comfort for pedestrians, can be improved with stronger linkages and promote a better quality pedestrian network within the district as a whole.

A pleasant and exciting walking experience has a positive impact on the perception of urban dwellers. In measuring comfort, several assessments were used to examine visitors' satisfaction over physical elements such as how well pedestrian elements can influence emotional comforts and how the visitors react to the qualities they experienced while walking.

Table 2: Pedestrians perception on Jalan TAR comfort elements

Elements			(1) Strongly Disagree	(2) Disagree	(3) Average	(4) Agree	(5) Strongly Agree	Total
	Comfort							
1	Condition of sidewalk are safe for walking	Total (%) ***Mean 3.28***	3 (2.5)	19 (15.8)	45 (37.5)	47 (39.2)	6 (5)	120 (100)
2	Pedestrian walkway is well maintained	Total (%) ***Mean 3.11***	6 (5)	15 (12.5)	61 (50.8)	36 (30)	2 (1.7)	120 (100)

3	Enough room for walking	Total (%) ***Mean 3.49***	0 (0)	14 (11.7)	43 (35.8)	53 (44.20)	10 (8.3)	120 (100)
4	Walkway dirty and littering everywhere	Total (%) ***Mean 3.04***	5 (4.2)	8 (6.7)	45 (37.5)	51 (42.5)	11 (9.2)	120 (100)
5	Vehicle exhaust odour on this street	Total (%) ***Mean 3.73***	2 (1.7)	11 (9.2)	25 (20.8)	62 (51.7)	20 (16.7)	120 (100)
6	Bad odour on this street	Total (%) ***Mean 3.34***	0 (0)	23 (19.2)	41 (34.2)	48 (40)	8 (6.7)	120 (100)
7	Sidewalk leads to and from adjacent areas	Total (%) ***Mean 3.63***	0 (0)	11 (9.1)	30 (25)	71 (59.1)	8 (6.6)	120 (100)
8	Vehicles dominates pedestrians	Total (%) ***Mean 3,62***	0 (0)	13 (10.8)	38 (31.6)	51 (42.5)	18 (15)	120 (100)
9	Accessible by various mode of transportation	Total (%) ***Mean 3.73***	0 (0)	6 (5)	36 (30)	62 (51.7)	16 (13.3)	120 (100)
10	Space function for people with special needs	Total (%) ***Mean3.17***	0 (0)	39 (32.5)	34 (28.3)	35 (29.2)	12 (10)	120 (100)
11	There are enough places to sit	Total (%) ***Mean2.57***	0 (0)	73 (60.8)	32 (26.6)	9 (7.5)	6 (5)	120 (100)

Table 2 shows the respondents' perceptions of comfort element at Jalan TAR. Respondents generally rated most of the comfort elements as satisfactory. It includes the criteria of the pedestrian walkway condition, acceptable walkway width and the connectivity of the pedestrian walkway to the adjacent areas. Respondents also highly agreed that the pedestrian walkway was accessible by various modes of transportation (highest mean score at 3.73). However, the quality of pedestrian walkway maintenance was rated as average. Hence, the respondents agreed that the walkway is not clean and have unpleasant odours. Respondents also gave negative feedbacks on the provision of space for people with special needs and also the lack of a place to sit (mean score lowest at 2.57).

Based on the previous research, Rahaman et al. (2012) mentioned that the current city centre of Kuala Lumpur is not a pedestrian-friendly city due to its lack of pedestrian linkages and existence of major deficiencies such as poor maintenance, inefficient design, and poor accessibility. Visitors often find

deficiencies in the pedestrian sidewalk facilities that are physically challenging to the disabled and the elderly. Unlicensed vendors and hawkers use the pedestrian sidewalk for their business purposes and some building owners prohibiting public access across their properties have worsen this scenario (Rahaman et al., 2012). Reduction in total sidewalk width due to the vendor's existence often impedes pedestrian movements. A city centre is not a pedestrian-friendly city if it lacked of pedestrian linkages and existence of major deficiencies such as poor maintenance, inefficient design and poor accessibility (Tarudin, Rashid, Kordi, Azmi, & Aziz, 2016).

Elements of Safety and Security

Safety and security element is one of the determinants of a good and effective walkable environment. A safe pedestrian environment allows the pedestrians to walk comfortably and reduces the sense of fear of accident or crime (Zakaria & Ujang, 2015). The intensity of pedestrian is required to increase safety because the streets will be more alive and lively (Jacobs, 1969). The components of the pedestrian safety are also associated with motorist behaviour, and crossing exposure and security. As noted by Newman (2008), the urban designs are important to avoid the formation of hidden and obscured niches in order to reduce crime on the streets. Hidden and obscured niches can be criminal hideout and expose the user to crime especially at a place with low intensity of pedestrians.

Table 3: Pedestrians' perception on Jalan TAR safety and security

	Elements		(1) Strongly Disagree	(2) Disagree	(3) Average	(4) Agree	(5) Strongly Agree	Total
	Safety and Security							
1	Feeling safe walking along the pedestrian	Total	0	17	60	38	5	120
		(%)	(0)	(14.2)	(50)	(31.7)	(4.2)	(100)
		Mean	***3.26***					
2	Crossing the street	Total	9	36	50	25	0	120
		(%)	(7.5)	(30)	(41.7)	(20.8)	(0)	(100)
		Mean	***2.76***					
3	Distance of road to the sidewalk	Total	13	57	29	19	2	120
		(%)	(10.8)	(47.5)	(24.2)	(15.8)	(1.7)	(100)
		Mean	***2.47***					
4	A quiet pedestrian area invites crime	Total	0	15	18	64	23	120
		(%)	(0)	(12.5)	(15)	(53.3)	(19.2)	(100)
		Mean	***3.80***					
5	Dark area at night invites crime	Total	0	16	30	59	15	120
		(%)	(0)	(13.3)	(25)	(49.2)	(12.5)	(100)
		Mean	***3.61***					

Table 3 shows the respondents' perception on the pedestrian walkway safety and security elements at Jalan TAR. They were asked to value five main elements for safety and security i.e. feeling safe when walking along the pedestrian area, feeling safe when crossing the street, reasonable distance between the main road and the sidewalk, quietness of the street invites crime and inadequate night lighting invites crime. The result indicates that quietness and inadequate night lighting along the pedestrian area were their utmost concern on the safety elements. They highly perceived that both circumstances of quietness and inadequate lighting will affect their safety as they will invite crime (mean score of 3.80 and 3.61 respectively).

Meanwhile, majority of the respondents agreed that they generally feel safe and secure when walking at the pedestrian area with a mean score of 3.26. They feel slightly unsafe, however, when crossing the street (mean at 2.76) and walking at the walkway where the distance of the walkway was too near to the main road.

Elements of Enjoyment

Factors affecting the vibrancy of urban areas vary and are much influenced by such variables as aesthetical values, physical attractions and environmental excitement. This relates to how much of the environment gives aesthetically pleasing to the consumer, attracting traders using the space, and they are happy with the opportunities offered (Owen, Humpel, Leslie, Bauman, & Sallis, 2004; Shay, Spoon, & Khattak, 2003).

In Table 4, the majority of the respondents agreed that there is interesting view including heritage and historical building nearby Jalan TAR pedestrian walkway. They also agreed that the existence of art street music such as 'busking' will catch pedestrians' attention resulting in them spending more time at the pedestrian walkway. The respondents also agreed that there is memorable character along Jalan TAR walkway that will attract people to come and spend their time in Jalan TAR. However, respondents averagely agreed that the pedestrian walkway has interesting wall street art and nice landscape along.

Table 4: Pedestrians perception on Jalan TAR enjoyment

	Elements		(1) Strongly Disagree	(2) Disagree	(3) Average	(4) Agree	(5) Strongly Agree	Total
	Enjoyment							
1	Interesting view such as heritage building	Total	4	11	40	61	4	120
		(%)	(3.3)	(9.2)	(33.3)	(50.8)	(3.3)	(100)
		Mean 3.42						
2	Wall street art along pedestrian walkway	Total	2	27	47	40	4	120
		(%)	(1.7)	(22.5)	(39.2)	(33.3)	(3.3)	(100)
		Mean 3.20						

3	Art street music along pedestrian walkway	Total (%) ***Mean 3.16***	5 (4.2)	20 (16.7)	46 (38.3)	47 (39.2)	2 (1.7)	120 (100)
4	Good landscaping	Total (%) ***Mean 3.20***	3 (2.5)	22 (18.3)	48 (40)	42 (35)	5 (4.2)	120 (100)
5	Has a memorable character	Total (%) ***Mean 3.49***	6 (5)	13 (10.8)	36 (30)	47 (39.2)	18 (15)	120 (100)

Respondents' Agreement with the Proposed Walkable Environment Elements

Table 5 shows the results of the analysis on respondents' level of agree or disagree with the proposed walkable environment enhancement measures. For this analysis, the respondents were given a list of proposed walkable environment enhancement measures and asked to provide an opinion to what extend were they agree or disagree with the suggestions.

The proposal to restrict the vendors and hawkers from using the pedestrian walkway and to provide more shady areas and shelter were the most popular proposals (with mean score of 4.61 and 4.52 respectively). These are then followed by the proposal to improve proper signage and warnings, restrict the streets beggar, provide better landscaping as well as maintain cleanliness along the pedestrian walkway. Meanwhile, providing murals and street arts to enhance the sense of welcoming to encourage people to walk and planting more trees along the pedestrian walkway were given the least priority.

Table 5: Mean Analysis of walkable environment enhancement

No.	Proposal	Mean Score of agreement
1	Shade trees along the pedestrian walkway, provide a sense of enclosure, privacy, and security	3.40
2	Soft and hard landscape to beautify and enhance the overall environment	3.96
3	Frequent maintenance and proper cleanliness along the pedestrian walkway	3.74
4	Provide more murals and street art to enhance the sense of welcoming environment.	3.65
5	Proper signage and warnings to create a safer environment	4.10
6	Provide shady trees and shelter where necessary	4.52
7	Restrict the vendors and hawkers using the pedestrian sidewalk space	4.61
8	Restrict the street beggar using the pedestrian sidewalk space	3.98

CONCLUSION

This study concludes that Jalan TAR pedestrian walkway has comfort and enjoyable elements as it able to offer both emotional and physical harmony between the human body and the environment. However, majority respondents were quite sceptical on safety and security issues and did not give a positive feedback which limits the overall walkability values of the area. This suggests that improvement is needed to further enhance the walkable criteria. As walkability environment should be the asset of a city whereby tourists get attracted to experience the place, there is a need to create a pedestrian walkway that is walkable, distinctive with a strong identity and sense of place. A pedestrian walkway with good and quality design will encourage greater community participation in walking and can influence emotional comforts and experience while walking. Sheltered walkway should be provided where necessary to shield the pedestrians from the hot weather and rainy days, and tree planting is seen a natural solution to these problems. The design and provision of all important walkway elements and street furniture (including public art) should be coordinated, wherever possible, to make a positive contribution, avoid unnecessary clutter, and ensure a safe, informative and attractive walking environment.

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THE DEFENSIBLE SPACE CONCEPT IN NEIGHBOURHOOD PARK CASE STUDY: TAMAN TASIK PUCHONG PERDANA, SELANGOR, MALAYSIA

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Abstract

Open space can contribute to the overall wellbeing of life by providing social and recreational focal points. However, open space may also be associated with undesirable qualities of a place such as crime activities that affect negatively its quality and the surrounding. Thus, to create a safe and comfort open space area, the defensible space concept is seen as an important approach to deter crime from occurring and to sustain the safety environment. Therefore, this research objective is to investigate whether the elements of the defensible space concept; territoriality, surveillance, and image, may be used in the planning of neighbourhood park. A study was carried out at Taman Tasik Puchong Perdana, Selangor by using a questionnaire survey to collect information from the visitors. The findings show that the defensible space concept with all the three elements was not implemented, which further may lead to the crime activities in the neighborhood park.

Keywords: open space, neighbourhood park, defensible space, territoriality, surveillance, image

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INTRODUCTION

Open space is an important element that needs to be provided at residential, commercial and industrial area development. It can contribute to the ecological balance of physical development and function as suitable place for social interaction and communication. As such, the provision of open space needs proper planning either from physical or social aspects. According to Zainudin and Abdul Malek (2010), safe environment is a condition which is free from all of the physical, social and mental threats. In order to prevent crime, it is important to design a space that is more easily observed through the placement of physical elements to maximize visibility. The environment is one of the factors influencing crime and the level of fear of crime in society (Sakip, Johari, & Salleh, 2012).

During the last few decades, crime incidences in open space and public spaces have been rapidly increasing (Iqbal, 2015). The absence of proper approach used to ensure the planning of open space and neighbourhood park can prevent crime resulted in the opportunity for crime to take place in neighbourhood park (Anastasia & John, 2007; Liebermann & Kruger, 2004). Hence, the purpose of this research is to examine the implementation of the defensible space concept in neighbourhood park.

LITERATURE REVIEW

The defensible space concept was introduced by Oscar Newman in 1972. This concept is one of the approaches to the prevention of crime. According to Newman (1972), defensible space is defined as "....model for residential environments which inhabits crime by creating the physical expression of a social fabric which defends itself....an environment in which latent territoriality and sense of community in the inhabitants can be translated into responsibility for ensuring a safe, productive and well-maintained living space".

The physical design usually provides the potential for community care and social control to prevent crime. Newman's concept of space defence was explained on buildings, roads and the environment in residential area. Although the concept was not specifically targeted at neighbourhood park, its elements provide the key point of a space defence that potentially makes it less vulnerable to crime. In fact, this concept can be adapted into the design scheme of open space and neighbourhood park, and made as one of the key elements in planning residential areas and its layout.

Generally, the main purpose of the concept is to restructure the physical layout and create the social strength among the people so that communities can strengthen their social interaction and prevent crime from occurring in their housing area. This includes road and surrounding areas, open spaces and recreational areas. As mentioned by Mair and Mair (2003), defensible space is "…a structure for the environment of residential which describe the strength of the social through the environment manipulation". This structure can also

improve the condition of the environment to promote safety, comfort, satisfaction and productivity of community across a variety of contexts.

This approach aims to prevent criminal activities through the creation of social value which could keep the community from the threat of criminal activity in the neighbourhood park. It is important to plan and develop a conducive recreational area, which can create a sense of belonging to the community. Further, it will lead the local people to appreciate, value and ensure their neighbourhood park is safe and well managed to give comfort and guarantees the safety of the users. In this sense, the planning of the residential area (and neighbourhood park) is more liveable and can be managed by the residents within their locality (Mohit & Hannan, 2012).

The concept of defensible space does not solely emphasise on physical planning approach in preventing crime, but also including certain technical methods and mechanisms particularly when designing the space's layout. It also involves the social aspects, where it needs the participation and awareness among the community in eradicating crime.

Elements of Defensible Space Concept

According to Newman (1972), the three elements that create the defensible space are the territoriality, surveillance, and image.

Territoriality

Territorial include a group of individuals and other territorial units. This group will form its surveillance to monitor their home environment. Each unit who is in the territory has territorial characteristics. A set that includes several territorial known as a territorial complex. To determine the territorial shape of a region, individuals who reside in these areas must be observed. This is a situation that formal (professional) and informal (social). This space refers to ownership clearly and evidently depends on other factors such as appearance and size, shape and size, the number of units, the breadth, the types of boundaries and a clear distinction and detail.

This principle emphasizes that all areas either owned by an individual or the public should be made clear to public space, semi-public or private and semi-private. A clear definition of space can help to determine who has the right to use the space as well as give confidence to the community acting on a stranger or suspicious activities in their neighbourhood. Separation of this space determines the quality and spaciousness of every individual in the context of the design and layout that emphasizes the concept of 'Defensible Space' for showing the character of the layout. Observation of this case still has not received serious attention while it has a huge influence on the development plan. In a plan for open space and neighbourhood park, the establishment of private space, spatial space behaviour, and territory can be formed within the theory of 'Defensible Space'

which is a space defence as a transition zone between public space, semi-public, semi-private and private. The relationship with the territorial concept living space must be able to differentiate between these spaces to enhance the sense of security and can help to reduce the occurrence of crime.

Surveillance

Surveillance is an element that is closely related to elements of the territory in which breadth of a territorial community area will affect the environmental aspects of surveillance in those communities. It emphasizes the area that is design to allow the people within the area to observe the activities in the area. The element of surveillance makes the people engage in unnoticed activities. Some of the elements that can create surveillance in the area are lighting and benches. Lighting is important to ensure the area can be seen and not dark so that people can supervise the area and avoid unnoticed activities. If an area is poorly maintained and unsupervised, it will create 'sign of crime' (Melde & Esbensen, 2009).

Image

The image refers to the location of the area that does not appear vulnerable to crime and not isolated from the surrounding view. The image of the area can attract people to visit the area. Thus, it can elude from the existence of the defenceless area which may lead to the crime activities. Every planning of neighbourhood park should emphasize and implement the safety elements to ensure the safeness of the public. The "Defensible Space" concept is important in the implementation of safety elements in the recreation area. The evaluation of safety level in the recreation area will be carried out in this study. This concept is crucial in ensuring the security elements be applied in every planning of recreation area to provide comfort and safety to the users. The implementation of security elements are also vital to reduce the crime activities.

RESEARCH METHODOLOGY

Study Area

This study is focused on the implementation of the Defensible Space Concept in neighbourhood park, which is the Taman Tasik Puchong Perdana, Puchong, Selangor. The total area of Taman Tasik Puchong Perdana is 7.70 acres, which includes 4.51 acres of lake area. Based on the planning standards published by the Federal Department of Town and Country Planning Peninsular Malaysia (2013), the park can be classified as a neighbourhood park.

Taman Tasik Puchong Perdana is located in Puchong within the administrative boundary of Subang Jaya Municipal Council (MPSJ). It is located near the entrance of Puchong Perdana, which is within 300 meters from the exit

to Lebuhraya Damansara Puchong (LDP). Located next to the park is a primary school (Sekolah Kebangsaan Puchong Indah) and a mosque (Masjid As-Salam), and a food court under the management of MPSJ (Figure 1).

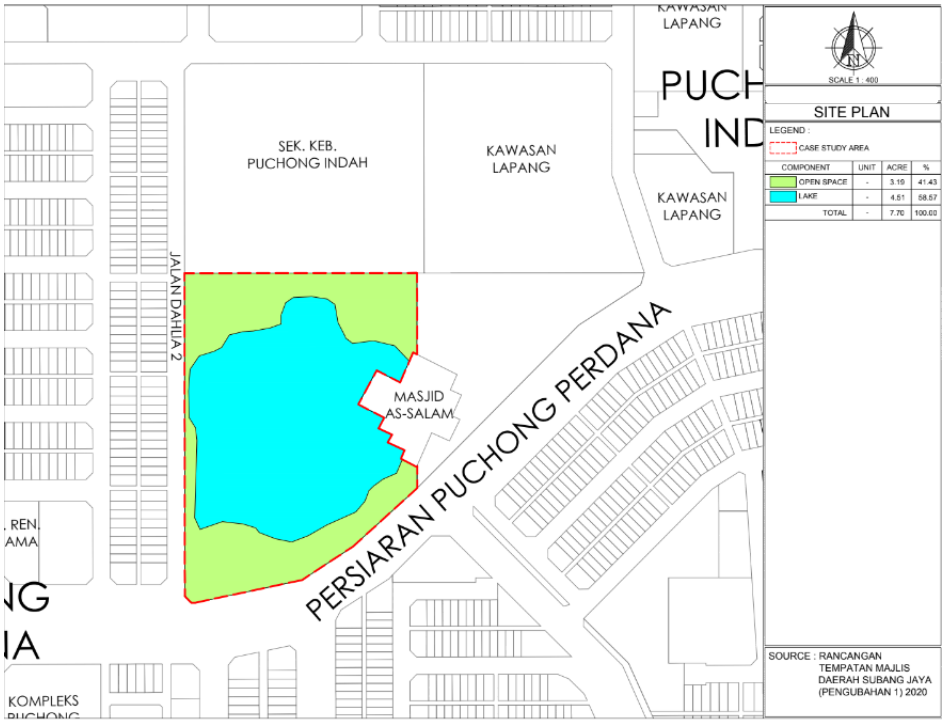

Figure 1: Taman Tasik Puchong Perdana and its surrounding development

Questionnaire Survey and Sampling of Respondents

The implementation of defensible space concept in the neighbourhood park was identified through a questionnaire survey. The questionnaire emphasises on identifying the public opinion on the three elements of defensible space concept, which are territoriality, surveillance and image. A total of 119 respondents were selected from the total population of 17,388 in the study area by using Raosoft Sample Size Calculator. The samples were determined with the confidence level of 92% with the amount of response distribution of 50%. A five-points Likert type scaled items were set up for which respondents were asked to indicate their assessment level of agreement and disagreement, ranging from ‘less agree’ (1) until ‘extremely agree’ (5). The samples covered both male and female, different ethnic groups, and different age groups (Table 1).

Table 1: Background of respondents

Variables	Percentage (%)
Gender	
Male	58.00
Female	42.00
Ethnicity	
Malay	85.70
Indian	5.90
Chinese	8.40
Others	0.00
Age	
< 20 years old	47.10
20-29 years old	27.70
30-39 years old	8.40
40-49 years old	5.90
> 59 years old	10.90

Method of Analysis

The data were analysed using frequency, chi-square and correlation tests as provided in the IBM SPSS software. The purpose of the analysis is to identify the safety level, sense of security among the respondents and the implementation of defensible space concept in Taman Tasik Puchong Perdana.

RESULTS AND FINDINGS

Territoriality

Based on the results shown in Table 2, 76 respondents agreed with the opinion on the characteristic of the whole of the study area as a public space with the percentage of 63.9% and the mean score of 3.70 – agreed. Accordingly, the study area is a neighbourhood park that is used by the community to do recreational activities. This showed the function of the study area as a public space for the community. Moreover, 60.5% of respondents agreed that the neighbourhood park has created a sense of belonging environment (mean score 3.71). This is because most of the visitors felt that they have rights to do any recreation activities in the park. It also allows the visitors to have interaction among themselves without any interruption. Interaction among the neighbours is important to strengthen the relationship among the community.

However, the findings show that the study area is unable to create a safe environment as perceived by 62.2%, with the mean score of 2.47. This is because of the safety elements such as lighting, CCTV and security patrol are not well provided in the study area that further caused the visitors feel not safe. Most of the respondents (73.1%), with a mean score of 4.22, felt that the existence of dark

spots particularly due to lack of lighting at the study area at night will lead to crime.

Table 2: The respondents' opinion on territoriality element

Justification		1	2	3	4	5	Total
Clear characteristics as a public space	Nos.	2	31	10	47	29	119
	%	1.7	26.1	8.4	39.5	24.4	100.0
	Mean	3.70					
"Sense of belonging" environment	Nos.	4	35	8	40	32	119
	%	3.4	29.4	6.7	33.6	26.9	100.0
	Mean	3.71					
Safe environment for activities	Nos.	11	63	5	28	12	119
	%	9.3	52.9	4.2	23.5	10.1	100.0
	Mean	2.47					
Presence of dark spot at night lead to crime	Nos.	5	26	1	22	65	119
	%	4.2	21.8	0.8	18.5	54.6	100.0
	Mean	4.22					

The neighbourhood park is a secondary territorial type which the area is less important than the primary but still have a moderating influence on the residents. The territoriality is important to show the boundary between the recreation area and non-recreation area. However, there is no provision of fence, bollard and landscape around the neighbourhood park (Photo 1 and 2). The provision of fence, bollard and landscape is important to ensure the one-way in and out in order to increase the safety level of visitors in the recreation area.

Photo 1: No barrier around the study area

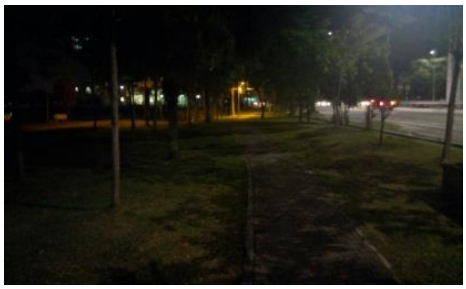

Photo 2: No barrier between the park and motorized lane

Overall, the findings showed that the study area is lacking with the territorial elements that obscured the identification of boundaries between private and public spaces in order to enhance the safety aspect based on the defensible space concept.

Surveillance

Surveillance is also the key element of defensible space concept which can help in reducing crime. Based on the questionnaire survey, 74% of the respondents, with mean score of 4.18 (Table 3), agreed that surveillance elements such as security patrol and CCTV are lacking in the study area. At the same time, 77.3% of respondents, with mean score 4.31, agreed that certain part of the neighbourhood park also lack lighting at night (Photos 3 and 4) and has caused visitors to feel unsafe and insecure.

Table 3: The respondents' opinion on surveillance element

Justification		1	2	3	4	5	Total
Lack of surveillance elements	Nos.	5	20	6	19	69	119
	%	4.2	16.8	5.0	16.0	58.0	100.0
	Mean	4.18					
Lack of lighting elements	Nos.	3	21	3	19	73	119
	%	2.5	17.6	2.5	16.0	61.3	100.0
	Mean	4.31					

Photo 3: Lack of lighting at gazebo

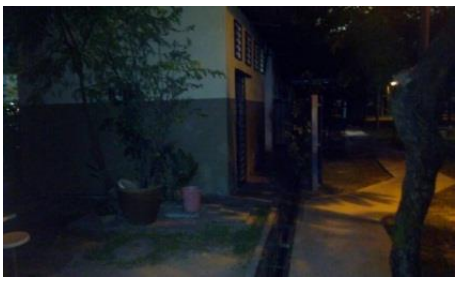

Photo 4: Location of public toilet in secluded area with poor lighting

Image

Image plays an important part in attracting people to visit neighbourhood park. Fundamentally, if the study area can attract people due to its attractive landscape, it also can create a natural element of supervision and help in reducing crime. The result from the questionnaire surveys showed that 67.2% of the respondents, with mean score 3.85 (Table 4), felt that the landscape in the study area is not properly managed and not in good condition. Furthermore, the presence of many large shady trees has obstructed the view towards the public area (Photo 5).

Meanwhile, 62.1% of the respondents, with mean score 3.92 (Table 4), perceived that the lack of physical barrier separating the jogging track and the road is posing danger to joggers. Likewise, some other areas within the park are also without barrier between recreational space and the roads (Photo 6). Apart from accident risk, this also would allow criminals to enter and exit the recreation area with ease.

Table 4: The respondents' opinion on the image elements

Justification		**1**	**2**	**3**	**4**	**5**	**Total**
Landscape is not properly managed	Total	9	25	5	40	40	119
	(%)	7.6	21.0	4.2	33.6	33.6	100.0
	Mean	3.85					
Barrier-less jogging track poses danger to users	Total	4	32	9	16	58	119
	(%)	3.4	26.9	7.6	13.4	48.7	100.0
	Mean	3.92					

Photo 5: The presence of shady trees obstruct view and surveillance.

Photo 6: No barrier to separate between recreation area and motorized lane

For relationship analysis, correlation tests had been carried out. The analyses showed a significant relationship between gender and sense of security among respondents. The level of security as measured showed that male (78%) felt secured when doing activities in the park as compared to female (Table 5). Thus, a higher percentage of female respondents felt unsecured (40%) as compared to male respondents (22%). Also, Chi-square test showed a statistically significant association between gender and sense of security with p value of 0.031 ($p < 0.05$). It shows that sense of security is dependent on gender. Thus, factor of gender was affecting the level of sense of security. It is suggested that the security aspects in the study area should be improved especially for the female users.

For the aspects of ethnic group and age, chi-square and correlation analyses show non-significant association or relationship with the sense of security. It indicated that variables of ethnic and age did not affect the sense of security among the respondents. It showed that sense of security level was no significant different among different ethnic group as well as age group.

Table 5: Correlation between gender and sense of security

Justification		Gender		Total
		Male	Female	
Sense of security when doing activities in the park	Yes	54 (78%)	30 (60%)	84 (71%)
	No	15 (22%)	20 (40%)	35 (29%)
Total		69 (100%)	50 (100%)	119

Note: Pearson Chi-square p value = 0.031

CONCLUSION

As a conclusion, the overall findings demonstrate the lack of defensible space concept implementation in the neighbourhood park. It is also found that most of the visitors felt the neighbourhood park is not safe for them to engage in recreational activities. This could be attributed to several weaknesses of the park such as lacking a strong element of territoriality due to no physical barriers between the recreation area and non-recreation area to control the entry to and the exit from the neighbourhood park. Furthermore, there is also lack of surveillance elements such as security patrol and CCTV, as well as community programmes and awareness among the community. The programmes and activities are essential to attract people to come to the park, thus, become one of the surveillance agents. The image of the study area also failed to encourage and attract people to engage in the recreation activities. Thus, the implementation of the defensible space concept at the park is highly recommended, not only to prevent crime, but also to strengthen the social interaction of the area.

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NCIA-AMB MASUK KAMPUNG PROJECT: A PARADIGM OF OPPORTUNITIES AND CHALLENGES FOR SUSTAINABLE RURAL DEVELOPMENT

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Abstract
Malaysian government is focused to accomplish world-class living standard of whole nation by year 2025 through sustainable development irrespective of regional, religious and ethnic boundaries. The Northern Corridor Implementation Authority (NCIA) is an organization set up for the implementation of Koridor Utara (Northern Corridor Economic Region, NCER) in Malaysia for achieving this vision. Such economic corridors are aimed to elevate the income levels through agriculture, manufacturing, logistics, education and tourism. The execution of development projects always impact the involved community in multiple dimensions. Masuk Kampung Project at Pantai Murni, Yan Kedah was one of the NCIA initiatives in collaboration with AMB (Akademi Binaan Malaysia). This paper draws out a conceptual framework of community perceptions associated with this project based on qualitative research. Viewpoints studied through interviews and participant observation helped in fabricating the opportunities and challenges connected with rural development. Findings revealed that community perception is of key importance and their prime reflections can be beneficial to policy makers, stakeholders, academicians and civil society in shaping the policy agenda for future projects of same nature in Malaysia. Hence, the study is a contribution to understanding development projects aiming at rural areas on national and global channels.

***Keywords*:** sustainability, rural development, economic conditions, sustainable tourism, community perceptions

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INTRODUCTION

Malaysia is a multi-ethnic and multi-religious country with a population of 28.5 million. It is characterized by three main ethnic groups: Malay and indigenous people, Chinese, and Indians. Ever since the independence from the long British rule in 1957, Malaysia has successfully transformed itself from a poor country into a middle-income nation by stressing on the economic development of rural areas in its five-year plans (Hatta & Ali, 2013). Many schemes were introduced to encourage development of agriculture sector, rural industrialization, resettlement schemes, infrastructure, and community development. This has been observed to be a continuous process, aimed to achieve certain, carefully crafted goals and solve root-level problems faced by rural community. Due to the exceptional nature of rural development plans, with prominent state interventions, rural development in Malaysia is now considered to be identical with state's development strategies. Such plans are aimed to solve problems such as the sharp contrast between the lifestyles in the urban and rural areas, deficiency of financial growth, inadequate rural that prevailed prior to independence and little productivity. In this regard, Northern Corridor Implementation Authority (NCIA) is an authorized organization for the execution of one such project named as Northern Corridor Economic Region (NCER) in Malaysia. However, recent study discovered that accomplishments from the project have not visualized the expectation; hence leading to poor execution of NCIA which was meant to operate in flexible manner to achieve the overarching goal of shared growth while ensuring compliance from all stakeholders (Athukorala & Narayanan, 2018). This sets the direction to study the concerns of one of the stakeholders involved i.e. the community, for successful implementation and execution of such projects. Zal (2018) established that it is important to determine the right group of people from which to gain information about a community's potential, and also the need, as a first step, to involve both groups of people in the development process. The current study revolves around one of NCIA rural project in collaboration with AMB (Akademi Binaan Malaysia) in Pantai Murni, Yan, Kedah within the framework of such project. Discussions focused on the opportunities and challenges associated with sustainable rural development from the viewpoint of *kampung* (village) community. The study holds significance by observing the *kampung* perceptions in relation to the actual facts of rural economic progress in Malaysia.

THEORETICAL FRAMEWORK

In order to meet vital energy needs economically, efficiently and sustainably of present world, a balanced energy portfolio is required. The portfolio should be well-suited for the socio-economic conditions of the country as well as for its own region on individual basis. Roughly 1.6 billion people worldwide do not have access to electricity in their homes, representing slightly more than one quarter

of the world's population (Flavin & Aeck, 2005). In many areas, people still live without refrigeration, television/radios, and even light. The investment of energy resources in rural areas is a core step in achieving economic sustainable development.

Sustainable development is generally discussed in terms of environmental considerations, but from a rural community perspective, sustainable development must address how people of the community generate the income to maintain their rural lifestyle (Freshwater, 2000). Sustainability ensures that generated benefits and supported organizations meant to continue even after the completion of project. Sustainability is defined as guarantee that the institutions supported through projects and the benefits realized are maintained and continue after the end of the project (Tango International, 2009).

There are many scholarly approaches to rural development. According to (Maxwell, Urey, & Ashley, 2001), "In peri-urban zones, the main opportunities are likely to include intensive agricultural activities for the city, short-distance commuting, weekend leisure, and town-oriented industrialization; further away from towns, arable farming, some tourism, and resource-based industrialization are options; in remote areas, subsistence farming, long-distance migration and 'niche' tourism are likely to be the main options". This viewpoint describes distance of rural areas from cities as major factor for measuring the potential of rural development projects. Another stance relates to the evolving of rural development over the years as symbiotic feature. Ellis (2000) illustrated this evolution from basic community development to integrated rural development, which has got further attention as sustainable livelihoods providing solution to poverty eradication for more than two decades.

Malaysia has well incorporated such sustainable approaches of rural development in its national plans. According to Grand Transformation Plan (GTP), the accessibility of basic infrastructure is stated as a primary right of every resident of Malaysia irrespective of their location. State and local governments are promised to provide four major components of national infrastructure namely roads, electricity, water and housing to cater some percentage out of 35% Malaysian rural community (Prime Minister's Department, 2010). Several studies have been conducted on the rural developments and its multidisciplinary scopes opened venues for different philosophical discussions. In this regard, study on the ideological context of rural development in Sabah, Malaysia revealed that such development works provide the entry point for federal government into village politics; if development does not necessarily raise the local standard of living, it facilitates the expansion and entrenchment of the ruling elite – the United Malaysia National Organization (UMNO) (Doolittle, 2014). Recently, another study in three rural villages of Perak State was conducted to discover the viewpoints of rural community about the renewable energy technologies aiming to advance sustainable lifestyles in rural setting. Findings suggested that even due

to limited understanding of village folks, state-funded information and management programs about perks and benefits of renewable technology will extend the usage of low-carbon technological impacts within Malaysian rural set-up (Sivapalan, Haunschmid, & Isa, 2017). Building upon dedicated momentum of rural development, 10th Malaysian Plan integrated economic corridors as a key element of the country's economic strategy, as well as a means to tackle "intra- and inter-regional imbalances" narrowing down to only or two lead respective sectors (Hutchinson, 2017)

PROJECT FRAMEWORK AND RESEARCH METHODOLOGY

Brief Description of NCIA-AMB Project

Vision of Koridor Utara (NCER) states: "To be a world-class economic region of choice for investments, work, living and learning in a safe, clean and sustainable environment by 2025" (Northern Corridor Implementation Authority, 2012).The Government of Malaysia is striving for establishment of socio-economic oriented projects to achieve remarkable progress of rural areas of the country. NCIA is responsible for developing the Koridor Utara (NCER) which includes four states of Malaysia i.e. Perlis, Kedah, Penang and Northern region of Perak. The objective is to upgrade living standard in the region economically and socially by year 2025 as stated earlier. NCIA-AMB Masuk Kampung Project in Pantai Murni, Yan Kedah was one of such development schemes (Figure 1). The theme of project was structured on economic development through automotive & aeronautics sectors and tourism development (Hutchinson, 2017). The expectations can be better realized by approaching *kampung* folks during and after the execution phase of project to discover their perspectives and ideologies. The purpose of this study is to understand the thin line between anticipations and actual impacts and experiences of *kampung* community as consequence of this project. Such perceptual framework is essential for drawing out environmental impact studies and future policies for rural development projects.

Research Methodology

Perceptions of *kampung* community were recorded through qualitative research methods comprising semi-structured interviews and participant observation. This combination of qualitative research was essential to document the perceptions and viewpoints of rural community of the project. The purpose of such methods permits the generation of facts and figures from multiple sources of information. This provides platform for broad understanding of research concerns.

Primary qualitative data was composed at *kampung* level through semi-structured interviews based on multiple themes of sustainable development including economic sustainability, tourism development, improvement of infrastructure, exposure of local culture, loss of forest cover, transformation of

rural environment into urban, negative impact on marine life, and inflation of land prices. The interview session involved 10 families randomly selected from the *kampung* community in the summer of 2014. Interviewees were asked to express their hidden concerns and thoughts about ongoing construction of project. The respondents were stimulated to speak freely on the established themes of discussion regarding the perceived challenges and opportunities associated with NCIA-AMB Kampong project. Also, exercise of participant observation further strengthened the discussion points highlighted by respondents involved in the study. Primary data was further complemented with secondary data through existing literature to justify the documented perceptions of community.

Figure 1: Execution stage of NCIA-AMB Kampung Project
Source: Author

RESULTS & DISCUSSION

Economic Sustainability

Under the influence of globalization concepts and changing trends, the community are looking forward to the generation of variety of business and trading opportunities (Derek Hall & Mitchell, 2005). This is also true in case of NCIA-Kampong project, Yan, Kedah. As told by one of the interviewees, expectations included better movement of human capital for different types of business and commercial opportunities. The economic altitudes of rural families are projected in order to increase living standards and poverty eradication (UN-DESA, 2012). Previous development projects in all 5-year Malaysia Plans have shown promising consequences for raising income levels of rural community (Table 1).

Table 1: Reduction in poverty in urban and rural Malaysia

	1970	1992	2002	2012
URBAN	21.3%	4.7%	2.3%	1.0%
RURAL	58.7%	21.2%	13.5%	3.4%

Source: Elhadary & Samat (2015)

For instance, after upgrading of connecting bridge called White Elephant Bridge, between Pulau Bunting and Pantai Murni in Yan, Kedah, noticeable increase in activities of economic and social sectors leading to better employment opportunities was exposed as key forecast by the community. The Kedah government plans to develop Pulau Bunting as a port. Since the NCIA-AMB project is aimed at the economic development of region, rural community was observed to be curious about the business opportunities after the project completion. Before the completion of the project the employing activities to earn monthly income was majorly fishing as explained by one of the *kampung* folks. No doubt, demand for increased income opportunities is always there due to continuous population growth; indicating economic sustainability of rural projects through constant availability of social capital.

Tourism Development

Internationally tourism development of rural areas is considered to be a major factor that affects the areas socially, economically and culturally, giving it a prime consideration for a sustainable development (Donald & MacLeod, 2010). It benefits in the promotion of art and culture of the area involving different strategies and many governments encourage tourism development as it add up to their economy (Lee, Lee, Yongseok Shin, & Wall, 2016). Malaysia five-year development plans included rural tourism as one of the integral development strategy for achieving economic stability in rural areas. An increasing number of communities have started their own homestay programs, which offer holiday experience in rural setting (Kayat & Mohd Nor, 2006). These programs are mostly operated by local communities and require local involvements. The project of NCIB-ABM Masuk Kampung followed the same trend to enhance investment in the tourism development through local and international tourists. Before the commencement of the project, in viewpoint of *kampung* public, tourism was imagined to bring the diverse social groups to *Kampung* Pantai Murni. This encouraged the community to invest at the location along with concept of homestay program for the promotion of rural tourism. Local public in *kampung* desired to operate such types of program to get themselves involve in implementing sustainable development of tourism. However, this sector still demands the skills among rural communities necessary for running, managing, and promoting a tourist product (Marzuki, Ali, & Othman, 2010).

Improvement of Infrastructure

The Malaysian perspective is described in Government Transformation Program (GTP) that all nationals of Malaysia, regardless of their ethnicity and location, will receive good lifestyle. According to this viewpoint, the wide provision of improved infrastructure was one of major expectations of whole community (Figure 2). Electricity is beneficial in terms of new opportunities of work, domestic, household, educational and leisure benefits (Torero, 2014). In addition to electricity, provision of water facility is also key factor for adequate infrastructure. It is evident from previous rural development projects (1980-2005), there was 50% increase in households with piped water connections attaining figure of 90% where the only exception were states of Sabah and Kelantan achieving 60% of rural households with piped water provision. Taking expression on the supply of electricity to rural and urban areas during 1992 – 2000, Ngah (2010) confirmed that in year 2000 the families having electricity in East Malaysia were more than 90% in Sarawak and 70% in Sabah.

Figure 2: View of NCIA-AMB Project after completion
Source: Author

Exposure of Local Culture

The influx of foreigners into the rural setting makes a great contribution of exposing local culture to global channel. Mixed responses from *kampung* folks were observed for this concern perceiving it as an opportunity and challenge. The positives argued that this would attract more foreign tourists and that they will return home with the experience, local cuisines and dresses, as well as other local souvenirs purchased. On the contrary, the negatives supported the conventional perspective of influx of foreign tourists would lead to local culture losing originality of character.

Loss of Forest Cover

Forest cover and green lands are the prime assets of rural community of Malaysia. The proposed projects adversely impacting the green environment. Construction phase is more focused on removing the green cover instead of utilizing them in a healthy way for environmental sustainability as the planned framework of the projects demand more cutting of trees and concreting the land (Figure 3). During the execution phase, the natural touch of rural setting got affected through demolishing of traditional Malay houses. Gradual increase of temperature and gradual decrease of green environment were recorded as prime concerns according to *kampung* folks. Due to constructed bridge, the natural resources got disturbed to some extent. The venture of energy sources in the area created a little discomfort among *kampung* folks due to loss of forest cover.

Figure 3: View of on-site construction works
Source: Author

Transformation of Rural Environment into Urban

The transformation of rural setting into urban setting is accompanied by environmental cost putting natural resources at stake. Concrete structures and covered land surface are consuming the rural look and setting as described by one of the *kampung* folks. Another perception can be argued here that limitation on extension of agricultural and farming production in the area can account for shortage of local employment opportunities. *Kampung* people believed that the changed face of rural setting with constructed bridge is associated with more business opportunities. The rural-urban division is somehow disappeared after the complete execution of the project, bursting as a great concern for the *kampung* folks (Figure 4). Restricted dispersion of water into the sea in heavy rainy seasons due to these manmade structures, which become cause of flooding lately, was documented as prime reason behind this concern.

Figure 4: Transformed outlook of *the kampung*
Source: Author

Negative Impact on Marine Life

Development projects tend to impact the natural environment due to human and mechanical activities involved in a construction project. NCIA- AMB Masuk Kampung project affected the marine environment and contributed to water pollution. In fact, this is a critical consequence as recent study established that despite vast development in Malaysia, there is a myriad of water shortage issues; the country needs to carefully manage its freshwater resources to achieve sustainable development (Oh, Leong, Poh, Chong, & Lau, 2018). One of the *kampung* representatives described that due to newly introduced commercial activities heaps of garbage and excessive amount of wastes went into the sea. In this regard, one such project named Crocker Range National Park (CRNP) was initiated in 1984 to save the biodiversity of the forest and preservation of water with its safe distribution. Later, the government opened it for tourists which adversely affected the natural habitat, resulting into loss of diverse variety of flora and fauna due to human activities (Hjulmand, Nielsen, Vesterløkke, Busk, & Erichsen, 2003). Such negative impact is a great challenge for achieving sustainable nature of the project.

Inflation of Land Prices

The Tenth Malaysia Plan 2011-2015 emphasized on economic development of the nation for next five years by connecting rural areas to urban clusters through modern infrastructure and facilities. Likewise, 11th Malaysia Plan 2016-2020 is committed on encouraging more private investment, improving rural-urban linkages, expanding implementation of programs under 21st Century Village, promoting use of modern technologies, empowering rural entrepreneur community, encouraging community driven cooperatives, providing quality rural

basic infrastructure and basic services (EPU, 2015). The NCIA-AMB Masuk Kampung Project has similar vision for upgrading the living standard of *kampung* community by providing amenities, communication and links to the neighbouring urban centres. The fresh investment for tourism purposes in the region has increased the land prices, creating an alarming situation for community in maintaining their homes in the near future. The conversion of adjacent land areas into commercial use within the premises of new development pushed back the existing settlements. This emerged as one of the great concerns for *kampung* folks. Commercial development encourages inflated rates of land due to provision of modern and up-to-date infrastructure leading to commercialism. This aspect considered as both opportunity for investors and challenge for *kampung* community at the same time.

CONCLUSION

The study established that there is need to improve the management and execution phase of development projects for rural areas in Malaysia. Similarly, the aims and activities of such projects should be designed to facilitate the life of rural community and to deal better with their social and environmental issues. This study was dedicated to explore the viewpoints of rural people affected by the NCIA-AMB Masuk Kampung Project (Table 2). Discussions show that improved economic activities, tourism development and upgraded infrastructure were considered as opportunities in viewpoint of rural community. While loss of forest cover, transformation of rural environment into urban and negative impact on marine life were recorded as challenges. Exposure of local culture and inflation of land prices were perceived as both opportunity and challenge by *kampung* people.

Table 2: Opportunities and challenges involved in NCIA-AMB Project

Kampung Concerns for NCIA-AMB project	Opportunity	Challenge
Economic sustainability	√	
Tourism development	√	
Improvement of infrastructure	√	
Exposure of local culture	√	√
Loss of forest cover		√
Transformation of rural environment into urban		√
Negative impact on marine life		√
Inflation of land prices	√	√

This study concludes that these opportunities and challenges should be acknowledged in order to achieve sustainable nature of the rural development project. No doubt, improvement of rural-urban divide will elevate the living standard of rural community, but there is also need to satisfy what people think and feel. State and local governments must admit the vital importance of public participation and perception. This calls for resolving the institutional barriers which prohibit the practice of public engagement in project development process. Since Malaysia is focused in achieving its rural development goals for Vision 2025, incorporating rural community perceptions will help in establishing sustainable nature of rural development projects despite the mandatory mechanical processes and excessive commercialism.

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MULTI-DIMENSIONAL HUMAN INTERACTION IN OPEN SPACES

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Abstract
Due to rapid urban development, open spaces have changed drastically over the decades and generations have been struggling with its consequences. There have been various studies on how open spaces provide positive reaction to human. Apparently, in relation to open spaces, Malaysia has received very little attention from researchers. This paper investigates the human interaction experienced in the open spaces and how it relates to city sustainability. The aim of this paper is to provide valuable insight of the various dimensions of human interaction experienced in open spaces. This study employed a quantitative research method whereby questionnaire survey was administered to 861 respondents who visited five selected open spaces of Shah Alam, Selangor, Malaysia. The findings in this paper address human-human interaction and human-nature interaction in the parks.

Keywords: open spaces, human-human interaction, human-nature interaction

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INTRODUCTION

Currently open spaces are emerging as one of the most important spaces in the urban fabric. They are multi-purpose public spaces in the city that offer social, economic, and environmental benefits. They help to enhance the image of the city, and improve the quality of urban life. Hence, there are various theories that relate to the multi-dimensional human interaction in the open spaces. Chiesura (2004) claimed that the major function of open space is to satisfy people's recreational need. However it can be seen that open spaces provide more than just recreational satisfaction. Arifin (2005) stated that open spaces with plant represent natural contact with human due to their roles in producing oxygen, and controlling the surrounding system and the soil water. Moreover, natural landscape in open spaces can sometimes play a key role in promoting social interaction (Oguz, 2000). Hence, open spaces might have different usage and purposes towards different people in the urban areas.

As there are various studies on how open spaces provide positive reaction to human and nature, hence the question is multi-dimensional human interaction in different hierarchy of open spaces offer different positive impacts to the urban dwellers? Multi-dimensional human interaction in the open spaces can be categorised as human-human interaction and human-nature interaction. Under the human-human interaction, there are three variables that can be measured which are social interaction, citizen participation and sense of community. As for the human-nature interaction, the variables to be measured are contact with nature, aesthetic preference, and recreational or play. Thus, among these variables, which are the variables that are suitable for each types of open spaces.

According to Mutiara & Isami, (2012) people's involvement and interaction in open spaces can enhance the sense of belonging among people and at the same time increase the degree of neighbourhood attachment. However, different hierarchy of open spaces might offer different purposes and interactions among the users. The typology of open spaces are basically characterized by population number, size of the open space and also the facilities provided in the open space.

HUMAN INTERACTION IN OPEN SPACES

Although open spaces play vital role in improving the environmental system (Marzukhi, Karim, & Latfi, 2012; Ariffin, 2005), their main function is to satisfy people's recreational need. When an open space was designed, the overarching consideration was based on real or perceived notions of recreational needs.

Increasing empirical evidence have indicated that the presence of natural assets and it components in urban context provide significant contribution to the quality of life in many ways. Besides vital environment services such as air and water purification, and wind and noise filtering, open spaces provide social and psychological services which are of crucial significance for the liveability of

modern cities and the well-being of urban dwellers (Chiesura, 2004). They help in reducing stress, rejuvenate city dwellers and provide a sense of tranquillity (Kaplan, 1993). Conway (2000) verified beliefs about stress reduction benefits and mental health through the experience on the use of open spaces.

Hence, Matsuoka and Kaplan (2008) provided a valuable insight into how human interact with outdoor urban environments, which included open spaces. They provided major themes, or purpose of using open spaces, that are directly linked with open spaces which are; human-nature interaction and human-human interaction. As for the nature needs, there are three variables that can be measured which are, contact with nature, aesthetic preference, and recreation or play. Whereby for human needs, the variable to be measured are social interaction, citizen participation, and sense of community. There are much to be learned about the relationship among the six human interactions examined by the researchers. Hence, with the rapid urbanization in the city, it is important to study the issues of scale in terms of human benefit. Moreover, Matsuoka and Kaplan (2008) stated that the human needs that are categorized into six general themes and that these needs often interact with each other. Hence, giving an urban setting, especially open spaces might affect the fulfilment of other purposes.

RESEARCH METHODOLOGY

This research takes the view of Sekaran and Bougie (2016) in selecting structured questionnaire surveys to investigate and measure attitudes and perceptions. It is considered the most appropriate method to obtain a large amount of data as it permits analysis in statistical form within a relatively short of time. Hence, in this study, questionnaire survey was carried out to gather the data, namely the user's profile of open spaces (D1); the human-human interaction in open spaces (D2); the human-nature interaction in open spaces (D3); and the perceived benefits and vitality of open spaces (D4).

The results served very well in formulating the variables and items for four domains in the research instrument of questionnaire survey. There were six parts in the questionnaire form, namely: (1) socio demographic profile; (2) purpose and visit information; (3) human-nature interaction; (4) human-human interaction; (5) facilities, amenities and accessibilities; and (6) perceived benefits and opinion.

Sampling was determined based on Sekaran and Bougie's (2016) rules in determining sample size namely: (1) sample size larger than 30 and less than 500 are appropriate for most research and (2) where sample are to be broken into subsamples, a minimum sample size of 30 for each category is necessary. Thus, this study uses a disproportionate stratified random sampling where the samples size was ascertained according to the size ratio of each park in relation to the total size of study area (Table 1).

Table 1: Sample size for each study area

Study Area	Typology	Sample Size	%
Taman Tasik Shah Alam	Urban Park	428	49.7
Section 7	Local Park	149	17.3
Section 18	Neighbourhood Park	134	15.6
Section 8	Playing Field	100	11.6
Section 4	Playground	50	5.8
TOTAL		861	100

The questionnaire survey was administered to 861 respondents who visited the five selected open spaces of Shah Alam, Selangor, Malaysia. The response rate for the questionnaire survey was 100 percent.

RESULTS AND FINDINGS

The data from survey questionnaires was coded into SPSS software for statistical analysis. The main focus of the analysis was to understand the relationship of human-human interactions and human-nature interactions that took place in the open spaces area. In terms of users' profile, it was found that majority of the respondents visited the open spaces more than three times and mostly during the weekend. Additionally, the findings show that majority of the respondents visited the open spaces in the afternoon and spent between 30 minutes to 60 minutes in the parks. Majority of the respondents visited the open spaces accompanied by a partner or friends. Hence, these provide great optimism that improved social interactions can be promoted through a properly design open spaces.

Human Interaction

To measure the human interaction that respondents experienced in the open spaces, the structure of the questionnaire was divided into three sections that are contact with nature, aesthetic preference and recreational play. The data was then analysed in SPSS using Chi-square and p-value methods. Table 2 below shows the overall analysis of human-nature interaction.

Table 2: Overall analysis of human interaction

Contact with Nature Domain						
		Neighbourhood park	Playfield	Local park	Playground	Urban park
UN1	Unity with nature	0.0126	0.3443	0.1783	0.1569	0.2440
US1	Unity with my self	0.2048	0.0731	0.0765	0.7860	0.1802
FR1	Freedom	0.0024	0.0569	0.1990	0.7138	0.2356
RS1	Recreational Satisfaction	0.6356	0.0985	0.0412	0.7886	0.1726
AD1	Adventure	0.1728	0.3911	0.0095	0.0588	0.7030
HP1	Happiness	0.4380	0.0779	0.0306	0.6805	0.3928
VO1	Vitality	0.4594	0.0055	0.2102	0.2295	0.6561
Aesthetic Preference Domain						
UN2	Unity with nature	0.1369	0.6109	0.0807	0.7747	0.9044
US2	Unity with my self	0.0377	0.7310	0.0155	0.8888	0.1004
FR2	Freedom	0.1750	0.8179	0.0254	0.2529	0.1971
RS2	Recreational Satisfaction	0.1125	0.5780	0.0050	0.5740	0.2315

AD2	Adventure	0.3463	0.2680	0.0007	0.7260	0.8400
HP2	Happiness	0.0267	0.5099	0.0107	0.3293	0.8873
VO2	Vitality	0.7971	0.6512	0.2499	0.6006	0.6193
Recreation and Play Domain						
UN3	Unity with nature	0.4405	0.1579	0.0002	0.2953	0.0091
US3	Unity with my self	0.5530	0.0857	0.0197	0.1181	0.0087
FR3	Freedom	0.6048	0.0886	0.0028	0.2575	0.0649
RS3	Recreational Satisfaction	0.9955	0.0492	0.0001	0.3626	0.0351
AD3	Adventure	0.6145	0.6607	0.0035	0.1913	0.1434
HP3	Happiness	0.4991	0.1774	0.0000	0.6294	0.0634
VO3	Vitality	0.4553	0.0605	0.0001	0.1197	0.1779
Social Interaction Domain						
UN4	Unity with nature	0.1277	0.2097	0.6241	0.0149	0.0084
US4	Unity with my self	0.2179	0.6136	0.6973	0.4781	0.0117
FR4	Freedom	0.1658	0.6695	0.6568	0.4208	0.2127
RS4	Recreational Satisfaction	0.4434	0.0908	0.8026	0.7859	0.1018
AD4	Adventure	0.2254	0.4801	0.8822	0.2625	0.2125
HP4	Happiness	0.0373	0.7493	0.7761	0.7512	0.0286
VO4	Vitality	0.1206	0.4831	0.5874	0.1931	0.1395
Citizen Participation Domain						
UN5	Unity with nature	0.7147	0.9540	0.0893	0.1569	0.0176
US5	Unity with my self	0.7712	0.0993	0.0977	0.3442	0.0089
FR5	Freedom	0.4831	0.9287	0.1303	0.5347	0.0018
RS5	Recreational Satisfaction	0.2674	0.3303	0.8605	0.7886	0.0006
AD5	Adventure	0.9455	0.8981	0.5659	0.5487	0.0529
HP5	Happiness	0.6462	0.2857	0.1068	0.8503	0.0056
VO5	Vitality	0.0864	0.0881	0.0868	0.8793	0.0023
Sense of Community Domain						
UN6	Unity with nature	0.4535	0.0099	0.0826	0.0124	0.2132
US6	Unity with my self	0.2936	0.0044	0.1102	0.8888	0.4400
FR6	Freedom	0.1800	0.8179	0.1609	0.7361	0.1796
RS6	Recreational Satisfaction	0.0385	0.5780	0.3750	0.3941	0.0803
AD6	Adventure	0.9776	0.6757	0.1932	0.0016	0.0882
HP6	Happiness	0.8554	0.5380	0.0831	0.6688	0.2955
VO6	Vitality.	0.5434	0.6512	0.0573	0.6006	0.6786

: Items of significant different on dependant variable= p-value equal or less than 0.05
: Items of no significant different on dependant variable= p-value above 0.05

The results in Table 1 show that the main purpose of respondents visiting open spaces is for recreational and play. Thus, it can be stated that the main purpose of urban dwellers using the open spaces is for recreational purposes. This is supported by Marzukhi, Karim and Latfi (2012), whom stated that the provision of open spaces should have positive impact on the quality of public life and public health which then link to the economic and social aspects of the urban dwellers.

From the overall analysis it can also be seen that the main purpose of urban dwellers needing open spaces in the city they lived in is due to enjoy recreational satisfaction, unity with self, sense of freedom, adventure and happiness. There were only a few of the respondents agreed that the open spaces act as a positive channel to unite with nature. This is supported by Mansor, Said and Mohamad (2010), who emphasised on the lack of knowledge on the relationship of open spaces in promoting beneficial well-being effects and nature to the urban residents. However, the positive attitudes (measured by satisfaction level towards unity with nature, unity with self, freedom, recreational satisfaction, adventure, and happiness) of urban dwellers are commonly found while they are utilising the open spaces.

As for the relationship of the city sustainability and the purpose of open spaces for the urban dwellers, from the overall findings it can be seen that city sustainability relates to the domain of contact with nature, recreational and play, and citizen participation. Kim (2005) suggested that more and more research and investment on open spaces might create prosperous, liveable and equitable cities in developing countries. Thus, more open spaces should serve not only for the contact with nature, citizen participation and recreational activities but also towards the aesthetic preference, social interaction and sense of community. Hence, from the exploratory survey and behaviour mapping conducted suggest that the human-human interaction in open space domain can be divided into three which are social interaction, citizen participation and sense of community. Table 3 shows the overall findings on social interaction in the open spaces.

Table 3: Overall findings on human-human interaction in open spaces

Social Interaction Domain						
		Neighbourhood park	**Playfield**	**Local park**	**Playground**	**Urban park**
SI1	I always come here for social interaction with my friends	0.1763	0.6577	0.6617	0.1989	0.2076
SI2	The open space is a suitable place for social interaction	0.4501	0.3012	0.6515	0.0899	0.4986
SI3	I can pursue many social activities in this open space	0.9208	0.6839	0.6287	0.6912	0.4410
SI4	I feel happy doing social interaction in this open space	0.0065	0.2708	0.5198	0.6563	0.7036
SI5	The design of the open space allow me to have social interaction easily with my friends	0.4104	0.0192	0.6784	0.6441	0.8017
SI6	Overall, I would rate the open space with social interaction activities as very satisfying	0.1585	0.0054	0.7232	0.4377	0.6679
Citizen Participation Domain						
CP1	The open space allows me to socialize with other citizen	0.5512	0.1333	0.9863	0.2410	0.3157
CP2	The open space is suitable for citizen participation in the community	0.7787	0.9260	0.7129	0.3910	0.9153
CP3	The open space strengthen the citizen participation regardless activities and events held here	0.3722	0.8807	0.7789	0.7405	0.0498
CP4	The citizens here concern on what is happening in the open space area	0.5657	0.8085	0.9242	0.7693	0.0291
CP5	Overall, I would rate the citizen participation in this open space as very satisfying.	0.3599	0.7262	0.5009	0.8517	0.1701
Sense of Community Domain						
SC1	The open space allows me to have community events	0.5304	0.2592	0.1941	0.7157	0.5899
SC2	The open space allows me to know the surrounding citizens of the area	0.5030	0.2840	0.0043	0.2746	0.8914
SC3	The open space strengthen the relationship between the citizens here	0.0001	0.1407	0.0026	0.2893	0.6336
SC4	I feel safe while using the open space	0.7244	0.4615	0.0463	0.6015	0.6488
SC5	I know well other people who are using the open space	0.6276	0.1279	0.1622	0.0016	0.6744
SC6	The community here know and fully utilized the open space	0.3480	0.1359	0.0979	0.1795	0.9285

SC7	Overall, I would rate the sense of community in relation with open space here as very satisfying.	0.2113	0.8285	0.0565	0.2893	0.9424

: Items of significant different on dependant variable= p-value equal or less than 0.05
: Items of no significant different on dependant variable= p-value above 0.05

For the social interaction domain, playfield gave a significant value of 0.0054 compared to the other types of open space. Moreover, the design of the playfield also allows majority of the users to socially interact with their friends. According to Philips (1996), a good design of an open spaces should taking consider the needs of the public in regard to their interactions and activities. Moreover, a good design of open space also should comprise all range of people and linked to their own human need. In this study, the selected playfield functions for football activity. Its significant score in social interaction domain suggests that social interaction may be enhanced through outdoor recreational activities.

As for human-nature interaction, the exploratory survey and behaviour mapping conducted suggest that the human-nature interaction in open space domain can be divided into three, which are contact with nature, aesthetic preference, and recreation and play. Table 4 shows the overall findings on human-nature interaction in open spaces.

Table 4: Overall findings on human-nature interaction in open spaces

Contact with Nature Domain						
		Neighbourhood park	**Playfield**	**Local park**	**Playground**	**Urban park**
CN1	The design of the open spaces allows me to contact with nature	0.0000	0.1448	0.8420	0.0793	0.6119
CN2	I like the natural appearance of the open space	0.0391	0.0664	0.4124	0.0275	0.9085
CN3	I feel calm with the nature provided in the open spaces	0.0025	0.1146	0.6688	0.0000	0.8369
CN4	I can pursue many activities with nature in this open spaces	0.0001	0.1413	0.8490	0.6567	0.0768
CN5	I can appreciate the nature when I'm in the open space	0.0023	0.0782	0.4947	0.5010	0.1223
CN6	Overall, I would rate the nature in this open space as very satisfying.	0.5867	0.6556	0.6172	0.3070	0.3931
Aesthetic Preference Domain						
AP1	The open space allows me to value aesthetic elements	0.1749	0.9512	0.2187	0.8743	0.1656
AP2	I like the natural preference in this open space	0.2517	0.9646	0.0426	0.9267	0.8080
AP3	I feel calm with the aesthetic elements provided in the open space	0.4123	0.6396	0.0168	0.5228	0.5362
AP4	I can pursue many activities in relation with aesthetic element in this open space	0.8721	0.8439	0.1468	0.6251	0.9159
AP5	I can appreciate the aesthetic elements when I'm in the open space	0.0019	0.7161	0.0441	0.6492	0.0562
AP6	Overall, I would rate the aesthetic preference in this open space as very satisfying.	0.4010	0.0611	0.0152	0.5186	0.1717
Recreational and Play Domain						
RP`	The open spaces allows me to have recreational activities	0.3629	0.0031	0.0199	0.4505	0.2513

RP2	The open spaces provides various activities for recreational purposes	0.6393	0.0079	0.0005	0.9463	0.4982
RP3	I feel calm when doing recreational activities here	0.7070	0.3338	0.0016	0.5816	0.4377
RP4	I can pursue many physical activities in this open spaces	0.1176	0.0136	0.0000	0.2005	0.6688
RP5	There are various of facilities provided in the open spaces for recreational activities	0.0311	0.2663	0.0089	0.5784	0.4008
RP6	I normally do recreational activities here alone	0.0546	0.1271	0.0053	0.4970	0.3873
RP7	I normally do recreational activities here with my partner/group	0.7422	0.7491	0.0054	0.7715	0.4960
RP8	Overall, I would rate the recreational activities provided in the open space as very satisfying	0.5120	0.9788	0.0004	0.0207	0.3212

: Items of significant different on dependant variable= p-value equal or less than 0.05
: Items of no significant different on dependant variable= p-value above 0.05

For contact with nature domain, neighbourhood park shows the highest significant value in terms of design, natural appearance, sense of calmness, activities provided and sense of nature appreciation. In comparison, playground also shows significant value on natural appearance and sense of calmness. As for the other types of open space, none shows significant value in relation to contact with nature. These are contrasted with the finding by Chiesura (2004) that the vitality of contact with nature is shown to hold across a wide range of urban context which includes greenways and parks. However, open space, through its ability to offer contact with nature, has been found to reduce stress, promote relaxation and restoration, and reduce anger, fear and aggression (Ulrich, Dimberg, & Driver, 1991). Hence, contact with nature should be considered in the design stage of open space as it not only promotes physical but also mental wellbeing.

As for recreational activities and play domain, the local park shows the most significant value for the domain. In comparison, neighbourhood park, playfield and playground also show significant value towards recreational activity and play domain. This is in tandem with the socio-ecological framework proposed by Sallis (2009) that users of open space would be more physically active if the open space offers an accessible, safe and attractive place for exercise. Moreover, findings by Merom, Tudor-Locke, Bauman and Rissel (2003) suggest that close access to open space does encourage greater use by local people that contributes to greater physical activity. In relation to this study, all types of open spaces, except for Urban Park, were found to successfully provided interaction for the recreational activities. However, in relation to the behaviour mapping analysis, urban park shows among the significant numbers of physical activities in the area. Giles-Corti et al. (2005) argued that attractiveness, size and specific amenities are factors that determine use of public open space, which could be measured to determine the association between physical activity and public space

access. Hence, specific amenities should be further improved in the urban park to ensure the users satisfaction towards recreational activities at the park.

Table 5 shows the overall findings of regression analysis on the perceived benefits and vitality of open spaces domain. The table shows that the urban park fulfilled both perceived benefits for the human-nature interactions and human-human interactions. According to Department and Town and Country Planning Peninsular Malaysia (2013), urban park should function as local attraction for recreational activities and nature appreciation. Hence, this shows that Section 2 urban park positively fulfils the perceived benefits for the users at the open space.

Additionally, Section 8 playing field and Section 7 local park also fulfils the perceived benefits of human-human interactions in the open spaces. This is due to the function of the open spaces whereby the Section 8 functions as playing field. Hence, human interaction occurred highly in the area. The Department of Town and Country Planning (2013) suggested that playfield should cater for three division of neighbourhood which functions as recreational activities for children, teenagers and adults. Local park should cater for local dwellers' recreational, sport and social community needs.

Table 5: Overall findings of perceived benefits and vitality of open space domain

Model		Unstandardized Coefficients		Standardized Coefficients	Sig.	Dependent Variable: Perceived Benefit			Overall Result
		B	Std. Error	Beta		R-square	F-statistics	p-value	
Section 18									
1	(Constant)	2.685	.334		.000	0.059	4.004	0.021	
	Human-nature	.148	.075	.172	.051				X
	Human-human	.106	.065	.142	.108				X
Section 8									
1	(Constant)	2.162	.426		.000	0.18	10.444	0	
	Human-nature	.044	.091	.045	.634				X
	Human-human	.360	.083	.412	.000				√
Section 7									
1	(Constant)	1.572	.467		.001	0.206	15.685	0	
	Human-nature	.064	.129	.049	.619				X
	Human-human	.558	.130	.424	.000				√
Section 4									
1	(Constant)	3.240	.473		.000	0.04	0.927	0.403	
	Human-nature	.105	.105	.159	.321				X
	Human-human	.054	.117	.073	.650				X
Section 2									
1	(Constant)	1.262	.221		.000	0.301	56.474	0.000	
	Human-nature	.418	.065	.383	.000				√
	Human-human	.222	.054	.246	.000				√

√ : There is significant relationship
X :. There is no relationship

CONCLUSION

In conclusion, this study has shown that open space is vital to city sustainability. Provision of open space must consider human interaction domain in order to ensure the benefits of open space reach the users of open space. Elements of open

space such as green space, water features and physical attributes need to be included in its design in order to enhance the interactions between human-human and human-nature in open space.

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MEETING HOUSING NEEDS OF THE POOR AND NEEDY MUSLIMS THROUGH *ZAKAT* AND *WAKAF*

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Abstract

Meeting housing needs of the poor and needy is a continuous challenge. The challenge is exacerbated, among others, by the continuous and upward increases in the cost of living, population growth and the availability of resources. The Government intervenes through policy implementation and assistance in the forms of subsidies and the provision of social housing. In Islam, there is an opportunity to help the poor and needy meeting their housing needs through *zakat* and *wakaf*. Consequently, a study applying a combination of library research and in-depth face-to-face interviews with experts was carried out. The key objectives of the study are to assess the potential of *zakat* and *wakaf* in the provision of affordable housing for the poor and needy, and if so, to identify appropriate strategies to empower the *zakat* and *wakaf* authorities in carrying out the task. The main findings from the study suggest that *zakat* and *wakaf* have great potential to help the poor and needy in meeting their housing needs and that the best way forward is for the *zakat* and *wakaf* authorities to do so through collaboration, either among themselves or with private property developers. The significance of the study and its findings are viewed in terms of the innovative idea in promoting *zakat* and *wakaf* authorities to collaborate instead of working on their own, with conditions that issues related to the Shariah are resolved.

Keywords: economy, housing, procurement, social, *wakaf*, *zakat*

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INTRODUCTION

The problem of the poor and needy accessing to or owning decent and affordable housing is on the rise. Despite Government intervention, through a variety of assistance and policy implementations, the housing woes of the poor and needy continues unabated (Abdul Rashid, Ahmad Sarkawi, & Hasan, 2014; Abdul Rashid, Hasan, Ahmad Sarkawi, Othman, & Aripin, 2015a; Abdul Rashid, Hasan, & Ahmad Sarkawi, 2015b; Abdul Rashid et al., 2017; KRI, 2015; Ahmad Sarkawi, Abdul Rashid, & Hasan, 2015; Cheah & Almeida, 2016; Abdul Rashid, 2017). Having access to decent and affordable housing is a pre-requisite for nurturing healthy living and good individual and family values (Quran, 30: 21), these values, in turn, contribute towards the overall goodness of society and the country.

The terms poor and needy (*miskin* and *miskin tegar*) mean different things to different people. The Government refers to *miskin* or poor and *miskin tegar* or needy/hardcore poor as those with monthly household income below RM940.00 and RM580.00 (Peninsular Malaysia) respectively [i].

The Government has been active and consistent in assisting the poor and needy in meeting their housing needs. They implemented policies, introduced subsidies and provided assistance including the implementation of a variety of affordable housing schemes that attempt to match affordability - assessed through monthly income – and house type and price (Ahmad Sarkawi et al., 2015; Abdul Rashid, 2017). However, the problem of housing the poor and needy is far from over as the shortfall in affordable housing continues to increase (KRI, 2015; Cheah & Almeida, 2016; Abdul Rashid, 2017).

In Islam, the poor and needy are referred to as *fakir* and *miskin*. The former refers to one that has neither material possession nor means of livelihood while the latter is one with insufficient means of livelihood to meet basic needs. Helping the *fakir* and *miskin* is an obligation on the rich as well as highly encouraged on all Muslims; the former through *zakat* and the latter through *wakaf*. The presence of *zakat* and *wakaf* reaffirms Islam's position on the importance of the fair and equitable distribution of wealth among the *ummah* (Quran, 2:43; 9:60; 2:155, 261). Under *zakat*, *fakir* and *miskin* are eligible to be assisted and their eligibility is determined through *haddul kifayah* (poverty line under the *zakat* system) [ii].

The *Majlis Agama Islam Negeri-Negeri* (MAINs or State Islamic Religious Councils) are the authorities entrusted with the administration of *zakat* and *wakaf*. MAINs, therefore, have been active in collecting *zakat* and *wakaf* contributions as well as their disbursements. Under *zakat*, disbursements are made to the *asnafs* while under *wakaf* the help goes to beneficiaries that have been specifically designated by the *Wakeef* (donor)[iii]. The style of assistance includes helping the *asnafs* and others in meeting their housing needs[iv]. However,

Abdul Rashid et al. (2014) contended that not much has been done in terms of helping the *asnafs* and others in meeting their housing needs in a big way.

The purpose of this paper is to report on a study assessing the potential of *zakat* and *wakaf* in the provision of affordable housing for the poor and needy. In addition, the study endeavors to identify appropriate strategies to empower the *zakat* and *wakaf* authorities in carrying out the task. The study was carried out through review of literature and interviews with selected representatives of *zakat* and *wakaf* authorities and key players of the housing industry.

This paper is structured into 6 parts. Part 1 introduces the paper. Part 2 reviews the state of affordable housing in Malaysia focusing on the supply and demand for low-cost housing. The low-cost housing is deemed as the most appropriate housing scheme to match the affordability and lifestyle of the poor and needy as well as generally meeting the operational requirements of *zakat* and *wakaf*. Thereafter, part 3 reviews the state of housing assistance provided by *zakat* and *wakaf* respectively to the poor and needy, followed by part 4 wherein methodology used for the study is described. Part 5 and 6 present results from the study and the ensuing discussions followed by the concluding remarks respectively.

AFFORDABLE HOUSING ISSUES IN MALAYSIA

According to KRI (2015), as of 2010, house ownership in Malaysia stood at 72.5%. In addition, the Government's target to deliver 1 million units of affordable housing by 2018 seems difficult to achieve. Up to 31 December 2016 only 20.7% of the 1 million targeted units were completed. Furthermore, the Government acknowledge the problems they face in housing the nation. Constraints faced include the acute lack of affordability among house buyers, the mismatch between supply and demand which are location specific and the number of agencies involved with housing (Kementerian Kesejahteraan Bandar, Perumahan dan Kerajaan Tempatan, 2017).

Among the most notable Government efforts in the provision of affordable housing is their policy on the development of housing schemes with prices targeted to benefit the low and middle-income earners. Currently, there are eight such schemes targeting those with monthly household incomes from as low as RM750.00 to not exceeding RM15,000.00 (Table 1).

Table 1: Malaysia's Affordable Housing Schemes

No	Housing scheme	Target monthly household income (RM)	House price (RM)
1	PRIMA[a]	2,500 – 15,000	100,000 – 400,000
2	Perumahan Mampu Milik Swasta[b]	My Home 1 : 3,000 – 4,000	50,000 – 90,000 (Pen. Malaysia)

		My Home 2 : 4,001 – 6,000	90,001 – 170,000 (ditto)
3	Perumahan Penjawat Awam Malaysia[c]	<10,000	90,000 – 300,000
4	Program Perumahan Rakyat (PPR)[d]	< 3,000	30,000 – 35,000 (Pen. Malaysia) 40,000 (Sabah, Sarawak)
5	Rumah Mesra Rakyat Malaysia[e]	750.00 – 3,000	40,000 – 65,000
6	RUMAWIP (KL)[f]	< 15,000	80,000 – 300,000
7	Rumah SelangorKu[g]	3,000 – 10,000	42,000 – 250,000
8	Rumah Idaman Rakyat[h]	< 10,000	< 350,000

Source:
[a] *PR1MA (2018).*
[b,d] *Ministry of Housing & Local Government (2018a,b).*
[c] *Perumahan Penjawat Awam Malayia (2018).*
[e] *SPNB Mesra Sdn. Bhd. (2018).*
[f] *RUMAWIP, Kementerian Wilayah (2018).*
[g] *Lembaga Perumahan & Hartanah Selangor (2018).*
[h] *SPNB Idaman Sdn. Bhd. (2018).*

According to Cheah and Joan Almeida (2016), and Cheah Almeida, Shukri and Lim (2017), most Malaysians could not afford to own a house. The problem is worse in urban areas where the median price of houses is very much higher than what is deemed ideal for affordable housing[v]. They gave three key reasons for the phenomenon: mismatch between supply and demand, the sluggish increase in household income in relation to the increase in house price, and supply of new units that are concentrated on high-cost housing (i.e. house priced >RM250,000.00 per unit). Cheah and Almeida (2016) argued that the housing industry failed to supply sufficient housing units for those in the low and middle-income segments of the society. They estimated the shortfall, in 2014, stood at 960,000 units. Given the trend in population growth and the increase in the number of households (household sizes tend to decrease), they estimated that by 2020 the shortfall in affordable housing to be in the region of 1 million units. In effort to bridge the gap Cheah and Almeida (2016) proposed strategies that include increasing the supply of affordable housing units, lowering the prices of affordable housing through innovative techniques such as the use of Industrialized Building Systems (IBS), developing a credible private sector rental market for affordable housing, and to further facilitate developers and home buyers having access to financing for their development and purchases respectively.

The findings of Cheah and Almeida (2016) is consistent with the findings from a study carried out by KRI (2015). In the latter, KRI (2015) found out that

the median price of houses in Malaysia in 2014 was 4.4 times more than the median household income. This translates into a 'seriously unaffordable' housing market. In urban areas like Kuala Lumpur and Penang, the situation is considered 'severely unaffordable' whereby the score stood at 5.4 and 5.2 times median household income respectively. KRI (2015) also reiterated that the problem of affordable housing will get worse in years to come given Malaysia's demographic factors namely continuous increase in population, rapid rate of urbanization and decrease in household size.

However, KRI (2015) argued that current affordable housing strategies that focus on the demand side such as making house financing cheaper or providing subsidies for home buyers and supply-side intervention via direct provision of low-cost houses or subsidizing housing costs are unsuitable as they might drive price increases resulting, among others, in more household debt. Their key solution lies on the supply side i.e. improve the elasticity of housing supply so as to make the supply side of housing more responsive to the needs of all sections of the population. KRI (2015) believe such an approach could be realized through reforming the Malaysian procurement system.

ZAKAT AND *WAKAF* AND AFFORDABLE HOUSING

Islam calls for Allah's abundance to be shared in a fair and equitable manner. Thus, those bestowed with wealth are required to help the poor and needy. The wealthier Muslims therefore, are required to pay *zakat* and are encouraged to make *wakaf* contributions. Hence, *zakat* is an obligation (*wajib*) whereas *wakaf* is philanthropy (Quran, 2:43; 9:60; 2:155, 261). In the former, Allah decrees the beneficiaries to be the *asnafs* whereas, in the latter, the beneficiaries are as directed by the *Wakeef.*

In terms of permissibility of utilizing *zakat* money for the purpose of investing in socio-economic infrastructures such as the building of low cost housing, the *Majma al Fiqh al Islami* has decided that it is permissible as long as the investment meets the following conditions: an investment may be undertaken as long as no further demand for *zakat* monies to be distributed for the purpose of basic sustenance, the *zakat* money is expended on Shariah compliant activities, the investment is guaranteed whereby the principal, as well as the potential profits, belong to *zakat*, the investment can be promptly liquidated to meet pressing matters involving the *asnafs*, detailed feasibility study is required and the investment must be approved by the reigning authority[vi]. Anwar (1995) provided a detailed explanation of the permissibility and compatibility of channeling accumulated *zakat* funds into long-term investment for the betterment of the *ummah*. In addition, Saad, Sawandi and Mohammad (2016) pointed out that during the reign of Caliph Umar Abdul Aziz there was *zakat* surplus and that the surplus funds were invested in projects that bring benefits to the *asnafs*. In Malaysia, it was reported by Dahaman, Hussin and Mohd Noor (2015) that the

fatwa committees of the states of Selangor and Melaka have decreed that investing *zakat* money is permissible but subject to conditions to ensure the security of the *zakat* monies are not compromised.

Ahmad Sarkawi et al. (2015) reviewed the style and type of housing assistance provided by *zakat* to *asnafs*. From a total of 32 types of *zakat* assistance, two focus on housing i.e. assistance in repairing, building or payment of a deposit for low-cost houses; and assistance to build a house in collaboration with other agencies.

Abdul Rashid et al. (2017) reviewed records on *fatwas* concerning the permissibility of *wakaf* assets to be invested in socio-economic developments including housing. In general, it is permissible but subject to specific instructions issued by the *Wakeef*. Other conditions include the practice of *Istibdal* (replacement of the acquired land), ownership of the *wakaf* land where the development takes place is not transferable, only the usufruct, and that the development must be Shariah compliant.

Studies by Abdul Rashid et al. (2017) and Abdul Rashid (2017) revealed that housing projects, both to unlock the value of *wakaf* land and building low-cost housing, have been commissioned and are currently being commissioned on *wakaf* land under a variety of procurement approaches. However, on low cost housing Abdul Rashid et al. (2017) identified the reasons why the *wakaf* authorities are not active: constraints in the availability of *wakaf* land as suitable sites, inappropriate size of available *wakaf* land, lack of money as capital, the reluctance of private developers and funders to collaborate in developing affordable housing on *wakaf* land, and the preference of some *wakaf* authorities to focus developing traditional religious facilities rather than low cost housing, arguing instead that housing is a State matter.

On the constraints faced by *wakaf* authorities in developing *wakaf* land for housing, researchers have proposed that *wakaf* should consider working in collaboration with others such as with *zakat* and/or private property developers[vii]. For example, in a study carried out by Mohd Ali et al. (2016), they highlighted the merits when *zakat* and *wakaf* collaborate in the building of residential units for *asnafs*. Similarly, Abdul Rashid et al. (2014; 2015a) proposed a tripartite joint venture procurement model between *wakaf-zakat*-private property developer as a way forward.

METHODOLOGY

In the current study, the authors hypothesized that *zakat and wakaf* have great potential in contributing towards the provision of affordable housing for the poor and needy. They believe that these two socio-economic instruments could be utilized as the third funding source – self-funding and State's funding via appropriate policies, subsidies and social housing being the first two funding sources respectively – in helping the poor and needy towards meeting their

housing needs. Consequently, the key objective set for the study is to assess the potential of *zakat* and *wakaf* in the provision of affordable housing for the poor and needy. In addition, this study endeavors to identify appropriate strategies to empower the *zakat* and *wakaf* authorities in carrying out the task.

The study adopted the qualitative research method. It combined desk research – review of the literature including fatwas on *zakat* and *wakaf* – and a series of open-ended face-to-face interviews with representatives drawn from 6 *zakat* and *wakaf* authorities (MAINs) and 4 housing developers involved in developing housing projects on *wakaf* land.

RESULTS AND DISCUSSIONS

In the course of the study, 10 interviews were conducted. The interviews generated rich qualitative data that was analyzed using the thematic analysis technique. Table 2 presents the results of the study.

Table 2: Results from the interviews

Provision of housing for the poor and needy	*Zakat*	*Wakaf*	Strategy
Shariah permissibility	Yes	Yes	*Zakat* with conditions *Wakaf* as desired by the *Wakeef*
Preferred type of housing	Low-Cost Housing	Low-Cost Housing	Type and price to follow the Government's Low-Cost Housing
Priority in solving the housing issue	X	X	To solve peoples' problems related to well-being, religion, education and the likes. Housing is a State matter
Capability			
Land	X	Yes	Unsuitable/restricted *wakaf* land might be swapped via *Istibdal*
Capital	Possible	Yes	Can raise money via cash *wakaf*, utilize surplus *zakat* money
Expertise	X	X	Willing to collaborate, subject to Shariah permissibility
Forming JV with a private developer	Yes	Yes	Terms of JV agreement should follow Shariah
Experience working with a private developer	X	Yes	
The willingness of private property developer	Yes	Yes	Some developers are skeptical. They could not comprehend the risks due to potential Shariah issues

The results from the study suggest that it is permissible, subject to Shariah conditions, for *zakat* surplus to be used as an investment in socio-economic projects including the building of houses for the *asnafs*. Similarly, it is permissible, subject to Shariah conditions, for *wakaf* to be employed in the provision of affordable housing for the poor and needy. In terms of the type of housing suitable for development, the interviewees agreed that houses to be developed for the poor and needy should be modeled after the Government's Low-Cost Housing Scheme, with the price capped at about RM40,000.00 per unit.

However, both the *zakat* and *wakaf* authorities do not feel that the provision of housing for the poor and needy should be accorded the highest priority. They consider looking after the well-being of the poor and needy Muslims especially in the provision of daily sustenance, education, religion and medical and health are more important. In addition, they consider the provision of housing for the poor and needy are matters to be addressed by the State.

In terms of availability of land for development, *zakat* has no such resource but *wakaf* has a sizeable land bank scattered across the country. According to Hasan (2008), there was a total of 20,735.61 acres of land registered as *wakaf* land, comprising 14,815.787 acres for specific *wakaf* and 5,919.83 acres for general *wakaf*. *Wakaf* land designated as specific (other than for housing) cannot be used for housing development unless replaced via *Istibdal*.

In terms of availability of funding to be used as capital, Ahmad Sarkawi et al. (2015) believe that *zakat* authorities could utilize *zakat* surplus i.e. the balance after all disbursements made. In contrast to *zakat*, *wakaf* is not cash-rich. However, through initiatives in unlocking the values of *wakaf* land and effort in collecting cash *wakaf*, the potential of *wakaf* being richer in cash looks promising. The cash arising therefrom could be expended as capital for housing development.

However, in terms of expertise, both *zakat* and *wakaf* authorities admitted that their organizations are staffed by non-technically trained personnel. Therefore, their capability to handle housing development projects is very limited. In past and on-going projects, they appointed consultants or partnered with Jabatan Kerja Raya Malaysia (JKR).

The respondents view the idea of *zakat* and *wakaf* authorities integrating their resources as positive. Results from the review of the literature confirmed that some MAINs have already embarked on such initiatives whereby *zakat* authorities build facilities intended to benefit the *asnafs* on *wakaf* land (Abdul Rashid, 2017). In addition, acknowledging their lack of technical expertise as well as the requirement of a much larger amount of capital injection into mass low-cost housing projects, these authorities are receptive of working with private property developers, on condition that the requirements of the Shariah, are not in any way compromised.

On the part of the private property developers, most Muslim developers are keen to participate in such collaborative working environment. They believe such an engagement would benefit them in terms of the appropriate profits and also as means of contribution towards the *ummah* and Islam. However, the small and medium-sized private property developers may face difficulties to acquire the much-needed working capital and bridging finance. *Wakaf* land could not be monetized. Banks are reluctant to accept *wakaf* land as collateral since the developers or MAINs do not have outright ownership or rights over the land.

In terms of appropriate strategies that could be employed to combat the identified constraints, topping the list of potential strategies are:

1. *Zakat* and *wakaf* authorities should consider collaborating thus, enhancing their financial and technical capabilities to handle housing development projects. To this end, further interpretation of the relevant Shariah rulings on the permissibility of such a collaboration, distribution of risks and responsibilities, and the resulting incomes are required;
2. Capabilities of the z*akat* and *wakaf* authorities could be further enhanced, in all the key areas, by working in collaboration with credible private property developers;
3. The *zakat* and *wakaf* authorities should consider procuring houses in a variety of styles to suit their funding and technical capabilities and demand for houses by the poor and needy Muslims. Demand should be localized. In this way, small or medium scales procurement could be undertaken that carry lesser risk such as direct purchases from established developers or from the secondary market. Procurement of a new development involving a large amount of funding and other resources are subjected to a higher level of risk and this style of development should not become the mainstream approach.
4. Capacity building within the MAINs and strategic change in mindset are required. The authorities should acknowledge that z*akat* and *wakaf* are powerful tools that could be utilized effectively in uplifting the socio-economic conditions of the Muslims especially the poor and needy, including in meeting their housing needs; and
5. Government support via positive policies is needed and this must be complemented by active R&D to drive the ideas forward.

CONCLUSION

This paper reported on a study assessing the potential of *zakat* and *wakaf* in the provision of affordable housing for the poor and needy. The findings from the study suggested that *zakat* and *wakaf* have such a potential. In addition, the study identified the availability of key resources and mindset of as among the key constraints that could impede upon such a potential. To this end, key strategies that include a call for the *zakat* and *wakat* authorities to work in collaboration

with credible private property developers thus enhancing their financial and technical capabilities, and capacity building within the MAINs have been identified and herein recommended for further consideration.

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[i] Refer to *Program Pembasmian Kemiskinan Bandar* (PPKB) Kementerian Kesejahteraa Bandar, Perumahan Dan Kerajaan Tempatan, online:
http://www.kpkt.gov.my/index.php/pages/view/285 accessed 13 November 2017.

[ii] For further discussion on *haddul kifayah* refer to Manual Pengurusan Agihan Zakat published by Jabatan Wakaf, Zakat dan Haji, Jabatan Perdana Menteri Malaysia, online:
http://intranet.jawhar.gov.my/penerbitan/p_admin/file_upload/manual_pengurusan_agihan_zakat.pdf accessed 10 February 2018.

[iii] Refer to JAWHAR, available online: http://intranet.jawhar.gov.my/spmj/public/index.php accessed 11 November 2017.

[iv] Refer to http://www.zakatselangor.com.my/terkini/fakir-miskin-dapat-bantuan-rumah-lzs-mais/; http://www.maiamp.gov.my/maiamp2/index.php/zakat/maklumat-bantuan-bina-rumah.html; https://selangorkini.my/2015/12/mais-tiga-tanah-wakaf-bangunkan-projek-perumahan/; all accessed 11 November 2017.

[v] The authors used the Median Multiple (MM) approach, i.e. maximum median house price is 3 times the annual median household income. In their study, they found out that the ratio of housing affordability in 2014 stood at 4.4 which means houses in Malaysia is seriously unaffordable (Cheah Su Ling and Joan Almeida, 2016).

[vi] 3rd Seminar *Majma al Fiqh al Islami* held on 8-9 *Jamadil Akhir* 1413H (2-3 December 1992 in Kuwait as quoted by Azila et al. 2015.

[vii] On *wakaf* development via government funding in collaboration with financial institution and body corporate, see Anan C. Mohd (2015). Pembangunan Wakaf Menerusi Pendanaan Kerajaan dan Kerjasama Institusi Kewangan dan Korporat: Hala Tuju, Cabaran dan Harapan. Presentation, Program Muzakarah Wakaf anjuran JAKIM, Sasana Kijang, Bank Negara Malaysia, 12 November 2015.

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IDENTIFICATION OF STRATEGIES FOR URBAN AGRICULTURE DEVELOPMENT: A SWOT ANALYSIS

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Abstract

Population growth is the major reason for increased food demands and countries face difficult challenges in ensuring food security. This study was conducted to investigate the prospects of urban agriculture (UA) development in Penang state, Malaysia, from the experts' perspective, particularly on the strengths, weaknesses, opportunities and threats (SWOT). Fifty-seven Penang state stakeholders were interviewed. This study applied qualitative analysis method using SWOT analysis to identify and prioritize strategies for urban agricultural development in order to assist planners to manage urban agriculture for achieving food security in urban areas. Based on the results of the SWOT analysis, strategic plans for urban agriculture development system were prioritized into legal framework, financial, infrastructure, land, water, environment and health, social, marketing, and research and development aspects. Finally, a number of strategies for sustainable development of urban agriculture were outlined in order to reduce the weaknesses, avoid the threats, improve the strengths, and grasp the opportunities for the development of urban agriculture production in the Penang state.

Keywords: urban agriculture, SWOT analysis, strategic plan, stakeholders, sustainable development

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INTRODUCTION

A variation of urban agriculture systems exists globally, depending on local socio-economic characteristics, populations, geographic, climate and political conditions. Urban agriculture (UA) and peri-urban agriculture (PUA) focuses on the production of food and non-food products. Technical UA implicates different activities for food production such as horticulture, mycoculture, apiculture, aquaculture, floriculture, and cultivation of plants, tree crop and livestock (de Bon, Parrot, & Moustier, 2010; Gallaher & Njenga, 2014).

UA has ample potential to yield positive social, economic and environmental returns for cities and their citizens and has been noted and received attention from city planners, policymakers, and scholars (Mougeot, 2005; Colasanti, Hamm, & Litjens, 2012; Drake & Lawson, 2015). A survey of UA practices across the globe indicates that factors like urban ecosystems remain connected to urban planning, design, and management for resilience (Scarlett & Boyd, 2013), urban landscape (Saha & Eckelman, 2017), land use preferences (Lovell, 2010), water management practices (Cohen & Reynolds, 2015), innovative forms of green urban architecture practices (Specht et al., 2014), quality of governance (Walker, 2015), legal-technical, policies, bureaucratic rules and procedures (Mendes, 2008), and are highly supportive for sustainable development of UA. A strong policy is needed to feed the entire world population, to guaranteeing the protection and preservation of natural resources for future generations to achieve sustainability. Therefore, implementation of any policy should be supported and shared by the relevant agencies, urban farmers, urban dwellers, community and society, so that maximum impacts and relevance will be achieved.

Urban and peri-urban agriculture (UPA) in Malaysia play an important role as part of the supply chain of cheap food within the country and in managing urban and peri-urban open space (Ramaloo & Siwar, 2016). This also includes related activities such as production, processing and marketing of products to supplier or for direct sale. The scale of UPA in Malaysia is determined by the land availability and its size, water availability, climate factor, labour, skills, legislative support, and finance.

UPA in Penang state is an activity that covers crop and livestock production and is practiced under different circumstances. UPA in Penang state is practiced by school children, community residents, senior citizens, private and public employees, individuals, and commercial urban farmers. UPA in Penang can contribute to the urban populace in a situation of drastic urban development, high oil prices, and expensive raw commodity prices. The main benefit of urban farming is for the poor to grow their own food on plots in urban areas, thus, increasing access to indispensable food, and they can also sell the surplus beyond their consumption to the urban market.

The aim of this study is to examine in depth the existence of UA development in Penang as well as to assist in the formulation of strategies for UA development for policy makers and planners. This study identifies internal and external factors of urban agriculture development. The SWOT analysis of internal factors can be classified as strengths (S) or weaknesses (W), and external factors can be classified as opportunities (O) or threats (T).

RESEARCH BACKGROUND

Study Area

This study was conducted in the Penang state, located on the northwest coast of Peninsular Malaysia, by the Strait of Malacca. It has two separate areas, namely the Penang Island and Seberang Perai (formerly known as Province Wellesley) on the mainland. Penang has five administrative districts, namely the North-East district (*Daerah Timur Laut)* and South-West district (*Daerah Barat Daya*) on the Penang Island; and the North Seberang Perai district (*Daerah Seberang Perai Utara*), Central Seberang Perai district (*Daerah Seberang Perai Tengah*) and South Seberang Perai district (*Daerah Seberang Perai Selatan*) in Seberang Perai. Penang has a land area of 1,030 square kilometres (Department of Statistics Malaysia, 2011). Small and larger scale agriculture in Penang state are included in the category of urban and suburban agriculture. The land in Penang is considered among the best farming land suitable for all types of crop production. Penang farmers practice crops production (staples, vegetables, fruit, and herbs), staples and cash-crops production, mixed farming production (crops and livestock), vegetable production, fruit production, plant/flowers production, and herbs plants production (Ramaloo, Siwar, & Isahak, 2017).

SWOT Analysis

A SWOT (Strengths - Weaknesses - Opportunities - Threats) analysis is a method used to assist in identifying strategic directions for an organization. In the early 1960s, the Harvard Business School Faculty developed the SWOT organizing framework of matching an organization's internal factors (resources, capabilities, and limitations) with its external environment as a first step in the process of strategy development (Hill & Westbrook, 1997) and its relation in making decision (Shrestha, Alavapati, & Kalmbacher, 2004). The SWOT analysis is a strategic planning tool concerned with the analysis of an organization's internal and external environments (Salmi, Ahmed, & Hasnan, 2015; David, David, & David, 2016). This analysis compares strengths and weaknesses (the resources) of an organization to opportunities involved in the growth and improvement of an organization and examines the external threats generated by its environment (Valentin, 2005; Ommani, 2011). SWOT analysis is typically carried out in the form of a group meeting with common themes or interactions (Brooks, Heffner,

& Henderson, 2014), although it is not impossible for the SWOT analysis of a particular subject to be identified by a single individual. According to McNutt (1991), a group of people represents different perspectives on the action to be done and different expertise in order to identify the SWOT based issues. The meeting with a group may be either prepared with relevant documents or questionnaires. Weihrich (1999) modified the SWOT into the format of a matrix, matching the internal factors (strengths and weaknesses) with its external factors (opportunities and threats) to generate strategies. As a framework, SWOT can be represented in a simple two-by-two matrix, as shown in Figure 1. This matrix representation allows key issues to be summarized and then debated within a participatory strategy-making session to best surface the ideas and specialized knowledge of key parties within the stakeholders or organization.

	Positive (to achieve the goal)	Negative (to achieve the goal)
Internal origin	Strengths	Weaknesses
External origin	Opportunities	Threats

Figure 1: SWOT Analysis matrix

SWOT analysis matrix is one of the efficient qualitative models that have been widely used for various subjects. Although SWOT analysis has been generally used in business plans, nowadays it is used to evaluate issues and policies related to decision-making and also to evaluate sustainable agriculture in a systematic way. Falsolayman and Sadeghi (2013) used SWOT analysis to evaluate sustainable agriculture in a systematic way even though SWOT analysis has been generally used in business plans. SWOT analysis has also been used for sustainable development (Ommani, 2011; Reihanian, Mahmood, Kahrom, & Tan, 2012; Zhang, 2012; Ghorbani, Valiollah, Rafiaani. & Azadi, 2015). While, Halla (2007), Liu (2013), and Valipour, Akbari and Zaker (2013) used SWOT analysis to formulate strategies for UA development.

This study uses SWOT analysis tool as a strategic planning approach to indicate strategies for developing UA in the Penang state, Malaysia. This method has been adapted to identify critical factors affecting the development of UA and to undertake preliminary decision making and planning (Arslan & Er, 2008) for developing UA in mega cities. SWOT analysis is a continuation of the situation analysis of internal-external factors, where 'strengths' apply to current forces associated with a UA whereas 'opportunities' refer to what actions could be taken to enhance this development, and 'weaknesses' refer to current problems whereas 'threats' are problems waiting to happen. The combination of these interactions produced some general strategies to develop urban agricultural activities to achieve food security and sustainability in Penang state.

Data Preparation and Analysis

This research is a qualitative study. To conduct the SWOT analysis, face to face semi-structured interviews with different stakeholder groups were carried out. Expert interviews were considered as an efficient method of gathering data, especially in exploratory phase of a project (Bogner, Littig, & Menz, 2009). An expert group workshop and personal interviews were held amongst 57 member participants of urban farmers, agriculture stakeholders, municipal city stakeholders and university academic members (Table 1).

Table 1: Basic data of the participants

Number	Type of Participant	Number of Participants
1	Urban Farmers	40
2	Agriculture Stakeholders	12
3	Municipal City Stakeholders	2
4	University Academic Members	3

In order to explore different aspects of the experts' views, experiences and perspectives on developing UA, the interview questionnaire mainly consists of open-ended questions. Interview sessions were held in each district of the Penang state and covered topics and questions related to UA policies, research, marketing, opportunities, challenges and future prospects. The SWOT analysis does not require any special tool to make the questionnaire or calculate the data collected from the stakeholders. The most important part of this analysis were open interviews and focus groups to find the strengths, weaknesses, opportunities and threats, and finally develop a strategic plan for UA development.

RESULTS

Based on the observations and data from Penang stakeholders, the SWOT factors were mapped one by one. Table 2 shows the list of strengths, weaknesses, opportunities, and threats in the SWOT analysis of Penang stakeholders. The authors outlined SWOT matrix that was based on the identification and categorization of major UA issues within each cell of the matrix.

A lot of interesting facts about UA issues were found, which can be classified in each of the SWOT components. SWOT analysis itself actually includes two factors: internal factors (strengths and weaknesses) and external factors (opportunities and threats). Internal factors are factors which influence is wholly derived from the study object, in this case urban agriculture development in Penang state itself can bring a positive influence (strength) and can also bring a negative influence (weakness). Meanwhile, external factors are factors that originate outside of development of the UA but from nature, the environment, and the influence of other outsiders. The SWOT analysis has been useful in deciding the concept strategy accurately.

Table 2: SWOT analysis of Urban Agriculture (UA) in Penang State

STRENGTHS	WEAKNESSES
(S_1) National recognition of UA (S_2) Stakeholders support & encourage the implementation of UA program (S_3) The UA program involves communities, individuals, schools and institutions (S_4) Farmers initiate networking and knowledge sharing and experience (S_5) Stakeholders provide services, advice & technical support to farmers (S_6) Stakeholders monitoring the urban agricultural activities (S_7) Increased number of UA gardens (S_8) Stakeholders relationship with farmers on UA development	(W_1) UA activities are not registered (W_2) There is no official plan policy statements, district plan policy statements, by-laws, provincial legislation or policy and federal legislation for UA (W_3) Lack of acknowledgement of urban agriculture in planning policy (W_4) UA is not recognized as a category of land use that is different from other land use in urban planning policy (W_5) UA whether positive or negative is not in the official document of the city (W_6) Limited of capital for UA (W_7) No policies of loans and grants for UA (W_8) Lack of secure tenure on land (W_9) Lack of research and extension systems for UA
OPPORTUNITIES	**THREATS**
(O_1) UA can alleviate poverty and source of food security for urban poor (O_2) UA can provide employment opportunities (O_3) UA can generate income (O_4) UA can reduce transportation cost (O_5) Experience and lesson of domestic and global UA development are available (O_6)Development of urban agricultural technologies (seeds, fertilizers, tools and agricultural machinery) (O_7) UA contributes to sustainable development of agriculture: biodiversity, environmental protection & improving soil fertilization	(T_1) Use of agricultural land for housing, industrial and urban development (T_2) UA has land issues for access and availability (T_3) Imperfect infrastructure (T_4) Domestic food production does not guarantee food security and availability (T_5) Youth not interested in UA activities

SWOT Strategies

The UA strategic planning in Penang state marks the beginning towards action and implementation of UA. The success of UA depends on how the key players, namely Ministry of Agriculture and Agro-Based Industry, state government, local government, Food Policy Council, Economic Planning Unit, municipal and city councils, Department of Agriculture, Department of Irrigation and Drainage, Department of Environmental Protection, Health Department, Federal

Agricultural Marketing Authority (FAMA), Non-governmental organizations (NGOs), universities and farmers' associations manage and implement urban agricultural activities as a new sector. Based on the SWOT matrix analysis, the authors propose a strategy plan for enabling legal framework, research, and capacity building for relevant stakeholders to develop urban agriculture in Penang to achieve a sustainable urbanization system (Table 3).

Table 3: Proposed Penang urban agriculture strategic plan

Issue	Goal	Objectives	Strategies	Relevant Authority
Legal Framework	Provision of legal framework for UA	1. Develop UA policy documents 2. Develop UA law for territories, states & districts (by-laws) 3. Institutionalize UA into the structure of the Municipal Council	1.Draft UA policy document 2. By-law in favour of UA & in place of execution	1. Ministry of Agriculture & Agro-Based Industry 2. Food Policy Council 3. Economic Planning Unit
			3.Provide UA office and make sure it delivers	1. Municipal and City Councils
Financial	Provision of financial allocation for UA	1. Allocating budget for UA activity 2. Identifying loan facilities for farmers / households for UA activities 3. Identify & promote donor funding for UA activities	1.Make an estimate of spending expenses for UA activity execution (commercial, medium, small and subsistence for UA)	1. State government 2. Local government
			2.Create advertisement campaign to sponsor UA activity 3.Advertise basic documents to potential donors of UA activities	1. Municipal and City Councils 2. Non-governmental organizations (NGOs)
Infrastructure	Provision of UA infrastructure	1. Identify UA technique/ technology 2. Provide logistical equipment	1.Train farmer / household on appropriate technology / technique for UA 2.Provide transportation & agricultural equipment	1. Municipal and City Councils 2. Department of Agriculture
Land	Provision of land for UA	1.Provide land for UA activities 2. Provide security of tenure for UA	1.Identify land & verified the owner 2.Make a lease agreement	1. Municipal and City Councils
			3.Provide plan, measurement & marking to plant in the city	1. Department of Agriculture
Water			1.Identify water sources	1. Municipal and City Councils

	Provision of water for UA	1. Ensure clean & adequate water supply for UA activities	2.Develop infrastructure for tap water and recycling water for UA irrigation purposes	2. Department of Irrigation and Drainage 3. Department of Environmental Protection
			3.Rainwater harvesting	1. Municipal and City Councils 2. Farmers' Association
Environment & Health	Promote environment and health aspects of all UA development projects	1. Ensure access to fresh / nutritious food / herbs for every household 2. Minimize the spread of diseases in the UA practice community 3. Promoting environmentally-friendly urban farming practices 4. Ensure the production of nutritious foods and herbs that enhance the body's health system	1.Providing assistance to communities to diversity gardens (such as herbs, vegetables, etc)	1. Municipal and City Councils 2. Department of Agriculture
			2.Build proper sanitation facilities in UA activities	1. Municipal and City Councils
			3.Promoting organic farming methods and methods 4. Promote the use of organic or natural foods that are not processed	1. Department of Agriculture 2. Health Department
			5.Ensure that farmers / urban households avoid environmental pollution 6.Educate farmers / urban households on natural resource cycle methods	1. Department of Agriculture 2. Department of Environmental Protection 3. Farmers' Association
Social	Achieve food safety assurance, improve food nutrition and promote sustainable UA for households	1. Provide fair opportunities for UA activities among social groups in terms of gender and social status 2. Create job opportunities 3. Generate income 4. Reducing household expenses	1. Providing land for UA activity for poor urban households to plant and market UA products	1. Municipal and City Councils
			2. Ensure UA's activities as employment for poor urban households, disadvantaged groups and elderly 3. Ensure that farmers / households / disadvantaged groups / elderly generate income and ensure food safety through UA activities	2.Department of Agriculture 3. Farmers' Association
Marketing	Marketing of UA production	1. Identify markets for UA farmers 2. Promote diversification of UA production	1. Advertise UA production 2. Promoting urban farmer businesses	1. Municipal and City Councils 2. Department of Agriculture

			3. Train farmers on production and marketing of suitable UA commodities	3. Federal Agricultural Marketing Authority (FAMA) 4. Farmers' Association
Research & Development	Research-based capacity building for UA	1. Using research-based on UA issues, challenges and future prospect 2. Conduct research on identified UA issues 3. Ensure UA farmers have UA knowledge and skills 4. Conduct research on identified of UA technique	1. Collect, compile and share information about UA 2. Conduct research on modern agricultural techniques 3. Conduct UA workshops / training / seminars / forums with various stakeholders 4. Keep data record on UA activities	1. Municipal and City Councils 2. Department of Agriculture 3. Department of Environmental Protection 4. Department of Irrigation and Drainage 5. Non-governmental organizations (NGOs) 6. University/Research Institution 7. Farmers' Association

UA will ensure food security and poverty eradication if the authorities can create a clear legal framework. The involvement of various stakeholders in UA should be implemented at all levels through a systematic structure. Capacity building for municipalities should be implemented to ensure that urban agricultural policy objectives are met. UA policy needs to be set up and coordinated by local governments especially in municipalities.

DISCUSSION

The aim of this study is to understand the involvement, influences, interactions and relationships networking among key stakeholders on developing UA activities and food systems in the study area. The development of UA in Malaysia is still in early stages. Stakeholders and farmers have different perceptions and priorities about the UA. Among the fifty-seven priority stakeholders: Fifty-two of them (Penang Department of Agricultural and urban farmers) were those who have leadership in implementing and involving on UA activities and program; three of them (university academics) were those involved in research and investigation of UA development, while two stakeholders did not have any involvement in implementing UA program (municipal and city council stakeholders).

This research is based on the internal and external (SWOT analysis) factors and strategic planning tool to develop UA. From the analysis, 8 strength factors and 7 opportunity factors as advantages, and 9 weakness factors and 5 threat factors as constraints were identified as facing Penang state UA

development. From the results of SWOT analysis, strategic plans for UA development system was proposed to include legal framework, financial, infrastructure, land, water, environment and health, social, marketing, and research and development.

CONCLUSION

UA is an important component of sustainable development. Our findings support local planning practitioners in filling regulatory gaps, and practices of urban agriculture, and in seeking to promote UA in order to achieve food security in urban areas in the near future. These require a system that makes use of stakeholders' integrated role in order to implement the UA strategic plan for Malaysia. In the planning and implementation of integrated UA systems the policymakers and planners plays a key role in the recognition of benefits and other elements that contribute towards the sustainability of the UA system.

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HISTORIC BUILDING INFORMATION MODELLING (HBIM) FOR MALAYSIAN CONSTRUCTION INDUSTRY

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Abstract

The Historic Building Information Modelling (HBIM) is widely accepted and practiced all over the world. However, the adoption of HBIM within Malaysian construction industry is relatively low and slow because it demands new skill sets such as 3D modelling expertise, understanding of the approach, a lot of collaboration and it forces industry players to relate to each other differently. It is psychologically a very healthy environment, but not necessarily an easy transition. Since our cultural heritage buildings are limited, it is crucial for us to take care of it. Loss of information, insufficient documentation, poor maintenance, lack of technology adaptation, and reports reliability are among common problems the industry are facing. This paper review the attributes of HBIM based on literature, and its benefits, processes, tools, and challenges are highlighted. From this study, HBIM shows significant attributes that can contribute in providing a better understanding in handling historical buildings, besides allowing enhanced communication and documentation.

Keywords: Historic Building Information Modelling, attributes, benefits, challenges, Malaysia

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INTRODUCTION

Historic Building Information Modelling (HBIM) is the evolution of Building Information Modelling (BIM). BIM is an approach that gets people and information working together effectively and efficiently (Antonopoulou, 2017; Abdul Shukor, Wong, Rushforth, Basah, & Zakaria, 2015; Volk, Stengel, & Schultmann, 2014). The idea of HBIM arises from the BIM approach which has been a popular topic of discussion within construction industry worldwide. Instead of focusing on newly build construction, adopting the technological approach for historical building is widely considered all around the world. In European countries such as England and Ireland, HBIM approach has been applied on some of the country's heritage buildings such as Imperial War Museum and Woodseat Hall in Staffordshire (Antonoupoulou, 2017). In the United Kingdom, an organization called Historic England spearheads many conservation works of the country's heritage buildings by adopting this approach. In Italy, there are buildings such as the San Cipriano Church and St. Maria Church, which have been taken as HBIM case studies (Continenza, Redi Savini, Tata, & Trizio, 2018) to move forward with their culturally rich Roman buildings. In Turkey, there is an increasing awareness via summits and discussion to preserve Ottoman's empire architectural heritage within the region using the approach. The organizations in these countries are using HBIM because they believed that HBIM has many benefits. It gives great value in the future, more efficient and promotes technological relevancy (Baik, 2017; Logothetis, Delinasiou, & Stylianidis, 2015; Abdul Shukor et al., 2015). However, there are no case studies found using HBIM in Malaysian context. This is not surprising since the adaptation of BIM itself is still in infancy for Malaysian construction industry (Zahrizan, Ali, Haron, Marshall-Ponting, & Hamid, 2013).

Historic buildings are important as they reflect the identity of a nation and culture. In Malaysia, there are only 183 buildings that have been gazetted as national heritage by the authority (Ali et al., 2017). The National Heritage Department or Jabatan Warisan Negara (JWN) is the authoritative body that leads the effort of heritage preservation in Malaysia. According to the Malaysian Heritage Act 2005 (Act 645), these buildings need to be at least 50 years (clause 2.1a) before it can be qualified for registration under the Act. In Malaysia, there are not many buildings with significant values to the country remain entirely operable after 50 years due to deterioration issues (Al-Obaidi, Wei, Ismail, & Kam, 2017).

Since the number of heritage buildings is limited, it is crucial for us to take care of the traditions and heritage; ensuring its timelessness and safe from any threats (Mohd Yusoff, Dollah, & Kechot, 2010). Most of the conservation and preservation of these historic buildings are carried out manually by conventional methods where guidelines such as Historical Architecture Building Survey (HABS) are followed by conservationists (Kayan, Akashah, & Ishak,

2013). Generally, the standards and documentation process uses papers, pictures, and reports as main output. However, building model is seldom produced as a submission requirement. Loss of information, insufficient documentation, poor maintenance, lack of technology adaptation, and reports reliability are among common problems the industry are facing (Ali et al., 2017; Khodeir, Aly, & Tarek, 2016; Volk et al., 2014; Harun, 2011).

Fortunately, the recent development in ICT has introduced HBIM as a tool to manage projects related to construction industry effectively and efficiently (Ali et al., 2017). A HBIM model can store information of any historic building and allow continuity of information sharing among stakeholders (Khodeir et al., 2016; Volk et al., 2014). Among the information that can be stored are the materials used for the building, description of work regarding an element or components of the building, semantics for building elements, manufacturers detail and dimension of building components (Ali et al., 2017; Logothetis et al., 2015). Therefore, this paper discusses how HBIM can benefits towards Malaysian construction industry in relation to using HBIM for heritage buildings.

HISTORIC BUILDING INFORMATION MODELLING (HBIM)

HBIM is a study using BIM approach on historical buildings. In other words, HBIM is proposed as a new system of modelling historical structures. It is a shared digital representation of physical and functional characteristics of any built object, which forms a reliable basis for decision-making during its life-cycle (Murphy, McGovern, & Pavia, 2013). HBIM is a semantic-aware database of historical buildings, in which the geometric model is connected to descriptive multi-source information. Semantic-aware database refers to the model's capability to store information within it and able to connect to other sources. HBIM is also described as a novel system to automatically produce visualization models and preservation of documents (Dore & Murphy, 2017).

HBIM is a project simulation consisting of the 3D models of the historic building's components with links to all required information including the description about individual components and its nature. In many cases, this denotes a beginning of a new approach where the details about historical components can be shared and communicated visually, which has previously only been available to persons who could 'read plans' (Continenza et al., 2018; Antonoupoulou, 2017). In essence, HBIM can be used as an archive, information resource and acts as a management tool to aid future investigations on projects and research (Baik, 2017; Volk, et al., 2014; Murphy et al., 2013). HBIM demands skillsets such as 3D modelling expertise, understanding of the approach, a lot of collaboration and it encourages industry players to relate to each other differently (Continenza et al., 2018; Antonoupoulou, 2017; Abdul Shukor et al., 2015). Up until now, Malaysian government through Construction Industry and Development Board (CIDB) and Public Work Department (PWD) plays an active

role in encouraging construction players to embark BIM approach for their projects. The relevant bodies have made some significant initiatives such as organizing seminars, providing affordable series of training and establishing a reference center in Kuala Lumpur for the industry to refer. The approach is believed to help in increasing efficiency among practitioners, reducing operating cost and improving sustainability. Although the potential for HBIM to be implemented in Malaysian construction industry is still up in the air, it has been proven to provide efficient and productive outputs in other countries (Antonoupoulou, 2017; Baik, Boehm, & Robson, 2013; Zahrizan et al., 2013). Hence, as for our initial step, it would be recommended to embark on HBIM in term of existing BIM framework.

ATTRIBUTES OF HBIM

In practicing HBIM, one needs to think on the building's representation to simulation process by considering 'all-in-one' analysis consisting of geometry, semantics, and information of the historic building (Dore & Murphy, 2017). Since HBIM is beyond simple illustration, a HBIM practitioner needs to be able to describe the object and the relationship within the structure. Nevertheless, for better understanding, authors have come up with the following attributes about HBIM:

1- Able to store information about the building components

Since HBIM model can act as a semantic-aware database which refers to its capability to store information within it, therefore, it can be connected with other sources and information such as the material used, manufacturer's detail and relevant data can be seen clearly and shared effectively (Khodeir et al., 2016). HBIM platforms being used currently in the industry are similar to BIM platforms provided by software providers such as Autodesk, ArchiCAD, Tekla and Bentley since they offer almost similar functionalities. The functionalities and capability to store and display intangible data such as material's type, the name of the component, dimension, models and other relevant information; apart from the visual shape of the form can be viewed from a platform such as Autodesk A360's.

2- HBIM allows a clear and reliable visual display

HBIM allows a clear and reliable visual display since the historical building is constructed in 3-dimensional (3D) using its tool. This eliminates the problem of drawings misinterpretation that sometimes happen in the industry (Abdul Shukor et al., 2015). A 3D model gives its stakeholder a better view on how the building looks like. Figure 1 shows a complete architectural model of Balai Besar Alor Star that has been modelled into an HBIM environment.

Figure 1: Balai Besar in HBIM environment
Source: Authors (2017)

3- Able to define building components into its elements

HBIM permits better understanding about a component's nature in terms of its element and sub-elements (Baik, 2017; Baik, Alitany, Boehm, & Robson, 2014). It allows the practitioner to deconstruct and reassemble historical components for a better understanding of its nature. Example of this feature is shown in Figure 2.

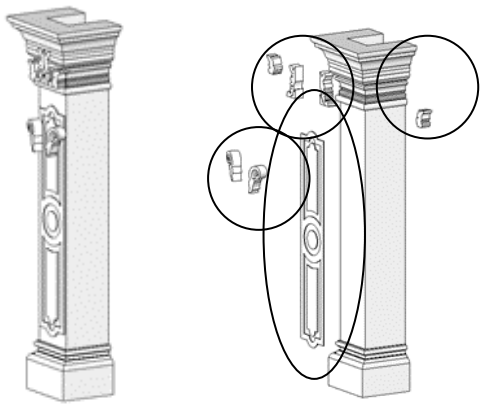

Figure 2: Example of Balai Besar Alor Star component's assemblies
Source: Authors (2017)

4- Automation for documentation and reference

Since the process of components creation will create a library of various components which contains elements and its sub-elements, the HBIM platform also enables information to be studied and inserted as valuable information (Beck, 2013). This information can be used for documentation purpose and also act as the reference for every stakeholder (Noor et al., 2017). Figure 3 shows an example on how the breakdown of a component creation will help in the understanding of the nature of the component itself. This will allows a better understanding on the building as a whole.

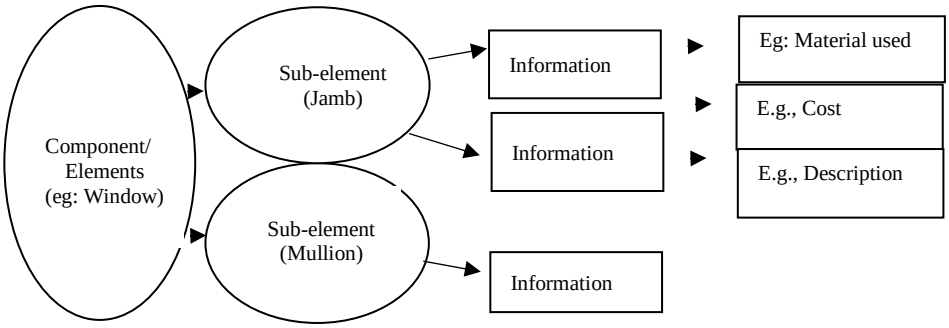

Figure 3: Example of component (Window)

MAIN BENEFITS OF HBIM

This research seeks the potential of the applications of BIM in the heritage sector (HBIM). It may vary according to the scope and purpose of a project with the considerations below:

1-Documentation

Most historical buildings worldwide have complex geometry, ornamentation, and woodcarving. Thus 3D documentation is the most appropriate method to capture every detail (Quattrini, Malinverni, Clini, Nespeca, & Orlietti, 2015). This documentation in a digital archive creates a collection of historical data, information and different types of design shall result in automated documentation of precise preservation and conservation of heritage (Baik et al., 2013). HBIM also allows the integration of the digital representation for the building lifespan. These data will accelerate the acquisition process and improves the accuracy of the repository (Beck, 2013).

2-Simulation for Planning

In terms of design simulation such as sun path, structural reliability, and other tests can be performed quickly and may act as the reference benchmarks for planning (Antonoupoulou, 2017). This platform enables faster and cost-saving method in keeping track of the environmental performance of the historical building. Other simulation capabilities that are available include energy analysis, structural analysis, and scenario analysis (Khodeir et al., 2013). Scenario analysis refers to the ability of HBIM model to represent distinct periods; which allows the establishment of a sequence of building evolution and condition.

3-Communication

In HBIM, the communication between stakeholders can be made simpler, faster and easier to be shared with themselves (Continenza et al., 2018; Ali et al., 2017). HBIM model can support 'live update' if someone is modifying the model. It is instantaneously shared, and the data can be used commonly among relevant

parties. For example, if the client gave a review on the model, a modeller can instantly change it on the platform. Thus, it allows communication through utilization and sharing of information.

It is more effective to coordinate a building using a visual approach with a 3D model, so that the location and relationships of all the components and their potential conflicts can be resolved while still in the planning phase (Baik, 2017; Ali et al., 2017; Abdul Shukor et al., 2015). This also mitigates potential conflict where plan drawings do not provide visual clue about the height of any drawn components, which normally need to be visualized from the study of several drawings and written information. In short, these advantages can be used in many occasions such as in conservation planning, condition monitoring, preventive maintenance, asset management, intervention options appraisal, work programming, construction simulation, disaster preparedness and project security (Ali et al., 2017; Baik et al., 2013; Del Giudice & Osello, 2013).

Other than that, in Malaysian interest, HBIM has substantial value in preservation and conservation of historical and heritage buildings. As the vital drive, the Federal government needs to be an early adopter of HBIM technology. Among benefits of HBIM adoption are (Continenza et al., 2018; Antonopoulou, 2017; Abdul Shukor et al., 2015; Volk et al., 2014):

- Increase understanding on heritage buildings;
- Creating more jobs opportunities;
- Increases productivity;
- Better documentation and reliable storage information of historical buildings;
- Better facilities management;
- Technology relevancy; and
- Provides a way of transmitting knowledge to the future generation.

Nonetheless, upon HBIM completion, the model can be used for future purposes such as reuse, monitoring, replication, reconstruction, 3D printing and even for gaming and tourism development (Continenza et al., 2018; Antonoupoulou, 2017). However, there is an urgent need to develop a shared interoperable historical building objects library, to enable an improved and more efficient future HBIM projects to be accomplished (Baik et al., 2014).

HBIM PROCESS

Generally, HBIM process consists of 2 stages as shown in Figure 4. In the first stage, is the data collection phase activity called the ‘learning phase’ where data regarding the building is collected using few methods. Activity such as data collection needs to be carried out to have a better understanding regarding the historical building (Baik, 2017). This stage 1 is mainly to gather the tangible data such as length, width, height and other relevant information. However, data such

as dimensions will be used later in the 'second phase' in Stage 2. These dimensions will be in the digital reconstruction phase or the modelling based on the data collected. After the model is completed, an analysis and semantic enrichment will take place in the 'third phase'. A strategic approach to organize these data and metadata is crucial in this phase. Lastly, the 'fourth phase' involves the integration of the HBIM project for the client. In this phase, it might require different delivery requirement depending on the client's needs. Phase 2 to 4 is the processing stage, and its objective is to store and to utilize the information gathered.

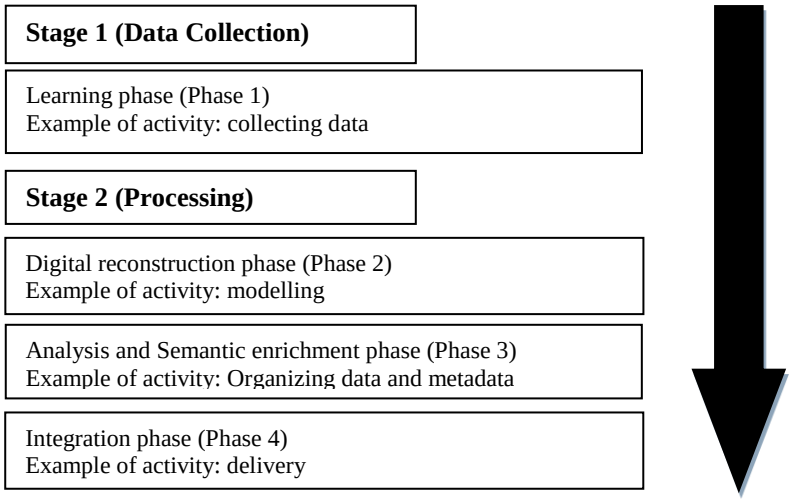

Figure 4: Process of HBIM in stages

HBIM TOOLS

HBIM tools are equipment and software that are used to facilitate and execute the process flow to enhance the workability of the process (Ali et al., 2017; Quattrini et al., 2015). HBIM tools are generally divided into two complementary objectives; (1) to capture tangible data (2) to stores intangible data. The paragraphs that follow will describe tools for HBIM.

Nowadays, the most popular method used to capture dimension, forms, and typology of the building is known as Terrestrial Laser Scanning (TLS) (Quattrini et al., 2015). TLS is a high-end equipment that helps to capture data in the form of point clouds within a very short period of time. The point cloud is a set of data points in a 3-dimensional coordinate system usually defined by X, Y, and Z coordinates. Point cloud files support the design process by providing the real-world context where you can recreate the referenced objects or insert additional models (Murphy et al., 2013). Figure 5 shows an example of data collection using this method. The conventional method is by taking the

measurement using a tape measure or laser measurement before the details obtained is converted into drawings, but this method will take a longer time to arrive at the final data collection (Noor et al., 2017).

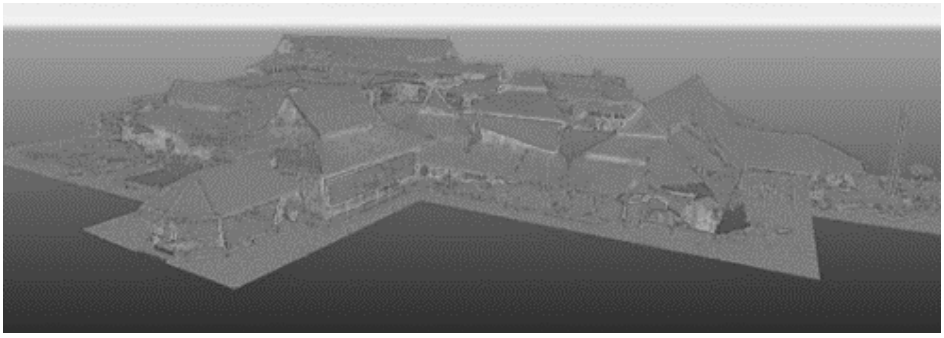

Figure 5: Example of data collection using Terrestrial Laser Scanning tool for HBIM
Source: Authors (2017)

For the second objective, there are modelling software provider that are active in the market nowadays such as Autodesk, Bentley, Glodon, Tekla, Graphisoft, Ecodomus, and Vico (Baik et al., 2014). Among favourite tools being used are Autodesk Revit, Autodesk Structure, Bentley Facilities, Tekla Structures, Gehry Digital MEP and Naviswork. Each tool provider provide many different tools as it has its functions to manage various activities in projects related to the construction industry. Usually, the selection of the tools is based on four (4) features, which are reliability on communication and data exchange, accuracy, and usability (Baik et al., 2013). The selection of tools to be used for a specific project may also vary depending on the scope and background of the work to ensure a successful output.

CHALLENGES IN HBIM

Despite the promising benefits of HBIM, some challenges are unavoidable. Among the common challenges in implementing HBIM are insufficient experts to execute the process, expensive tools and training, low commitment and awareness from the stakeholders view to invest for historical buildings (Dore & Murphy, 2017; Gardezi, Shafiq, Nurudinn, Farhan, & Umar, 2014; Volk, et al., 2014).

However, one of the most significant challenges for HBIM approach is documenting the building in terms of BIM functionality. This is because many information about historical building has been lost and some are impossible to retrieve thus, creating data void problems (Antonopoulou, 2017; Baik et al., 2014; Beck, 2013). Although BIM functionalities help in improving attribution of HBIM, but this is useless if no information regarding the historical building is available. Therefore, the primary challenge lies in the techniques in getting the

information to minimize data voids in the process.

Data voids have implications in the modelling process, where the level of development (LOD) for HBIM might not reach the highest LOD, thus making the model 'incomplete.' In HBIM modelling process, there are two types of information involved, known as tangible and intangible information (Volk et al., 2014). Tangible is information about shape, forms, and whatever perceptible by touch and can be physically measured, whereas intangible is information that is physically untouchable such as the description of the material used for the element that gives value to it. Therefore, in the modelling process, accuracy, complexity, and reliability of data are important. Commonly, HBIM process gives challenges in three major areas known as accuracy, complexity, and reliability (Dore & Murphy, 2017). In handling this concern, tools such as TLS and modelling software plays a vital part in minimizing this problem. For data voids, some practitioners suggest that educated guesses may have to be made about certain aspects of the asset's information (Baik, 2017; Ali et al., 2017). However, all information (delivered/exchanged) must be verified and validated, allowing zero ambiguity.

It is recommended that in HBIM process, any part of the model is based on assumption due to data voids or incomplete information should be explicitly marked to avoid ambiguity and future confusion, misinterpretation and ill-informed decision-making (Antonouloupou, 2017; Baik, 2017). An approach to validating these data can be made later through 'expert opinion' method.

CONCLUSION

The Historic Building Information Modelling (HBIM) has been acknowledged by many kinds of research to be useful to develop a system for maintaining a historical building efficiently. Its attributes which enable big data storage and reuse of information along with capability of acting as domain knowledge throughout the lifecycle of a building has made it very popular. Extensive encouragement to use HBIM in the industry can help to expand the overall initiatives and strengthen the image of the Malaysian industry. Besides, looking at current government efforts for BIM, it is anticipated that HBIM technology will likely be used for many other types of projects in the future. Lastly, it is also recommended that further research on this area be performed for a better addition to the body of knowledge for Malaysia's chapter.

ACKNOWLEDGMENT

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ECOLOGICAL FRIENDLY APPLIED TECHNOLOGY TO NEGOTIATE THE DILEMMA BETWEEN ENVIRONMENTAL PROTECTION AND URBAN DEVELOPMENT

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ABSTRACT

Urban development consumes resources and therefore abolishes the ecological function of the natural environment. It generates the dilemma between urban development and environmental protection. Urban development cannot be halted for many reasons due to its importance to accommodate population growth, urbanization and economic development. Determinations to negotiate the dilemma between environmental protection and urban development have been undergoing for many years. One of the efforts is mesoscale ecological friendly technology concept where the function of natural environment could be maintained while letting progressive urban development to flourish. The study was conducted in secondary city in Peninsular Malaysia of Johor Bahru. The study was conducted by analysing secondary information obtained from relevant resources, by undertaking internet research on the applications of ecological friendly technology towards sustainability in developed and developing countries, and by observing the connection between urban development and environmental state. The findings show that by employing applied ecological friendly technology, the urban physical development can still be undergoing without substantial environmental impacts.

***Keywords*:** ecological friendly technology, environmental protection, urban development, sustainability.

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INTRODUCTION

In a big picture, economic development of many developing countries is depending heavily on natural resources (Barbier, 1987; Panayotou, 1993; Pearce, Barbier, & Markandya, 2013; Solow, 2016). While natural resources is confined within an environment, economic development attempts to utilize and tends to overuse the natural resources (Gylfason, 2001; Betz, Partridge, Farren, & Lobao, 2015; Bergstrom & Randall, 2016), and therefore, environmental conservation and economic development do not always go hand-in-hand, as reflected in a simple illustration in Figure 1.

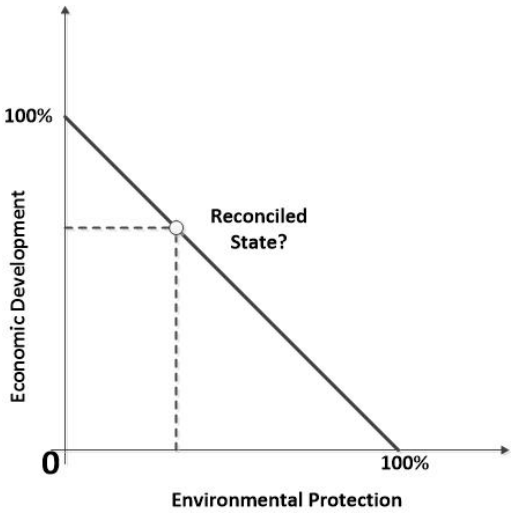

Figure 1: Economic growth vis-à-vis environmental protection

Even though the relationship between economic development and environmental protection does not necessarily linear as exhibited by Figure 1, but it is not wrong to say that the relation can be considered as linear or quasi-linear, as the summation of economic development and environmental protection is actually a binary (Tietenberg & Lewis, 2016; Shoreman-Ouimet & Kopnina, 2015). The sum of reconciliation of both aspects leads to 1.0. By this, a negotiation of natural resources use for economic growth and environmental protection towards optimum state would be necessary. The prime question is now to what extent an optimum state is optimum? It could not be answered in a straightforward manner. It depends greatly on many factors such as existing government policy (Sachs, 2015; Susskind & Ali, 2014), present level of economic development of a country (Tietenberg & Lewis, 2016), and ethical views of the society on environment (Harper & Snowden, 2017; Stenmark, 2017). To some extent, environmental protection and economic development is

reconcilable towards optimum state. The property rights holder, e.g. the government, can negotiate and reconcile these two entities for better environment and economic development.

Subscribing the analogy of economic development and environmental protection dilemma, in a mesoscale, the dilemma can also be brought to confront the urban development vis-à-vis environmental protection (Carley & Christie, 2017). The reconciliation, in this case, can be done by letting urban development undergo while keeping the ecological function intact, even though there are physical disturbances on environment. Ecological friendly technology at mesoscale level is recognized in this study as urban environmentalism towards sustainable development (Gibbs, 1998; Mol, Spaargaren, & Sonnenfeld, 2014; Zhou, 2015).

Biodiversity is an obvious domain that will be impeded first and foremost by urban development. On the other hand, biodiversity is recognized as a keystone of whether or not an ecological entity is healthy (Laurila-Pant, Lehikonen, Uusitalo, & Venerjarvi, 2015). Extensive and massive land conversion for urban development will definitely promote ecological loss (Chen, Liu, & Lu, 2016; Appiah, Forkuo, & Bugri, 2015). However, this study does not give the emphasis on ecological losses i.e. plant and animal losses and ecological footprint, since the land conversion considered in this study was only clustered and small-scale instead of extended and massive land conversion. Rather, it gives the emphasis on physical consequences of the ecological changes that took place due to urban development.

This study looks at the relevant elements of urban development and environmental design which are able to reconcile the physical development of a city and its ecological function by minimizing the disturbance to the function of environment. For the purpose of the study, in-depth field observation and gathering the qualitative secondary information have been done in Johor Bahru, Malaysia. Review of relevant literatures and reports has also been carried out.

THE STUDY AREA

Johor Bahru, as exhibited in Figure 1, is a city in the southern part of Peninsula Malaysia with about 497,000 total population. Johor Bahru is included in Iskandar Malaysia Region, which is a growth centre in the Southern Peninsula Malaysia. Iskandar Malaysia, itself as a growth centre, is strategically situated in the southernmost tip of Peninsular Malaysia. Iskandar Malaysia upholds a strong identity and advanced economic potential as the region possesses strategic location, which is favourable for ancient traders and merchants from around the globe.

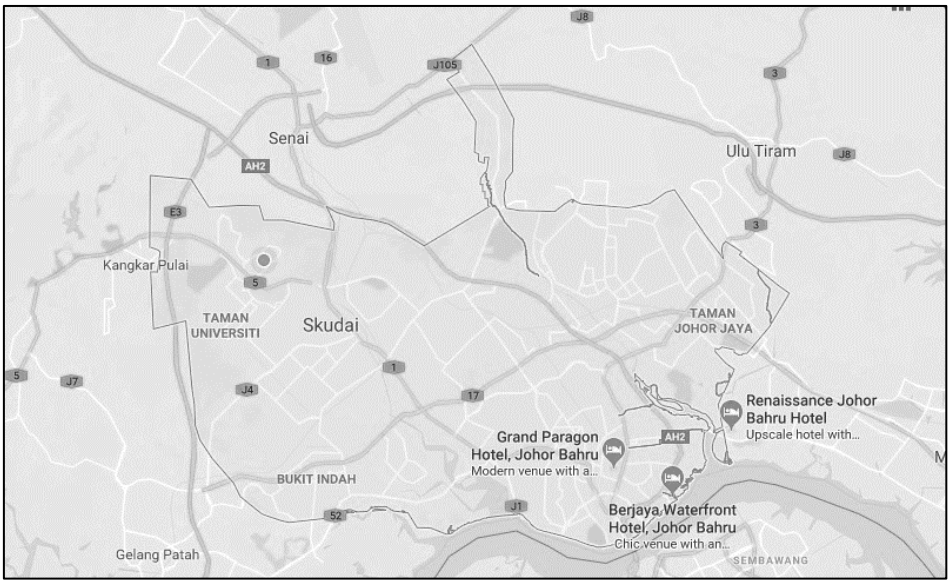

Figure 1: Johor Bahru, Malaysia

Rapid urban development in Johor Bahru was signified by the development of well-planned residential and commercial areas and other built-environment elements by employing the principles of acceptable standard environmental and landscape design principles. However, the increase of built environment automatically stalemates the presence of natural environment that carries values beyond merely economic. Moreover, built environment can still deliver the ecological function at some points, if it was designed through the urban environmental or ecological modernization principles.

THE APPROACHES

This study observes the physical changes as a result of urban development and its physical consequences particularly with respect to hydrological aspect. The study also looks at underlying theoretical groundwork on ecological loss and gain. However, since the area involved in the ecological changes commonly covers very minor change as $S \alpha A^z$ (Lennon, Kunin, & Hartely, 2002), where S is number of Species and A is area, and the plants diminished would not impede ecological losses as they are abundance and usually endemics, therefore the quantity of ecological loss would be trivial and thus ignored.

Changing in Rainfall-Runoff Relationship: The Most Visible Impacts of Urban Development

Surface Runoff Modification

Changes in the imperviousness of the land exert essential influence on rainfall-runoff relationship due to changes in the hydrological-ecological process in urban area (Yao, Wei, & Chen, 2016). They asserted that the growth of impervious surfaces in urban areas is directly associated with urban development. The factor that influences the variations in urban hydrology includes increased runoff, decreased recession time, decreased groundwater recharge and decreased base flow (Burns et al., 2005; Liu, Ahiablame, Bralts, & Engel, 2015).

A study in Johor Bahru Malaysia by Majid, Jamaludin and Ibrahim (2013) shows a linear model on the correlation between housing density and impervious surface that can be expressed by an equation of ln {y/(1-y)}=0.6716+0.08x, where y: proportion of impervious surface and x: housing density (unit/acre). By using this equation, the correlation between housing density in unit/acre and percentage of impervious ground surface is shown in Figure 2.

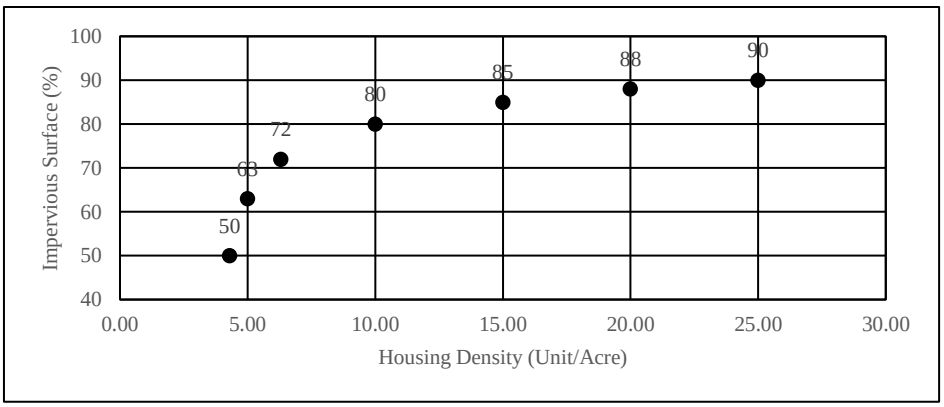

Figure 2: Housing density and impervious surface
Source: Adapted from Majid et al. (2013)

Figure 2 reflects residential plots in Johor Bahru with bungalows and Semi-Ds type of house, where the ground surface composed of pavement and roof in a flat land, and unimproved area. It is obvious that the higher housing density would result in higher impervious area, and therefore higher surface runoff as exhibited in Figure 3.

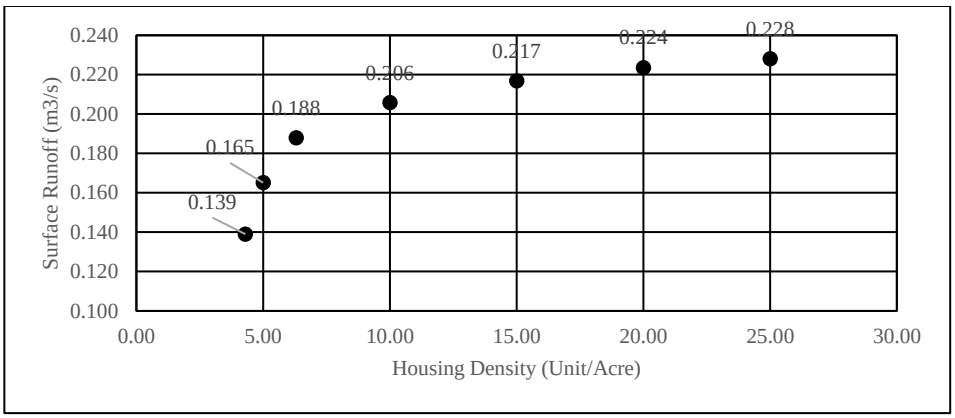

Figure 3: Housing density and surface runoff, for I=1mm/hour, A=1km^2

Figure 3 confirms that changing the landscape from natural environment to built environment would subsequently increase the possibility of getting urban flooding. This situation should be optimized by letting residential development takes place – because the development is unavoidable in a growing city – and at the same time minimize the possibility of flood occurrence. The coping strategies to optimize this dilemma are discussed in the subsequent sections.

Underground Storage

As discussed in the earlier section, floods are greatly influenced by urban land use. Not many local authorities can appropriately control land use in order to reduce flood magnitude. Given the present run-off coefficients are not easy to modify and also rainfall is beyond people's control, thus the maximum discharge from an urban area theoretically cannot be modified. However, the rate of release of discharge can be modified through natural storage. This concept works significantly under one condition: that the efforts must be done by all individual citizens. The individuals provide storage according to their land plot area, defined by $\boldsymbol{S_i = 0.001A_i \times h \times D}$, where $\boldsymbol{S_i}$ is storage that must be provided individually (m^3), Ai is individual land plots area (m^2), $\boldsymbol{h}$ is design rainfall (mm/hour) determined by the local authority, and $\boldsymbol{D}$ is projected rainfall duration (hour). The best situation will be created if those storages are installed underground since this storage enables collected rainfall to recharge into groundwater. In the long run, it will provide sufficient groundwater source and ultimately lead to sustainable development. Rain water that falls within an individual land parcel is collected, including through pipes from the roof-top, and discharged into an underground tank for subsequent recharge into groundwater (Figure 4).

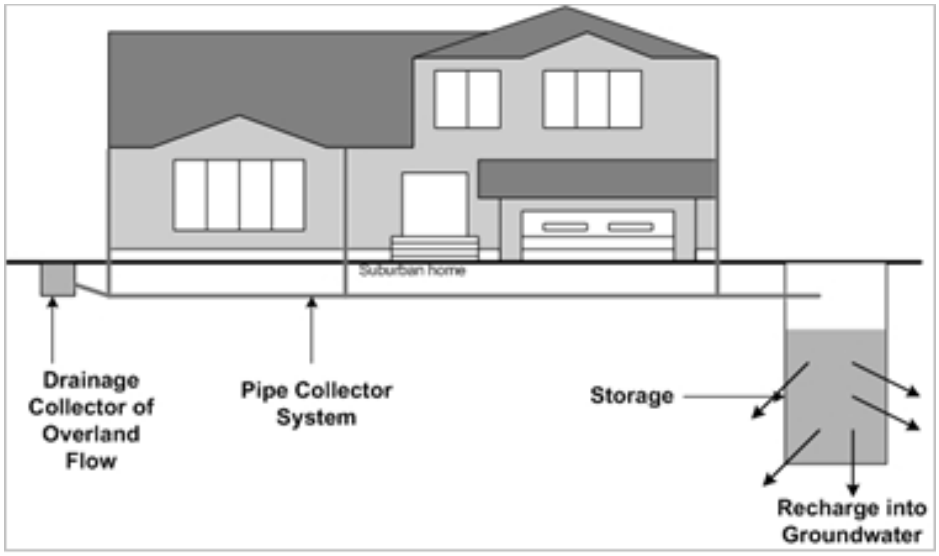

Figure 4: Individual underground rainwater storage system

The effectiveness of the individual storage system depends on the hydraulic conductivity of tank storage, groundwater table, as well as rainfall intensity, duration and frequency. More permeable soil structure around the storage boosts groundwater recharge, therefore, the process of emptying the storage will be faster, and successive rainfall can be stored properly in the tank. Higher groundwater table and less permeable soil structure will delay the emptying process of the tank and reduces its capacity for storing successive rainfall.

In densely populated urban area, where detached individual houses are normally rare, and multi-storey building types are dominant, the storage system can be placed at either roof-top or basement (Figure 5). However different operation is applied for the roof-top storage, that is, at the time when rainfall stops, and underground storage is empty, the roof-top storage can then be released to the underground storage. The same principle of storage calculation for individual detached houses can be applied to multi-story buildings. With this arrangement, assuming that individual storage system works well, the reduction of flood magnitude will be directly proportionate to the built-up area excluding roads and other non-occupancy areas. This reduction also leads to a reduction in the need for drainage infrastructure; costs for providing such infrastructure; and flood damages and losses. At the same time, it potentially leads to an increase in groundwater resources and improved environmental sustainability.

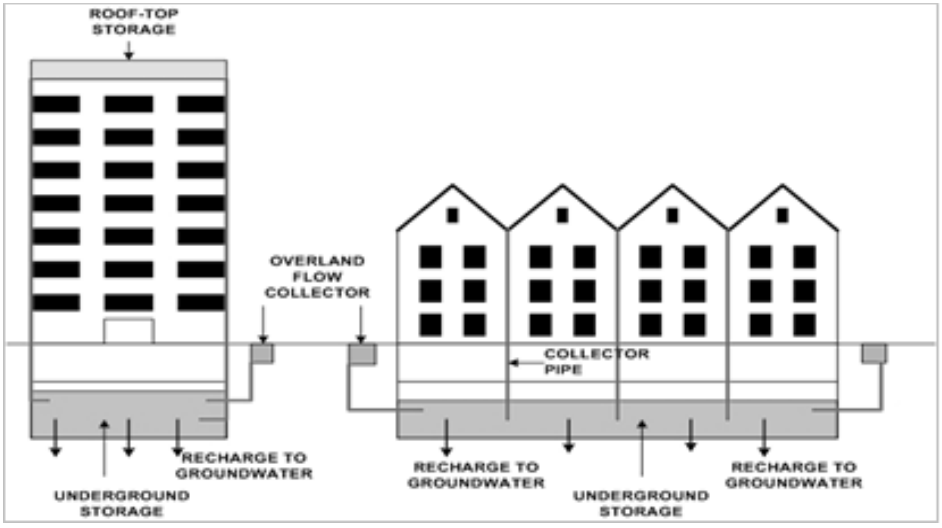

Figure 5: Storage system in urban-type residential building

If all the above-mentioned activities are implemented appropriately, harmonious coexistence between human and nature will be potentially achieved, and urban development will not badly affect urban environment. Floods will no longer be viewed as disasters to defend against, but rather as normal, natural phenomena that humans must learn to adapt to and make the best of. The Netherlands' socially-rooted approach for addressing climate change adaptation to flooding sums it up best with a vision of a country "safe against flooding, while still remaining an attractive place to live, to reside and work, for recreation and investment" (Wenger, Hussey, & Pittock, 2013).

Pervious Interlocking Paver

The most obvious and visible demand of an urbanizing area to cope with increasing car ownership and commercial area is parking lots. The acreage for parking lots depend on some factors that will contribute to the number of parking spaces that will be available on an acre of land. This includes: (a) Size of each parking space (b) Size and design of driving and turning lanes (c) Layout and topography of the land (d) Other factors such as handicap-accessible parking and surface of the lot/field. In case the demand of parking lots must be met by means of outdoor off-street parking, the land conversion from vacant land to parking lots will be necessary. If the conversion took place from bare land, the biodiversity losses, e.g. plants losses, would not be significant, and also many endemic plants in the Peninsular Malaysia are currently either not at vulnerable or endangered status, rather at 'least concern' (IUCN, 2017). By this status, the endemic plant losses as a result of changing landscape would be insubstantial, and therefore other factor, i.e. urban flood, would be more concern.

Sometimes we need to construct a parking lots (a built environment) from previously natural environment by minimizing the environmental function of the area, i.e. keeping surface runoff at minimum level while maintaining the natural environment and beauty. In such cases, the natural beauty can be improved by artificial natural beauty as more preferred by people due to non-random appearance, e.g. theme parks are more preferable than random nature. At the same time, surface runoff can be reduced by adopting pervious interlocking paver. In this case, ground surface is designed to allow as much as possible infiltration rate of surface runoff, as exhibited in Figure 6. The use of pervious pavers may reduce surface runoff around 10-15%. This is a somewhat significant in the reduction of flood. Other than reducing surface runoff and flood, mesoscale urban environmentalism practices can also reduce or eliminate epidemic diseases.

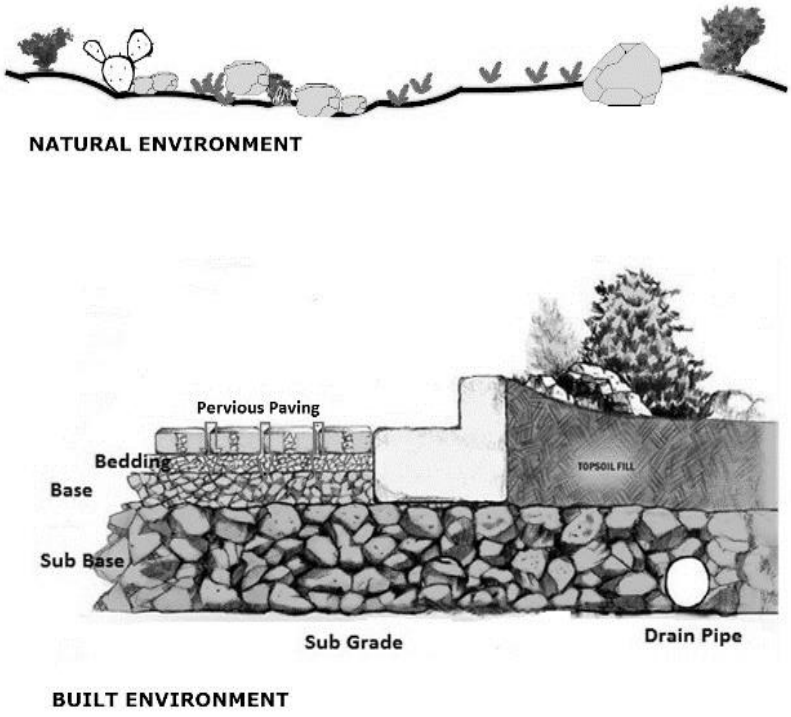

Figure 6: Allowing surface runoff to recede

Eliminating Prevalent Disease

Some parts of Johor Bahru are dengue fever prevalent as many cases of this disease spread by *Aedes Aegypti* were found in the areas. One of the causes is due to random natural condition of the place that encourages mosquitoes to breed. At this random condition, stagnant storm water could not freely flow and therefore land surface could not totally dry up. This situation invites mosquitoes to breed.

Figure 7 exhibits a situation that in natural condition, the surface runoff would generate a long-term inundation i.e. stagnant water, which along with dead shrubs and plants, create a perfect breeding grounds for *Aedes Aegypti* that causes dengue fever. In some residential neighbourhoods in Johor Bahru, the *Aedes Aegypti* breading grounds were augmented by lack of awareness of some citizens in littering and disposing trashes. It makes some residential neighbourhoods become endemic areas where dengue becomes prevalent. An urban environmentalism approach can be applied by eliminating the culprit, i.e. the breeding grounds of the mosquitoes. In this case, the natural condition can be improved by providing a sufficient drain pipe with sand and gravel filter. Thus, during rainy days, the storm water would quickly be absorbed by drainage pipe, and no inundation is created afterwards, eliminating *Aedes aegypti* breeding ground. At the same time, the environmental function at that place will be maintained i.e. natural environment is still unharmed. There would be a few ecological losses at the area for sure, but the lost can commonly be offset somewhere else.

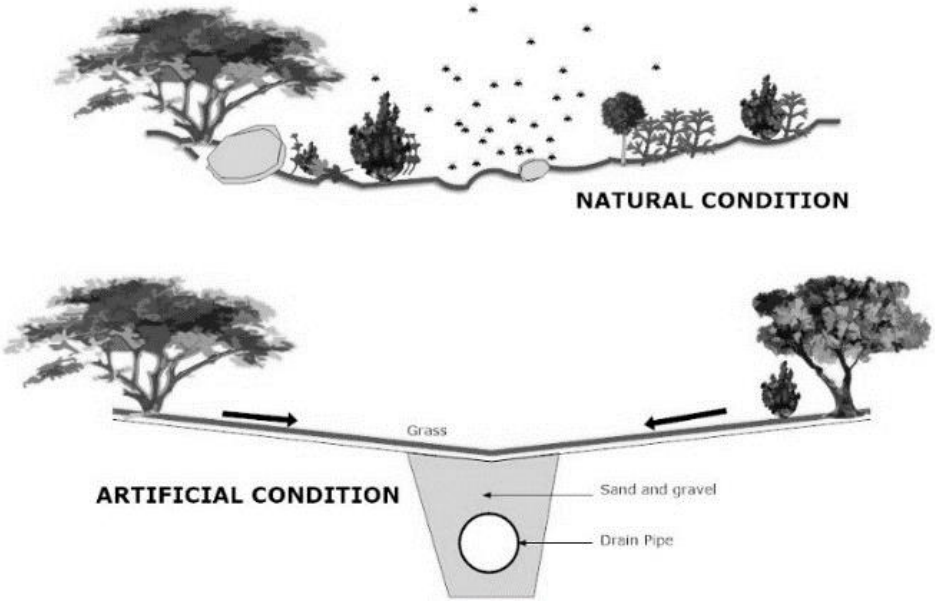

Figure 7: Eliminating *aedes aegypti* breeding grounds

Connecting Habitats

In urban area or anywhere where the road construction must separate one habitat into two, an ecological tunnel would be necessary. There are two different definitions on ecological tunnel from geological and ecological viewpoints. From the geological viewpoint, an ecological tunnel is an environmental friendly and

energy-efficient state of during and post-construction phase (Zhang, Lei, & Xue, 2011). On the other hand, from the ecological standpoint, an ecological tunnel is defined as a tunnel that is able to convey both human and animal activities without creating disturbance to both species (WWF Russia, 2018). However, this study subscribes to the latter definition.

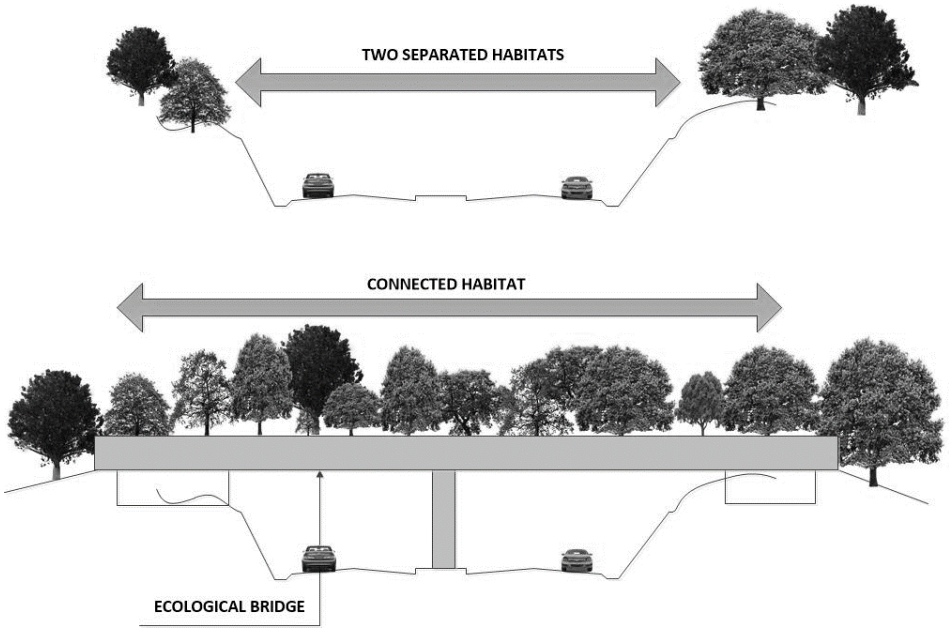

Figure 9: A separated and re-connected habitat

An ecological tunnel or ecological bridge or ecological link is an equivalent system of a fish ladder in the dam construction where a habitat is separated by the dam. A fish ladder is a right riposte to reconnect the habitat separated by anthropogenic activities like dam, particularly for seasonally migrating fish. This is an effort to reconcile the cohabitation of man and nature. The disturbance of human activities would be minimized with the presence of ecological link.

WAY FORWARD

Negotiation between urban development and environmental protection can be done in many ways. One of the ways is through ecologically friendly technology, as demonstrated by some good practices in the study area, through the discussion above. To expedite the adoption of ecological friendly technology by local authorities, mainstreaming the ecologically friendly technology in planning policies and tools is necessary along with consistent and persistent law enforcement for appropriate reconciliation process from micro to macro level. By

this action, the disturbance to biodiversity, ecological integrity and environmental disasters, such as urban flood, could be avoided or minimized. At the same time, urban development could be undertaken without very much worry about ecological disruption, because the development envisions beyond the planning horizons.

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IMPEDIMENTS TO HOME OWNERSHIP: PERCEPTION OF LOW- AND MIDDLE-INCOME TENANTS IN SELANGOR

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Abstract

Home ownership affordability has been a serious issue among the low and middle income households in Malaysia. Main contributors to this issue are low income, high cost of living and growth in income that does not commensurate the rise in property price. This research intends to identify the level of home ownership affordability among those who are unable to have a house and are tenants. In addition, it intends to examine the factors that affect their home ownership affordability. The study focuses on people residing at rented units in Kajang, an urban city in Selangor, where primary data was collected using questionnaire method. The target group was low and middle income households, whose head of household aged between 21 to 50 years and total household income capped below RM7,500. The success rate was 74 percent based on 250 households met. The research findings indicate that the level of home ownership affordability varies by ethnicity, household income and educational level. Meanwhile, four main factors that influence home ownership affordability are price of house, affordable mortgage loan, proximity to workplace and government policy on affordable housing. Majority of the respondents are still pessimistic of their ability to own a residential unit.

***Keywords*:** housing, low and middle income household, affordability, access to housing

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INTRODUCTION

Housing has direct and immediate influence on education, health, political, environment, security, safety, economy and social life of any society (Ariffin, Zahari, & Nadarajah, 2010). Carlson et al. (2011, cited by Salhotra, 2018) state that consequences of inadequate housing include 'worse health, educational, and economic outcomes'. Poor families that do not receive housing assistance are likely affected in their drive to higher education, lower socioeconomic status, and pose higher chances of teenage pregnancy and being malnourished (Salhotra, 2018). In developing countries, the price of house increases faster than its annual household income. Although housing reserve may be adequate by quantity, but as the price is high, those in the lower and middle income groups are unable to achieve their dream of owning a home (K'Akumu, 2007). For the majority in these groups, monthly expenditure on housing instalments forms the single largest category. Quite often, more than 30 percent of their monthly income is spent on mortgage payments (Beer, Kearins, & Pieters, 2007).

It is commonly known that rapid urbanisation and industrialisation attract rural to urban immigration in developing countries. This creates a continuous demand for housing, especially for the immigrants from low and middle income households at urban areas. Shaffer (2015) points that supply in the United States is lower than demand due to restrictions by local government in the provision of housing, mainly from 'zoning regulations, … approval processes, … and outdated building codes' (p. 41). Inadvertently, the value of residential properties in urban areas has skyrocketed while population growth in urban areas reduces availability of land for development, leading to an exponential increase in the premium for urban land (Arıöglu, 2002) eventually causes the rise in price of new house. In Malaysia, the price of residential properties in the country grew at 6.45 percent between 2016 and 2017 alone (Valuation and Property Services Department, 2017). The Malaysian government has carried out policies that focus on low income households to purchase affordable house. Yet, the volume offered is still insufficient for this target group (Wan Abd Aziz, Kuppusamy, Doling, & Hanif, 2014).

While attention is given to the low income group, the middle income households have been marginalised due to lack of policies to support them. As a result, the Malaysian government introduced PR1MA houses for the middle income households earning between RM2,500 and RM7,500 per month, with conditions that they must be first time buyers, owner-occupied and units cannot be sold in the first 10 years. For the low income households, the government looked at providing opportunities for them to rent units. The City Hall of Kuala Lumpur has been tasked with this initiative by the Ministry of Finance Malaysia, whereby more than half of its public housing stocks are rented out at a mere RM124 per month for a three-bedroom unit, and RM55 per month for a studio unit. Tenants bear no other costs. These are too attractive to many that they do

not want to own it, which would otherwise cost RM250 per month, excluding the maintenance costs, repairs and taxes (Pros and cons in rent-to-own schemes, 2018). Renting however lead to a shortfall in the sense of belongingness to their unit, facilities and the neighbourhood.

There is still a dearth of work in tenants and home ownership affordability in Malaysia. This paper fills the gap in home ownership affordability, especially discussion on obstacles to home ownership and affordability among the tenants in urban area among low and middle income tenants in Selangor and secondly, factors that cause them to continue being tenants.

THEORETICAL UNDERPINNING

Within the mainstream economic theory, neoclassical economic theory appears more established to press for liberalising the market from the state in the provision of goods like housing. The theory states price is determined by an interplay between supply and demand in the market, which moves into an equilibrium price when quantity in demand equals its supply (Khalid, 2010). Neoliberalism theory is widely used to describe liberalisation of government control or protection of the economy which augments corporate control of the market (Kahn, 2007). In China, neoliberal reform has brought significant changes in the provision of urban housing in the 1980s (Wang, Shao, Murie, & Cheng, 2012). In many countries, neoliberal policy has impacted on the housing provision, opportunities and affordability (Forrest & Hirayama, 2009).

Duan (2011) applied price to income ratio (PIR) and housing affordability index to measure housing affordability in Lanzhou, Northwest China and confirmed that household income is a significant factor of housing affordability. Besides, Lau and Li (2006) used PIR to analyse the changing financial ability of Beijing households in the purchase of commercial housing. Torluccio and Dorakh (2011) identified that housing affordability is not only to be seen as the ratio of apartment cost to citizen's income but also the ability to obtain a loan to buy a house. They pointed that housing affordability in Russia and Belarus continues to be a big challenge. Home ownership affordability issues in Australia have been influenced by demographic change, household income, location, mortgage loan, housing prices, social amenities, economic growth and government policy (Berry & Dalton, 2004; Berry, 2006; Burke et al., 2008; Yates & Milligan, 2007; Sliogeris, Crabtree, Phibbs, Johnston, & O'Neill, 2008).

Wan Abd Aziz, Hanif and Kuppusamy (2010), in their study on housing affordability issues for 1,137 middle income household in major cities in Malaysia, found that housing affordability is greater amongst private employees and majority of the middle income households own houses priced between RM120,000 and RM150,000 in Malaysia except for Kuala Lumpur with a mean of between RM180,000 and RM200,000.

Thus, findings above show that home ownership affordability can be influenced by various factors such as availability of housing loans by financial institutions, construction cost, household income, housing loan interest rates, house price, social amenities, demography characteristics, location, population size, government policies and programmes.

METHODOLOGY

This study was focused on Kajang, a large town situated about 20 kilometres away from Kuala Lumpur with a population of local citizens being at 311,785 (Department of Statistics, 2011). The research targeted on low and middle income tenants only. As such, this quantitative study employs a purposive sampling technique as it required respondents who are aged 21 years old and above, married and still renting a house. Parents visiting eight kindergartens, one vernacular primary school and a convent school in the area form the basis of identifying the respondents, who must be tenants. Once identified, the respondents were interviewed directly or issued a questionnaire if they insisted of being given one to answer themselves.

Being the key instrument, the questionnaire used was developed based on previous studies by scholars in this field such as Trimbath and Montoya (2002), Berry and Dalton (2004), Berry (2006), Burke and Pinnegar (2007), Md. Sani (2007), Yates and Milligan (2007), Sliogeris et al. (2008), Duan (2011), and Torluccio and Dorakh (2011). All questions were closed-ended and based on perspectives of neo-classical economic and neoliberal theories. The five-point Likert scale is used to assess the level of agreement to statements. Home ownership affordability was measured using 17 statements but was reduced to only 14 after a pilot test. The alpha reliability coefficient scores for the items in the pilot test were 0.7799. As many as 250 sets of questionnaires were distributed but only 204 sets of questionnaires were returned successfully. After a review, 19 sets of questionnaires were removed as they did not comply fully to the criteria set. Therefore, only 185 sets of questionnaires were used in this study, with an alpha value of 0.7916 in the final test. We have left the housing affordability level to be decided by the respondents themselves.

DATA ANALYSIS

Data analysis techniques used in this study is quantitative. The factor analysis as an inferential statistical analysis is used in this study based on the data obtained from the survey questionnaire to determine the factors that influence the respondents' home ownership affordability. The factor analysis techniques reduced and clustered the original 14 observed variables into a small number of factors. The second objective of this paper is assisted through the use of Exploratory Factor Analysis (EFA). Meanwhile, chi-square test was also used to

see whether the level of home ownership affordability is significantly influenced by respondents' demographic background.

RESULTS AND DISCUSSION

Of the 185 participants in the survey, 51.4 percent were females. This may be incidental due to the method employed by the study, which accepted the head of household or the spouse residing at the unit. The majority of respondents were ethnic Malays (57.3%), followed by Indians (21.1%), Chinese (16.2%) and Others (5.4%). Almost one quarter of respondents (25.4%) have completed higher secondary school or MCE/SPM academic qualification followed by lower secondary schooling or SRP/PMR qualification (24.3%), 14.6 percent had a diploma and only 11.9 percent had a degree. In contrast, only 1.1 percent of total respondents had post-graduate degree. Meanwhile, a large proportion of respondents' spouses have completed lower secondary schooling (26.1%). As a result, majority of them are blue collar workers. Almost all (97.3%) households had one or two persons working. Distance of respondents' workplace was recorded as follows: below 3 km (23.4%), 3.0 – 5.9 km (18.1%), 6.0 – 8.9 km (4.6%), 9.0 – 11.9 km (9.9%) and 12 km and above (33.9%). Almost two-thirds (66.9%) of the tenant respondents paid a monthly rental of below RM500, while those for RM500-799, RM800-1099, and RM1100 and above accounted for 25.4 percent, 7 percent and 0.7 percent, respectively. The tenure of occupancy at the time of study was 22.2 percent for below 2 years, 25.4 percent for 2 – 3.9 years, 17.8 percent for 4 – 5.9 years, 17.8 percent for 6 – 10 years, and the remaining 16.8 percent have resided there more than 10 years.

Figure 1 presents reasons why the respondents were still renting a unit than to own one. A total of 72.5 percent of the respondents cited financial reasons while 14.1 percent wanted a unit near their workplace.

The plan to purchase a house whether it is new or a house that was occupied before may be influenced by various factors such as ethnicity, total household income and the affordability level. Table 1 verifies that there is almost no discernible difference in the proportion of tenants by ethnicity (Malays and Indians) in terms of affordability to purchase a house that is priced below RM150,000. However, a larger proportion of the Chinese could afford a house that is priced more.

Among the low income tenants, more ethnic Indians (28.6%) could afford a house that is priced between RM100,000 and RM150,000 as compared with 5.8 percent by Malays and 15.4 percent by ethnic Chinese.

For the middle income tenants, a large proportions of the Malays (59.2%) and Indians (54.6%) of the middle income tenants could afford a house that is priced between RM50,000 and RM150,000. The proportion for the Chinese is lower at 35.2 percent, likely contributed by the fact that a larger proportion of this group could afford houses priced over RM150,000.

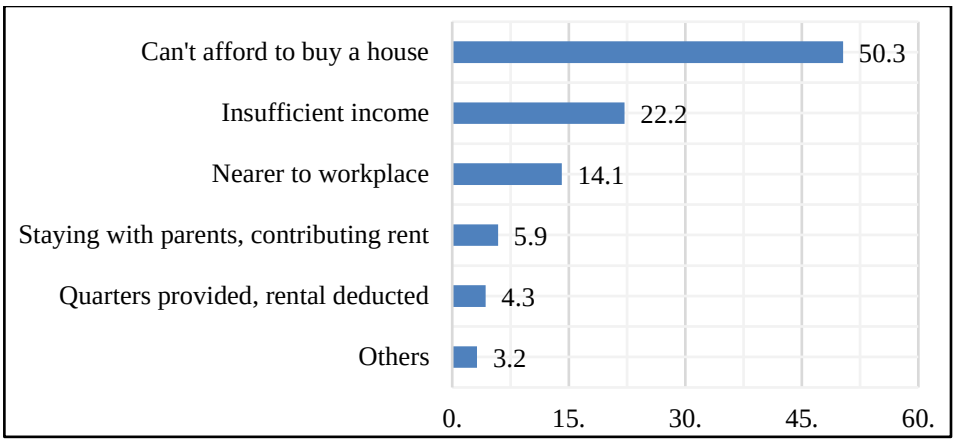

Figure 1: Reasons for residing in rented unit (%)
Note: "Others" include 'have not decided yet', 'intend to purchase unit elsewhere', and 'blacklisted by financial institution'

Table 2 displays affordable price according to household income. About 43 percent of respondents from low household income group (RM500-RM2,499) are likely to buy a house priced below RM50,000 only. On the other hand, the corresponding proportion of respondents for the middle income household is expectedly low at 13.2 percent. However, 42.9 percent of those from the middle income households (RM2,500-RM7,499) are able to purchase a house priced between RM100,000 and RM200,000. Only about 15 percent of the latter income group could afford a house priced RM200,000 and more. This confirms household income as one of the significant determinants of home ownership affordability, consistent with the findings of Duan (2011).

The analysis found that 72.7 respondents with only primary school education could afford to buy house at RM50,000 and below. Meanwhile, 80.0 percent of respondents with SRP/PMR certificate could afford a house below RM100,000, followed by 89.4 percent of respondents with MCE/SPM certificate could afford a house valued at RM150,000. All respondents who had Form Six/STPM qualification could afford houses below RM150,000. Among those who have a degree, it is noted that 90.9 percent of respondent could afford a house at a higher ceiling up to RM300,000. This illustrates that the higher the educational attainment, the higher the affordability level for a house of their choice.

Table 1: Affordable price of house by ethnicity

Affordable Price of House (RM)	Ethnicity				Total N (%)
	Malay	Chinese	Indian	Others	
Households: Both Low and Middle Income					
< 50,000	28.3	26.7	33.3	10.0	52 (28.1)
50,000-99,999	40.6	16.7	28.2	30.0	62 (33.5)
100,000-149,999	16.0	16.7	28.2	30.0	36 (19.5)
150,000-199,999	8.5	23.3	10.3	10.0	21 (11.4)
200,000-249,999	1.9	10.0	-	-	5 (2.7)
250,000 and above	4.7	6.7	-	20.0	9 (4.8)
Total N (%)	106 (100.0)	30 (100.0)	39 (100.0)	10 (100.0)	18 (100.0)
$\chi^2 = 27.83$, df = 15, $p \leq 0.05$, significant					
Households: Low Income only[a]					
< 50,000	42.3	53.8	39.9	100.0	40 (42.6)
50,000-99,999	48.1	15.4	28.6	-	36 (38.3)
100,000-149,999	5.8	15.4	28.6	-	13 (13.8)
150,000-199,999	3.8	15.4	3.6	-	5 (5.3)
200,000-249,999	-	-	-	-	-
250,000 and above	-	-	-	-	-
Total N (%)	52 (100.0)	13 (100.0)	28 (100.0)	1 (100.0)	94 (100.0)
Households: Middle Income only[b]					
< 50,000	14.8	5.9	18.2	22.2	12 (13.2)
50,000-99,999	33.3	17.6	27.3	33.3	26 (28.6)
100,000-149,999	25.9	17.6	27.3	11.1	23 (25.3)
150,000-199,999	13.0	29.4	27.3	-	16 17.6)
200,000-249,999	3.7	17.6	-	-	5 (5.5)
250,000 and above	9.3	11.8	-	22.2	9 (9.9)
Total N (%)	54 (100.0)	17 (100.0)	11 (100.0)	9 (100.0)	91 (100.0)

Note: For *a* and *b*, the income categories are retained for easy comparison, but χ^2 estimates are withdrawn due to excessive empty cells.

Table 2: Affordable price for a house by monthly household income

Affordable Price of House (RM)	Household Income (RM)				Total N (%)
	500-1,499	1,500-2,499	2,500-4,499	4,500-7,499	
Households: Both Low and Middle Income[a]					
< 50,000	46.2	41.2	16.9	3.8	52 (28.1)
50,000-99,999	34.6	39.7	33.8	15.4	62 (33.5)
100,000-149,999	15.4	13.2	27.7	19.2	36 (19.5)
150,000-199,999	3.8	5.9	10.8	34.6	21 (11.4)
200,000-249,999	-	-	3.1	11.5	5 (2.7)
250,000 and above	-	-	7.7	15.3	9 (4.8)
Total N (%)	26 (100.0)	68 (100.0)	65 (100.0)	26 (100.0)	185 (100.0)
$\chi^2 = 59.8$, df = 15, $p \leq 0.01$, significant					

	Low Income Households	*Middle Income Households*	
< 50,000	42.6	13.2	
50,000-99,999	38.3	28.6	
100,000-149,999	13.8	25.3	
150,000-199,999	5.3	17.6	
200,000-249,999	-	5.5	
250,000 and above	-	9.9	
Total N (%)	94 (100.0)	91 (100.0)	
$\chi^2 = 39.2$, df = 15, $p \leq 0.01$, significant			

Level of Home Ownership Affordability among Tenants

Table 3 shows that the level of home ownership affordability between low and middle income tenants is, as expected, different.

Table 3: Affordability level between low and middle income households

Description	Low Income Households	Middle Income Households
Affordable Price (RM)	100,000 and below (80.9%)	100,000 - 200,000 (42.9%)
Affordable Deposit (RM)	5,000 or below (78.7%)	10,000 or below (81.3%)
Affordable Monthly Housing Loan Payment (RM)	500 or below (81.9%)	Below 800 (81.4%)

Source: Survey results

Perception of Government Policy in the Provision of Affordable Housing

Data available from the study show that almost three quarters of respondents (73.5%) were still dissatisfied with the performance of the government on public home ownership. The respondents were unsure (46.5%) whether the National Housing Policy could bring house prices down in the future. This study shows that the government policy is still unsuccessful on the provision of affordable housing as viewed by the respondents. It also reflects that 16.5 percent of the middle income households and 14.9 percent of the low income households feel pessimistic that "National Housing Policy will force house prices to decrease in the future". Furthermore, 27.5 percent of the middle income households agree that the government's housing policy was ineffective on home ownership in urban areas. These distributions show some extent of discomfort with the ability of the government in handling the provision of affordable housing.

Factors Affecting Home Ownership Affordability

We used 14 statements to explore factors influencing home ownership affordability premised on perspectives of neoclassical economic and neoliberal theories. They are housing price, household income, daily expenditure, interest rates, monthly instalment, housing loan, economic crisis, public amenities, transportation, network, nearby workplace, supply affordable housing, perception of National Housing Policy, government policy and enforcement.

The employment of a factor analysis using the principal component model in this analysis reduced these variables into several key factors using orthogonal rotation (Hair, Black, Babin, & Anderson, 2010). Although Field (2005) suggested critical factor loadings to be 0.4, we set a higher critical factor loading at 0.5. Four factors were produced – labelled as Affordable Mortgage Loan (monthly instalment, housing loan, household income, daily expenditure and fear of economic crisis); Housing Price (enforcement, interest rates, housing price and supply affordable house); Proximity to Workplace (nearby workplace, transportation network and public amenities) and Government Policy on Affordable Housing (national housing policy and government policy).

In real terms, Affordable Mortgage Loan allows an individual to submit an application for a loan, and once approved, he/she worries whether he/she can afford to pay the monthly housing loan instalment. This behaviour which focuses on affordable mortgage loan is as predicted by neo-classical economic theory. Meanwhile, on Housing Price, people complain that they could not afford to buy a house due to constant increases in house price as the latter is determined by the market forces causing the poor to remain being tenants. The neoliberal theory widely applies in the Malaysian housing market.

Proximity to Workplace, contributes to home ownership affordability because people prefer to stay in places nearby their workplace, public infrastructure and facilities to save time and cost. The final factor Government Policy on Affordable Housing, relates to the Ministry of Housing and Local Government and Ministry of Finance which are directly involved in addressing the problem of housing affordability. Nevertheless, according to neoliberal theory, the government should stay away from intervening in the market. On the contrary, the Malaysian government attempts to assist the low income group to own a house through national housing policy and applies minimal intervention in the upper band of housing industry (Wan Abd Aziz et al., 2014). Private developers are not keen to produce housing units for the low income people as they gain too little from it.

CONCLUSION

In conclusion, the finding shows that a large proportion of the middle income tenants in Kajang could afford to buy house priced at RM100,000 to RM200,000, while the majority of low income tenants could only afford a house price less than

RM100,000. These are still difficult to find due to the high housing prices in Kajang contributed by its proximity to Kuala Lumpur and Federal Government Administrative Centre of Putrajaya. Meanwhile, they still prefer to be tenants at Kajang due to proximity to their workplace. This somewhat mirrors the finding of Cox and Followill (2018) whose exploration of historical data in few US cities found that home ownership is not always the best decision. Furthermore, they also worry whether they can afford to pay the monthly housing loan instalment once they secure a loan. With these compounding reasons, they are most likely to continue to stay in rental homes than to buy a house at current scenario. But, being a tenant does not free them from rises in the rental rates.

Although the government has implemented various programmes and activities to ensure the people, especially urban low income group, have access to housing market, there exists a serious impurity in the imbalance between demand and supply of housing units. Home ownership affordability cannot be solved just by giving subsidy or zero deposit to purchase a house. It is because owning a house does not just involve the payment of deposit but also involves the commitment to monthly instalments for the next 25 years or so, involving the burden to commit about one-third of their income. Thus, buying a house and the ability to hold on to home ownership are two different things. Then comes the need to commit a deposit for the unit. Providing a low public assisted interest rate for their housing loan may help.

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NOTES TO CONTRIBUTORS AND GUIDELINES FOR MANUSCRIPT SUBMISSION

INTRODUCTION

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