

JOURNAL OF THE MALAYSIAN INSTITUTE OF PLANNERS

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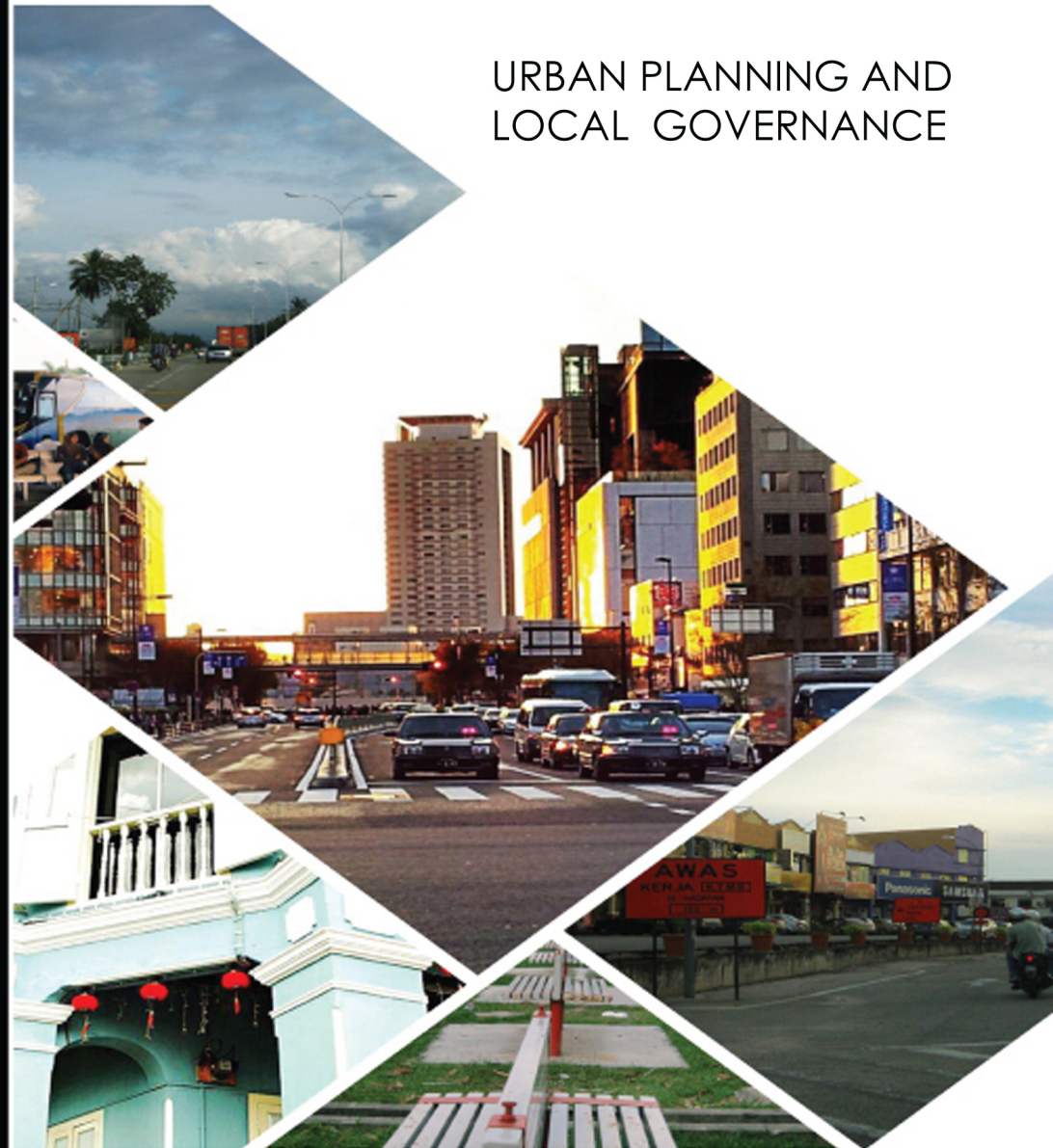
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“Whoever travels in search of knowledge is on Jihād until he returns”
(Transmitted by Tirmidhi & Darimi)



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PREFACE

Urban planning is a broad spectrum of subjects covering technical, social and political processes concerning with the control of the use of land and design of the urban environment. Local governance similarly extends its realm into areas such as urban management, institutional and capacity building, legal and regulatory mechanisms as well as accountability and transparency in the undertakings at the lowest level of administration. In view of these two research areas, diverse elements such as solving environmental issues through technical know-hows, coastal area management towards sustainability, speedier and smoother public services deliveries through the application of Information and Communication Technology (ICT) and community decision and governance, form parts of this book. Cities experiencing persistent problems such as increasing population, multiplicity in number of cities, air and noise pollution and traffic congestion have attracted many urban planners to come out with innovations and creative solutions to counter measure the effects of cities' dynamisms.

Local governance in Malaysia is expected to encounter many issues extending from the residential and community facilities allocation, threatened coastal areas' management, public services delivery enhancement through Information and Communication Technology (ICT), legislative and regulative issues surrounding local governance, local economic generation through tourism promotion, to the more detailed climatic mapping and road geometrical design to resolved more specific localised issues. This edited book has addressed the above mentioned urban planning and local governance subjects in the eight chapters that it contains. The authors of chapter 1 explore the technical approaches of geospatial in a localised context. Urban governance resilience is mapped for the purpose of demarcating the urban morphology.

The authors of chapter 2 have adopted a more fiscal and financial approach towards managing a degrading coastal area. In light of sustainable governance, the authors have managed to quantify various aspects of threats to sensitive coastal areas. In chapter 3, the authors focused on the application of ICT in public services delivery mechanism. E-payment deployments in the case studies of Majlis Bandaraya Shah Alam and Majlis Daerah Kampar have been cited as successful deliveries of local government services. Chapter 4 investigated the concept of satisfaction from the perspective of residential dwellers. The authors elaborated, quantified and analysed empirical evidences of satisfactory living conditions and environs.

In chapter 5, the authors retrospectively reflected on the legal and institutional setting of various legislation related to urban planning and local governance. Historical setting and chronological development of each enactment processes are cited and discussed in great detail. The authors in chapter 6 discussed the positive impacts of tourism activities and expenditure on the local communities. Both direct and indirect benefits and economic impacts are quantified to model the actual community receipts from these travel and expenditure patterns. The case study of Melaka, a UNESCO world heritage site has been exemplified.

In chapter 7, the authors mapped the changes in urban climate adopted in land use planning through the use of Geographic Information System (GIS). They reviewed such deployment in various planning documents and the effectiveness of such practices in the contemporary urban governance practice.

Finally, at a localised context, the road geometric design has been investigated against the effectiveness of regulating speed on the arterial road by the authors of chapter 8. They concluded that whilst this regulation is purposively for discouraging the negative behaviour among drivers, effectiveness levels depended on the siting and location of such provision and strict adherence to the designs guidelines.

In the end, it should be mentioned that although the eight chapters have addressed the important issues, directions and challenges of governing urban centres at the lowest level of administration through effective urban planning, these do not provide a complete spectrum of urban studies, implying that local governance is a derived part of sustainability, hence, it is a multi-faceted and continuous process.

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Kuala Lumpur, November 2014

MESSAGE FROM THE PRESIDENT

Dear Readers,



The publication of this journal is one of the many activities undertaken by the Malaysian Institute of Planners (MIP) to propagate knowledge and information pertaining to research in town planning to its members as well as the public. This Journal provide a platform for town planners and researcher to write articles that could contribute to the advancement of theory and practices in urban planning and its related field. This year, MIP is once again proudly to produce its Third Special Issues, volume 12th, 2014. Eight related titles to urban planning and local governance were written by a group of experts from IIUM and UM.

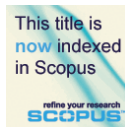
In meeting the challenges in today's built environment, the Journal has managed to produce quality reviewed articles that discussed various discipline within the ambits of town planning, highlights its issues and propose solutions closely related to sustainability and best planning practices. The need for good governance and quality decision making process is essential and it is hoped that the articles in this Special Edition issues are able to provide inputs and provoke thoughts towards better planning for our country.

Urban and Regional Planning is very broad based subject that covers technical and political process concerned with the control of the use of land and design of the urban environment, including transportation networks, provision of public facilities, housing, GIS, tourism and others dimension of town planning, in order to guide and ensure the orderly development of settlement and communities. The wide ranging topics in urban planning reflect the various dimensions of sustainable cities and urban planning that is holistic and comprehensive. Thus, I hope this issue provides a better insight to all readers of the broad dimensions that urban or town planning has and the role of town planners play in growth and development of the nation.

Apart from the MIP's contribution to the planning circle, Planning Malaysia is also extended to various planning related organizations, institutions of higher learning as well as to all members of the institute. We will extend the circulation of this journal to non-planning related organizations, institutions and professionals that has direct and indirect role in planning within and outside the country. Finally, I would like to extend my congratulation to the journal's Editor-in-Chief, Professor Dato' Dr Mansor Ibrahim and his team for this Special Issue No.3, Twelve Edition publication and my appreciation is extended to the team of writers and contributors from various institution of higher learning whose contribute from the first inception of this Journal in 2003 until today. I hoped that the dedication and continuous support from town planners to this Institute will continue and strengthen in future.

Thank you and happy reading.

Md Nazri Mohd Noordin
PRESIDENT
(2013-2015)



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GEOSPATIAL TECHNOLOGY APPROACHES IN URBAN MORPHOLOGY FOR RESILIENT URBAN GOVERNANCE

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Abstract

This study analysed the potential of applications of geospatial technology in urban planning research in urban morphology. Urban morphology is the study of the form of human settlements and the process of their formation and transformation. It is an approach in designing urban form that considers both physical and spatial components of the urban structure. This study was conducted in Georgetown, Penang with the main purpose to identify the evolution of urban morphology and the land use expansion using remote sensing images and Geographical Information System (GIS) technique. Four series of temporal satellite SPOT 5 J from 2004, 2007, 2009, and 2014 were used to detect an expansion of land use development using change detection technique. Three types of land use were identified, namely built-up area, unbuilt-up area, and water bodies with a good accuracy of above 85%. The result showed that the built-up area significantly increased due to the rapid development in urban area. Finally, the result provided an understanding and strengthened the relationship between urban planning and geospatial applications in creating sustainable and resilient city and future urban governance.

Keyword: Urban morphology, GIS, Remote sensing, urban planning, urban governance

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INTRODUCTION

Approximately half of the world population is living in urbanised area, and that number is about to rise in the next decade. Therefore, improving our knowledge on urban pattern and its dynamics at multiple spatial scales is a real challenge for research especially in achieving resilience in urban governance. The understanding of urban growth and interpretation of urban morphology can be a key challenge to the rapid urbanisation of the settlements (Cheng, 2011). Urban morphology is an approach in designing urban form that considers both physical and spatial components of the urban structure (Bentley & Butina, 1990; Paul, 2008). The criteria for evolutionary process of development at a particular city, such as plots, blocks, street layout, buildings, urban material, and open spaces, are considered as part of the history.

From the view of classic concepts that develop by M.R.G Conzen which known as pioneer in urban morphology, he divided urban form into three part which are first, town plan, secondly is building fabric and thirdly is land and building utilization (Whitehand,2007). This concept have become important as a process of urban development and provide an understanding on urban morphology Moreover, urban morphology can change over time as new urban fabric is added and as the existing fabric is internally modified. The changes of internal components are major concerns that represent the interrelation of physical evolution such as economic, cultural, and political dimensions that are associated with urban dynamics (Rashed et al., 2005).

The urban morphology analysis can be performed by using geographic information system (GIS) and remote sensing technique. These techniques can reveal the relationships among patterns, trends, forms, and structures of urban settlements. These techniques also help investigate the past and present patterns and trends of urban growth. Morphological analysis makes it possible to summarise the changes and trends of urban spatial structure and urban form. As a result, urban morphology analysis requires multitemporal datasets covering the whole urban area across a long period. Stimulated by rapid advances in geospatial technologies, high-resolution remotely sensed imagery has become widely available and at a low cost. These advances have made monitoring urban growth possible, and the availability of multiple temporal datasets has very much been improved recently (Liu & Zhou 2005, Xian & Crane 2005). Multitemporal analysis is a kind of spatial analysis and model using multitemporal datasets.

Liu and Zhou (2005) report a land use change trajectory analysis method based on multitemporal imagery, and further apply this method for the prediction of urban growth into the future.

Satellite imagery with different spatial resolutions is a real opportunity and is a very relevant data source in this domain. Remote sensing is widely known among urban planners, city planners, and policy makers as a useful tool for extracting biophysical information about urban environment including land cover and land use mapping, urban morphology description and analysis, vegetation distribution and characterisation, hydrography, and disaster relief. This tool is also widely used in the field of natural resource exploration and management. However, little is known about the detection of the subtle relationships between physical appearance of urban landscape and socioeconomic conditions of the population. The data that are currently available from Earth observation systems present an opportunity to collect information about urban settlements at several scales and on several dimensions (Netzband & Jürgens, 2010, chap. 1), and urban population growth and problems will increase in relevance in the coming decades (Semler, 2006; Stow et al., 2007; Weeks, Getis, Hill, Gadalla, & Rashed, 2004). Therefore, it is important to demonstrate how remote sensing tools can contribute useful information to the study of cities and urban settlements. In this context, the objective of this study was to analyse an urban morphology based on urban pattern using integration of remote sensing satellite and GIS techniques in achieving resilience in urban planning governance. This study was performed on an urban area of Georgetown for calibration of feature selection and classification.

STUDY AREA

The study was conducted in Georgetown, a historic city in the state of Penang. Comprises Penang Island and Georgetown, Penang is the heart of the metropolitan area, which is the second largest urban conurbation in Malaysia. The city of Georgetown was established in 1786 by the British and it is the first British port town along the Straits of Malacca. The city has more than 200 years of urban history. In this study, the urban morphology of Georgetown was analysed to understand the trends and patterns of urban form and the expansion of urban growth. The increasing intervention from high rise construction and new developments within the historic urban fabric has given some transformation and evolution in urban morphology of the city (Shuhana et al., 2012).

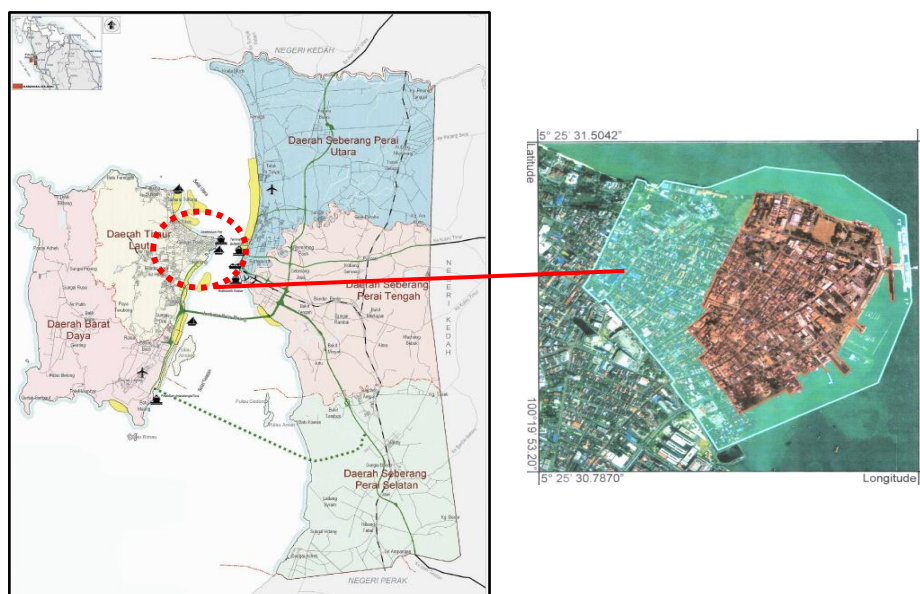


Figure 1: Key plan Georgetown in Pulau Pinang context (left) and study area (right) (Source: Structure Plan Pulau Pinang 2020 & Draft Special Area Plan Georgetown 2011)

URBAN MORPHOLOGY FOR RESILIENCE URBAN GOVERNANCE

Urban morphology refers to the form of human settlements and the process of their formation and transformation. This morphology occurs based on certain characteristics such as urban fabrics, natural and man-made structures, street layout, architectural complexity, urban materials, and human activities (Sharifah et al., 2013). These characteristics influence the changes in environment, economy, and social activities of the urban settlement. Besides that, urban morphology analysis can help identify the transformation of urban form development and the evolutionary of urban form and structure (Cheng, 2011).

Moreover, urban morphology plays a fundamental role in the resilience of urban system. In recent years, the challenge facing most of urban areas is how to accommodate future population and development growth in a sustainable manner. Any of transformation in urban patterns and forms should be taken seriously so that it will minimise the negative impacts

towards the environment. In some countries such as Granada, the environment of the city becomes physically degraded, damaged, or even destroyed by the impact of the urban development that follows modernisation. The main issues on urban morphology and planning are still poorly developed.

Thus, the significance of urban morphological study has yet to be realised amongst urbanists (Whitehand, 2004). Therefore, urban morphology study provides important knowledge to the planner in order to develop any area in a city or even for fringe belt. Lack of interest and awareness in history among the planners and others have prevented them from developing the settlements with systematic urban dynamics. Hence, the responsibility for the built environment is not taken seriously towards realisation of sustainable urban development. Therefore, urban planners need information to allow them to respond to the expectations and needs of the urban growth. The information can help forecast future model of urban settlements (Kalyani & Govindarajulu, 2013).

Urban morphology study can help in design control through policy. Due to deficiency in policy for design control, urban morphology study can be an important issue and can be considered in developing a method for expressing detailed design policies (Hall, 1997). The phenomenon of urban morphology on urban system can affect the economy, environment, climate, technology, and others of the entire city or even region. This urban morphology process can be a force that drives demand and change in the policies or strategies in order to shape sustainable and resilient urban form and structure. From this process, all agencies involved in city planning can structure the urban form into a systematic arrangement (Gillen, 2006).

Understanding the urban morphology in selected area helps decision makers identify the strong or potential asset in the area. In the context of this study, Georgetown is known as a heritage area due to numerous heritage buildings and living cultures. Public agencies and the local authority have taken initiatives to market this city's image to the world. These initiatives give benefit to the city's strategic planning and marketing, and give satisfaction and pride to the citizens (Ismail & Mohd-Ali, 2006). Besides that, culture diversity in Georgetown has a great contribution towards the morphology of the urban area. By having many cultures in the city, the government could play a role in implementing cultural policies to produce great urban transformation (Pereira & Nofre, 2011). Thus, the locals and international tourists would understand the morphology of different cultures in Georgetown that has been established since the ancient years.

There is historic and cultural significance worth of preservation for sustainable development in Georgetown. However, uncontrolled development has resulted in the building of new buildings and facades with old buildings sandwiched in between them. Therefore, initiatives should be taken to give life back to the historic city of Georgetown and to regenerate the area. Hence, guidelines and policies on urban conservation must be taken seriously by all parties such as the local authorities, Federal and State Governments, Department of Museums Malaysia, heritage trusts, and other professional bodies (Shahrul et al., 2013).

MATERIALS AND METHOD

Data and Ancillary Information

Data were collected from primary and secondary sources (see Table 1) such as maps and satellite imagery. Land use map of Georgetown and satellite images from Spot 5 J were used in this study. For Spot 5 J, four satellite images (nominally 2004, 2007, 2009, and 2014) were used in order to identify land cover changes in the study area.

Table 1: Materials and data used in this study.

Data Types	Year	Provider	Process	Output
Maps				
Land use map of Georgetown	2013	Jabatan Perancang Bandar & Desa (JPBD)	Digitize, coordinates	Map of Georgetown 2013
Satellite Images				
Spot 5 J	2004,2007,2009,2014	Agensi Remote Sensing Malaysia (ARSM)	Geometric correction, Enhancement, Classification	Land use and land cover map 2004,2007,2009 & 2014

Methods

In order to understand the dynamic phenomenon of urban morphology, the basic requirements are information on land use change, urban pattern identification, and computation of change detection. In this study, all this required information was compiled and converted to digital forms, and was readily used in both data processing in Digital Image Processing system and Geographic Information System. Two main Digital Image Processing

systems namely ERDAS Imagine and Envi were used in this study. ArcGIS software as the Geographic

Information System was also used to generate various thematic layers consisting of Georgetown's administrative boundaries, roads, contours, and administrative boundary map, using urban maps and other available maps. Overall, five scenes from Spot 5 J were used to analyse the land use change between 2004 and 2014. For all images, there were free clouds. Pre-processing was used to comprise a series of sequential operations including atmospheric correction or normalisation, image registration, geometric correction, and masking (e.g., for clouds, water, irrelevant features).

Change detection is the process of identifying differences of a feature or phenomenon in the state by observing the feature or phenomenon at different times. In remote sensing, it is useful in land use or land cover change analysis such as in urban morphology. In this study, the analysis of change detection was carried out. The analysis was used to identify the changes of land cover from 2004 to 2014. Using image differencing involves the subtraction of two images and the addition of a constant value to the result. The analysis of change detection develops an image differencing algorithm as the function, and creates a change detection image as an output. Thus, in this study, from the images, the expansion of the land use and land cover within 11 years was detected. The images were then classified into three namely built-up area, unbuilt-up area, and water bodies in GIS software of ARCGIS 10. The images were also assigned with different colour to differentiate the class to analyse the changes of land use respectively.

RESULTS AND DISCUSSION

Four images obtained from 2004 to 2014 were classified using supervised classification. The images were classified into three classes namely built up area, unbuilt-up area, and water bodies to identify the expansion of land use. The assessment of the classification was carried out based on the classified image in each processing. Table 2 below summarises the accuracy of the assessment of the classification process for each satellite image. An overall classification accuracy of over 85% was achieved during image processing.

Table 2: Accuracy Assessment for land use classification for the images

Satellite Images	Year	Accuracy (%)	Kappa Statistic
Spot 5 J	2004	95.00	0.9208
	2007	95.00	0.9200
	2009	93.68	0.8998
	2014	98.67	0.9776

Expansion of Land use (2004-2014)

The expansion of land use can be seen from 2004 until 2014. The images clearly showed that the urban development significantly increased. The expansion of the urban area was mostly towards the Strait of Malacca. The images showed that the town expanded inwards and there was also a series of reclamation extending towards Weld Quay as the new waterfront. Due to rapid changes in Georgetown, unbuilt-up area decreased, thus leading to an increase in the built up area with the increasing intervention from high rise construction and new developments within the historic urban fabric. Hence, these changes brought some transformation and evolution in urban morphology of the city (Shuhana et al., 2012). Figure 3 shows the development of land use in Georgetown.

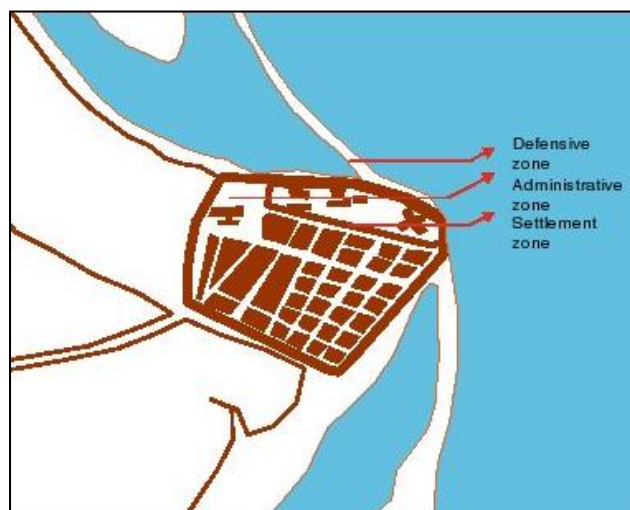


Figure 2: Temporal land use classification in Study Area obtained from SPOT J imageries

In Georgetown city, we can see the changes in urban morphology components namely building plots, street layout and open spaces. For the building plots, there are only three zone that invented by British authority which are defence zone, administrative zone and settlement zone.

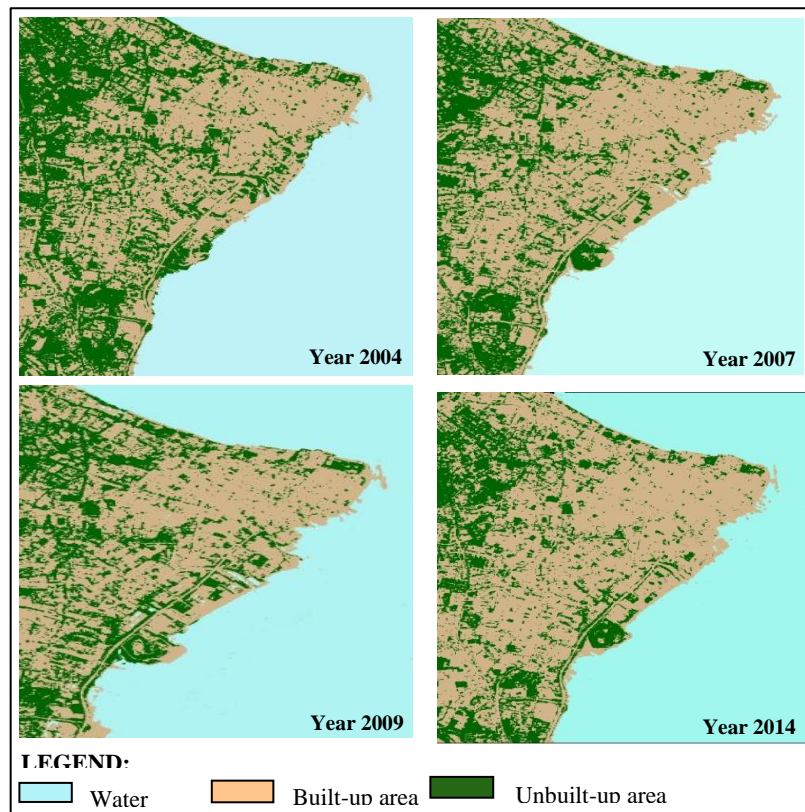


Figure 3: The earliest settlement of Georgetown with the implementation of unplanned gridiron concept.
(Source: Hassan, 2009)

Due to the development of Georgetown, building plots were increased in order to support the population of people that influx in this city. This lead to the foundation of the street settlement and layout. Every street layout represents different settlement from different religions and ethnicity. The direction of expansion land use or the encroachment of land use were inwards to the inner city of Georgetown and the building plots become more complex when the trading activities become successful.

Moreover, the street layout can be categorized according to the background of the people that living in the street. The zones are as below and shown in Figure 4:

1. Zone 1: Indian Muslim Settlement
2. Zone 2: Chinese Settlement
3. Zone 3: Malay Settlement
4. Zone 4: Indian Hindu Settlement
5. Zone 5: Commercial Area

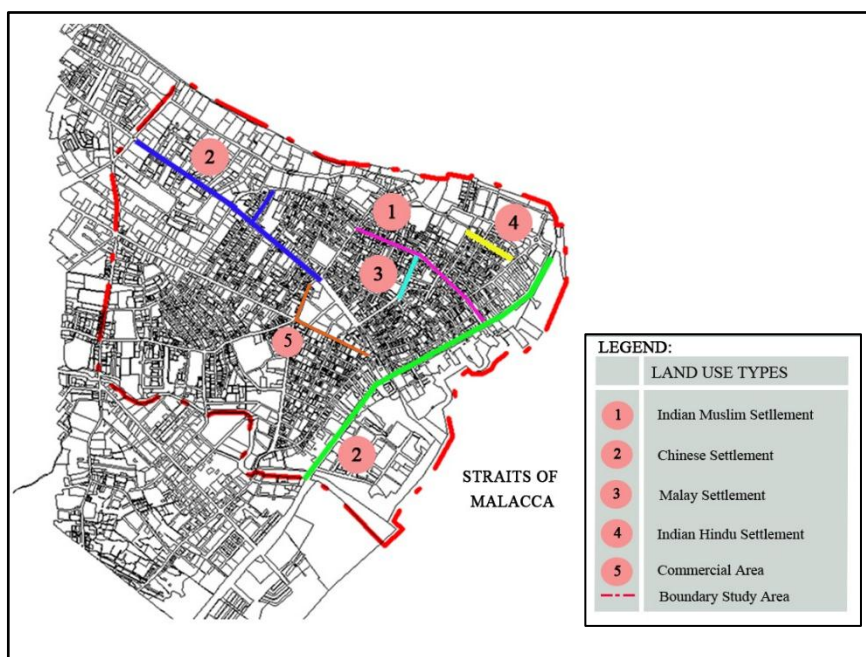


Figure 4: Distribution of street layout settlement

Only religions and ethnicity background can only be traced based on the people around the street, types of shop, types of goods sold and architecture buildings during site observation.

Burke and Ewan (1999) stated that open space contributes the quality of life to the people. Thus, there are four area that served as open space for public in this study area which are:

1. Esplanade
2. Taman Kota Lama
3. Taman Penyayang
4. Padang Brown

During British colonial, Esplanade was the first colonial open space in the city. The esplanade is associated with the Fort Cornwallis and adjacent to the colonial government buildings. The activities occur at Taman Kota Lama and Esplanade significantly contributes to the visual and sensory experience of Georgetown's townscape.

However, in study area, there are only four open spaces that can be access by public. Therefore, the development of Georgetown city is not well balanced with the existing of open spaces. With the minimum numbers of open spaces, it will give negative impact to the community in order to have social interaction with others people. It would give problems to people to travel far from their home for only to do recreational activity.

CONCLUSION

In this study, the process of development occurring in the metropolitan area, city, town, or village was examined. The study gave basic understanding on how the settlements faced the evolution of development in terms of urban forms and urban spatial structure. Moreover, traditional urban theories investigate how cities develop and grow through systematic interactions of infrastructure, people, and economic activities. With given advances in technology and the sheer scale and pace of contemporary urban growth, the most rapid changes in urban form, pattern, and structure are taking place where historical roots are weakest as in the recent suburbs of long established Western cities, or in the new cities of developing countries. That is how the significance of urban morphology replaces or improves the weakest area to become a more urban dynamic area. The advancement of geospatial technology in studying the urban morphology such as GIS and remote sensing shows that it will help in dealing with spatial problems such as urban planning and management issues. The technology is useful in assisting planners, decision makers, and the community to efficiently respond to challenges, plan successful future, and improve service delivery (Narimah, 2006). In short, GIS and remote sensing should play more roles in managing, monitoring, and planning land use development in Malaysia. This study could give many parties such as planner, architect, and local authority

an incredible capability in decision making processes such as planning, policy making, and legislating law.

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SUSTAINABLE GOVERNANCE IN RELATION TO THE FINANCIAL ASPECT IN MANAGING COASTAL AREAS: MALAYSIAN EXPERIENCE

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Abstract

Managing natural resources sustainably is essential in this contemporary era of land use planning system. This includes managing and planning the invaluable of coastal areas. In this regards, coastal management programmes have been regarded as a key approach in delivering the coastal strategies and objectives towards achieving a sustainable coastal development worldwide. This is supported by the good governance to ensure that the implementation of coastal development is successful. As such, this paper suggests that the aspect of good governance as one essential element of coastal management that can and should make a substantial contribution to planning and managing coastal land uses in Malaysia. It has many positive implications to the environmental, social and economic sectors. The experience of Lembaga Urus Air Selangor (LUAS) in managing the coastal areas via the implementation of good governance indicates the requirement of good governance in ensuring a successful coastal management. In addition, financial element has become a significant attribute in implementing coastal management initiatives. This study offers input in planning literatures by addressing the integration of coastal management, good local governance, land use planning and financial elements which are very relevant with today's current global changes on environment as a whole.

Keyword: governance, coastal management; financial; town planning; land use; sustainable.

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INTRODUCTION

Speed is an important measure to evaluate safety of the road network. Speed is also an important transportation parameter because other than safety, it relates to time, comfort, convenience, and economics. According to Currin (2001), high speed carries high risk, whereas low speed is relatively safe. Traveling at a speed more than the speed limit is not recommended, as it could cause the drivers to lose control of their vehicles and cause fatalities, especially at winding roads. In Malaysia, accidents on roads are linked with the problem of inconsistencies in the operating speed. Driving at above the speed limit, uncertain weather conditions and drowsiness of the drivers are the three main causes of fatal accidents during the festive seasons (The Sun, 2009). A number of issues may be relevant with respect to the road safety aspect of a development proposal and in particular speed of vehicles. A study by Moore et.al, 1995 has documented an extraordinary strong association between speed and road traffic crash risk, the odds ratio for speed in excess of 84 km/hour is being almost 40 times higher than that for speeds below 60 km/hour (Petridou and Moustaki, 2000). A number of research has shown that the safest groups are the vehicles travelling at or below the 85th to 90th percentile speeds. A research by Elvik, et.al, 2004, has found that there is a very strong statistical relationship between speed and road safety and it is difficult to think of any other risk factor that has a more powerful impact on accidents or injuries than speed. The statistical relationship between speed and road safety is very consistent as when speed goes down, the number of accidents or injured road users also goes down in 95% of the cases. When speed goes up, the number of accidents or injured road users goes up in 71% of the cases (Elvik, et.al, 2004).

The U.S. Federal Highway Administration in 2005 has declared that nearly 30% of fatal vehicle collisions every year in the United States were taken place on curve alignment of the roads. About 83% of these crashes on winding roads were due to roadway departures from sliding, skidding or rolling over. All the causes, as mentioned above, for the vehicles which are running off the road namely sliding, skidding and rollover were caused by negotiating the curve at a very high speed. On the other hand, in Denmark, about 20% of all personal injury accidents and 13% of all fatal accidents were occurred on curves in rural areas; and in France, over 20% of fatal accidents on dangerous curves in rural areas (Herrstedt and Greibe, 2001).

The reason for the accidents is the same as indicated earlier, where the drivers were negotiating the curve at a very high speed. In China, according to the accidents database by the Chinese Ministry of Transportation in 2009, 26,292 road accidents were occurred on curved roads accounting for about 10% of the total accidents in 2008. Additionally, 9,070 people were died and 36,112 people were severely injured in these accidents. The main cause of these accidents, again, is due to excessive vehicle speed (Chen et.al.). In a simple sense, these kinds of accidents were happened at road curves because of inappropriate speed of vehicles, traveling at a speed higher than the speed limit along that particular road. However, the inappropriate-speed theory can be applied to straight road as well, where drivers have the tendency to press the accelerator and generally increase the speed because of a greater feeling of well-being and sense of familiarity of the road, consequently increasing the accident risk. A survey conducted by Collins (2008) has identified, drivers, on average, would drive faster on a straight open road, followed by a straight road in bad weather, a bendy open road, a bendy road in bad weather, a straight road in the dark and, finally, a closed bendy road. Nonetheless, it is also shown that speed limits, if suitably selected, can help to reduce the speeds thus reducing the accident rates (Hobbs and Richardson, 1967).

In a nutshell, it is evident that there is a clear relationship between changes in speed and changes in road safety: the larger the change in speed, the larger the impact on accidents or accident victims. In relation to this statement, it can be seen that road geometrical design also has some influences towards the speed of vehicles, thus explaining about the close relationship between road geometrical design, speed, and road safety. This paper focuses on the relationship between speed of vehicles and road geometrical design, and explains how different road geometrical design can influence the speed of vehicles. This paper describes the measurement of speed characteristics of the vehicles at a specified location under free-flow traffic conditions prevailing at the time of the study.

LITERATURE REVIEW

Spot Speed

In moving traffic stream, each vehicle travels at a different speed. Thus, the traffic does not have a single characteristic value, but rather a distribution of individual speeds. Speed is generally qualified according to three main types: i) Spot speed, ii) Running speed, and iii) Journey speed.

Spot speed is speed at a certain spot on one part of road at certain time (Mohamed, 1993), defined as the average speed of vehicles passing a point. Spot speed study is designed to measure the speed characteristics at a specified location under the traffic and environmental conditions prevailing at the time of the study. According to Khanna (2001), spot speeds are affected by physical features of the road for example pavement width, curve, sight distance, gradient, pavement unevenness intersections, and roadside developments. Other factors that could influence spot speeds are environmental conditions (like weather, visibility), enforcement, traffic conditions, driver, vehicle, and motive of travel.

The above statement is supported by Hobbs (1967), where he wrote that measurements of spot speeds show a wide distribution and many interacting circumstances serve to determine the particular speed which individual drivers adopt. These circumstances will include those peculiar to the driver himself (such as his psychological and physiological traits); those concerned with his immediate environment and those affected by the more remote environmental considerations of law enforcement, type of district, and public opinions. Mohamed (1993), Khanna (2001), and Hobbs (1967) further explained the main elements of immediate environment are type of vehicle, road alignment, cross section and surface, weather, speed limits, and volume. As we can see, there are several elements that are repeated, which shows that the authors have agreed on the common elements that could influence spot speed.

Mohamed (1993) and Garber (2001) have cited that spot speed data can be used for certain purposes. It includes, but not limited to:

- a. Establishment of parameters for traffic operation and control and determination of existing roadway speeds, such as speed zones, speed limits (85th percentile speed is commonly used as the speed limit on a road), passing restrictions, and prioritisation of speed enforcement locations;
- b. evaluate the effectiveness of speed enforcement programs such as use of different speed limits for passenger cars and trucks;
- c. evaluate, identify or determine the adequacy and speed impact of roadway geometric characteristics, including horizontal and vertical alignment and general roadway features;
- d. identify whether the roadway is in need of greater law, enforcement, or reconstruction;
- e. determine speed trends and impact of traffic control devices (traffic signs, pavement markings, signals etc.);
- f. evaluate the effects of speed on highway safety through the analysis of crash data for different speed characteristics; and
- g. provide evidence to support or refute complaints of excessive speed.

In conducting the spot speed study, the suitable place and time for conducting this study are the important elements to be considered. According to Mohamed (1993), before placing the equipment and enumerators, researchers should search for a suitable site to conduct the study. Based on the objectives of the study, among the sites that are often selected as study site are highway or road that is straight, even and wide; road segment that is located between two junctions in urban area; road accident site or area where signboard is proposed. In terms of the suitable time to conduct the spot speed study, Mohamed (1993) has suggested the time between 9.00 a.m. to 12.00 noon; 3.00 p.m. to 6.00 p.m.; and 8.00 p.m. to 10.00 p.m.; study duration of one hour and; at least 50 vehicles as samples.

Road Geometrical Design

Ashley (1994) and Khanna (2001) stated that the required geometric design of highway depends on the speeds that vehicles are traveling. The speeds that are anticipated on the road are generally the basis for planning appropriate road alignment. Therefore, during the design stage, appropriate speed along the highways shall be determined in advance. However, Hong and Oguchi (2005) provided a contrast view stating that speed of traveling vehicles is dependent upon the geometric design of the highways. These statements highlight that both road geometrical design and speed of the vehicles have symbiosis relationship – i.e., both dependent upon each other. Ashley (1994) also stated that the geometric design parameters of horizontal alignment such as bends and straights should fit the functions of road. It was considered that straight roads are the safest and most beneficial of all but subsequently the opinion has shifted towards horizontal curvature can be beneficial as well, provided it is designed appropriately. An example of this is the introduction of bends in highway to reduce speeds, as long straight stretches of road may encourage undesirably high speeds whilst also contributing to loss of concentrations due to monotonous alignment.

It is important to note that, when assessing the acceptability of the geometry of an existing highway, the design standards related to the 85th percentile speed should be relevant. For example, if a highway has a speed limit of 90 km/h, but it is considered that the actual 85th percentile speed is greater than 90 km/h, then the required geometry should be assessed in relation to the higher observed design speed. It should always be remembered that the underlying factor for the standards of road geometry is highway safety (Ashley, 1994). Consequently, the vehicles observed in the lower 15 percent are considered to be traveling unreasonably slow and those observed above the 85th percentile value are assumed to be exceeding a safe and reasonable speed (Texas Department of Transportation, 2012).

In this regard, road geometry shall be designed to suit the needs of it, and speed is one of the main elements that must be taken into consideration as road geometry and its design influence speed. Currin (2001), Ashley (1994) and Hobbs (1967) agreed that speeds may vary, but it depends on several factors that might affect it such as:

- a. general variables – time, date, weather conditions, highway classification, lighting conditions etc.
- b. road users – drivers, journey purpose, travel mode etc.
- c. vehicles – type, make, year, vehicle conditions, external and internal features etc.
- d. road environment – traffic control, traffic conditions, road design features, road surface, adjacent land use, special consideration etc.

On the subject of traffic lane, both Bateman (1948) and Khanna (2001) agreed that the minimum width of traffic depends upon the width of the motor vehicles and lateral clearance between passing vehicles which is considered safe. Mannering (2005) also mentioned that when lanes are narrower, adjustment is needed because narrow lanes and obstructions close to the travel lane could cause the traffic to slow as a result of reduced psychological comfort and limits on driver maneuvering and accident avoidance options.

Highway Functional Classification

Highways are classified according to their respective functions and in terms of character of the service they are providing. Highways and streets are primarily described as rural or urban roads, depending on the areas in which they are located. This primary classification is essential since urban and rural areas have different characteristics, especially those that are related to type of land use and population density, which significantly influence travel patterns (Garber, 2001). Garber (2001) also mentioned that all highway systems involve a hierarchical classification by the mix of access and mobility functions provided. There are four major classes of highways which include:

- a. Limited-access facilities
- b. Arterials – principal arterials and minor arterials
- c. Collectors – major collectors and minor collectors
- d. Local roads and streets

For this study, only literatures related to arterial system are focused in this section. Arterials are the surface facilities that are designed primarily for through movement but permit some access to abutting land (Roess, Prassas, and McShane, 2004). One of the most significant characteristics of arterial roads is vehicles traveling at a speed 80 to 90 km/h. As listed by Garber (2001), arterials can be divided into two: major or principal arterials and minor arterials. The principal and minor arterials then can be divided into two more categories namely – for principal: urban principal arterial system and rural principal arterial system, and for minor, urban minor arterial system and rural minor arterial system (Garber, 2001). Urban principal arterial system is the system of highways serves the majority activity centers of the urban areas and consist mainly the highest-traffic-volume corridors. On the other hand, the rural principal arterial system consists of a network of highways that serves substantial number of interstate trips. Virtually all highway trips between urbanized areas and a high percentage of the trips between small urban areas are made on this system.

The urban minor arterial system includes streets and highways that are interconnect with and augment the urban primary arterials. This system serves trips of moderate length and places more emphasis on land access than the primary arterial system. As for the rural minor arterial system, Garber (2001) stated that this system of road boosts the principal arterial system in the formation of a network of roads that connects cities, large towns, and other traffic generators, such as large resorts. Travel speeds on these roads are normally higher than principal arterial system.

OBJECTIVES AND RESEARCH METHODOLOGY

Objectives

The following are the objectives of this study:

- i. To identify existing road geometrical design elements of straight and curved arterial road segments.
- ii. To evaluate the effects of road geometrical design of the selected road stretches on the speed of vehicles.
- iii. To compare spot speed of traffic stream at the selected road stretches.
- iv. To suggest measures in achieving stipulated speed limit by the road users.

Background of Study Area

The study area is a stretch of an arterial road namely KL Middle Ring Road (MRR2). MRR2 is a ring road that was built by Public Works Department to link neighborhood areas around Wilayah Persekutuan Kuala Lumpur-Selangor border. The spot speed survey station was located at two points as indicated by point A and Point B in figure 1. Point A is located at the curvature stretch of the road near Zoo Negara, and point B at the straight stretch of the road near a Petronas Petrol Station. Both points have the same road characteristics having three lanes in each direction measuring 3.5 m lane width and 10.5 m total width. The stretches of the selected road were dual carriageway and the road surface was asphaltic concrete.



Figure 1 Location of Spot Speed Survey Station

1.1 Sample Size and Sampling Method

The geometric design elements covered in this study include the horizontal curve, width of the road, and available lanes. Besides, the other physical aspects such as the width of road median, width of road shoulder, and road surface were also considered. On the other hand, the spot speed survey was conducted on 100 vehicles (which is the selected sample size) passing at a point at each of the straight and curved road.

Systematic sampling method was applied to ensure that the samples were appropriately selected to represent the population. Only passenger cars were selected as the target vehicle because they represent the predominate mode of transportation along the selected road and other roads. The systematic sampling method was applied by selecting the first vehicle randomly and then every 5th vehicle until the total sample size was reached. On average, the traffic volume on MRR2 was 180,000 to 200,000 vehicles per day (Ministry of Works, 2011). Data was collected during off-peak hour to measure the actual speed of vehicles during free-flow traffic.

1.2 Method of Data Collection

Data on roadway geometry such as horizontal curve, available lanes of the selected arterial road and road surface was observed. Pictures were taken to represent data on these elements by using a camera. Furthermore, the width of the road and its shoulder were measured using a laser distance meter device and a measuring tape. To measure spot speed, two points on the arterial road, one at the straight stretch and another at the curvature stretch were selected. In order to collect the data on spot speed, the enumerators have placed a radar gun at an appropriate location at the road side at a distance of minimum 10 meter from the selected vehicles. The radar gun was targeted at each selected vehicle to measure the spot speed of the vehicles.

1.3 Method of Data Analysis

The spot speed characteristics such as mean, median, standard deviation and percentile speed were calculated by using statistical analysis methods. T-test was used to test the statistical differences in mean speed of the vehicles at straight and curved stretch of the road. The calculation of t-test was conducted by using Minitab. Samples, mean, and standard deviation were filled in into Minitab prior to the calculation of the t-test.

2. RESEARCH FINDINGS

2.1 Road Geometrical Design Analysis

The road geometrical designs such as width and number of lanes were similar at the both selected road stretches. The width of the road is 10.5 meter with three lanes each direction, each measuring 3.5 meter wide. The width of this road is identical with that of the guideline requirements of an arterial road width (Ministry of Works, 2011).

For straight road, the width of each traffic lane is even. The road shoulder at the extreme left of the road is measured as 1 meter wide. The width of landscape and drainage reserve is 2.75 meter and 1.5 meter respectively (table 1). The median width of this road is 2.5 meter.

Similarly, the width of the curved road is also even for each of the three traffic lanes. The median is 2.5 meter wide. The width of landscape and drainage reserve is also 2.75 meter and 1.5 meter respectively. However, this road stretch has wider shoulder at approximately 3 meter. The normal, usable shoulder width that should be provided along arterial road is 3 meter (Ministry of Works, 2011).

Although both road stretches have no grades or vertical curvature, road with curvature, however, has superelevation. According to Ministry of Works, the maximum superelevation ratio that should be allowed for urban roads is 0.06. Generally, the main differences between the two road stretches are horizontal curvature, width of shoulder and superelevation (table 1). Other than that, the road stretches are similar in terms of road geometrical design.

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E-PAYMENT AT THE LOCAL GOVERNMENT LEVEL: A STUDY OF MAJLIS BANDARAYA SHAH ALAM AND MAJLIS DAERAH KAMPAR

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Abstract

Information and Communication Technology (ICT) adoption through the implementation of electronic government (e-Government) helps improve local authority's service delivery for the benefit of the community. Many of the local authorities have adopted the online payment method for the assessment rate collection. Despite the notion that e-Government increased productivity and improved efficiency, citizen's usage is still considered minimal and has been comparatively low especially in services involving transactional. This study investigates the factors influencing the usage of online payment method in local authority's assessment rate collection. Data for this study was collected through questionnaire, interview and document analysis. The findings showed that perceived usefulness, perceived ease of use, perceived risk, payment receipt issuance and income level seem to influence user's intention to adopt the online payment method.

Keyword: Urban morphology, GIS, Remote sensing, urban planning, urban governance

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INTRODUCTION

The advent of the ICT has revolutionized the way government works. The electronic government or the e-Government has shifted and transform the way government operates. According to the United Nations (2003), two interrelated phenomena contributed to the engagement of e-Government in the public service. First, the rapid globalization that opens up a more competitive products and services among nation. Second, the advancement of the ICT that offers new approaches in the betterment and improvement of service delivery that includes those provided by the local authorities to the communities under their purview. The e-Government today is seen not only as a vehicle to enhance public service delivery, but has increasingly shifted towards a public-centered development (United Nations, 2012). According to the latest report of the United Nations e-Government Survey 2012, the ICT and e-Government is dubbed as an important tool towards achieving a sustainable development for all (United Nations, 2012). The increasing number of e-Government implementation is evident throughout the world not only for public service delivery but also as a mean of interaction between government and citizens (Akman, Yacizi, Mishra, & Arifoglu, 2005; Gupta & Jana, 2003; Ndou, 2004; Ramlah, Nor Shahriza, Norshidah, & Abdul Rahman, 2007).

According to Tayib (2000), the application of ICT has been identified as an important factor that contributes towards an effective revenue collection system in the United Kingdom and the United States (as cited in Yurita Yakimin, Marlina and Mohamad Sharofi, 2005). In Malaysia, the government has put strong emphasis on the application of ICT in public service delivery. In 1997, following the launch of Multimedia Super Corridor (MSC), the government introduced the e-Government as a flagship application under the MSC with the objective to reinvent the government through connectivity and to spearhead the country into the Information Age (Malaysian Administrative Modernisation and Management Planning Unit [MAMPU], Prime Minister's Department, 1997). One of the e-Government key projects includes the electronic services (e-Services), aim to enable citizens to have 24-hours access through a one-stop service window such as online payment for utility bills.

In the Ninth Malaysia Plan, the government encouraged the local authorities to adopt the online payment system as one way to strengthen their revenue collection (Economic Planning Unit, Prime Minister's Department, 2006). With the e-Government initiative already in place, the assumption is that the assessment rate collection and payment should have

been a lot easier and convenient to both local authorities and rate payers alike. The aim of this paper is to investigate the factors that influence the usage of online payment method in local authority's assessment rate collection; with specific reference to two local authorities, Majlis Bandaraya Shah Alam (MBSA) in Shah Alam, Selangor and Majlis Daerah Kampar (MDKpr) in Kampar, Perak.

LITERATURE REVIEW

Local authority is the level of government that deals with the people the most and entrusted to administer local affairs with devolved powers (Ainul Jaria Maidin and Bashiran Begum Mobarak Ali, 2009). In dealing with the people on administrative matters and with the burgeoning of online interactions, it is only logical that these transactions should take advantage of the availability of the electronics communication (Norhaslina Hassan et. al., 2013). Studies conducted on the practice of e-Government in Malaysia found that in general citizen's usage is comparatively low (Maizatul Haizan, Mohammed Zin, Ali, Wan Idros & Mohd. Yusof, 2011; Siddique, 2008, United Nations, 2005). Among the factors that are established to be significant towards citizen's intention to use e-Government are trust, perceived usefulness, perceived relative advantage, perceived image, perceived ease of use and trust of the government (Ooh, Suhaiza, Ramayah & Fernando, 2009; Ramlah, Norshidah, Abd Rahman & Murni, 2011).

According to the United Nations' e-Government Survey, Malaysia's overall performance has not been encouraging and has been listed within the range of 30 to 45 in the survey ranking since 2003. In contrasts, the Republic of Korea has managed to position itself in the first rank in 2010 and 2012. Interestingly, the Republic of Korea was ranked 15th when the survey was first initiated in 2003, and has since shown extraordinary improvement. Its achievement is attributed to the government's ICT policy as outlined by the Ministry of Public Administration and Security (MOPAS) (Sung-mi, 2012). The Republic of Korea government has an ICT road map in place with the launch of the Smart e-Government Plan together with the Mid-Long Term Mobile e-Government Plan in 2011 to prepare themselves with the smart era of the information age. Earlier in 2010, the government of Republic of Korea passed the Personal Information Protection Law in its effort to protect personal data online. These are among the initiatives targeted by the Republic of Korea to achieve a world class e-Government via four strategic points (Sung-mi, 2012). First, the development of a targeted 917 mobile e-

Government services by 2015. Second, the establishment of a safe online environment through the protection of personal data information. Third, strengthening the peoples' support to realize an information-based society. Fourth, pushing for mutual growth information for the benefit of the public and private sector.

Earlier studies have identified factors that influenced the implementation of e-Government. The basic foundation of the implementation should be citizen focused in order to establish connectivity between the government and citizens (Bertot & Jaeger, 2006; Evans & Yen, 2006; Reddick & Turner, 2012; Shareef, Kumar, Kumar, & Dwivedi, 2011). Engagement with the citizens is done through the dispersion of technology, in most cases, the internet. Sandolval-Almazan and Gil-Garcia (2012) further assert that although e-Government diffusion is essential, citizen adoption is far more important to embrace the service. The standpoint is echoed by Helbig, Gil-Garcia and Ferro (2009) who found that many e-Government services has neither produced the intended results of a more efficient government nor an engaged participation by the citizens. Equally as important in the implementation of the e-Government is the usability. Venkatesh, Chan and Thong (2012) identify usability as one of the four key characteristics of transactional e-Government services. Based on the findings, the study recommended the need to recognize the preferences of various segment of users before executing the e-Government initiative. Another imperative factor that influences the implementation of e-Government is privacy and security. Now that the services are done electronically rather than manually, people feel more insecure with regards to their personal data and information especially involving financial transactions. As Yu, Hsi and Kuo (2002) pointed out; security becomes the main concern when people deal with online transaction because of the absence of direct contact between the sender and the receiver. He and Mykytyn (2007) stress that privacy and security issues might deter people from using online services especially online payment fearing that their account may be misused.

Four most relevant and numerous cited theories have been identified to present the ideas of previous research. The Diffusion of Innovation (DOI) theory is commonly used in research related to information system to determine user's acceptance towards new technologies. The DOI theory proposed that the rate of diffusion is influenced by five important characteristics of innovation: (1) relative advantage, (2) complexity, (3) compatibility, (4) trialability, and (5) observability (Lai & Rieck, 2005; Ooh et al., 2009; Ramlah et al., 2011;

Rogers, 2003). Ooh et al. (2009) observe that if the potential user experienced one of these factors to be inconsistent, the user is least likely to embrace the benefit of innovation. Although the DOI theory is widely used in studies related to e-Government, Shareef et al. (2011) argue that the theory is unable to capture the crux of citizen's behavior in adopting e-Government.

The Technology Acceptance Model (TAM) is widely used to study user's acceptance of technology (Carter & Belanger, 2005; He & Mykytyn, 2007; Maniam & Halimah, 2008; Ooh et al., 2009; Shyu & Huang, 2011). Similar to the DOI theory, TAM suggested that users who find it useful are more willing to adopt the technology. TAM featured two determinants that affect user's acceptance of technology: (1) perceived usefulness; and (2) perceived ease of use (Davis, 1989). The perceived ease of use refers to the free effort involved in applying the technology. The TAM attempted to investigate what drives user behavior, despite the cynicism that it can be a difficult task.

The Theory of Planned Behavior (TPB) suggested three variables that determine the intention and actual behavior of a person: (1) attitude, (2) subjective norms, and (3) perceived behavioral control (Ajzen, 1991). Hung, Chang and Yu (2006) had used the TPB as a model in their study on determinants of user acceptance of the e-Government services and found that subjective norms and perceived behavioral control are significant with adopters' intention not to use and to use technology, respectively. According to Maizatul et al. (2011), the Unified Theory of Acceptance and Use of Technology (UTAUT) is the latest and powerful theory to understand users' acceptance of Information System. Venkatesh, Morris, Davis and Davis (2003) claim that the UTAUT was able to explain 70 per cent of technology acceptance behavior, as compared to other models which normally explain only about 40 per cent of acceptance.

The review of literature above has demonstrated the various manners that people have adopted when dealing with the authority electronically and it is evidenced that more may need to be done to ensure that the public are comfortable and felt secured in these transactions. With the expanded network and the availability of smart devices, it is anticipated that more studies will be conducted on this subject matter especially at the local government level.

RESEARCH METHODOLOGY

This paper employs the interview method and administered questionnaire. The purpose of the interview with the officer in charge is to gather information about the implementation of the online payment method at MBSA and MDKpr. Subsequently, follow up on the data regarding the assessment rate collection is made through e-mail. The respondents for the questionnaire comprise of residents in the administration area of MBSA and MDKpr. Using the area sampling, areas in MBSA and MDKpr are clustered accordingly and questionnaires are distributed according to the clustered area to meet the most representation of the population. A total of 300 questionnaires were distributed in the MDKpr locality and another 300 in the MBSA locality. The entire questionnaire is composed of closed questions except for the last question which is open-ended. This is to allow respondents to freely comment on any issue related to the online payment method.

Of the 300 distributed questionnaires in the MDKpr locality, only 46 were returned, a response rate of 15 per cent. Three of the returned questionnaires have to be excluded because of incomplete answers. In the MBSA locality, 66 out of 300 questionnaires were returned, giving a response rate of 22 per cent. However, seven of them are not usable because of too many incomplete answers. The low response rate is likely to be caused by residents who are tenants and does not own the house. Tenants normally do not pay the assessment rate as the cost is borne by the house owners. The best of effort has been put to identify houses that indicate the resident as owner of the house.

RESULTS

The value of Cronbach's alpha for all four constructs exceed 0.7, a range that is deemed acceptable and reliable. Table 1 show that a majority of the respondent (35.3 per cent) is in the range of 41 – 50 years of age. A majority have a monthly income level of RM5, 000 and above (38.0 per cent). The survey shows that 82.4 per cent of respondents use the internet with 94.0 per cent of them has internet access at home. Among the internet users, they frequent the internet daily (69.0 per cent), suggesting a very active use of the internet among users.

Table 1: Demographic profile.

Variable	Frequency	Per cent	Variable	Frequency	Per cent
<i>Gender</i>			<i>Internet Usage</i>		
Male	69	67.6	Yes	84	82.4
Female	33	32.4	No	18	17.6
<i>Age</i>			<i>Internet Use Experience</i>		
Below 20	1	1.0	Everyday	58	69.0
20 – 30	3	2.9	A few times a week	11	13.1
31 – 40	25	24.5	A couple of times a month	4	4.8
41 – 50	36	35.3	Rarely	11	13.1
51 – 60	25	24.5	<i>Internet access at home</i>		
Over 60	12	11.8	Yes	79	94.0
<i>Income Level (Monthly)</i>			No	5	6.0
Below RM500	1	1.0			
RM500 – RM1,000	19	19.0			
RM1,001 – RM2,000	15	15.0			
RM2,001 – RM3,000	15	15.0			
RM3,001 – RM4,000	10	10.0			
RM4,001 – RM5,000	38	38.0			
Over RM5,000					

Additionally, the survey found that 42.4 per cent of respondents in MBSA preferred the online payment method. MBSA compared to MDKpr, offers a wider range of online payment method through eight banks: (1) Citibank, (2) Public Bank, (3) HSBC, (4) RHB Bank, (5) CIMB Bank, (6) Maybank, (7) MBF, and (8) UOB Bank. Figure 1 shows the assessment rate collection according to online banking preference. The majority of users preferred using online payment by Maybank followed by MBF and Citibank. It is assumed that the wider range of online banking offered by MBSA gives a broader choice for users to adopt the online payment method since it is more flexible for those having different bank accounts to make the payment online.

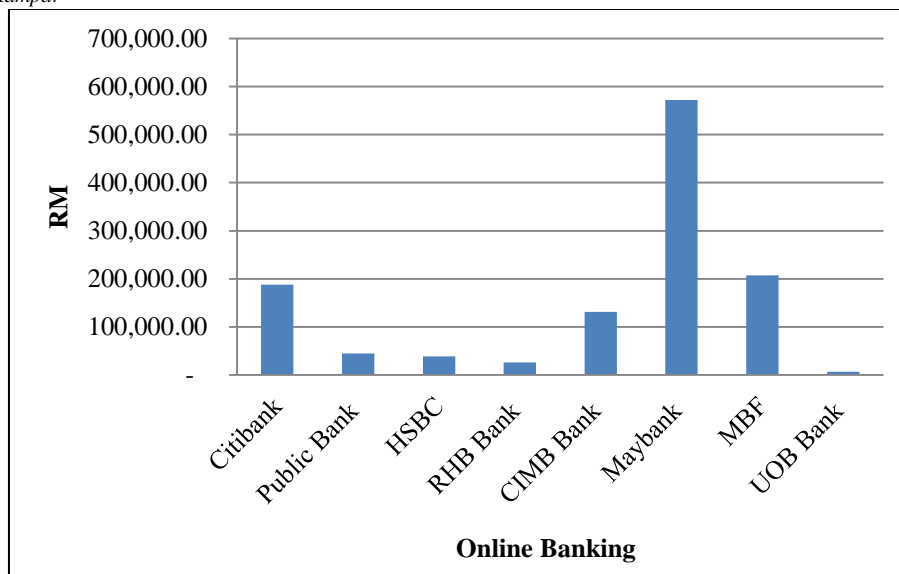


Figure 1: Assessment rate collection from online banking for MBSA (2011)
 Source: MBSA

An independent-sample t-test was conducted to compare male and female perception whether online payment saves time. Result in Table 2 shows that there was no significance difference between males and females in terms of their perception whether online payment saves time.

Table 2: Results of independent T-test on whether online payment saves time

	Male		Female		df	t	Sig. (2-tailed)
	Mean	SD	Mean	SD			
Online payment saves time	2.75	.557	2.50	.718	49.195	1.738	.088

The five main independent variables employed in this study as the determinants of online payment method adoption are perceived usefulness, perceived ease of use, perceived risk, receipt issuance and income level. The dependent variable is the user's adoption on the online payment method. Pearson product-moment correlation coefficient is used to investigate the relationship among the group of variables. All five independent variables are found to be significantly correlated with the dependent variable. Results are shown in Table 3.

Table 3: Correlation analysis between online payment method usage factors

Items	Perceived usefulness	Perceived ease of use	Perceived risk	Receipt issuance	Income Level	User's adoption
Perceived usefulness	1					
Perceived ease of use	.675**	1				
Perceived risk	-.437**	-.396**	1			
Receipt issuance	-.419**	-.427**	.604**	1		
Income level	.345**	.292**	-.300**	-.464**	1	
User's adoption	.556**	.440**	-.551**	-.659**	.435**	1

**Correlation is significant at the 0.01 level (2-tailed)

Among all the independent variables, perceived usefulness has the strongest, positive correlation with the dependent variable which is the online payment adoption, $r = .556, p < 0.01$, two-tailed. This is followed by perceived ease of use, with a moderate, positive correlation with the dependent variable, $r = .440, p < 0.01$, two-tailed. Perceived risk has a strong, negative correlation with user's adoption of the online payment, $r = -.551, p < 0.01$, two-tailed, with higher levels of perceived risk associated with lower levels of user's adoption. Receipt issuance has the strongest, negative correlation with the dependent variable, $r = -.659, p < 0.01$, two-tailed, with higher levels of receipt issuance associated with lower levels of user's online payment method adoption. Income level has a moderate,

positive correlation with user's intention to adopt online payment method, $r = .435, p < 0.01$, two-tailed.

Hypotheses testing

Each hypothesis was tested for statistical significance using Pearson correlation method. The results are as follows:

Hypothesis One – Perceived Usefulness

H₁: Perceived usefulness will positively influence the intention to adopt online payment method.

The results of Pearson correlation found that there was a strong, positive correlation between perceived usefulness and online payment adoption, $r = .556, p < 0.01$, two-tailed. Perceived usefulness was associated with user's intention to adopt the online payment method. Thus, hypothesis H₁ is supported in the study. This result attests the findings of some previous studies. Ramlah et al. (2011) discover that perceived usefulness is a strong determinant for e-government adoption and is particularly valid in the government to citizen (G2C) adoption. Liao and Cheung (2002) find that individuals expect accuracy, speed and user friendliness as among the most important quality in the perceived usefulness of internet based e-Banking. Ooh et al. (2009) establish that perceived usefulness has a significant positive relationship with the adoption of e-Government services.

Hypothesis Two – Perceived Ease of Use

H₂: Perceived ease of use will positively influence the intention to adopt online payment method.

The results of Pearson correlation found that there was a moderate, positive correlation between perceived ease of use and user's online payment adoption, $r = .440, p < 0.01$, two-tailed. Perceived ease of use was associated with user's intention to adopt the online payment method. Thus, hypothesis H₂ is supported in the study. The result supports the findings of Poon (2008) who established that convenience and accessibility have positive effect on consumer adoption of e-Banking. The result is also consistent with the study by Ramlah et al. (2011) who found that perceived

ease of use is a strong determinant for adoption of online tax filing or e-Filing in Malaysia. According to the study, users are inclined to fill in the online tax filing at the leisure of their home rather than queuing up at the service counter. In a similar vein, Carter and Belanger (2005) and Ooh et al. (2009) propose that perceived ease of use is among the important predictors of user's intention to adopt e-Government services. These findings affirm Davis' (1989) TAM in which the model proposed that a technology is of no use if it is not easy to use.

Hypothesis Three – Perceived Risk

H₃: Perceived risk will negatively influence the intention to adopt online payment method.

The results of Pearson correlation found that there was a strong, negative correlation between perceived risk and user's online payment method adoption, $r = -.551$, $p < 0.01$, two-tailed. Higher levels of perceived risk are associated with lower levels of user's online payment method adoption. Thus, hypothesis H₃ is supported in the study. The result of Hypothesis Three is consistent with Pavlou (2003) who suggested that perceived risk is negatively related to user's intention. Belanger and Carter (2008), Hung et al. (2006) and Maizatul et al. (2011) also opined a significant correlation between perceived risk and user's intention to use.

Hypothesis Four – Receipt Issuance

H₄: Payment receipt issuance will positively influence the intention to use online payment method.

It is hypothesized that if a receipt is issued as a proof of payment, user is more likely to use the online payment method to pay the assessment rate. No known study has used this as a construct to determine user's intention to use e-Government and the like. However, based on similar studies by Eastin (2002) and Ramlah et al. (2011), receipt issuance becomes the independent variable in Hypothesis Four. The results of Pearson correlation found that there was a strong, negative correlation between payment receipt issuance and user's online payment method adoption, $r = -.659$, $p < 0.01$, two-tailed. The results suggest that when receipt is issued upon payment via counter, users are not keen to adopt the online payment method for they are more

comfortable having a receipt as a proof of payment. Thus, hypothesis H₄ is supported in the study. For the record, the negative correlation is due to the fact that at present the receipt is only issued when payment is made via the counter, hence there are users who opted not to use the online payment method because of the need to obtain the receipt.

Hypothesis Five – Income Level

H₅: User's income level will positively influence the intention to use online payment method.

Hypothesis Five seeks to investigate whether user's income level positively influence the intention to use online payment method. Hypothetically, users with higher income will have greater access to online facilities such as the internet and computer at home, hence enabling them to use the online payment method. The results of Pearson correlation found that there was a moderate, positive correlation between income level and user's online payment adoption, $r = .435$, $p < 0.01$, two-tailed. User's income level was associated with user's intention to adopt the online payment method. Thus, hypothesis H₅ is supported in the study. According to Akhter (2003), income is strongly related with opportunity cost of time in which as income increases, the perception of the value of time changes. Akhter (2003) hypothesizes that wealthier people are more likely to use the internet for online transaction. Based on Akhter's (2003) study, He and Mykytyn (2007) adopted the income level as one of the predictors to determine customer's intention to adopt the online payment method. While Akhter's (2003) study found that wealthier people are more likely to make online purchase, a similar study by He and Mykytyn (2007) advocate that income level does not influence customer's intention to pay bills online. A summary of the five hypotheses discussed above is presented in Table 4.

Table 4: Hypothesis accepted/rejected summary

Hypothesis	Accepted/rejected
H ₁ : Perceived usefulness will positively influence the intention to adopt online payment method.	Accepted
H ₂ : Perceived ease of use will positively influence the intention to adopt online payment method.	Accepted
H ₃ : Perceived risk will negatively influence the intention to adopt online payment method.	Accepted
H ₄ : Payment receipt issuance will positively influence the intention to use online payment method.	Accepted
H ₅ : User's income level will positively influence the intention to use online payment method.	Accepted

A further analysis of multiple regression was carried out to analyze how well a set of variables is able to predict a particular outcome. As shown in Table 5, the selected predictors were accounted for 55.2 per cent of the variance of online payment adoption with $F = 17.276$ significant at $p < 0.05$. The results showed that two predictors were found significant; receipt issuance has the strongest impact on user's online payment method adoption ($b = -.402$) followed by perceived usefulness ($b = .302$). The findings implied that users are very much concern with the proof of payment when making assessment rate payment online. Users are also influenced to adopt the online payment method because of its usefulness, in this case it is deemed as cost and time saving for them. The finding is normal for an analysis of multiple regressions because a significant predictor independent variable in a simple linear regression may be significant in multiple regressions due to overlap of variance with other independent variables in the model.

Table 5: Influence of independent variables on online payment method

	Unstandardized Coefficient		Standardized Coefficient		
	B	Std. Error	Beta	t	Sig.
Perceived usefulness	.080	.030	.302	2.662	.010
Perceived ease of use	-.010	.039	-.028	-.255	.799
Perceived risk	-.019	.013	-.156	-1.501	.138
Receipt issuance	-.147	.040	-.402	-3.641	.001
Income level	.029	.025	.105	1.148	.255

$R^2 = 0.552$, $F = 17.276$, sig. $F = 0.000$

DISCUSSION

After about ten years of the implementation of online payment method as one of the alternatives to pay assessment rate, the main concern of users seem to be the issuance of receipt. This was apparent in both correlation and multiple regression analysis test conducted. Furthermore, the questionnaire has provided an open ended question at the last section to invite respondents to give feedback on any related issues. Although a majority of the respondents chose not to give any feedback (65.7 per cent), 19.6 per cent mentioned the receipt issue. Respondents are more inclined on paying over the counter to get the receipt as proof of payment. Some have suggested that the local authority should come up with a mechanism that provides a proof of online payment, similar to a receipt issuance if paid via the counter. Other factors such as perceived usefulness, perceived ease of use and perceived risk have significantly correlated with user's intention to adopt online payment method, very much the same outcome with findings of other similar studies.

Previous studies affirmed that perceived usefulness is a significant factor in influencing electronic services adoption be it in the government or private sector alike and has contributed towards time and cost reduction (Akman et al., 2005; Bertot & Jaeger, 2008; Evans & Yen, 2006; Liao & Cheung, 2002; Maniam & Halimah, 2008; Ndou, 2004; Ooh et al., 2009;

Poon, 2008; Ramlah et al., 2011). The survey found a significant percentage of online payment users among the respondents in MBSA. The result may be related to Shah Alam city status in which people in the city are perhaps more inclined to use online payment because it is perceived as useful in terms of time and cost saving especially in a demanding lifestyle. Payment over the counter requires users to come at specified time according to the operating hours, but with online payment, residents are able to pay at their convenience.

The findings of previous studies also found a significant relationship between perceived ease of use and the usage of online services especially in the public service delivery (Carter & Belanger, 2005; He & Mykytyn, 2007; Liao & Cheung, 2002; Ooh et al., 2009; Poon, 2008; Ramlah et al., 2011). Users tend to be more inclined to use the e-Government services when it is perceived as being conveniently accessible and easy to adopt. Perceived risk is found to be negatively influencing the intention to use the online payment method. This finding is consistent with results of previous studies that have shown perceived risk as an important determinant of e-Government services especially when it involves transactional services (Belanger & Carter, 2008; Hung et al., 2006; Maizatul et al., 2011; Pavlou, 2003). Safety and security concerns often deter users from adopting the online payment method for fear of personal data abused and risk of account security breaches.

Out of the five factors identified as determinants for user's intention to use the online payment method, this study found that receipt issuance has the strongest correlation with user's adoption. Further, the multiple regression analysis confirms that receipt issuance is the strongest determinants among the five factors that affect user's intention to adopt the online payment method. To the best of the researchers' knowledge, no similar study has used receipt issuance as a construct to determine online payment adoption. However, this study accounted receipt issuance as a factor, postulating that the lower usage of online payment method in assessment rate collection has a relationship with the non-issuance of receipt when payment is made online. The findings proved that users are generally concern with the proof of payment when paying online. A majority of respondents (19.6 per cent) who answered the open ended question at the end of the questionnaire mentioned that the absence of receipt issuance discourage them to use the online payment method.

Income level may not be the strongest factor influencing the usage of online payment method but the hypothesis is still supported. Although some users may use internet facilities at the office or other places, having internet at home seems to be safer and less risky for them to make transaction that involves money and personal information. Therefore, it was hypothesized that income level positively influences user's intention to use the online payment method. The finding is consistent with previous study of Akhter (2003). Nevertheless, other studies have found no significant relationship between income level and online usage (He & Mykytyn, 2007; Rhee & Kim, 2004). In particular, Rhee and Kim (2004) acknowledge that income level is not significant because the internet facilities are widely made available for the public. In this regard, this study found that income level plays a role in influencing user's intention to adopt the online payment method. This is perhaps attributed to the user's ability to have internet facilities before enabling them to engage in online transactions.

It should also be noted that results of the study have shown important difference between user's preference mode of payment in MBSA and MDKpr, where MDKpr registered a lower percentage of online payment users. During the interview with MDKpr officers, it was informed that generally the public prefer to make payment over the counter, not necessarily for the receipt, but for the sake of meeting MDKpr staffs and perhaps some friends or familiar faces. This shows that although the local government has the capability of using e-payment, its traditional method of collection should be retained as certain segment of the community may prefer to use the 'over-the-counter' approach for any transactions. This was found to be true when some respondents did mention that they prefer to pay over the counter because they are satisfied with the good counter services. An effective collection of assessment rate is one of the most vital aspects for any local government as the revenue generated can significantly influenced the capability of the organisation in delivering its services to members of the public. As such it is imperative that the approached adopted in the assessment rate collection should be catered to the needs of the residents.

CONCLUSION

This paper presents the findings of a study to investigate the factors influencing the usage of online payment method in local authority's assessment rate collection. Findings indicate that perceived usefulness, perceived ease of use, perceived risk, payment receipt issuance and income level has a significant relationship towards the intention to adopt the online payment method for paying assessment rate. Although there is generally positive perception from users to adopt the online payment method, there are some concerns that can be addressed in order to increase user's participation and to enhance the implementation of e-Services among the local government. In this context, the local authorities are encouraged to keep further strengthen the security of the online system; offer a wider selection of the online payment method and to provide proof of online payment. In a broader perspective, it is recommended that the government adopts the best practices of Republic of Korea's e-Government implementation that has seen impressive development throughout the years.

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RESIDENTIAL SATISFACTION - CONCEPT, THEORIES AND EMPIRICAL STUDIES

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Abstract

Residential satisfaction, defined as the feeling of contentment when one has or achieves what one needs or desires in a house, is an important indicator and planners, architects, developers and policy makers use it in a number of ways. There are three theories – housing needs theory, housing deficit theory and psychological construct theory, and most empirical studies have used these theories or a combination of these theories in their research design. A number of variables representing housing and neighbourhood characteristics, individuals' socio-demographic attributes as well as their perceptions of housing and neighbourhood conditions have been analysed in most empirical studies what stand to indicate that further studies are required until a general theory of residential satisfaction/ dissatisfaction emerges. Also, a host of variables belonging to housing and its environment including the socio-demographic attributes of residents exert significant influences on the level of residential satisfaction/ dissatisfaction which is however, culture and value specific indicating that further studies on residential satisfaction/ dissatisfaction can be undertaken on case specific context to guide public policies on housing.

Keyword: Residential satisfaction, housing needs theory, housing deficit theory, psychological constructs theory, neighbourhood characteristics

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INTRODUCTION

Since the post-war housing boom of the 1950s and early 1960s and the concomitant growth of suburban developments in western countries, two phenomena – new residential development and living patterns and the central city rebuilding through slum clearance programmes, have played a catalytic role in fostering much of the research on residential satisfaction (Campbell et al, 1976). Meanwhile, the developing world is experiencing rapid urban growth (urbanization) which is due to rapid industrialization and economic growth since 1970s. Thus, the governments in these countries have been providing/ facilitating different types of houses for different income groups. Residential satisfaction studies in these countries are focussed on ascertaining the extent to which houses produced and provided by both public and private sectors satisfy the aspirations of the citizens.

Residential satisfaction has been considered as a complex construct as its precise meaning depends on the place, time and purpose of assessment and on the value system of the assessor, involving an extensive range of people - architects, planners, sociologists, psychologists and urban geographers (Bardo and Dokmeci, 1992). Galster (1985) pointed out that the concept of residential satisfaction has been utilized in at least four different ways: First, it has been used as a key predictor of individuals' perceptions of general "quality of life". Second, it has been used as an ad hoc evaluative measure for judging the success of housing developments constructed by the private sector and the public sector. Third; it has been used as an indicator of incipient residential mobility and, hence, altered housing demands and neighbourhood change. Fourth, it has been used to assess residents' perceptions of inadequacies in their current housing environment so as to direct forthcoming private or public efforts to improve the *status quo*. Therefore, it is essential to understand the concept of residential satisfaction within the milieu of its theoretical and empirical perspective.

OBJECTIVES

The aim of the paper is to provide an overview of the theoretical and empirical perspective of residential satisfaction with the following objectives:

- a) To explore the concept of residential satisfaction;
- b) To investigate the various theories of residential satisfaction;
- c) To examine the empirical studies on residential satisfaction at cross-cultural level; and
- d) To assess the need and importance of residential satisfaction as a policy tool to guide future housing development.

METHODOLOGY

In order to fulfil the stated objectives of the paper, methodology adopted is based on the gathering and analysis of secondary data and information. Desktop research was carried out for about six months to search for the theories and studies of residential satisfaction at cross-cultural levels which included both developed and developing countries. A review of the theories and empirical studies on residential satisfaction was carried out to arrive at a meaningful conclusion leading to the need for further studies on residential satisfaction, based on country or culture specific situations.

LITERATURE REVIEW

Definition of Residential Satisfaction

In order to understand, the concept of residential satisfaction or housing satisfaction as some researchers usually use it, we should, firstly, take the term apart as Housing and Satisfaction and define them separately and secondly, we should define the concept of residential satisfaction or housing satisfaction together.

Housing does not mean an individual's dwelling unit only. It is a composite of the overall physical and social components that makeup the housing system (Francescato et al., 1987). Further, housing is a multidimensional phenomena, including structural type (e.g., single family home), tenure (own or rent), location and political jurisdiction (Shlay, 1998).

Satisfaction is a process of evaluation between what was received and what was expected (Parker and Mathews, 2001). Satisfaction can be precisely defined as the perceived discrepancy between aspiration and achievement, ranging from the perception of fulfilment to that of deprivation (Campbell et al., 1976). Williamson (1981) found that satisfaction was not only conditioned by physical aspects but also by the ability to form social networks. Finally, Satisfaction is a subjective response to an objective environment (Potter and Cantarero, 2006).

Residential satisfaction involves an extensive range of experts and professionals; some of them try to define the term from one dimension while others try to define it from multi-dimensional perspectives. For instance, Onibokun (1974), defined the residential satisfaction as a spatial aspect - "Housing satisfaction encompasses satisfaction with dwelling unit and satisfaction with the neighbourhood and the area". Conversely, Satsangi and Kearns (1992), defined residential satisfaction as psychological aspect - "Housing satisfaction is a complex attitude". In addition, Lu (1999) has defined residential satisfaction as a complex cognitive construct. Besides that, Ogu (2002) reported that "the concept of housing or residential satisfaction is often employed to evaluate residents' perceptions of and feelings for their housing units and the environment". On the other hand, Galster (1985) has defined residential satisfaction as social aspect - "The concept of residential satisfaction has become the preeminent social indicator employed by housing developers, analysts and policymakers alike during the last decade". Also, McCray and Day (1977) refer to housing satisfaction as "the degree of contentment experienced by an individual or a family member with regard to the current housing situation".

Contrary to the above, many experts and professionals have realized that, residential satisfaction is multi-dimensional aspects. For instance, Bechtel (1997) observed that residential satisfaction is determined by a mix of factors that include not only the house and its physical qualities but also the surrounding neighbourhood and social quality of the surrounding. Further, Francescato et al., (1986) mentioned that residential satisfaction indicates people's response to the environment in which they live. In this definition the term environment refers not only to physical aspects of residential setting such as dwelling, housing developments, and neighbourhoods, but also social, economic and organizational or institutional aspects of such settings.

Theories of Residential Satisfaction

Residential satisfaction, defined as the feeling of contentment when one has or achieves what one needs or desires in a house, is an important indicator and planners, architects, developers and policy makers use it in a number of ways. Indeed, theories of residential satisfaction all hinge upon the notion that residential satisfaction measures the differences between household actual and desired (or aspired to) housing and neighbourhood situations (Galster and Hesser, 1981). There are three main theories upon which most of the empirical studies are based. These are housing needs theory, housing deficit theory and psychological construct theory.

Housing Needs Theory

Rossi (1955) introduced the notion of “housing needs” to conceptualize residential satisfaction / dissatisfaction. In his theory, Rossi posited that changing housing needs and aspirations as households’ progress through different life cycle stages often place households out of conformity with their housing and neighbourhood situations. The “lack of fit” between their current and desired housing needs creates stress or dissatisfaction with their current residence. Households respond to such stress or dissatisfaction through migration, which brings a family’s housing into adjustment with its housing needs. Life cycle changes may generate different space requirements, which are considered the most important aspect of the needs. Thus, households are likely to feel dissatisfied if their housing and neighbourhood do not meet their residential needs and aspirations.

Housing Deficit Theory

Morris and Winter (1978) introduced the notion of “housing deficit” to conceptualize residential satisfaction / dissatisfaction. In their housing adjustment model of residential mobility, they theorize that individuals judge their housing conditions according to normatively defined norms, including both cultural norms, which are dictated by societal standards or rules for life conditions, and family/personal norms, which amount to households’ own standards for housing.

Thus, an incongruity between the actual housing situation and the cultural and /or familial housing norms results in a housing deficit, which in turn gives rise to residential dissatisfaction. Households with a housing deficit who are hence dissatisfied are likely to consider some form of housing adjustment. They may attempt to make in situ adjustments to reduce dissatisfaction by revising their needs and aspirations to reconcile the

incongruity or by improving their housing conditions through remodelling. They may also move to another place and bring their housing into conformity with their needs.

Psychological Construct Theory

Galster (1985) introduced the notion of “psychological construct” of residential satisfaction and theorized that individuals may be seen as cognitively constructing a “reference” condition for each particular facet of their residential situation. The quantity or quality of the given facet implied by the reference point will depend on the individual’s self-assessed needs and aspirations. If the current situation is perceived to be in proximate congruence with (or superior to) the reference situation, a psychological state of ‘satisfaction’ should be manifested. If, on the other hand, the current situation falls short of the reference situation by more than a ‘threshold deficiency’, two alternatives are possible. One may attempt to reconcile the incongruence by ‘adaptation’, through redefining needs, reducing aspirations and/or altering the evaluation of the current situation, thereby producing a modicum of satisfaction. The other alternative is that one cannot somehow adapt to the current residential context, in which case ‘dissatisfaction’ should be manifested. Such individuals, over time, would likely attempt to reduce their dissatisfaction by altering conditions of the present dwelling unit or by moving to another more congruent residential situation (Foote et al., 1960). Of course, these options may be relatively limited, e.g., by lack of purchasing power for lower income households and discrimination against minority households. The main elements of the three theories are summarised in Table 1.

Table 1: Summary of residential satisfaction theories with their major elements

Author(s) & Year	Name of theory	Main elements
Rossi (1955)	Housing needs theory	a) Life cycle stages and changing housing needs. b) Discrepancy between current and desired housing needs creates housing stress or dissatisfaction. c) Residents respond to this distress through migration.
Morris & Winter (1978)	Housing deficit theory	a) Individuals judge their housing conditions according to some norms.

		<ul style="list-style-type: none"> b) Incongruity between actual and familial housing norms results in housing deficit. c) Housing deficit is mitigated through some form of housing adjustments.
Galster (1985)	Psychological construct theory	<ul style="list-style-type: none"> a) Individuals cognitively construct a “reference” condition of their residential situation. b) Satisfaction prevails when current housing is proximately congruent with the reference situation. c) Incongruence will lead to either adaptation or dissatisfaction/ modification.

Source: Literature review, 2014.

Most empirical studies on residential satisfaction/ dissatisfaction have used either one or a combination of the three theories discussed above. A host of variables representing housing and neighbourhood characteristics, individuals’ socio-demographic attributes as well as their perceptions of housing and neighbourhood conditions have been analysed in most housing studies (Lu, 1999). However, some empirical studies have demonstrated that housing deficit is a useful theory in explaining residential satisfaction and mobility behaviour (Bruin and Cook, 1997; Husna and Nurijan, 1987).

EMPIRICAL STUDIES

Residential satisfaction has been researched in numerous empirical studies which examine characteristics of the users (either cognitive or behavioural) or characteristics of the environment, both physical and social (Amerigo and Aragonés, 1997). Characteristics of users, however, are involved in socio-demographic characteristics of residents and behavioural characteristics of residents as well. On the other hand, the characteristics of environment are involved housing characteristics and neighbourhood characteristics. In fact, those characteristics have been viewed as the essential elements in determining residential satisfaction/ dissatisfaction levels (the dynamic interaction). On the other hand, behavioural characteristics of residents are considered as the result of the dynamic interaction.

Socio-Demographic Characteristics of Residents

Empirical studies have identified a number of important factors belonging to residents' characteristics, such as age, income, duration of residence, and ownership of house (Lu, 1999; Spear, 1974). According to a number of authors (Baum et al., 2010; Chapman & Lombard, 2006; Lu, 1999; Oswald et al., 2003; Pinqart & Burmedi, 2004) age exerts a positive effect on residential satisfaction. Older people tend to be more satisfied with their dwelling than do younger people. Weidemann et al., (1989) reported, in general, that the levels of housing satisfaction of elderly residents are likely to be higher than those of younger residents. Galster (1987) also argued that empirical findings of housing satisfaction should be segregated by household type (e.g., family and elderly). A study by Mohit et al., (2010), however, argued that age of the household is negatively related to housing satisfaction.

Yeans (1972) and Tucker (1969) found a significant relationship between income and housing satisfaction. Previous works by Adriaanse (2007) and Lu (1999) indicated that higher income households are generally satisfied with their housing. Frank and Enkawa (2009) contended that higher income enables households to move to a suitable house in an attractive neighbourhood, which may result in a relatively higher level of satisfaction.

Halimah and Lau (1998) compared the perceived concept of home aspired between Malay and Chinese housewives in Low-cost housing in Selangor and found that there were significant differences between the Malays' and Chinese perception of home and housing satisfaction.

Vera-Toscano and Ateca-Amestoy (2008) pointed out that, the higher the education level of the heads of the household; the more satisfied they are with their housing compared to household heads with lower educational attainment. Indeed, a positive relationship has been found between housing satisfaction and age, income, education and job status (Campbell et al., 1976; Pruitt, 1977). However, Lu (1999) found that education appears to have insignificant effects on housing satisfaction.

Homeownership or tenure status is a key indicator and determinant of residential satisfaction. Although Husna and Nurijan (1987) did not find any difference between owner and tenant residents of public low-cost housing in Kuala Lumpur, many studies reveal that residential satisfaction is much higher among homeowners than renters (Loo, 1986; Lu, 1999). Elsinga and Hockstra (2005) reported that homeowners in seven out of eight European countries are more satisfied with their housing situation than tenants and only in one country do homeowners and tenants display similar level of satisfaction. Even with similar quality of housing unit, owner-

occupiers tend to be more satisfied than renters possibly because homeownership gives a sense of 'self-gratification' to owner-occupiers and makes them psychologically proud and satisfied with their dwelling units (Kaitilla,1993). Barcus (2004) found that tenure shift from renters to owners is the only significant variable in predicting residential satisfaction of American urban-rural migrants; individual migrant characteristics and their motivations offered little explanation for the variation in residential satisfaction. In addition, Whiteford and Morris (1986) also examined the impacts of both households' age and tenure type on households' housing satisfaction. They found that older renters are as satisfied as owners, whereas younger renters are significantly less satisfied than all other groups.

Housing Characteristics

According to Lane and Kinsey (1980) housing characteristics were more crucial determinants than demographic characteristics of housing occupants. Thus, empirical studies show that building features such as number of bedrooms, size and location of kitchen and quality of housing units, are strongly related to residential satisfaction (Noriza et al., 2010). Morris et al., (1976) found a positive relationship between number of rooms and housing satisfaction. Speare and Stewar (1974) and McCown (1977) also found a negative relationship between person-per-room ratio and housing satisfaction. As the number of persons-per-room increases, creating a higher density living environment, housing satisfaction decreases. Oh (2000) in her study on housing satisfaction of middle income households in Bandar Baru Bangi Malaysia, revealed that while the residents were highly satisfied with the space and price of the house owned, they were not satisfied with the size of kitchen, plumbing and public facilities such as recreational area, playground, taxi and bus services in the housing area.

Pruitt (1977) analyzed the housing characteristics related to housing satisfaction and found that tenure, age of dwelling, and structural quality were related to housing satisfaction. Home ownership and high structural quality were also indicators of higher perceived housing satisfaction. A negative relationship was found between age of dwelling and housing satisfaction. Those persons in older units were less satisfied.

Preference for a specific type of dwelling structure has also been found to be related to housing satisfaction. Morris et al. (1976) and Rent (1978) found a single family detached home to be preferable over alternatives such as mobile homes and multi-family units. Mastura, et.al. (undated) in their cross-section study found that project type, house price

and length of residency significantly influence housing satisfaction among the residents of Penang Development Corporation's project. Also, Ukoha and Beamish (1997) observed that while the residents of public housing in Abuja, Nigeria, were satisfied with neighbourhood facilities, they were dissatisfied with structure types, building features, housing conditions and management.

According to Baum, et. al. (2005); Hipp (2010) and Parkes et al., (2002), structural attributes of housing is a significant factor affecting housing satisfaction. These attributes include objective physical characteristics of housing such as kitchen space, laundry and washing areas, size of living area and dining area, morphological configuration of residence hall, number and level of sockets, number of bedrooms and bathroom, other aspects of housing such as housing quality, privacy (social densities), and housing services provided by developers such as garbage disposal, safety, brightness and ventilation of the house (cited in Tan, 2011).

Neighbourhood Characteristics

Morris et al., (1976) pointed out that, a family evaluates a neighbourhood based on the following normative criteria: 1) Area should be predominately residential. 2) Accessible to quality schools. 3) Quality of streets and roads. 4) Homogeneity regarding social class, race, and ethnic group. Thus, Lu (1999) contended that neighbourhood satisfaction has been shown to be an important predictor of dwelling satisfaction.

Neighbourhood dissatisfaction, however, occurs with regard to distances travelled to school by children, to employment and medical centres and the geographical location of housing estates (Awotona, 1991). Also accessibility to the public transportation, community and shopping facilities and physical environment variables has been noted as predictors of neighbourhood satisfaction (Ozo, 1990). Baker (2002) has thus observed that location characteristics are important considerations for understanding the formation of residential satisfaction among public housing tenants. While housing is likely to be a source of satisfaction, elements of the neighbourhood such as level of crime (Mullins, et. al., 2001) or lack of amenity (Fried,1982) or industrial development or work place location are likely to be sources of dissatisfaction. Alison, et. al. (2002) by analyzing English Housing data concluded that although socio-demographic factors were much less important than residential perceptions in helping to predict dissatisfaction, the type of neighbourhood remained a significant independent predictor of dissatisfaction even when residents' views were taken into account.

Few studies, however, have examined the relationship between safety from physical accidents (e.g., fire, demolition, traffic accidents, etc.), which might also be very important in housing environments. Anderson et al., (1983) and Francescato, et al., (1979) are among those who have considered the issue of safety from accidents as a predictor of housing satisfaction. Lawton, et. al. (1984), however, found that safety from crime (e.g., rated risk of crime) was not found to be related to any of the other indices of well-being except for residents' housing satisfaction.

Yancy (1971) concluded, in a study of Pruitt-Igo, St. Louis, that one of the reasons for the failure of Pruitt-Igo was the lack of neighbourhood cohesion and social order associated with dissatisfaction with neighbours. Djebuarni and Al-Abed (2000) observed that the residents of public low-income housing in Sana'a, Yemen, attach great importance to the level of satisfaction with their neighbourhood, particularly, with privacy which reflects the cultural background of Yemeni society.

Therefore, it can be deduced that residential satisfaction does not only rely on the dwelling units itself; neighbourhood plays an important role in residential satisfaction (Noriza et al., 2010) and (Salleh, 2009).

Behavioural Characteristics of Residents

Behavioural characteristics of residents or "Housing adjustment and adaptation" as conceptualized by Morris and Winter (1978) are the family's efforts to redress the discrepancies between the housing it has and the housing it and others feel they should have when such deficits appear. In fact, housing adjustment is a process that may occur when a family experiences a normative housing deficit that causes a significant reduction in housing satisfaction. Housing adjustment takes place through residential mobility and residential modification (e.g., alterations, additions, etc.) (Morris and Winter, 1978).

Morris and Winter (1978) pointed out that, residential alterations and additions consist of two main phenomena - a) increases in the amount of space or number of rooms in the dwelling, and b) improvements in the quality of the dwelling. Thus, residential alterations and additions are typically undertaken to correct normative housing deficits in space or quality.

Harris (1976) by using satisfaction with the dwelling units or the neighbourhood or both, has shown weak relationships with residential alterations and additions. Yockey (1976) found no relationship between space satisfaction and planning to make alterations and additions. The reason for the weak relationship or absence of relationship between

satisfaction and planning future alterations may be the curvilinear relationship between satisfaction and alterations. As in residential mobility, people who are dissatisfied with their dwelling tend to make home improvements. Such alterations are undertaken partly to overcome deficit and partly to improve the resale value of properties. People who are highly satisfied with their dwelling and neighbourhood may love the dwelling so much that they want to continue improving it (Morris and Winter, 1978).

Using only satisfaction with space and neighbourhood, Yockey (1976) developed a typology of satisfaction. She classified people according to high and low space satisfaction and high and low neighbourhood satisfaction. She further classified families according to whether or not they planned to move. People with low space satisfaction and high neighbourhood satisfaction who planned to move were most likely to make residential alterations. The second highest proportion planning alterations occurred in the group with the highest satisfaction levels and no expectation of moving. Morris and Winter (1978), pointed out that, the key determinant of the propensity to move and, in turn, actual mobility, is dissatisfaction with dwelling. In addition, neighbourhood satisfaction affects housing satisfaction and mobility.

Morris and Winter (1978) reported that respondents who were dissatisfied with their housing, their neighbourhood, and with specific features of the dwelling were more likely to plan to move than families who were satisfied. Another study (Morris et al., 1976) treated housing and neighbourhood satisfaction as intervening variables between normative housing deficits and the desire to move. Neighbourhood satisfaction was related to housing satisfaction and desire to move. Housing and neighbourhood satisfaction were the most important predictors of the desire to move. Only two characteristics of the family, duration of the marriage and sex of the head, were directly related to the propensity to move. A summary of the main findings from residential satisfaction studies has been presented in Table 2.

Table 2: Summary of main findings from residential satisfaction studies

Residential satisfaction with	Main findings
Socio-demographic characteristics of residents	<ul style="list-style-type: none"> a) Residents' characteristics such as age, income, duration of residence, house ownership, household types, impact residential satisfaction variously, positively or negatively across different countries/ cultures. b) The findings between residential satisfaction and residents' characteristics is not conclusive
Housing characteristics	<ul style="list-style-type: none"> a) Housing characteristics such as number of bed rooms and toilets, size and location of kitchen, living room, quality of housing unit, affect residential satisfaction differently at cross-cultural levels. b) The findings between residential satisfaction and housing characteristics are, however, not conclusive.
Neighbourhood characteristics	<ul style="list-style-type: none"> a) According to some authors, neighbourhood satisfaction is an important predictor of residential satisfaction. b) Neighbourhood dissatisfaction occurs due to higher distances travelled for school, work, shopping, medical centres. c) Safety from crimes and accidents is positively associated with residential satisfaction.
Behavioural characteristics of residents	<ul style="list-style-type: none"> a) Behavioural characteristics of residents reflect their feeling about their residential satisfaction/ dissatisfaction. b) Residents' react differently with their housing dissatisfaction. It can be adaptive or it may lead to migration depending on the degree of dissatisfaction or the ability of relocation.

Source: Literature review, 2014.

It appears from the foregoing review of empirical studies on residential satisfaction that while various housing, neighbourhood and household characteristics determine the level of residential satisfaction/ dissatisfaction, the impacts of these variables as determinants of residential satisfaction/ dissatisfaction tend to vary by housing types, tenures, countries and cultures what stand to indicate that further studies are required to determine residential satisfaction/ dissatisfaction on case specific situations to guide public policies on housing (Mohit, et.al., 2010,p.20).

Indicator Framework of Residential Satisfaction

Based on the review of theories and empirical studies pertaining to residential satisfaction, a multi-faceted indicator framework of residential satisfaction can be developed and this will help further research in this area. The framework is community based and it provides the architecture for framing to capture and evaluate community issues of importance. The framework is a composition of several components with each component being represented through a number of indicators or variables (Figure 1).

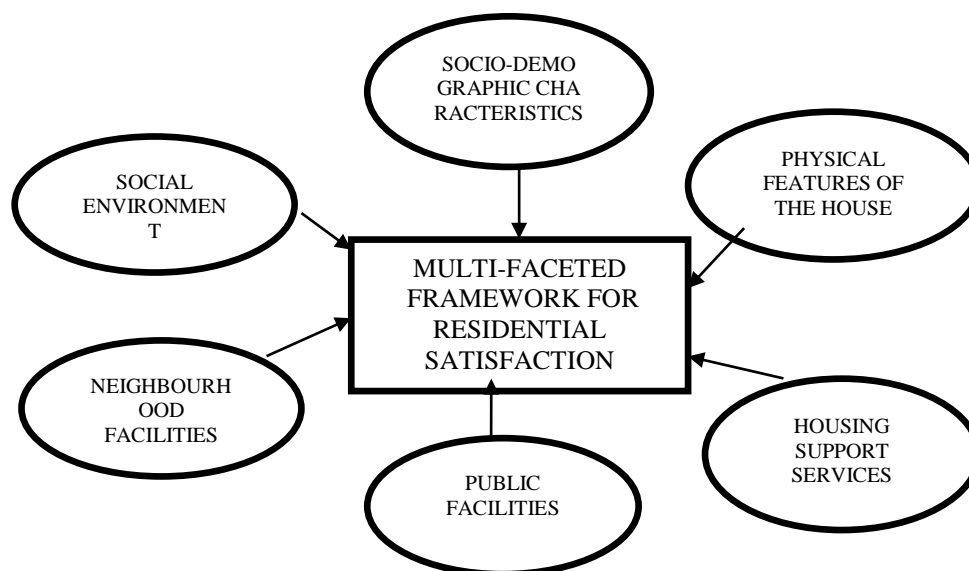


Figure 1: Multi-Faceted Framework for Study of Residential Satisfaction

MEASUREMENT OF RESIDENTIAL SATISFACTION

To understand residential satisfaction, it must be adequately measured (Gifford, 1997). However, adequate measurements of residential satisfaction depend on studying the type of variables that are related to the different processes: cognitive, affective and behavioural which take place in the dynamic interaction between the individual and his/her residential environment. Thus, Francescato, et. al. (1986) defined satisfaction as an attitude and stated that affective, cognitive and behavioural variables affect satisfaction.

Cognitive Process

The cognitive process refers to negative or positive perceptual attitudes and feelings occupants have while perceiving the “meaningfulness” or “meaninglessness” of their housing environment (Ajzen and Fishbein, 1981). In addition, it refers to perception and beliefs (e.g., about the physical environment, other residents) (Potter and Cantarero, 2006). Gifford (1997) pointed out that, there are two cognitive processes related to measurement of residential satisfaction namely, purposive evaluation and comparative evaluation.

Purposive evaluation has several aspects such as level factor (e.g., to evaluate a single part or a large portion of residence), quality factor (e.g., to evaluate the quality of residence such as beauty, lighting, or spaciousness) and focus factor which depends on the quality (e.g., to evaluate the ability of a particular lamp to light a study desk, or is it broader, such as lighting in the home as a whole). Therefore, the concept of residential satisfaction is often employed to evaluate residents’ perceptions of and feelings for their housing units and environment (Ogu, 2002).

Conversely, comparative evaluation, however, has two approaches to measurement of residential satisfaction which focus on discrepancy such as discrepancy between present and past residences and the discrepancy between present and ideal residences. Thus, the level of residential satisfaction can be precisely defined as the perceived discrepancy between aspiration and achievement, ranging from the perception of fulfilment to that of deprivation (Campbell et al., 1976).

Affective Process

The affective process refers to the positive or negative feeling that the occupants have where they live in. In other words, it is people's satisfied or dissatisfied attitudes towards their socio-physical housing environment (Ajzen and Fishbein, 1981). Also, it is both emotional and evaluation and is composed of multiple reactions that form a "global representation of the affective responses of people to the social-physical environment in which they live" (Weidemann and Anderson, 1985). In fact, there are three affective processes related to measurement of residential satisfaction namely, subjective attributes, objective attributes and personal characteristics (Amerigo and Aragones, 1997).

It has been found that the overall quality of life or life satisfaction is influenced by a variety of social and physical domains (e.g., family job, religious affiliation, residence, neighbourhood, community, etc.) (Campbell et al., 1976). Thus, Potter and Cantarero (2006) pointed out that the process of evaluating a domain begins with the objective attributes. While we all live in an objective world, we make decisions based on our subjective assessments of a situation. Therefore, our assessments of a domain are influenced by personal characteristics (e.g., experience, social standing, aspirations, reference group and so forth) which in turn affect our level of satisfaction with that domain. Thus, Potter and Cantarero (2006) also, defined residential satisfaction as a subjective response to an objective environment.

Behavioural Process

The behavioural process refers to all adaptive or non-adaptive behaviours that occupants exhibit in order to make the physical setting satisfactory to compensate a loss in needs or values (Ajzen and Fishbein, 1981). In fact, it measures behavioural intentions e.g., desire for staying or moving, recommendation to friends (Potter and Cantarero, 2006). In addition, Francescato et al. (1989) in their attitudinal model of residential satisfaction pointed out that, there are three behavioural processes related to the measurement of residential satisfaction: moving or staying in residential area (residential mobility), participation with other residents in activities related to the place where they live (social interaction), and attempting to personalize their surroundings (residential modification).

CONCLUSION

Residential satisfaction is a complex construct for three reasons. Firstly, it involves terminologically two complex terms - housing and satisfaction. Secondly, it involves three different processes - cognitive, affective and behavioural which lead to the third reason. It needs different measurements based on those processes such as objective attributes, subjective attributes, and personal characteristics. In addition, even though, residential satisfaction has three main theories viz., housing needs, housing deficit, physiological construct, most empirical studies on residential satisfaction/ dissatisfaction use one or a combination of theories what stand to indicate that further studies are required until a general theory of residential satisfaction/ dissatisfaction emerges. The empirical studies discussed indicate that a host of variables belonging to housing and its environment including the socio-demographic attributes of residents exert significant influences on the level of residential satisfaction/ dissatisfaction which is however, culture and value specific indicating that further studies on residential satisfaction/ dissatisfaction can be undertaken on case specific context to guide public policies on housing.

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HISTORICAL INFLUENCES TO PRESENT LEGAL SETTING OF PLANNING LAW IN MALAYSIA

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Abstract

Malaysia is a federation of thirteen states and three federal territories. Thus, it is a challenge to achieve uniformity of laws among the states. Presently, there are four sets of planning laws applicable in Malaysia. This paper looks at the historical factors that led to the non-uniformity of planning law in Malaysia. By using historical research methodology, this study found that the emergence of individual states back in the year 1400 AD is among the historical factors contributing to this non-uniformity of law. Additionally, the colonisation and the British influence over Malay Peninsula and the Borneo region, the formation of the Malaya Federation and the creation of federal territories also have strong implications in terms of administration and law uniformity. Despite the states eventually united under the essence of federation in 1963, this did not entail uniformity of laws among them. Additionally, states also have no obligation to adopt laws enacted by the Federal Government. Nevertheless, efforts to harmonise planning in the country have been undertaken. These include the amendment of planning laws and the establishment of national level planning committee.

Keyword: planning law, planning structure, constitution, federation, states.

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INTRODUCTION

Malaysia is a federation made up of thirteen States and three Federal Territories. The States are Johor, Kedah, Kelantan, Melaka, Negeri Sembilan, Pahang, Perak, Perlis, Pulau Pinang, Sabah, Sarawak, Selangor and Terengganu. Meanwhile, the three Federal Territories are Kuala Lumpur, Labuan and Putrajaya. Being a Federation, Malaysia subscribes to the essence of federalism that is ‘...the establishment of a single political system, within which, general and regional governments are assigned to coordinate authority such that neither level of government is legally or politically subordinate to the other’ (Watts, 1966:13). As such, the States Government are not obliged to adopt laws enacted by the Federal Government. This partly contributed to the non-uniformity of planning laws in Malaysia. Presently, there are four sets of planning law applicable to different parts of Malaysia.

This study adopted historical methodology to examine historical events and to determine their influences towards planning law scenario in Malaysia. Historical methodology can be described as method to objectively and systematically identify and evaluate evidence to obtain facts and to summarily explain the past happenings. Secondary data were used throughout the study.

DIFFERENT SETS OF PLANNING LAW COVERAGE IN MALAYSIA

The four sets of planning law applicable in Malaysia presently are:

- i. Town and Country Planning Act 1976 (Act 172);
- ii. Federal Territory (Planning) Act 1982 (Act 267);
- iii. Town and Country Planning Ordinance 1950 (Cap. 141); and
- iv. Sarawak Land Code (Cap. 81 [1958 Ed.]).

Figure 1 below shows the coverage of each set of the planning law. Town and Country Planning Act 1976 (Act 172) is applicable to all States in the Peninsular Malaysia. Meanwhile, all the Federal Territories adopted the Federal Territory (Planning) Act 1982 (Act 267). In Sabah, the State Government adopted its own Town and Country Planning Ordinance 1950 (Cap. 141). Similarly, the State Government of Sarawak also enacted its own law pertaining to matters including planning, which is the Sarawak Land Code (Cap. 81).



Figure 1: Different sets of planning law coverage in Malaysia

HISTORICAL INFLUENCES TO PRESENT TOWN AND COUNTRY PLANNING LEGAL SETTING

This study has found that the present situation where there exists a different set of planning law being applicable within Malaysia was partly influenced by the history of the development of the country. Table 1 below outlines important historical events from 1400 AD to 1965 that have partly influenced the present legal setting in Malaysian town and country planning.

Table 1: Important historical events that influenced the present legal setting in Malaysian planning.

Year	Event
1400	Malacca established by Parameswara.
1824	British acquired Malacca and formed Straits Settlements with Penang and Singapore
1843-1917	Sarawak and British North Borneo established incrementally.
1846	British acquired Labuan.
1874	Pangkor Treaty with Perak sets scene for British to extend control throughout the Malay Peninsula.
1896	Establishment of Federated Malay States (FMS).
1914	Grouping of Unfederated Malay States (UMS).
1945	Sarawak and British North Borneo became the responsibility of the British.
1946	British established Malayan Union.

1948	Federation of Malaya formed.
1957	Independence granted and Malaya formed.
1963	Malaysia formed through the unification of Malaya, Singapore, Sabah and Sarawak with Tunku Abdul Rahman elected Prime Minister.
1974	Kuala Lumpur became a federal territory.
1984	Labuan became a federal territory.
2001	Putrajaya became a federal territory.

Source: Adapted from Church, 1999 as cited in Bruton, (2007).

Historically, Malacca was found in 1400 AD by Parameswara. From a traditional fishing village, Malacca grew into an international trading port and enjoyed economic prosperity and had become ‘...new standard for Malays achievement’ (Andaya & Andaya, 2001:78). One hundred years on, in 1511, Malacca fell to the Portuguese who aimed to control maritime trade throughout the region. This led to the setting up of the Kingdom of Johor by Sultan Alauddin Riayat Shah, an heir to the Malacca sultanate. Later, with the assistance of the Dutch in Java, Johor ousted the Portuguese from Malacca. This put Malacca under Dutch influence through its United Netherlands Chartered East India Company.

At the same time, the British were also eyeing on Malacca to be under its sphere of influence. The British had already acquired Penang in 1786 and Singapore in 1819. Thus, in 1824, following the Anglo-Dutch Treaty, Malacca and the Malay Peninsula were transferred under the British sphere of influence.

However, British sphere of influence was restricted as far as the northern states of the Peninsula were concerned. This is because, during Malacca’s territorial expansion back in the early 15th century, the northern Malay states of Kelantan, Terengganu, Perlis and Kedah acknowledged Siam as overlord and Malacca’s influence was only felt here towards the end of the 15th century (Suhana, 1999; Rutter, 1989). After the fall of Malacca in 1511 and the decline of Johor in 1699, other states in the Peninsular emerged as individual states which generally recognized Siam as overlord and sent the ‘golden flower’ (*bunga mas*) as a sign of overlordship. This continued until the 1909 treaty between the British and Siam that transferred the suzerainty of Siam over the northern states to the British. These states became the Unfederated Malay States (UMS) under British administration.

The British sphere of influence was not limited to the Peninsula but also extended to the Borneo territories. British involvement in the Borneo region became greater from the 1840s after Sarawak inception as an identifiable political unit. Sarawak owes its inception as a state to the English adventurer, James Brooke (1803-68). The association between

Britain and the Brookes also helped to reinforce the connection between northwest Borneo and the Malay Peninsula. This connection was important as it also contributed to the inclusion of the Borneo states into Malaysia. By 1846, British continued to reinforce its influence in the Borneo region by acquiring the island of Labuan (Rozan Yunos, 2008). By 1868, Britain had made clear of her interest in northern Borneo (Sabah), which was now included in the British sphere of influence (Rutter, 1989).

Up to this point, a process which stretched back to a series of conquests of Malacca and British colonisation of the states of the Malay Peninsula had reached its conclusion under the British administrative system. As a result, the Peninsula was divided into the Straits Settlements, the Federated Malay States, the Unfederated Malay States and Borneo, which consisted of three protectorates including Labuan Island. This division of administrative units is shown in Figure 2 below.

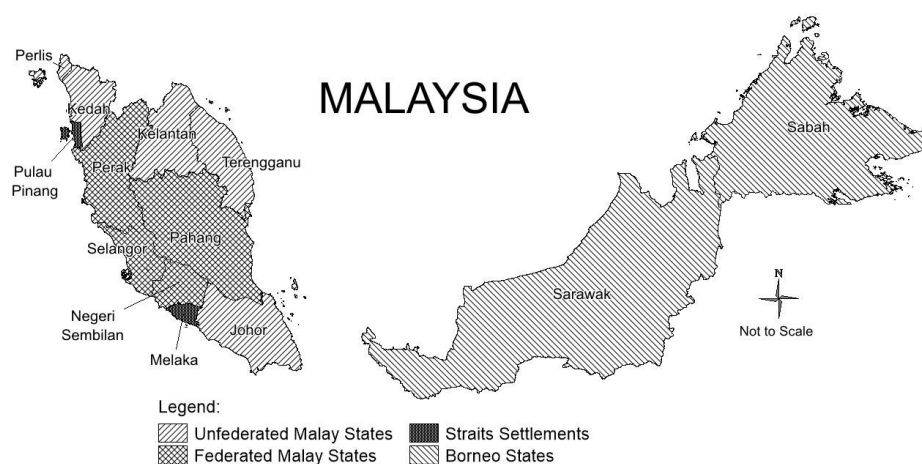


Figure 2: Malaya Administrative Units under British Colonization

In 1946, the British had established the Malayan Union and subsequently the Federation of Malaya in 1948. This paved the way to the independence of Malaya. However, strong connection between Malaya and the Borneo region had led to the formation of Malaysia in 1963. The Malaysia Agreement which was signed in 1963 relinquished British control over Sarawak, North Borneo (Sabah) and Singapore and allow them to join the Federation of Malaysia. Nevertheless, in agreeing to its inclusion into the

Federation, the North Borneo state proposed a 20-points agreement, which in part requires the provisions of the Federal Constitution with regard to land, forest and local government do not apply in the state. Hence, planning also remains within the domain of the state to regulate.

In more recent times, several areas of the states have also been handed over to the Federal Government of Malaysia to administer. Kuala Lumpur, the capital of Malaysia, became a federal territory in 1974. Meanwhile, Labuan Island became the second federal territory in 1984. The most recent addition to the list of federal territories in Malaysia was in 2001 when Putrajaya, the new Federal Government administrative centre became a federal territory.

These historical events, especially the colonisation and the British influence over Malay Peninsula and the Borneo region, the formation of the federation and the 20-point agreement, and the creation of federal territories have strong implications in terms of administration and law uniformity. As a result, at present time, each state in Malaysia has no obligation to adopt the laws enacted by the Federal Government. In other words, it is the state legislatures' discretion to adopt federal laws to be operated in the state. In the circumstance that federal law is to be adopted by the state, it will be gazetted as state law¹. Additionally, when land is under state jurisdiction as stipulated in the State List of the Federal Constitution, it inevitably affects the development planning process in Malaysia, in terms of final approvals of land matters².

Undeniably this historical account has some legal and administrative impact on current planning practice in Malaysia as affirmed by Bruton (2007:1) when he commented that "Planning in any country is inextricably linked with the history, politics and administrative structure of that country [...] given the different colonial histories of east and west Malaysia they have developed differently and have different systems of planning". This is manifested in the application of different planning laws in different region of Malaysia. As mentioned earlier, the states in the Peninsular (West) Malaysia apply the Town and Country Planning Act 1976 (Act 172), while planning in the federal territories is governed by the Federal Territory (Planning) Act 1982 (Act 267). In the meantime, states in East Malaysia (Sabah and Sarawak) have their own planning laws.

¹ Section 1 (2) of the TCPA 1976; "subject to subsection (3), this Act shall come into operation in a State on a date or dates to be appointed by the State Authority, with the concurrence of the Minister, by notification in the State Gazette"

² Refer to Ninth Schedule, State List of the Federal Constitution

PLANNING STRUCTURE IN MALAYSIA IN THE CONTEXT OF FEDERALISM

It is worth to look at the planning structure in Malaysia within the Federal Constitution ambit. This is because the current planning system in Malaysia embodied in the Town and Country Planning Act 1976 (TCPA 1976) originated from the Federal Constitution, notably Clause (1) of Article 74, Clause (4) of Article 76 and Clause (2) of Article 80. However, the Act which is meant for the uniformity of law and policy related to proper control of town and country planning is only applicable in Peninsular Malaysia, subject to notification in the State Gazette by the State Authority with the concurrence of the Minister for Housing and Local Government.

The 'Federal Constitution' is the 'supreme law' of the Federation (Article 4). By virtue of the supremacy of the 'Federal Constitution' (hereafter referred to as the Constitution), any law which is inconsistent with the Constitution, to the extent of the inconsistency, is void. Thus, the Constitution is recognised as a written law of the Federation that prescribes the manner in which the governmental system in Malaysia is carried out. Furthermore, it confers the legislative power to the Federal Government and the State Government, and the Local Government as far as planning is concerned. Accordingly, the planning administration in Malaysia is effectively carried out at these three governmental levels.

The relationship between these three governmental levels is governed by Part VI of the Constitution that spells out the distribution of legislative and executive powers followed by the distribution of the financial burden between Federal and State government. The most important parts of this kind of relationship which affect planning legislation are matters relating to land, national development and the National Council for Local Government that have been spelt out in the subsequent provisions. This distribution of power is further supplemented by the Ninth Schedule of the Constitution where three Lists are set out, namely, the Federal List, the State List and the Concurrent List as shown in Table 2 below.

Table 2: Federal, State and Concurrent Powers in Malaysia (A simplified scheme based on Arts. 74, 95B and Schs. 9-10)

FEDERAL	STATE	CONCURRENT
External affairs	State government	
Defence	Islamic law	
Internal security	Malay custom	
Civil law	Islam	
Administration of justice	<i>Local government</i>	
Citizenship	<i>Land</i>	<i>Planning</i>
Machinery of government	Riverine fisheries	Soil erosion
Finance and taxation	Forestry	Scholarship
Trade and industry	Roads and bridges	Public health
Shipping	Public nuisances	Social welfare
Fisheries	Agriculture	National parks and wildlife
Energy	Housing	Drainage and irrigation
Transport	Malay reservations	
Education	Water (so far as not federalized)	
Health		
Labour and professions	Sabah/ Sarawak (State)	Sabah/Sarawak (Concurrent)
Social security	Native law	Personal law
Aborigines	Posts	Some fisheries
Water supply, rivers and canals	Harbours	Some shipping
	Libraries	Some energy
	Immigration	Elections

Source: Harding (1996).

According to Harding (1996:168) "...the Federal List sets out those subjects on which only Parliament can legislate, and the State List sets out those subjects on which only the State Legislative Assemblies can legislate, while the Concurrent List sets out the subjects on which either may legislate". Any matters not included within these Lists are regarded as State matters (Article 77). Referring to these three lists as shown in Table 2 above, evidently, planning matters come under the 'concurrent list' in which both Federal and State Governments have a legislative power to enact planning law. However, matters pertaining to land are under the State list.

At the national level, Malaysia practices an integrated system of national development planning (Figure 3). Within this system, a cabinet of ministers is appointed by the King to advise him in the exercise of his functions. It consists of the Prime Minister as chairman and unspecified number of ministers. Three advisory bodies are established under the constitution, which are the National Land Council (NLC), the National Council for Local Government (NCLG) and the National Finance Council (NFC).

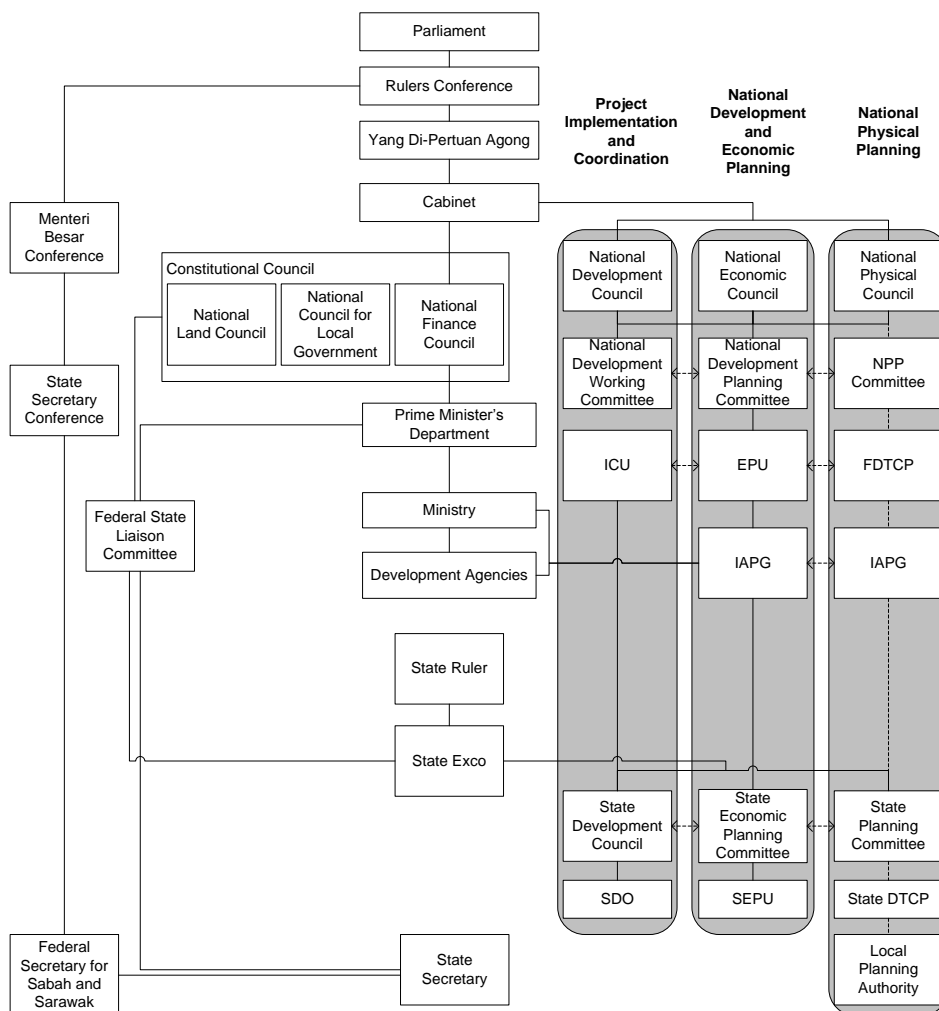


Figure 3: Integrated National Development Planning
 Source: Adapted from Bruton (2007)

This integrated national development planning system is simplified by the diagram below (Figure 4) focusing on hierarchical structure of town and country planning for socio-economic, and physical planning and development in Malaysia.

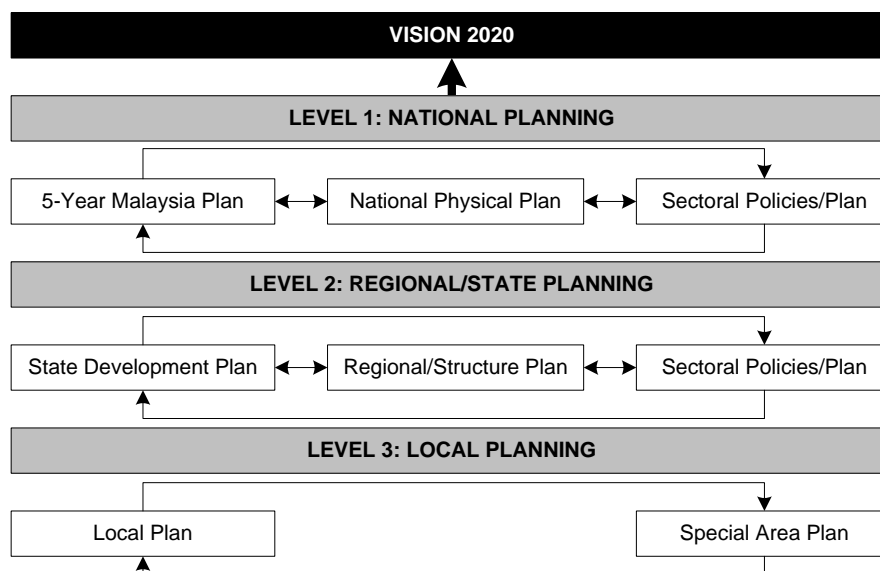


Figure 4: Malaysia: National Development Planning Framework after 2001
 Source: Adapted from Nur Sallehi Kassim & Islam (2006)

In the Peninsular Malaysia, the TCPA 1976 was amended in 2001 to overcome the lack of coordination of planning policies among states and between the Federal and States Government (Taye, 2002:6). It introduces radical changes to the administrative responsibilities of the States and the Federal Government, and strengthened the role of the Federal Government in planning with the following insertions;

- i. Provides for the establishment of the National Physical Planning Council (NPPC) chaired by the Prime Minister;
- ii. Formally establishes the position of Director-General of Town and Country Planning heading the Federal Town and Country Planning Department;
- iii. Makes provision for the establishment of regional planning committees for region that consist of an area situated in two or more states;

- iv. Amends the development control system to require that the state committee seek advice of the NPPC on application for new townships with a population exceeding 10,000 or covering an area of more than 100 hectares or both; a construction of any major infrastructure or utility; and developments affecting hill tops or hill slopes in environmentally sensitive areas;
- v. The National Physical Plan prepared by the Director-General of Town and Country Planning is to be translated in State Structure Plan and cascaded to Local Plan.

With regard to Sabah and Sarawak, the Constitution conferred on them greater legislative powers compared to those states in Peninsular Malaysia. Parliament's powers under Article 76A to extend the legislative powers of the States may, in the cases of Sabah and Sarawak, be exercised instead by an order of the Yang di-Pertuan Agong. Parliament's powers to legislate for land and local government do not apply to Sabah and Sarawak, which allows these States exclusive legislative control over these two matters. Although Sabah and Sarawak are represented in the NLC and the NLGC but their representatives may not vote, and they are not obliged to follow any policy laid down by these bodies; this position may, however, be altered by Parliament with the concurrence of the State Government (in relation to the NLC) or the state legislature (in relation to the NLGC). Furthermore, no area in Sabah and Sarawak may be included in a development area proclamation without the consent of the State Government (Harding, 1996:174).

The reasons for this situation may be found by looking back to the history of Sabah and Sarawak prior to and during the formation of Malaysia. These special exclusions and privileges were part and parcel of negotiations during the inclusion of these two states into Malaysia in 1963. From this perspective, Harding (1996:182) tended to conclude that "Malaysia is not a true Federation but rather a quasi-federation, [...] there is no real balance of constitutional power between the States and the Federation [...] the entrenching of special privileges for those States (Sabah and Sarawak) renders Malaysian federalism more complex [...] and that Malaysia is essentially a federation of three units (Malaya, Sabah and Sarawak) rather than thirteen units".

CONCLUSION

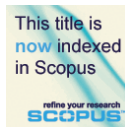
In short, this paper revealed the historical influences on present planning legal structure in Malaysia. The historical events since 1400AD until the creation of federal territories in more recent times give implications in terms of application of planning law throughout Malaysia. Historically, states were individual kingdoms administered by the Sultans. Throughout time, they were colonised and later formed into a federation, which is Malaysia. Nevertheless, until present day they retain the authority to accept or not to accept Federal laws, which is a result of the negotiation undertaken during the formation of Malaya. Consequently, this has led to the application of different sets of planning law in different regions of Malaysia.

Despite the non-uniformity of planning laws, efforts to harmonise planning throughout the country have been undertaken. These include the amendment to planning laws in order to overcome issues in coordination of planning policies between States and Federal Governments, and the establishment of national level planning committee like the National Physical Planning Council and the National Council for Local Government. Besides national level committees, similar set up of committees at regional level may also need to be put in place in order to further harmonise the planning policies and administration throughout the country. Further research is necessary to determine the impacts of this non-uniformity of planning laws on the administration and implementation of planning and development in the country.

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UNDERSTANDING OF TOURISTS' PREFERENCES PATTERN: A STUDY IN MELAKA, MALAYSIA

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Abstract

Tourism sector is one of the world largest and fastest contributors to the economic sector. The recognition as UNESCO World Heritage City in 2008, has led to the city of Melaka to be the most visited city in Malaysia. There has been a great deal of research devoted to identify the tourist preferences in countries, regions, cities, and other areas. Such estimation is essential for producing comprehensive estimates of tourism economic benefits in an area. This paper presents an evaluation of tourists' preferences among domestic and international tourists visiting Melaka. 1000 tourists were surveyed using diary records survey method. The result shows the purpose of heritage and conservation is the most important factors that motivate their visit to Melaka, while business purpose is the least motivating factors influencing the choice of destinations. It is also found that young, single and professional tourist is the new target market in Melaka.

Keyword: tourist preference, Melaka

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INTRODUCTION

Tourism is the largest and fastest growing industry in the world. While in Malaysia, tourism industry is the second largest industry with the main contributor to the economy after manufacturing sector. There are 25.03 million of tourist arrivals with total receipts of 60.6 billion in 2012. This amount represents an increase of 1.3% of tourist arrivals and an increase of 3.9% in total receipts compared with year 2011 (Ministry of Tourism, 2013). Based on the Economic Impact Report 2013 that has been prepared by World Travel and Tourism Council (WTTC), Malaysia generated 1,795,500 employments in 2012 in which 6.5% of total employment. This includes the employment in direct, indirect and induced sector in relation to tourism industry.

In addition, the total contribution of tourism industry to is RM146.5 billion in 2012. This includes 44.6% from direct contribution, 15.8% from induced contribution while 39.6% from indirect contribution. This figure justifies Malaysia generates large opportunities to the local community involving tourism industry. However, the report by WTTC declares that Malaysia recorded below world average of total contribution of employment in tourism industry (below 1,975,000). In early stage of tourism development in Malaysia three decades ago, Malaysia had the opportunity to host the first Pacific Asian Tourism Association (PATA) Conference in 1972, followed by second PATA Conference in 1986. Later, Malaysia takes a serious step in promoting tourism industry by the launching of the Visit Malaysia Year campaign in 1990, and followed by state visit year, for instance, Visit Terengganu 2013, Visit Melaka Means Visit Malaysia and others. Therefore, the tourism sector has contributed directly to the economy of Malaysia.

However, the issue on local economic benefits in several tourism activities namely accommodation, food and beverages as well as transportation in host destination is widely discussed. This subject is strongly based on purchase behavior of different market segment. Moreover, the inadequate supply in term of tourism facilities to the current demand effects various promotional tactics and decision process. Thus, the aim of this study is to give insight and understanding on existing literature on tourists' preference choice. The study deals with a state in Malaysia-Melaka, where received the influx of tourist every year. The paper will therefore comprise two main objectives: (1) to identify the tourists' profile (2) to identify the selection of destination preference choice among tourists. This paper makes an important contribution to the existing literature. This

paper extends the knowledge of tourist profiling and preferences of Melaka context for which no related researches have been published. The paper is organized in 3 sections. Section 2 reviews the relevant literature and site background. Section 3 describes the data collection procedures. Section 4 reports and discusses the findings.

LITERATURE REVIEW

Tourist Preferences

Tourist behavior is determined by various factors. It includes personal and external to the tourist (Swarbrooke and Horner, 1999). The external factors include preferences of the individual tourist, and observed as one of the most vital element and determine the special attributes of the host destination (Murphy, 1985). Many models related to the tourist behavior have been explained and studied by most of the tourism literature (Matheson & Wall, 1982; Murphy, 1985; Middleton, 1988; Goodall, 1991; Swarbrooke & Horner, 1999). Based on Murphy (1985), Moutinho (1987) and Goodall (1991) have categorized the four basic travel motivators. (1) Physical motivators such as the quality of food or accommodation, the efficiency of public transport system. (2) Cultural motivators such as the aspiration to experience the foreign customs, history, heritage and culture. (3) Social motivator such as visiting relatives and friends, meeting and business purpose. (4) Fantasy motivators refers to escape from the daily routine, leisure, and holiday. All of the preferences are composed from an image of that particular destination.

Pearce (1988) added that preferences are more specific than motivations, and are revealed by where the tourists go and what the tourists do. Based on Nicolau and Mas (2006), preferences were not specifically analyzed and addressed in certain technique such as conjoint analysis, a method that has been promoted by Suh & McAvoy (2005), but, research has most frequently used destination attributes and personal characteristics as the dimensions to define the choice of destination. In support, Decrop (2000) claimed that preferences are compared and the one is chosen over the other. The tourists have to decide and choose which of the destination they wish to visit and what are the attributes influenced such decisions. Based on Dellaert, Etterma and Lindh (1998), tourists' decisions are very complex decisions in which the choices and decisions for different elements are interrelated and evolve in a decision process over time, and most of the research on tourists' travel choice highlighted the tourist decision choice as

the key element in the travel decision making process. Thus, the decision making process is influenced by a number of internal and external variables. Internal variables refer to psychological elements and external variables refer to non-psychological elements. The criteria that always been highlighted by Um and Crompton (1990) and Sirakaya and Woodside (2005) includes personal (push) factors and destination attributes (pull factors). In 2006, Lam and Hsu mentioned that decision making process leading to the choice of travel destination had not been well researched.

However, list of researches on identifying important attributes affecting destination choice have been conducted, namely Goossens (2000), Heung et al., (2001), Kozak (2002) and Kim & Prideaux (2005). These studies have contributed to identify many choices and reasons. The likert scale using 5 points and 7 point was used for rating the importance of each choices, and each choices are then arranged in order. The literature of destination attributes have been explored by few researchers, namely prices and distance (Nicolau & Mas, 2006), climate (Hamilton & Lau, 2004), quality and pricing (Goossens, 2000). To conclude, the list preferences attributes introduced by Murphy were adopted as well as the method introduced by Decrop, Goossens, Heung et. al., Kozak and Kim was used in this study to compose and identify the preferences among tourists in relation to Melaka.

Study Site: Melaka, Malaysia



Figure 1: Map of Melaka, Malaysia and surrounding areas

Melaka is one of the fourteen states of Malaysia. It is located in south western coast of Peninsular Malaysia. The area of Melaka is 1,658 square kilometers and divided into three districts, namely Melaka Tengah, Alor Gajah and Jasin. It takes about two hours travel by road from Kuala Lumpur to Melaka and approximately three hours travel by road to Singapore. Melaka is a well-known historical state that rich with various tourism destinations since decades ago. In fact, tourism under the services sector recorded as the most important economic sector in the state, contributing 46.6% of GDP.

In attracting the tourist arrival and investors, state government has brought forward a slogan for promotional purpose. The slogan “Visit Melaka Means Visit Malaysia” has launched in early year of 2000. On July 7, 2008, Melaka have been recognized by United Nations Educational, Scientific and Cultural Organization (UNESCO) as a World Heritage City. The city has seen as a historical and heritage witness of 500 years of trading and cultural exchanges between East and West in the Straits of Melaka. UNESCO is now assisting Melaka to preserve and restore the valuable colonial buildings, squares, and churches that have been left by Portuguese, Dutch and British back in 15th- century. After the recognition by UNESCO, Melaka is now becoming the domestic and international tourists’ node with recorded the highest number, 13.711 million of tourists in 2012. They successfully attracted 1.366 million of domestic tourists in 2012 as compared to 3.512 million in 2007. In fact, the domestic arrivals grow faster after the UNESCO recognition from 4.857 million in 2007 to 10,199 million in 2012. According to report by the State Tourism Unit (2012), the top five countries of tourist arrivals are China with 652,002 tourists followed by Singapore (584,088), Indonesia (517,941), Taiwan (356,409) and Japan (123,930).

The state government is very committed collaborating with the state tourism players. As a result, rapid development of the tourism industry in Melaka enhance foreign exchange earner, contributing to economic growth, attract investment and create employment opportunities. Melaka State Government more focused in the way of the country's position as a leading foreign tourist destination, as well as enhances ongoing efforts to promote local tourism. Opportunities abound for entrepreneurs, business owners and investors who support the government.

DATA COLLECTION AND ANALYSIS

Diary Records Survey

In examining the expenditure of tourists, two popular methods have been used in most of the tourism research. They are exit interviews and daily expenditure records during the visit. Exit interviews had been implemented in early 60s, in which tourists will recall their spending in particular tourism destination or events and record the expenditure. However, Pearce (1988), Howard et. al (1991), Frechtling (1994), and Faulkner & Raybould (1995) found that many visitors had difficulties to recall their activities with the expenditure. This is due to the error or recall bias in recording the expenditure. Based on Rylander et al. (1995), the errors occur when the complexity of transactions and the length of time between the visit and interview increase. Frechtling (1994) also added it is caused by memory decay. Thus, in order to reduce and eliminate the error, previous researchers have uses diary records survey in which daily activities and expenditure will be recorded during their stay. Previous researches (Howard et al., 1991; Rylander et al., 1995) have used this method to identify the expenditure of an event, but they provide the survey in first day and mailed back to the research team when the visit is completed.

A total of 1500 diary record survey consists of 750 for domestic tourists and 750 international tourists were evenly distributed in selected hotels based on stars ranking in Melaka. Later, the survey successfully collected total amount of 1000 respondents among domestic and international. The survey was administered from March 2014 to April 2014. It includes 6 weekdays, 6 weekends. It was not difficult to monitor and collect the respondents answer sheets because the period was at the peak of the Malaysia tourism season due to school break and Visit Malaysia 2014. The diary record survey was distributed to the tourist during their hotel check-in. After completion, they will return the survey to the receptionist during check-out. Frequency analysis using Statistical Package for Social Science (SPSS) was employed to estimate the means among ten preference choices. The ten preference choices were obtained from tourism subsectors that have been focused and promoted by Melaka state government in their tourism agenda. Before the final estimations were made, a data screening was performed by the application of Kurtosis and Skewness measures in order to test for data normality as the assumption of normality is a prerequisite for analysis. It is found that all of the variables had met the

assumption of normality as the Kurtosis and Skewness values fell between +1.0 and -1.0 which were considered bivariate normal.

Profile of Respondents

Table 1: Profile of respondents

	Variables	Components	Frequencies	
			Domestic	International
Socio demographic	Origins		525	475
	Gender	Male	390	293
		Female	135	182
	Age	11-20	34	5
		21-30	266	174
		31-40	183	172
		41-50	29	64
		51-60	10	54
		61-70	3	6
	Marital status	Single	288	226
		Married	233	230
		Widowed	1	5
		Divorced/ separated	3	14
	Occupation	Student	95	28
		Government servant	140	84
		Private	194	280
		Pensioner	6	33
		Self-employed	90	46
		Unemployed	0	4
	Education level	SPM/ O-level	54	8
STPM/Matriculation/ A-Level		3	4	
Certificate		41	21	
Diploma		127	39	
Bachelor degree		240	314	
Master degree		56	71	
Phd		4	17	
Travel characteristic	Purpose visit	Holiday	455	374
		Visit family	15	12
		Business	35	29
		Shopping	6	13
		Education trip	12	13
		Conference, seminar	1	15

	Health treatment	1	12
First visit?	Yes	81	369
	No	444	106
Number visiting (adult)	1	273	187
	2	216	201
	3	19	54
	4	9	20
	5	7	7
	6	1	4
	7	0	2
Number visiting (children)	0	407	444
	1	51	6
	2	39	18
	3	13	6
	4	12	1
	5	1	0
Returning Melaka within 2 years?	Yes	522	417
	No	3	57

Table 1 above shows respondents' socio-demographic and travel characteristics. There are total of 525 respondents are domestic tourists and 475 respondents are foreigners. The majority of the respondents were male (68.3%), in their 21-30 range of age (44%). 28.8% of local tourists were single while 23% of international tourists were married. Both domestic and international was private employee (47.4%) with qualification of bachelor degree (55.4%). This profile pattern indicated clearly that the young single profession was the highest potential market in Melaka. Thus, the provision of tourism activities as well as basic facilities such as accommodation and entertainment in Melaka needs to be concentrated in such market.

Moreover, the majority of respondents visited Melaka for holiday. The respondents were domestic (45.5%) and international (37.4%). 44.4% of domestic tourists were not first-time visitors, while 36.9% of international tourists were first-time visitors. The study has identified health treatment for purpose of visiting Melaka among international tourist, as a new finding and new segment of potential market. It needs to be explored and widely promoted by the state government. The traveling profile above highlights the

domestic tourist are travelling individually (27.3%), while the international tourist are more likely traveling with partner (20.1%). 52.2 % of domestic and 41.7% of international tourists suggest will coming back to Melaka as Melaka provides a wide range of tourism activities and products hence delivers a high satisfaction to the visitors.

Tourists’ Preferences Choice of Destination

Table 2: Tourists’ preferences choice on Melaka
Statistics

	1	2	3	4	5	6	7	8	9	10
Valid	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Missing	0	0	0	0	0	0	0	0	0	0
Mean	2.3510	2.7690	6.1330	5.5590	7.8870	4.6710	6.3300	5.5730	7.8710	5.8020

Legend:

1. History & heritage values	6. Affordable
2. Cultural values	7. Facilities
3. Recreational & sports	8. Foods
4. Shopping heaven	9. Education values
5. Business opportunity	10. Atmosphere & environment

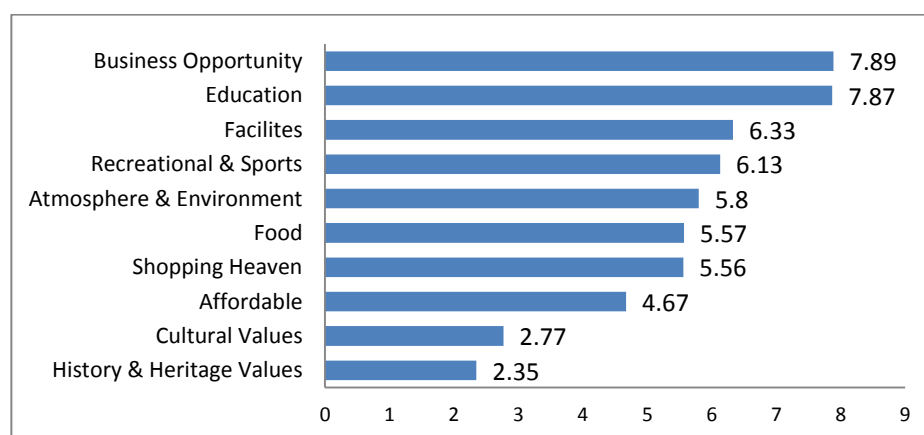


Figure 1: Tourists’ preference choice on Melaka

In the SPSS descriptive table 2 above, the result indicates the mean of history and heritage value is 2.35. Since the mean is most nearly to 1, thus, history and heritage value is the highest preference among tourist to visit Melaka. Next, the mean of cultural values is 2.77, thus, it is the second highest preference among tourist. Then, it is followed by affordable, 4.67; shopping, 5.56; Food, 5.57; atmosphere and environment, 5.80; Recreational and sports, 6.13; and Facilities, 6.33. Education and business opportunity respectively recorded the lowest preference choices of 7.87 and 7.89.

DISCUSSION

The purpose of this paper was to analyze the preferences of domestic and international tourists to Melaka, Malaysia. The results showed the history and heritage values as well as cultural values were two main attractions in attracting people to visit Melaka. The tangible heritage product namely A' Famosa, replica of Melaka's Sultanate Palace, Replica of the Flor De Lamar, Porta De Santiago and Stadthuys have been the main identity of Melaka since ages ago. Moreover, intangible cultural values have flourished with multi-racial, rich with tradition and custom in Melaka. That can be seen in the culture of Malay, Chinese, Indian, Baba Nyonya, Chitty, and Portugese. To illustrate detail on the relationship between these two highest preferences chosen and tourist origin, a chi-square test was conducted as below.

Table 3: Chi Square test for tourist origin and history and heritage value preference

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	83.413 ^a	9	.000
Likelihood Ratio	104.363	9	.000
Linear-by-Linear Association	37.413	1	.000
N of Valid Cases	1000		

a. 6 cells (30.0%) have expected count less than 5. The minimum expected count is .95.

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Phi	.289	.000
	Cramer's V	.289	.000
N of Valid Cases		1000	

Table 3 above shows a chi-square test of independence. It was conducted to evaluate whether domestic tourists have a greater likelihood to choose history & heritage values to visit Melaka than international tourist. The two variables were the origin of tourist (domestic and international) and history & heritage values (rank 1 to 10). Based on the result, tourist origin and heritage values preference were found to be significantly related, with (n = 1000), 83.41, p = .00, Cramers's V = .29 indicated a medium effect. Thus, the proportions of domestic and international who visit Melaka for the main reason of heritage values were 42.9% and 44.8% respectively. Thus, there was a significant association between tourist origin and history & heritage values preference.

Table 4: Chi Square test for tourist origin and cultural values preference

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	81.309 ^a	9	.000
Likelihood Ratio	93.520	9	.000
Linear-by-Linear Association	64.003	1	.000
N of Valid Cases	1000		

a. 5 cells (25.0%) have expected count less than 5. The minimum expected count is 1.90.

		Value	Approx. Sig.
Nominal by Nominal	Phi	.285	.000
	Cramer's V	.285	.000
N of Valid Cases		1000	

Table 4 above shows a chi-square test of independence. It was conducted to evaluate whether domestic tourists have a greater likelihood to choose cultural value to visit Melaka than international tourist. The two variables were the origin of tourist (domestic and international) and cultural value (rank 1 to 10). Based on the result, tourist origin and heritage values preference were found to be significantly related, with (n = 1000), 81.31, p = .00, Cramers's V = .285 indicated a medium effect. Thus, the proportions of domestic and international who visit Melaka for the main reason of cultural value were 44.6% and 45.3% respectively. Thus, there was a significant association between tourist origin and cultural value preference.

In other point, the chi-square test results above verified that the state government should not neglect the values of heritage and cultural conservation. This two main attributes have strong relationship with the origin of tourists especially tourists from the modern regions and countries. Heritage landmark building will always symbolize the image of Melaka hence allow tourists to trace the historical origin of the city. The concern of the new aim in driving Melaka as a green technology state, historical buildings will be overlooked than urban development. The concept of maximizing profit and density composition would certainly oppose the historical buildings and heritage preservation. As a result, conservation of heritage and cultural matter is succumbed to modern development and construction projects. Thus, the urban development and heritage conservation in Melaka should be harmony with one another in light of their importance, because both of them fit in the long term and interests of the tourists as well as local community.

The research finding has identified single and budgeted young professional group has the heritage and cultural influenced as the new main market segment of tourist in Melaka. It was proven in the result above, indicated that Melaka is recognized as one of the affordable tourism destination that offer low rate of tourism products. It is proved that the demand of low rate accommodation and other basic tourism services among

tourists is high. Thus, the state government needs to improve the linkages between the cultural and natural heritage of Melaka with the local community to remain the genuine. The young generation appreciates the heritage and natural projects even though it is small and medium scale, as long as it is genuinely adopting the local culture and community. Unfortunately, the pattern and trend of tourism development in Melaka is mostly towards the provision of new replica heritage attractions and imitation of intangible cultural with modern structures and centers surrounded and eliminate the values of heritage. The intention to diversify the tourism product and imitate of a genuine natural and cultural heritage tourism need to be reviewed systematically.

CONCLUSION

This study identified and evaluated the choices factors influencing the tourists' choice of Melaka as tourism destination. The result showed that history & heritage values and cultural value are the two most influential reasons in the choice of Melaka. Melaka turns out to be four most top cities and most favorable destination after Penang, Kuala Lumpur and Selangor. In fact, Melaka is preferred as it is a most affordable place to stay and visit, suitable place to escape and has a lot to offer for domestic as well as international tourists. This study aims to assist the state government to reinforce the strength that Melaka has and improve the weakness, hence do some planning in terms of development and promotional strategies in order to increase the number of tourists. Moreover, it helps Melaka tourism players to better understand on tourist choices pattern hence can develop their effective marketing strategies. In future research, it is recommended that research should focus on identification of tourists' behavior with the integration of tourists' expenditure and satisfaction in Melaka.

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THE REVIEW FOR THE USE OF URBAN CLIMATIC MAP IN THE LAND USE PLAN FOR URBAN PLANNING

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Abstract

Urbanization leads to positive and negative impacts on the society. While it accelerates economic growth, it also brings negative impact to the environment and people's health. The growth of urbanization is unavoidable; therefore, sustainability needs to be maintained to preserve the liveability of urban dwellers. The intention of this study is to review the use of climatic information in planning future developments in the local land use map. The studies of content and interview method were done in order to understand the real situation of this environmental mitigation. In further, the identification of the gaps of e study. The findings of this study were used to propose the climate indicators for the existing land use map. Future studies may focus on conducting preliminary experiments to apply the urban climatic map in the local context.

Keyword: urbanization, climate, urban climatic map, indicators, spatial planning

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INTRODUCTION

As the capital city of Malaysia, Kuala Lumpur is densely populated. The city has been showing signs of environmental problems due to the urban activities (Burghardt, Katzschner, Kupski, Chao, & Spit, 2010). The integration of public transports, infrastructures and tall structures, along with massive migration has further reduced the gaps between spaces. Hence, proper mitigation is necessitated in order to sustain the liveability of the city. Many mitigations are focusing on greenhouse gases (Kondoh, 2007; Rosenfeld et al., 1995). Only few studies have focused on the local climate conditions (Schwarz, Bauer, & Haase, 2010)

Urbanization gives positive and negative impacts to society. While it accelerates economic growth, it also brings negative impact to the environment. Warmer air temperature alters urban microclimates and imposes various negative effects on public's health; it also specifically causes environmental problems by intensifying heat waves, deteriorating air quality and increasing the occurrences of flood (Kondoh, 2007). Another related UHI problem is thunderstorm (Ahmad Fuad Embi & Norlida Mohd Dom, n.y.; Bornstein & Lin, 2000).

Urban climate is a function of urban structure and activity (Netzband, William, & Redman, 2007). Hence, the integration of information from many sources, such as from remote sensing imageries and climatic datasets, can give beneficial understanding to planners. In Germany, there is a legal requirement that developments should not worsen the climatic condition of a site (Ng, 2009). By using climate analysis, future developments can be planned by considering climatic conditions. However, it is crucial to note that such an analysis needs to be less complicated, and the approach to simplifying version of climate so that the results understandable by the planners. In the context of this study, several issues need to be identified; data scale and data types are among the important aspects that need to be considered before climate analysis is conducted for this study.

This study has identified the gap concerning the lack of climatic knowledge applied by local urban planners. Therefore, the intention of this study is to propose a climate map in an urban planning study. This study aims to propose a new analysis for incorporating climatic conditions to a land use map for use in future development analyses. The central idea is that the climate study is considered an appropriate way to plan future developments.

THE USE OF URBAN CLIMATE INFORMATION IN URBAN PLANNING

The integration of urban climate's information and environmental planning is a new approach to conducting an urban planning study. Urban climate might be a complex concept to urban planners, who often play the role of policy makers. However, urban climate can be made simplified by translating a scientifically sound data into spatial-based analysis. This paper, hence, will draw the attention from local planners to apply climatic dataset for future developments. This application was pioneered in Germany where climatic information was applied from the merging between a local urban planning and the Environmental Department (Burghardt et al., 2010; Urban Planning in the Essen Municipal Germany, 2010). In Hong Kong, air ventilation assessment was established by the Hong Kong government (Chao, Ng, & Katzschner, 2011; Ng, 2009; Ng, Chao, Katzschner, & Yao, 2009) since 2003, which saw the country being hit by severe acute respiratory syndrome (SARS) that had claimed many people's lives (Ng, 2009).

The understanding of applied climatology information is crucial in the urban planning study. Data, either from meteorological stations or mobile monitoring systems can provide an empirical base for investigations of the spatial and temporal structure of the urban heat island (Souch & Grimmond, 2006).

Higher temperatures in these decades have aroused the interest of researchers from all over the world. In London, the earliest historical works on UHI are well-documented (Howard, 1833). Since then, many scholars work on observing UHI with different themes by investigating the pattern, establishment of intensity, trends, and model and system development. Climatic mitigation can be a part of a sustainable urban development process. Additionally, several studies have proposed the process of utilizing climatic information for an urban planning work (Alcoforado, Andrade, Jing-feng, Lopes, & Vasconcelos, 2009; Burghardt et al., 2010; Chao et al., 2011; Ng et al., 2009; Ng, Katzschner, & Wang, 2007).

Foxon (2002) has briefly explained the definition of sustainable urban development. In particular, he mentioned that the purpose of development is to provide more effective and efficient services while at the same time, reduce harmful resources and environmental impacts. Another definition is meeting the present needs, although it does not compromise the ability of future generation to meet their needs. In another study, Turner (1993) has outlined a typology of sustainability from 'very strong

sustainability' to 'very weak sustainability'. To achieve sustainable urban development, cities must be planned and managed to form a balance between the needs of a human being and that of a natural environment by carefully using resources and transferring them to the next generation.

Depending on their methods, different practices use different indicator (Shen, Ochoa, Shah, & Zhang, 2011). In this study, indicator is an important key to understanding environmental problems. (Mega & Pedersen, 1998) claimed that indicators must be clear, simple, scientifically sound, verifiable and reproducible. Additionally, the indicator selected must be appropriate in order for appropriate planning framework to be designed to mitigate a problem, such as the indicators that were conducted by (Ibrahim, Abu Samah, & Fauzi, 2013; Mega & Pedersen, 1998; Oliver, Shahrudin Ahmad, Kadaruddin Aiyub, & Yaakob Mohd Jani, 2011).

Local and abroad urban planning studies related to remote sensing are delineated. In the local context, the urban planning studies have focused on identifying land cover change and urban sprawl (Noorzailawati Mohd Noor, Alias Abdullah, & Manzahari Nasrul, 2013; Noorzailawati Mohd Noor & Nur Aulia Rusni, 2013). According to (Oliver et al., 2011), air pollutants are likely to circulate in an urban environment due to UHI and hence, the pollutants in this area are consistently high compared to the ones in the surrounding area (Sani, 1989).

According to a study by the local government, the NUP guidelines (National Urbanization Policy, 2006), which was prepared by JPBD, has listed important indicators that are worthy of consideration. The urban heat island is also listed among the indicators (Indicator 26), but has not been analysed in the local government's study due to limited information. This policy creates a gap in knowledge, which the present study aims to fill in by proposing a suitable mitigation. One scholar, Sani (1990), was also aware that the transferring of the research results from temperate regions to the tropics needs to be considered in future studies.

ENVIRONMENT CONSIDERATION IN LOCAL AUTHORITY

Agenda 21 in Chapter 10 has stated that the integration of environment, planning and management needs consideration. An earlier proposal entitled 'Integrating geosciences into land use planning' by the Thematic Committee on Environmental and Sustainable Development discusses a pilot study on this matter (United Nation, 1997). According to the proposal, climatic information has seldom been used in local planning departments. In the local

context, most of the climatic information have been used in meteorology, environment and drainage irrigation departments. It was only in recent years that the awareness of using climatic information has been merged with local urban planning. However, the focus has been on climatic change particularly on GHG problems (Joseph, 2012; Ministry of Natural Resources and Environment Malaysia, n. y.). As for this study proposes an application to use climate information in land use maps as the added value of how climatic conditions relate to land use.

However, the UHI phenomenon is complex and various departments should involve in mitigating this problem. Accordingly, the interdependency between departments is crucial to ensure that the objective of the program is fulfilled. In this case, UHI is closely related to the environment, particularly to air and atmospheric conditions. Therefore, departments such as the Department of Environment (DOE) and the Town and Planning Department (JPBD) should be involved in the decision-making. DOE is a department that houses experts in environment, whose roles are to advise and give consultations on environmental conditions. Any condition needs to be reported to JPBD, who is responsible in making policies and executing decisions.

Owing to limited knowledge on urban climatology, they have less ability to adopt and transfer the climatic knowledge in planning, application, and design (Chao et al., 2011). Thus, it is crucial to have relevant training and education on urban climatic application and climatic spatial planning for the local authority.

URBAN CLIMATIC STUDIES FROM ABROAD

Further literature (Table 1) will focus on the urban climatic studies that were done in the abroad.

Table 1: Urban climatic studies

Abroad Studies	Datasets used
Ministry of Transport and Infrastructure Baden-Württemberg, (2013)	The significant bases are topographic maps, city maps, land use plans, and aerial photographs. The classification of climate and cold-air collection areas is not parcel-specific.
City of Stuttgart, (2013)	The base maps including the daily temperature curve, the vertical roughness (wind field disturbances), the topographic position and exposure and above all in the type of actual land use. Another criterion for particular climates is the quantity of emissions.

Chao, Yan-yung, & Lutz, (2010); Town Planning Board, (2011)	Using the urban climatic zones, thermal environment and air ventilation conditions within the urban canopy layer
Mora, (2010)	The climate are based on the variation of climatic factors as a result of topography and land cover
Ng, Lutz & Wang, (2007)	Develop urban climatic map and standards for wind environment

RELATED WORK IN LOCAL STUDIES

Scholars	Policy/ Guidelines
Hussien, (1989)	Historical of greening – In 1988, Alfred Venning as the state treasurer of Selangor (formerly a planter in Ceylon) proposed to build a botanical garden, known as Taman Tasik Perdana. Its maiden name was ‘Sydney Lake’, officially named by Clementi Smith on 13 th May 1889, as a starting point of the city green programme.
Hussien, (1989)	1973 – The first greening program – establish City Hall Beautification Unit in 1979. Tree Planting Program – 1972 – The planting breakdowns are as follows; roadside – 50%, open spaces (30%), public parks (10%), car parks (5%), buffer zone (5%). Since 1972, the city has planted approximately 231,000 trees specifically for shade. Public park – play space – minimum of 0.3 hectare (0.75 acre) and to provide with a standard of 0.12 hectare (0.3 acre) per thousand pop. Play area- minimum of 1.4 hectare (3.5 acres) and to be provided with a standard of 0.2 hectare (0.5 acre) per thousand pop. Sport facility – a minimum standard provision of 0.3 hectare (0.8 acre) per thousand pop. Local parks and gardens – apply a standard of 0.16 hectare (0.4 acre) per thousand population.
Mahesan, (1993)	Open space requirement: 667.0 hectares (2.75% of total area). Excluded private recreational open space, only about 468.6 hectares (1.94%) of the total area)-1acre per 1000 population (inadequate)
Yunos, (1993)	Greenery programme; roadside 50%, open space 30%, public parks 10%, buffer zones 5%, car parks 5%. Vision: open space Master Plan – to identify new priorities for new parks, open spaces, recreational programme etc.
Sani, (1995)	The urban area is several degrees higher compared to the rural area station (1973, 1979, and 1980), the min temperature yearly between the town and Subang is between 2° Celsius. In a calm night without wind, the difference can be up to 5° Celsius. The UHI has caused the cooling loads and additional peak of cooling demand.

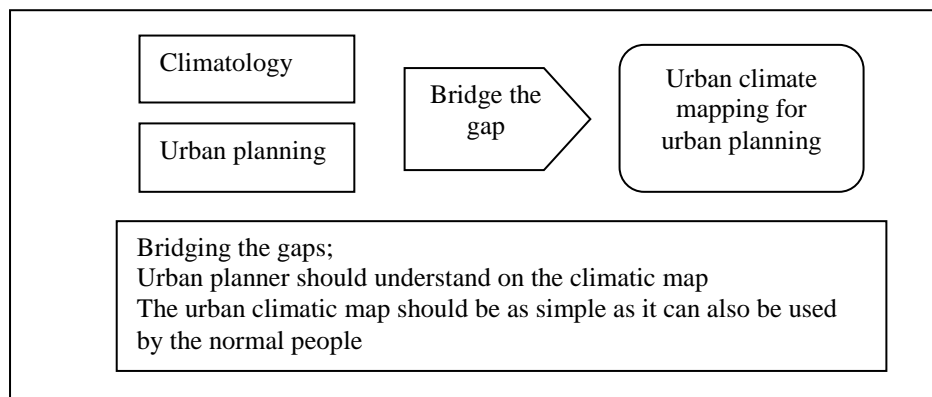
Sani, (1995)	The misunderstanding that used to arise with the greenery area is the assumption that the grass cover or shrub is enough to moderate the temperature. This current research, showed that the grass surface is better than the cement surface and soil, but the grass surface becomes dry fast in the afternoon and is not able to decrease the UHI intensity (Sani, 1986b).
Yeang & Hamzah, (1995)	The lowering of energy consumption would further reduce the overall emission of waste heat thereby lowering the overall heat island effect on the locality. This study proposes to design climatically-responsive tall buildings in the tropical high rise area
WWF Malaysia, (2001)	Indicator either we have achieved some balance between natural and built environment. Depends on the presence of medium sized trees, tree density and the heterogeneity of the habitat.
Selangor Structure Plan, (2002)	Planning Standard & Planning Park on the Roof Planning Standard Open Space and Recreational Area
JPBD, (2002a)	Landscape Total of green area - 40% from the development Individual green area – 10% from development Open Green area – 15% from development Individual green area – 30% from individual lot Buffer green area in lots – 6m
JPBD, (2002c)	Public garden – public park, public sport, leisure place (Town and Country Planning (Amendment) Act 1995, Act (A933). Provide 10% open space and recreation for developments such as; housing, commercial, industrial, mixed, tourism, institutional development.
JPBD, (2002b)	10% of open space out of the entire development area.
JPBD, (2002h)	Green network – connect the parks in towns such as Linear Park and Town Park. As a buffer zone to control pollution etc.
JPBD, (2002d)	Man-made lakes: Former Mining Lakes, Reservoir, engineered lakes Natural Lakes: Swamps, lagoons, oxbow lakes, lake zone Control development proposed for the lake area to prevent any negative effect – by creating zone system
JPBD, (2002e)	To retain stormwater and alleviate floods in the urban areas Minimum size of pond 0.3 hectares (3 or 5% of total area) A pond use to retain water for several hours before flow to drainage system and rivers.
JPBD, (2002f)	Of-top gardens are permitted in condominium housing development that exceeds 0.81 hectare in area. (No albedo/roof colour has been assigned in the guidelines) The location of air conditioning needs to be appropriately stated.
JPBD, (2002g)	Size of landscape that was proposed is 2.5m x2.5m and provided for every 2 to 4 bays. List of trees; Angsana (<i>Pterocarpusindicus</i>), hujan hujan

	(enteroboliumsaman), saga (adenantherapovonica), tamalan (Delbergia), Jambu laut (Eugenia grandis), pokok kaya (khayagrandis), pokok pasai (miliaazedarach), semarak api (delonixptecocarpum). (parking lot need to be planted with grass so the water easily absorbs to the soil)
JPBD, (2004)	b) able to identify and measure the problem and the quality of the town; environment programme; provision of environmental programs, provision for landscape index of water quality, discharged solid waste discharged, noise complaints, waterborne diseases per 1000 population.
National Urbanization Policy, (2006)	A sustainable and environmentally friendly development shall form the basis of environment conservation and improve the urban quality of life. Measure (iii) encourages development that reduces the impact of UHI.
JPBD, (2006)	Detention pond as open space Open Space and Landscape – 10% from development Buffer green
Ismail, Samad, & Rahman, (2008)	Green roof able to reduce global effect; global warming and local effect, UHI. It is known as passive techniques in reducing energy consumption and thermal performance in buildings.
Razali, (2009)	Study of temperature and relative humidity between open exposed sun, water based area and greenery area on human activities are performed.
Abdullah, Saito, & Said, (2011)	The parameter to be considered is the leaf area index which consists of tree height, planting species, planting distance and canopy area as well as plot for building envelope.
JPBD, (2012)	Green neighbourhood guidelines; proposing of pedestrian walkway study, plant trees, green buildings, brownfield and infill development etc.

The content analysis as Table 2.4 shows environmental consideration for human inhabitants in the urban area. However, there is no implementation on climate analysis that is very important for the inhabitants in the urban areas. Further analysis will look into the gaps between the climate and urban planning area.

RESULTS

From the analysis that was done in this study, there are gaps that need to be bridge among the climate data and the local urban planner. Further sections will focus on the indicators measure for climate development. Then, the proposed climate map for the local area will be elaborated. The last section proposes the conceptual framework for future directions of the research.



i) **Indicators measures for urban climate development**

This section is important to be understood by the local authority regarding the need of developing new techniques to moderate air temperature, and improve the health and comfort of human inhabitants in urban areas. A so called remote sensing and climatic analysis for use by urban planners need to be proposed from the collaboration with DOE. Several important indicators in this subject need to be considered. The following are the proposed indicators for UHI measures:

1. Land Surface Temperature image
2. Air temperature
3. Land use map
4. Wind direction
5. Climatopes

i) Land Surface Temperature image–This indicator is retrieved by using remote sensing imagery. It is measured by using thermal band and modelled by using an appropriate algorithm (in this case, by using Qin et al.'s (2001) mono window algorithm). Nevertheless, Schwarz, Bauer, & Haase (2010) have proposed that policymakers apply the following algorithm to thermal band to show the thermal emission between land uses:

$$EmissionIndex[i] = \frac{emission(i)}{emission(urbanGreen).100}$$

ii) Air temperature - The in situ measurement can be carried out by using mobile temperature several times. The measurements are then averaged to identify the mean temperature of a particular site.

iii) Land use map – The land use map will be overlaid on the other indicators and the resulting analysis needs to include the local climatic analysis, which indicates the polluted areas and the heat island status in such areas.

iv) Biophysical factors: LAI, elevation, albedo – Green areas is one of the most important parameters to be understood. However, the ability of such green areas to moderate air temperature also depends on the area's elevation, leaf area index (LAI) and coverage area. In this case, the mean average of parameters of such green areas need to be identified; also requiring identification is how far such mean temperature is able to cool the environment.

vi) Wind direction – this indicator is used for accessing surface roughness and topography. This data is important to mitigate which areas contain a cooling factor.

According to (Section of Urban Climatology, 2013), climatopes are areas with similar microclimatic characteristic that differ especially in the daily temperature curve, the vertical roughness (wind field disturbances), the topographic position and exposure and above all in the type of actual land use. Climatopes are named after the dominant type of land use.

ii) A proposal to develop a climatope map for local areas

According to the climatic map analysis, different scenarios can be developed to identify the worsening, improving or maintaining scenarios if a development is to be undertaken. A climatic map is able to show several options that need to be performed for a particular development.

Several indicators need to be used in order to design a climatope map according to the local climate of hot and humid weather. It is proposed that a zoning climatope map be designed according to the existing land use map. This study proposes the use of the existing climatope types as the ones used by the local government of Essen. The important climatopes are as follows:

1. Water climatope – Water climatope is one of the important land covers that are able to moderate the surrounding temperature. It is characterized by high levels of air humidity and wind, whereas air temperatures are lower during the day and higher during the night compared to the surrounding areas.
2. Open Space climatope – These areas are characterized by very small changes in wind flow and very few trees. Examples include playing fields and golf courses.
3. Forest climatope – These areas have very thick canopy layer of trees and are able to moderate air temperatures. Relatively, they have low temperatures and higher air humidity due to shading and evaporation during the day and mild temperatures during the night. Shading from thicker canopy layers helps to lower the temperature at walkways and the surrounding areas.
4. Green spaces climatope – These areas usually have thick canopy layers of trees and the resultant shading improves the air temperature of the walkway and surrounding areas. This category includes parks and gardens. The category of green space will also be referred to the LAI index (a higher LAI represents a dense canopy layer and vice versa).
5. City Border climatope – These areas have a good climate with a weak UHI, usually in built areas with one or three-storey buildings.
6. City Climate climatope – These areas have dense buildings and are pronounced as warm islands, which shows a bad bio-climate.
7. City Center climatope – These areas have high UHI and strong heat during the day. High level of air and noise pollution is present as well.

8. Commercial area climatope – This climatope is usually present under a dense development. It has heat island effect and low air humidity. This area is dry, has noise pollution and pollutants with high soil sealing.
9. Industrial area climatope – These areas exhibit higher emissions with a high air pollutants and noise. The air masses near the ground are warm, dry, and enriched with pollutants. The grounds of the buildings are warmer, which can significantly alter the wind field.
10. Deposit site climatope – These areas have much wind and it is warmer at night at the border, and this is different from the south and north aspects. The south aspect is warmer.
11. Deposit site (with vegetated area) climatope – These areas equalize north and south areas due to the existence of vegetation areas.

iii) A Conceptual Framework for A Future Research

Future research will be directed to experimenting the urban climatic preparation as a pilot study in the local area. For this study, a conceptual framework (Fig. 1) was designed. An environment climatic study may use remote sensing and meteorological datasets for future development considerations. The remote sensing indicators used in this study are urban growth, land surface temperature and biophysical indicators. The MET datasets used were air temperatures and wind data.

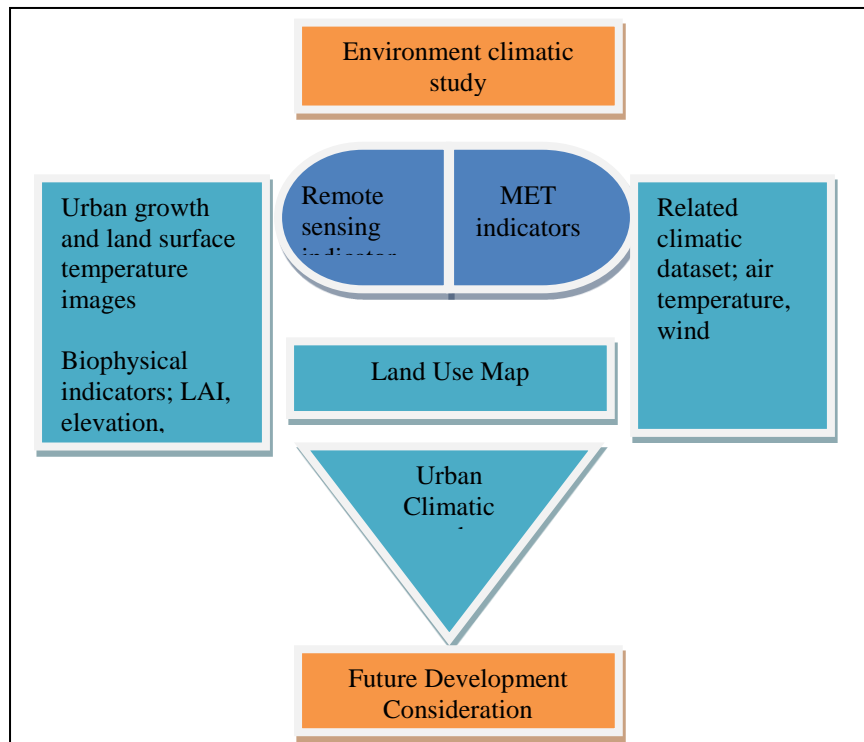


Figure 1: Conceptual Framework for Urban Climatic study

DISCUSSIONS

Urban climatic mapping is important because it uses important climate indicators for proposing the appropriateness of future developments. The importance of understanding urban climate, specifically of the local urban environment is crucial. Bridging the gap between the complexity of urban climate and urban planning is an important task to be achieved. In fact, the urban climate information can be simplified to be understood by planners.

CONCLUSIONS

It can be concluded that it is important to the local authority to start to use the local climate measures in order to ensure the appropriateness of planning for future development. It is crucial to use climatic conditions in an urban planning study. This study acts as a preliminary study of proposing the use of climatic variables in local urban planning. Future study may focus on the experimental work of the adopted climate variables in land use planning.

ACKNOWLEDGEMENT

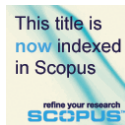
The author would like to thank the Essen Municipal for the interview. Appreciations are also forwarded to the Ministry of Education (MOE) for the study fund, and the Department of Environment (DOE) Malaysia, Malaysian Meteorological Department (MMD) and Town and Planning Department (JPBD) Malaysia for supplying the data.

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EVALUATING THE EFFECTS OF ROAD GEOMETRICAL DESIGN TOWARDS SPOT SPEED DISTRIBUTION ON ARTERIAL ROAD

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Abstract

Drivers travel at speeds they judge to be comfortably achievable in relation to the prevailing conditions and road geometrical design. The relationship between road geometrical design and speed of vehicles traveling in is very prominent. Speeds vary according to the perception of constraint imparted to the drivers by the road geometrical design. In a broader sense, these two factors are often interrelated with speed limits and road safety. The purpose of this study is to investigate how road geometrical design could influence the speed of vehicles on arterial road. Two roads with different geometric design were compared: arterial road with straight stretch and arterial road with curved stretch. The study was carried out by analyzing the speed characteristics between these two road stretches and it was discovered that vehicles traveling on straight road stretch tend to travel at higher speed than curved road stretch. The difference in the mean speed of the straight road and the curved road was tested for statistical significance by using t-test. The results show that there exists difference in the mean speed of the vehicles traveling at straight and curved road stretches. It was also found that the existing speed limit of the selected road stretches is lower than the 85th percentile speed. The 85th percentile speed is a commonly used measure to decide speed limit on a road. The vehicles were traveling at higher speed along straight stretch of road than curved road stretch. Few recommendations on strengthening the enforcement and improving speed reduction measures are drawn to discourage drivers driving at high speed to make roads free from accidents.

Keyword: speed, road geometrical design, road safety, straight road, curve road

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INTRODUCTION

Speed is an important measure to evaluate safety of the road network. Speed is also an important transportation parameter because other than safety, it relates to time, comfort, convenience, and economics. According to Currin (2001), high speed carries high risk, whereas low speed is relatively safe. Traveling at a speed more than the speed limit is not recommended, as it could cause the drivers to lose control of their vehicles and cause fatalities, especially at winding roads. In Malaysia, accidents on roads are linked with the problem of inconsistencies in the operating speed. Driving at above the speed limit, uncertain weather conditions and drowsiness of the drivers are the three main causes of fatal accidents during the festive seasons (The Sun, 2009). A number of issues may be relevant with respect to the road safety aspect of a development proposal and in particular speed of vehicles. A study by Moore et.al., 1995 has documented an extraordinary strong association between speed and road traffic crash risk, the odds ratio for speed in excess of 84 km/hour is being almost 40 times higher than that for speeds below 60 km/hour (Petridou and Moustaki, 2000). A number of research has shown that the safest groups are the vehicles travelling at or below the 85th to 90th percentile speeds. A research by Elvik, et.al., 2004, has found that there is a very strong statistical relationship between speed and road safety and it is difficult to think of any other risk factor that has a more powerful impact on accidents or injuries than speed. The statistical relationship between speed and road safety is very consistent as when speed goes down, the number of accidents or injured road users also goes down in 95% of the cases. When speed goes up, the number of accidents or injured road users goes up in 71% of the cases (Elvik, et.al., 2004).

The U.S. Federal Highway Administration in 2005 has declared that nearly 30% of fatal vehicle collisions every year in the United States were taken place on curve alignment of the roads. About 83% of these crashes on winding roads were due to roadway departures from sliding, skidding or rolling over. All the causes, as mentioned above, for the vehicles which are running off the road namely sliding, skidding and rollover were caused by negotiating the curve at a very high speed. On the other hand, in Denmark, about 20% of all personal injury accidents and 13% of all fatal accidents were occurred on curves in rural areas; and in France, over 20% of fatal accidents on dangerous curves in rural areas (Herrstedt and Greibe, 2001). The reason for the accidents is the same as indicated earlier, where the drivers were negotiating the curve at a very high speed. In China, according to the accidents database by the Chinese Ministry of Transportation in 2009,

26,292 road accidents were occurred on curved roads accounting for about 10% of the total accidents in 2008. Additionally, 9,070 people were died and 36,112 people were severely injured in these accidents. The main cause of these accidents, again, is due to excessive vehicle speed (Chen et.al.). In a simple sense, these kinds of accidents were happened at road curves because of inappropriate speed of vehicles, traveling at a speed higher than the speed limit along that particular road. However, the inappropriate-speed theory can be applied to straight road as well, where drivers have the tendency to press the accelerator and generally increase the speed because of a greater feeling of well-being and sense of familiarity of the road, consequently increasing the accident risk. A survey conducted by Collins (2008) has identified, drivers, on average, would drive faster on a straight open road, followed by a straight road in bad weather, a bendy open road, a bendy road in bad weather, a straight road in the dark and, finally, a closed bendy road. Nonetheless, it is also shown that speed limits, if suitably selected, can help to reduce the speeds thus reducing the accident rates (Hobbs and Richardson, 1967).

In a nutshell, it is evident that there is a clear relationship between changes in speed and changes in road safety: the larger the change in speed, the larger the impact on accidents or accident victims. In relation to this statement, it can be seen that road geometrical design also has some influences towards the speed of vehicles, thus explaining about the close relationship between road geometrical design, speed, and road safety. This paper focuses on the relationship between speed of vehicles and road geometrical design, and explains how different road geometrical design can influence the speed of vehicles. This paper describes the measurement of speed characteristics of the vehicles at a specified location under free-flow traffic conditions prevailing at the time of the study.

LITERATURE REVIEW

Spot Speed

In moving traffic stream, each vehicle travels at a different speed. Thus, the traffic does not have a single characteristic value, but rather a distribution of individual speeds. Speed is generally qualified according to three main types: i) Spot speed, ii) Running speed, and iii) Journey speed.

Spot speed is speed at a certain spot on one part of road at certain time (Mohamed, 1993), defined as the average speed of vehicles passing a point. Spot speed study is designed to measure the speed characteristics at a

specified location under the traffic and environmental conditions prevailing at the time of the study. According to Khanna (2001), spot speeds are affected by physical features of the road for example pavement width, curve, sight distance, gradient, pavement unevenness intersections, and roadside developments. Other factors that could influence spot speeds are environmental conditions (like weather, visibility), enforcement, traffic conditions, driver, vehicle, and motive of travel.

The above statement is supported by Hobbs (1967), where he wrote that measurements of spot speeds show a wide distribution and many interacting circumstances serve to determine the particular speed which individual drivers adopt. These circumstances will include those peculiar to the driver himself (such as his psychological and physiological traits); those concerned with his immediate environment and those affected by the more remote environmental considerations of law enforcement, type of district, and public opinions. Mohamed (1993), Khanna (2001), and Hobbs (1967) further explained the main elements of immediate environment are type of vehicle, road alignment, cross section and surface, weather, speed limits, and volume. As we can see, there are several elements that are repeated, which shows that the authors have agreed on the common elements that could influence spot speed.

Mohamed (1993) and Garber (2001) have cited that spot speed data can be used for certain purposes. It includes, but not limited to:

- h. Establishment of parameters for traffic operation and control and determination of existing roadway speeds, such as speed zones, speed limits (85th percentile speed is commonly used as the speed limit on a road), passing restrictions, and prioritisation of speed enforcement locations;
- i. evaluate the effectiveness of speed enforcement programs such as use of different speed limits for passenger cars and trucks;
- j. evaluate, identify or determine the adequacy and speed impact of roadway geometric characteristics, including horizontal and vertical alignment and general roadway features;
- k. identify whether the roadway is in need of greater law, enforcement, or reconstruction;
- l. determine speed trends and impact of traffic control devices (traffic signs, pavement markings, signals etc.);
- m. evaluate the effects of speed on highway safety through the analysis of crash data for different speed characteristics; and
- n. provide evidence to support or refute complaints of excessive speed.

In conducting the spot speed study, the suitable place and time for conducting this study are the important elements to be considered. According to Mohamed (1993), before placing the equipment and enumerators, researchers should search for a suitable site to conduct the study. Based on the objectives of the study, among the sites that are often selected as study site are highway or road that is straight, even and wide; road segment that is located between two junctions in urban area; road accident site or area where signboard is proposed. In terms of the suitable time to conduct the spot speed study, Mohamed (1993) has suggested the time between 9.00 a.m. to 12.00 noon; 3.00 p.m. to 6.00 p.m.; and 8.00 p.m. to 10.00 p.m.; study duration of one hour and; at least 50 vehicles as samples.

Road Geometrical Design

Ashley (1994) and Khanna (2001) stated that the required geometric design of highway depends on the speeds that vehicles are traveling. The speeds that are anticipated on the road are generally the basis for planning appropriate road alignment. Therefore, during the design stage, appropriate speed along the highways shall be determined in advance. However, Hong and Oguchi (2005) provided a contrast view stating that speed of traveling vehicles is dependent upon the geometric design of the highways. These statements highlight that both road geometrical design and speed of the vehicles have symbiosis relationship – i.e., both dependent upon each other. Ashley (1994) also stated that the geometric design parameters of horizontal alignment such as bends and straights should fit the functions of road. It was considered that straight roads are the safest and most beneficial of all but subsequently the opinion has shifted towards horizontal curvature can be beneficial as well, provided it is designed appropriately. An example of this is the introduction of bends in highway to reduce speeds, as long straight stretches of road may encourage undesirably high speeds whilst also contributing to loss of concentrations due to monotonous alignment.

It is important to note that, when assessing the acceptability of the geometry of an existing highway, the design standards related to the 85th percentile speed should be relevant. For example, if a highway has a speed limit of 90 km/h, but it is considered that the actual 85th percentile speed is greater than 90 km/h, then the required geometry should be assessed in relation to the higher observed design speed. It should always be remembered that the underlying factor for the standards of road geometry is highway safety (Ashley, 1994). Consequently, the vehicles observed in the

lower 15 percent are considered to be traveling unreasonably slow and those observed above the 85th percentile value are assumed to be exceeding a safe and reasonable speed (Texas Department of Transportation, 2012).

In this regard, road geometry shall be designed to suit the needs of it, and speed is one of the main elements that must be taken into consideration as road geometry and its design influence speed. Currin (2001), Ashley (1994) and Hobbs (1967) agreed that speeds may vary, but it depends on several factors that might affect it such as:

- e. general variables – time, date, weather conditions, highway classification, lighting conditions etc.
- f. road users – drivers, journey purpose, travel mode etc.
- g. vehicles – type, make, year, vehicle conditions, external and internal features etc.
- h. road environment – traffic control, traffic conditions, road design features, road surface, adjacent land use, special consideration etc.

On the subject of traffic lane, both Bateman (1948) and Khanna (2001) agreed that the minimum width of traffic depends upon the width of the motor vehicles and lateral clearance between passing vehicles which is considered safe. Mannering (2005) also mentioned that when lanes are narrower, adjustment is needed because narrow lanes and obstructions close to the travel lane could cause the traffic to slow as a result of reduced psychological comfort and limits on driver maneuvering and accident avoidance options.

Highway Functional Classification

Highways are classified according to their respective functions and in terms of character of the service they are providing. Highways and streets are primarily described as rural or urban roads, depending on the areas in which they are located. This primary classification is essential since urban and rural areas have different characteristics, especially those that are related to type of land use and population density, which significantly influence travel patterns (Garber, 2001). Garber (2001) also mentioned that all highway systems involve a hierarchical classification by the mix of access and mobility functions provided. There are four major classes of highways which include:

- e. Limited-access facilities
- f. Arterials – principal arterials and minor arterials
- g. Collectors – major collectors and minor collectors
- h. Local roads and streets

For this study, only literatures related to arterial system are focused in this section. Arterials are the surface facilities that are designed primarily for through movement but permit some access to abutting land (Roess, Prassas, and McShane, 2004). One of the most significant characteristics of arterial roads is vehicles traveling at a speed 80 to 90 km/h. As listed by Garber (2001), arterials can be divided into two: major or principal arterials and minor arterials. The principal and minor arterials then can be divided into two more categories namely – for principal: urban principal arterial system and rural principal arterial system, and for minor, urban minor arterial system and rural minor arterial system (Garber, 2001). Urban principal arterial system is the system of highways serves the majority activity centers of the urban areas and consist mainly the highest-traffic-volume corridors. On the other hand, the rural principal arterial system consists of a network of highways that serves substantial number of interstate trips. Virtually all highway trips between urbanized areas and a high percentage of the trips between small urban areas are made on this system.

The urban minor arterial system includes streets and highways that are interconnect with and augment the urban primary arterials. This system serves trips of moderate length and places more emphasis on land access than the primary arterial system. As for the rural minor arterial system, Garber (2001) stated that this system of road boosts the principal arterial system in the formation of a network of roads that connects cities, large towns, and other traffic generators, such as large resorts. Travel speeds on these roads are normally higher than principal arterial system.

OBJECTIVES AND RESEARCH METHODOLOGY

Objectives

The following are the objectives of this study:

- v. To identify existing road geometrical design elements of straight and curved arterial road segments.
- vi. To evaluate the effects of road geometrical design of the selected road stretches on the speed of vehicles.

- vii. To compare spot speed of traffic stream at the selected road stretches.
- viii. To suggest measures in achieving stipulated speed limit by the road users.

Background of Study Area

The study area is a stretch of an arterial road namely KL Middle Ring Road (MRR2). MRR2 is a ring road that was built by Public Works Department to link neighborhood areas around Wilayah Persekutuan Kuala Lumpur-Selangor border. The spot speed survey station was located at two points as indicated by point A and Point B in figure 1. Point A is located at the curvature stretch of the road near Zoo Negara, and point B at the straight stretch of the road near a Petronas Petrol Station. Both points have the same road characteristics having three lanes in each direction measuring 3.5 m lane width and 10.5 m total width. The stretches of the selected road were dual carriageway and the road surface was asphaltic concrete.



Figure 1 Location of Spot Speed Survey Stations

Sample Size and Sampling Method

The geometric design elements covered in this study include the horizontal curve, width of the road, and available lanes. Besides, the other physical aspects such as the width of road median, width of road shoulder, and road surface were also considered. On the other hand, the spot speed survey was conducted on 100 vehicles (which is the selected sample size) passing at a point at each of the straight and curved road.

Systematic sampling method was applied to ensure that the samples were appropriately selected to represent the population. Only passenger cars were selected as the target vehicle because they represent the predominate mode of transportation along the selected road and other roads. The systematic sampling method was applied by selecting the first vehicle randomly and then every 5th vehicle until the total sample size was reached. On average, the traffic volume on MRR2 was 180,000 to 200,000 vehicles per day (Ministry of Works, 2011). Data was collected during off-peak hour to measure the actual speed of vehicles during free-flow traffic.

Method of Data Collection

Data on roadway geometry such as horizontal curve, available lanes of the selected arterial road and road surface was observed. Pictures were taken to represent data on these elements by using a camera. Furthermore, the width of the road and its shoulder were measured using a laser distance meter device and a measuring tape. To measure spot speed, two points on the arterial road, one at the straight stretch and another at the curvature stretch were selected. In order to collect the data on spot speed, the enumerators have placed a radar gun at an appropriate location at the road side at a distance of minimum 10 meter from the selected vehicles. The radar gun was targeted at each selected vehicle to measure the spot speed of the vehicles.

Method of Data Analysis

The spot speed characteristics such as mean, median, standard deviation and percentile speed were calculated by using statistical analysis methods. T-test was used to test the statistical differences in mean speed of the vehicles at straight and curved stretch of the road. The calculation of t-test was conducted by using Minitab. Samples, mean, and standard deviation were filled in into Minitab prior to the calculation of the t-test.

RESEARCH FINDINGS

Road Geometrical Design Analysis

The road geometrical designs such as width and number of lanes were similar at the both selected road stretches. The width of the road is 10.5 meter with three lanes each direction, each measuring 3.5 meter wide. The width of this road is identical with that of the guideline requirements of an arterial road width (Ministry of Works, 2011).

For straight road, the width of each traffic lane is even. The road shoulder at the extreme left of the road is measured as 1 meter wide. The width of landscape and drainage reserve is 2.75 meter and 1.5 meter respectively (table 1). The median width of this road is 2.5 meter.

Similarly, the width of the curved road is also even for each of the three traffic lanes. The median is 2.5 meter wide. The width of landscape and drainage reserve is also 2.75 meter and 1.5 meter respectively. However, this road stretch has wider shoulder at approximately 3 meter. The normal, usable shoulder width that should be provided along arterial road is 3 meter (Ministry of Works, 2011).

Although both road stretches have no grades or vertical curvature, road with curvature, however, has super elevation. According to Ministry of Works, the maximum super elevation ratio that should be allowed for urban roads is 0.06. Generally, the main differences between the two road stretches are horizontal curvature, width of shoulder and super elevation (table 1). Other than that, the road stretches are similar in terms of road geometrical design.

Table 1: Road geometrical design elements at straight and curved arterial road

Road geometrical design elements	Straight road	Curved road
Horizontal curvature	No horizontal curvature	Has horizontal curvature
Width of road	10.5m	10.5m
Total of lanes available	3 lanes	3 lanes
Road surface	Asphaltic concrete	Asphaltic concrete
Width of road shoulder	1m	3m
Width of median	2.5m	2.5m
Landscape corridor	2.75m	2.75m
Drainage reserve	1.5m	1.5m
Super elevation	No super elevation	Has super elevation

Source: Primary data analysis (2011)

Spot Speed Analysis

The spot speed was measured at two different points, one at straight stretch and another at curved stretch, along Middle Ring Road 2 (MRR2). The sample size at each point of the road stretch is 100. The modal speed at straight road was 68 – 74 km/h, but at curved stretch it was 76.5 - 82.5 km/h. The mean spot speed at straight road was 83.47 km/h and at the curved road stretch, it was 73.92 km/h. The difference in mean speed between the two roads is 9.55 km/h (table 2). It shows that drivers were driving at higher speed at straight road stretch than curved road.

Table 2: Spot speed characteristics at straight and curved road stretches

Type of road	Straight road	Curved road
No. of sample	100	100
Mean speed	83.47 km/h	73.94 km/h
Modal speed	71 km/h	79.5 km/h
Median speed	82.2 km/h	74.5 km/h
Standard Deviation	12.87 km/h	12.10 km/h
15 th percentile	69.1 km/h	60.4 km/h
85 th percentile	96.2 km/h	85.4 km/h

The median or 50th percentile speed at straight road stretch was 82.2 km/h and that of curved road stretch, it was 74.5 km/h (table 2). It indicates that half of the cars were travelled at a speed of 82 km/h and below at straight road stretch and 74.5 km/h at curved road stretch.

The standard deviation speed at straight road stretch was 12.87 km/h and 12.10 km/h at curved road stretch. Percentiles can be used to indicate the position of an individual speed in a group of vehicles. It is mentioned in the literature that the vehicles observed in the lower 15 per cent are considered to be traveling unreasonably slow and those observed above the 85th percentile value are assumed to be exceeding a safe and reasonable speed. So, it is necessary to identify 15th percentile, 50th percentile, and 85th percentile at straight and curved road. The results of the percentile speed were calculated by using Minitab software.

For straight stretch arterial road, the 15th percentile speed was 69.1 km/h and the 85th percentile speed was 96.2 km/h (figure 2). The 85th percentile speed can be used to impose speed limit or overtaking distances as it is assumed to be the highest safe speed for a roadway section, and the 15th percentile speed shows the slower vehicles whose speed may be

causing interferences within the traffic stream. So, the design speed for arterial road with straight stretch at the selected area at MRR2 shall be limited to 96 km/h and vehicles should travel at least 69 km/h to allow smooth traffic stream. Figure 3, on the other hand, shows the results for arterial road with curvature where the 15th percentile speed was 60.4 km/h and the 85th percentile speed was 85.4 km/h. For arterial road with curvature, a speed limit of 85 km/h should be imposed and vehicles should travel more than 60 km/h so that they would not cause interferences to the traffic stream.

From the overall results, it is obvious that every single value of speed that was calculated for both road stretches are different from each other. The speed characteristics at straight road stretch were higher than curved road stretch except for the modal speed. Looking at the speed characteristics at the two road stretches, it is obvious that the vehicles at straight road were traveling at higher speed than curved road.

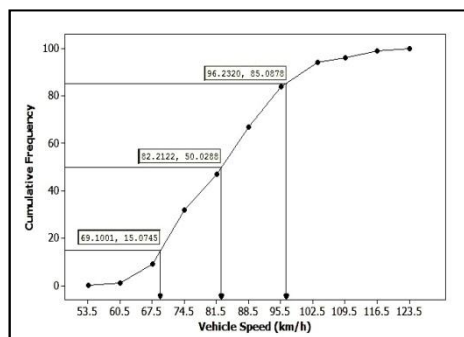


Figure 2 : Cumulative frequency graph with 15th, 50th and 85th percentiles (for arterial road with

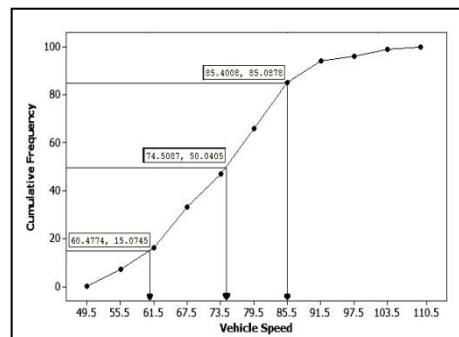


Figure 3: Cumulative frequency graph with 15th, 50th and 85th percentiles (for arterial road with curvature)

Two-sample t-test was used to determine whether there exists any significant difference between the mean of two independent samples statistically. The results would explain whether there exists any difference in spot speed between straight and curved arterial road stretch. Prior to t-test, Lavene's test was carried out to verify whether the variance of the variables is equal or not. The results show that F-value is 1.12 and the significance value (0.287) is greater than the critical value 0.05. So, it is safe to conclude that the variances for each group are equal. The t-test was conducted by using Minitab. Samples, mean, and standard deviation were filled in into Minitab prior to the calculation of the t-test. Table 3 shows the results of the t-test.

Table 3: Result of t-test from Minitab

	Levene's test		t-test for equality of means				95% confidence	
	F	Sig.	t	df	Sig	Estimate for difference	Lower	Upper
Equal*	1.12	.287	5.41	198	.000	9.55	6.07	13.03

Source: Result from Minitab (2011)

* Equal variances assumed

Table 3 shows that at 95% confidence interval, the sample mean is 6.07 and 13.03, which means it is 95% confident that the mean difference between straight road and curved road would fall between 6.08 (lower limit) and 13.03 (upper limit).

The t-test results show that the p-value is less than the 0.05 (in this case it is 0.00). It shows that there exists statistical significance difference in the mean speed between straight and curved road stretches. In other words, the speed of the vehicles at straight and curved road stretches is not equal. The differences in the mean speed of the vehicles at these two stretches were statistically significant. It can be concluded that the curved roads are an effective measure in reducing the speed of the vehicles. However, the extent to which the vehicles can reduce speed is actually depends on the design of the curved road segments.

DISCUSSION AND RECOMMENDATIONS

From the spot speed analysis, it was found that vehicles were traveling slower along curved road than straight road. The mean speed along straight road was 83.42 km/h and that of curved road 73.92 km/h. Collins (2008) also identified that drivers, on average, would drive fast on a straight open road, followed by a straight road in bad weather, a bendy open road, a bendy road in bad weather, a straight road in the dark and, finally, a closed bendy road. The statistical significance test to determine the difference between the mean speeds of two independent samples was carried out by t-test analysis. From the results, the p-value is 0.000, which is less than 0.05 and it defines that the difference between the two mean speeds is statistically significant. It shows that the existence of curve alignment at a road stretch can reduce the speed of the vehicles. In term of the percentile speed, it is mentioned in the literature, that the vehicles observed in the lower 15 percent are considered to be traveling unreasonably slow and those observed above the 85th percentile are assumed to be exceeding a safe and reasonable speed. The

85th percentile speed of the straight road at MRR2 was 96 km/h, whereas at curved road it was 85km/h. As 85th percentile speed is used to impose speed limit because it is assumed to be the highest safe speed for roadway section, so current speed limit (80 km/h) at MRR2 is considered low. The theory behind this is that drivers usually travel at speed that is reasonable and prudent for a given roadway segment, and they also usually careful about the speed limit. So, 85th percentile could be a guideline in setting up the speed limit as this speed is considered safe and reasonable under ideal conditions of the road. In line with this context, the results of this study are considered valid because as a vehicle approaches a curve, it is expected that the drivers, obviously, reduce the speed of their vehicles to an appropriate speed to safely negotiate the curve (Melendy, 2008).

The outcomes of this study can be used as a reference to assist the practitioners towards adopting best practice in highway geometric design and planning. As roadway is an important element in town planning, recommendation and measures to improve speed limit and enforcement is essential. Few recommendations are drawn from this study: the current speed limit should be revisited to determine an appropriate speed limit based on the 85th percentile speed; strict enforcement in reducing vehicles traveling at high speed should be imposed; and improvement on speed reducing measures should be introduced. For the enforcement, traffic cameras should preferably be installed to monitor vehicles' compliance with speed limits. Other than that, the drivers can be educated through seminars, forums, and campaigns on the impacts and risks of driving at more than the stipulated speed limits. The same approach could be applied to the drivers that traveled below the 15th percentile speed as they might make other drivers feel inconvenient. Education and public initiatives can make positive contributions to safe driving and fewer road casualties. In addition, it is recommended to add speed reducing measures, for instance, rumble strips and speed limit sign, especially well before approaching the curved road stretches to warn the drivers about the presence of curved road paths for them to reduce the speed of their vehicles.

CONCLUSIONS

Speed is one of the traffic operational elements that should be considered in the design of the road geometrics. The safe allowable speed limit will make vehicles to travel in an orderly and safe manner. It is noticeable, however, the number of accidents especially along the major roads increases over the years because of vehicles traveling at higher than the posted speed limit. This study analyses the effect of road geometrical design in combating the speed of the vehicles especially along arterial road. Two different road alignments, one representing straight road path and other curved road stretch were selected. The road geometrical elements and spot speed was measured at each of the selected road stretches.

The geometrical design of the road was found to be almost identical along straight and curved arterial road stretches. The effects of road geometrical design on the speed of the vehicles show that the differences in road geometrical design would directly affect the speed of the vehicles. The difference in the mean spot speed along straight and curved road stretches was tested for statistical significance by using t-test. The results show that the speed of the vehicles at curved road stretches was lower than straight road. It indicates that the introduction of curve alignment along the arterial road can be effective to arrest the speed of the vehicles. Finally, recommendations to reduce the speed of the vehicles were drawn. Some of the recommendations include: revisiting the current speed limit to determine an appropriate speed limit based on the 85th percentile speed; imposing strict enforcement in reducing vehicles traveling at high speed; and improving speed reduction measures especially before the curved road alignment. It is important to take note that road planning is one of the important factors in reducing the number of road accidents. The study findings highlight that the introduction of curved road alignment along road network can reduce the speed of the vehicles and hence make the road safe for the road users whenever negotiating curved road alignments. However, the design of the curved road alignment should be made depending on the safe speed limit of the road. When planning road network, the utmost priority on road geometrical elements should be given to make the road safe for the road users.

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NOTES TO CONTRIBUTORS AND GUIDELINES FOR MANUSCRIPT SUBMISSION

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