TYPOMORPHOLOGICAL DEVELOPMENT AROUND MASS RAPID TRANSIT STATIONS IN KUALA LUMPUR, MALAYSIA

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DEDICATION

This research work is dedicated to Angya Aar family

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ABSTRACT

Urban morphology is an interdisciplinary field with different approaches and technical terms whereby its focuses particularly on the domains of geography and architecture. It has substantially contributed to the understanding, intervening, and helping cities grow sustainably. Under the Eleventh Malaysian Plan, the city plan of Kuala Lumpur emphasised the Rakyat-Oriented approach; good quality of life and urban sustainability. In practice, Kuala Lumpur has entered into an important and crucial period in its growth ever since the first 5-year plan was introduced. Thus, the existing car-oriented urban areas are a result of the initial large-scale growth of Kuala Lumpur (1895-1960). Without doubt, the historicity of Kuala Lumpur proved that the transport system had influenced its rapid expansion. Hence, it is important to investigate the present growth of Kuala Lumpur, based on the recent mass rapid transit system (MRT) in the city landscape. It is an attempt to explain the current structure of a local plan by examining its physical development and social elements. Therefore, the study aimed at documenting its typomorphological phenomena in view of informing the management in creating policy decision. A descriptive exploratory approach was employed to elicit data related to typomorphological development theory and its social implications. This was achieved through (1) interview, (2) empirical observation, case study and cartographic redrawing, and (3) survey questionnaires administered to 400 respondents. The data were then analysed using urban morphology theoretical framework, and urban theory within regional science to account for changing density gradient that characterise the local settlement whereas, the survey questionnaire data are analysed using SPSS-21 software. The typomorphological development model is found to be capable of approximating reality. The results indicated that the general pictures of the present growth are deterministic: It is found that great similarities exist between the various Fringe belts of Kuala Lumpur. Our observation shows that in all cases, high-density high-rise development occurs closer to MRT stations, but unfortunately not for affordable housing. The examined development shows there is a tendency for large scale growth within the industrial outer Fringe belt and commercial inner Fringe belt. Even so, the patterns of growth indicated that MRT is residential biased. This large-scale development was found to be governed by the multiple land use that included open space, brownfield site, and immense mixed-use developments. The social element results indicated that the characteristics of MRT have a significant effect on residential satisfaction. Consequently, further analytical interpretation of the findings identified the core typomorphological development impact of phase of urbanisation, social aspect and economic benefit. The findings suggested that MRT does not benefit the poor in which this is contrary to Jane Jacobs's argument that, social vitality was the essential ingredients for achieving a city that functions well. Hence, this leads to a rethink on how MRT is used to allow for social sustainability. Based on this typomorphological evidence-based approach, the researcher argues that the area closer to MRT stations has higher residential densities that enable more people for easy access to MRT without the need for vehicle parking. Many residents identify that MRT is cheaper, but still a reliable mode of transportation as compared to owning a car. Ultimately, a typomorphological development framework suggests that the future of Kuala Lumpur in term of going for Low Carbon Society can be realised when urban population will largely utilise MRT train service for their daily routine.

ABSTRAK

Bidang morfologi bandar adalah merupakan bidang multidisiplin di mana ianya merangkumi pendekatan yang berbeza, terutamanya dalam bidang geografi dan seni bina. Ia telah menyumbang kepada pemahaman dan pengurusan landskap pembangunan kawasan bandar. Merujuk kepada Rancangan Malaysia ke-11, pelan Bandaraya Kuala Lumpur menekankan pendekatan 'Mesra-Rakyat', dari aspek kualiti kehidupan dan kemampanan bandar. Kini, Kuala Lumpur sedang memasuki fasa penting terhadap perkembangan dan pertumbuhan sejak rancangan lima tahun diperkenalkan. Sehubungan dengan itu, bandar berorientasikan kenderaan adalah hasil transformasi awal berskala besar Kuala Lumpur (1895-1960). Kuala Lumpur membuktikan bahawa sistem pengangkutan pada masa kini telah meningkat, di mana ianya memberikan kesan terhadap landskap perbandarannya. Kajian ini bertujuan untuk mengkaji perkembangan pertumbuhan bandar semasa terhadap pembangunan transit aliran massa (MRT) di Kuala Lumpur. Kajian ini adalah merupakan satu usaha untuk menerangkan struktur semasa pelan tempatan dari segi pembangunan dan kesan sosial. Justeru itu, tujuan kajian ini adalah untuk mendokumentasikan fenomena tipomorfologi dari pihak pengurusan dalam membuat keputusan dasar dan polisi. Pendekatan secara penerokaan deskriptif digunakan untuk memperolehi data yang mempunyai hubungkait dengan teori pembangunan tipomorfologi dan kesannya terhadap aspek sosial. Hal ini boleh dicapai melalui; 1) temu bual, 2) pemerhatian, 3) kajian kes dan perubahan bentuk kartografi, dan 4) soal selidik kajian kepada 400 orang responden. Data ini dianalisis dengan menggunakan kerangka teori morfologi bandar dan teori bandar secara saintifik untuk mengambil kira perubahan kepadatan yang mewakili penempatan tempatan. Data soal selidik pula telah dianalisis menggunakan SPSS-21. Model pembangunan tipomorfologi didapati dapat menghitung realiti. Hasil dapatan membuktikan bahawa gambaran perkembangan fizikal menunjukkan persamaan di antara kepelbagaian kawasan pinggir terhadap landskap Kuala Lumpur. Perkembangan pertumbuhan menunjukkan bahawa kepadatan pembangunan semakin tinggi berlaku di sekitar kawasan stesen MRT, tetapi malangnya bukan untuk perumahan mampu milik. Perkembangan pembangunan menunjukkan kecenderungan untuk pertumbuhan secara besar-besaran bagi kawasan perindustrian dan komersil di sekitar kawasan pinggir. Walau bagaimanapun, corak perkembangan pertumbuhan menunjukkan MRT memberi kesan berat sebelah kepada kawasan kediaman. Pembangunan skala besar ini didapati ditadbir dengan pelbagai penggunaan tanah termasuk kawasan lapang, kawasan tapak dan penggunaan fungsi bercampur. Hasil daripada elemen sosial, menunjukkan ciri-ciri MRT dapat memberi kesan yang ketara terhadap kepuasan kediaman. Oleh itu, pentafsiran analitikal diteruskan dengan mengenal pasti impak utama perkembangan pembangunan tipomorfologi dalam fasa perbandaran, aspek sosial dan ekonomi. Namun, hasil kajian ini membuktikan bahawa MRT tidak memberi manfaat kepada golongan miskin. Hal ini bertentangan dengan hujah Jane Jacobs yang menyatakan bahawa daya hidup sosial adalah penting untuk mencapai suatu bandar yang dapat berfungsi dengan baik. Hal ini penting untuk diambil kira semula supaya MRT digunakan untuk menggalakkan kemampanan sosial. Berdasarkan pendekatan tipomorfologi, penyelidik berpendapat bahawa lebih dekat stesen MRT, lebih tinggi kadar kepadatan kediaman yang akan memudahkan lebih ramai orang untuk akses ke MRT tanpa perlu meletakkan kenderaan di tempat letak kenderaan. Kebanyakan penduduk mengenal pasti bahawa MRT adalah lebih murah, dan dipercayai masih menjadi salah satu mod pengangkutan utama berbanding dengan memiliki sebuah kereta persendirian. Kesimpulannya, kerangka pembangunan tipomorfologi menunjukkan bahawa masa hadapan bandar Kuala Lumpur bagi mencapai Masyarakat Rendah Karbon boleh direalisasikan apabila sebahagian besar masyarakat menggunakan MRT dalam kehidupan seharian mereka.

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LIST OF ABBREVIATIONS

MRT	-	Mass Rapid Transit
SBK	-	Sungai Buloh - Kajang
SPAD	-	Land Public Transport Commission
KLIA	-	Kuala Lumpur International Airport
KLCC	-	Kuala Lumpur City Centre
KLMA	-	Kuala Lumpur Metropolitan Area
CBD		Central Business District
KLSS	-	Kuala Lumpur Sentral Station
FMS	-	Federated Malay States
LRT	-	Light Rail Light
KL	-	Kuala Lumpur
ETS	-	Electric Train Service
ERL	-	Express Rail Link
KTM	-	Keretapi Tanah Melayu
KV	-	Klang Valley
KLCH/DBKL	-	Kuala Lumpur City Hall
KLSP	-	Kuala Lumpur Structure Plan
TTDI	-	Taman Tun Dr Ismail
REHDA	-	Real Estate and Housing Developer's Associated of Malaysia
KL LCSBP	-	Kuala Lumpur Low Carbon Society Blueprint
LCS	-	Low Carbon Society
KMO	-	Kaiser Meyer Olkin
ISUF	-	International Seminar on Urban Form
MILU	-	Multiple Intensive Land Use
SAP	-	Station Area Planning

LIST OF GLOSSARY

Typomorphological development: Research framework to explore and understand the impact of the MRT stations and their urban surroundings in Kuala Lumpur Metropolitan Area.

Urban morphology research: It provokes broader senses of the physical form of a city, and the people and processes shaping it.

Material radiuses: It is an existing material or physical form throughout the cultural landscape of a city or town. This residue appear to remain constant throughout the morphological periods.

Block plan: A plot occupied by an existing building and defined on the ground by the building footprint. It is measured with relation to an average density of a household.

Building cycle: Periodic fluctuation in the rate of redevelopment dependent upon the changing socio-economic revaluation of area.

Closed building development: The arrangement of block plan dominants in rows of terraces and shophouses of more than eight houses. A term used by Whitehand (1967) to describe the Fringe belt of middle-class residential areas in the urban-rural fringe of major cities (specifically London).

Complementary development: A term used by Conzen (1969, p. 124) which refers to MRT influenced development taking place on existing open spaces and brownfield sites within a town.

First-cycle development: A term used by Pompa (1988), in short term, defined as initial urban development of Kuala Lumpur Metropolitan Area. Later immense redevelopment within their existing built-up areas are termed second-cycle development.

Historicity: Historical expressiveness of a city growth, which distinct material forms have been and are being shaped in the town's landscape.

Infill: A general term used to categorize the new increase of physical densities or infill development within the built-up areas.

Integument: A term used by Conzen (1960), it refers to a MRT case study in which is extended to another MRT station and their surroundings.

Morphogenesis: It is re-creation of physical reality and viewed as developmental research.

Repletion: It is gradual intensification of infill densities.

Redevelopment cycle: The process of redevelopment in response to changing socio-economic revaluation of area.

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CHAPTER 1

INTRODUCTION

1.1 The Historicity of Kuala Lumpur

A great deal of value is placed on historic environments today. The important role Malaysia eventually played in the spice trade from Malacca geographical location is without precedent in history. Rapid economic development with relation to transforming the regional character of Kuala Lumpur owes much to its historical factors. Kuala Lumpur was founded in the 1850s. At the time, when the pace of Malay Early town expansion accelerated due to discovery of tin mining industry. With the colonial officials plans for the small village, hardly yet a town. In 1880, Selangor state capital was moved from Klang to Kuala Lumpur due to its strategic location[1].

The colonial town grew rapidly as time went by, and with this growth drew in population (Gullick, 1990). Hamzah (1965) highlighted that Kuala Lumpur witnessed spontaneous physical growth between 1895 and 1960 (see Figure 1.1), whereby transport system had influenced its rapid expansion (Leinbach, 1975; Barter, 2004). The transport system can be distinguished into four morphological frames, each of which has contributed to its urban morphology. The historicity of Kuala Lumpur appear to be an effort to establish administrative centres and extract tin ore through a complementary rail and road system. Ultimately, it established an intimacy of the connections between transport and urban structure.

[1]Gullick, J.M. (2000). A history of Kuala Lumpur 1857-1939. Malaysian Branch of the Royal Asiatic. Selangor.

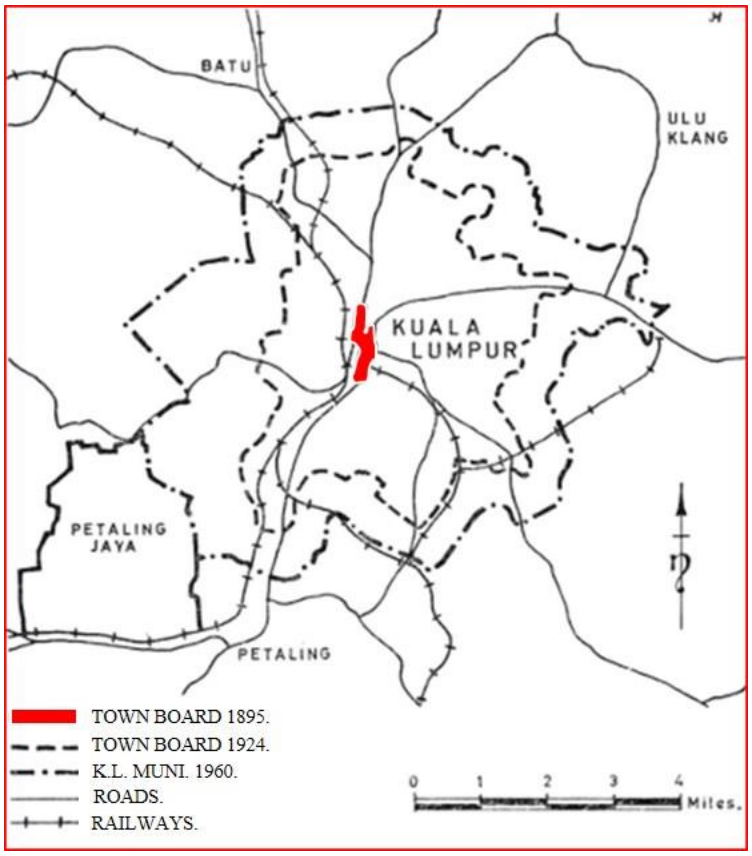


Figure 1.1 Territorial growth of Kuala Lumpur, 1895-1960 (Hamzah, 1965)

Historically, urban structure of Kuala Lumpur adopted almost exactly the British land use planning (Lee, 1988). An example of the early planned township or new town is Petaling Jaya (Lee, 1987). The British pioneering railway appear to be not functioning well since the start of comprehensive road system in the late 1980s (Barter, 2004). The completion of the Federal Highway linking Kuala Lumpur and Port Klang around this time, further integrated and facilitated urban development (Fauza, 2001). Subsequent urban growth had taken place primarily in the late 19th and early 20th centuries, along the main transport network (Bunell and Barter, 2002). Since the first 5-year Malaysia plan was introduced (1966–1970), the development of Kuala Lumpur is re-orientated away from the Federated Malay States (FMS) nodes. Under the 5-year Malaysian Plans, the draft structure plan (KLSP, 1984[2]) envision Kuala Lumpur to

[2]Kuala Lumpur City Hall. Kuala Lumpur Structure Plan. Kuala Lumpur (1984).

become a world-class city by 2020. Although not in term of the megacity due to high population growth and urban expansion, but due to what McGee and Robinson[3] have termed as a Mega-Urban Region of Southeast Asia. Reference is also made to the way in which the comprehensive road system, lined with buildings, extend out from the central area, joining parent city with neighbouring urban areas and large villages to form the metropolitan area of Greater Kuala Lumpur (Hamzah, 1965).

The 5-year Malaysian plan is complemented by regional and master plans to guide the development of specific areas. Examples of the early mega-projects in Kuala Lumpur Metropolitan Area (KLMA) includes the Federal Government Administrative Centre of Putrajaya, Kuala Lumpur City Centre or Central Business District (KLCC/CBD), Kuala Lumpur International Airport (KLIA), Kuala Lumpur Sentral Station (KLSS), and highly industrialised Klang Valley. The most remarkable of these projects is the KLCC project (see Figure 1.2). The KLCC project included the landmark building of the Petronas Twin Towers. Bunell and Barter (2002) suggested that the early urban growth is a pattern of bureaucratisation and industrialisation. Hamzah (1965, p. 138) similarly argued, the urban growth pattern can be agreed on as the forerunner of a better urban region.

Kuala Lumpur grew rapidly and continued to expand via planned townships or new towns (Barter, 2004). The long line of new towns included Badar Tun Razak and Wangsa Maju within the Federal Territory itself (see Figure 1.3), Shah Alam, Bangi New Town, Subang Jaya (and its extension USJ), and almost 40 others (Dasimah, 2001). Under the 5-year plans, the comprehensive road system within the KLMA might had a significant impact on the urban pattern. Bunell and Barter (2002) thus states that ‘more haphazard expansions of new towns in Kuala Lumpur had continued’, especially along transportation corridors. Figure 1.3 shows the detail of a comprehensive transport infrastructure wthin KLMA.

[3]McGee, T.G. and Robinson, T.M. (eds). The Mega-Urban Regions of Southeast Asia. UBC Press. Vancouver. (1995).

Figure 1.2 Kuala Lumpur City Centre and the Petronas Towers (Skyscraper website, 2019)

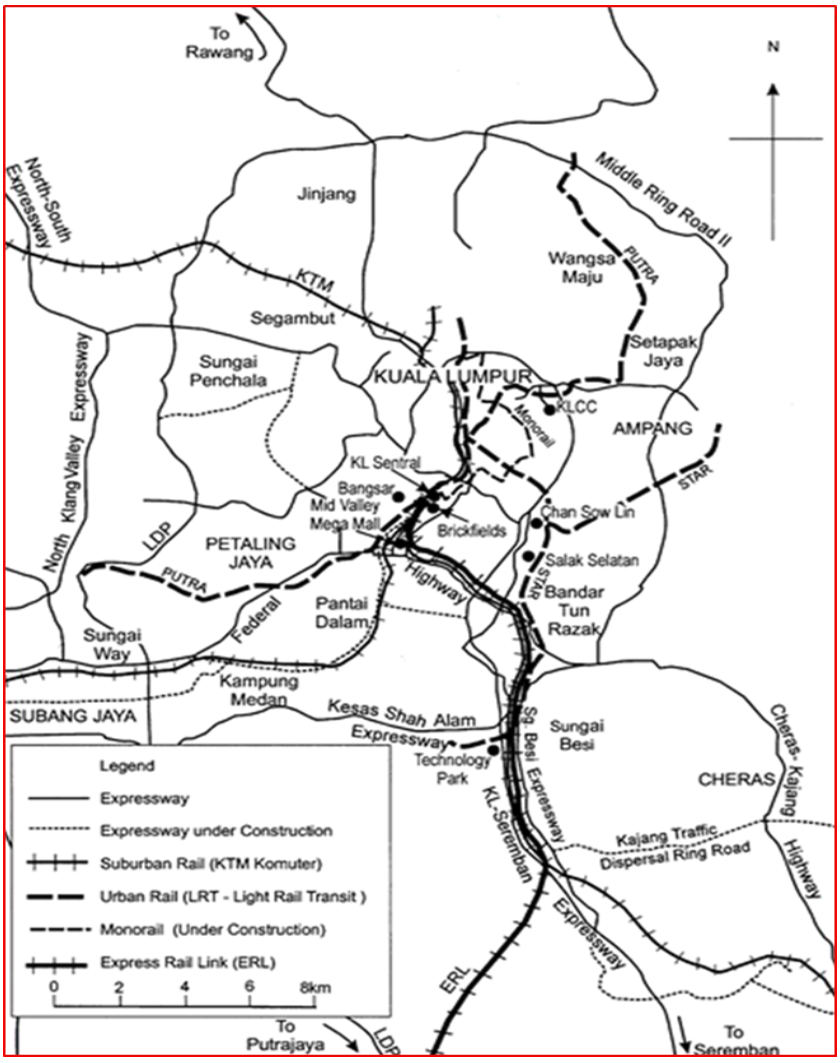


Figure 1.3 Map of the central part of the Kuala Lumpur Metropolitan Area **(**Bunell and Barter, 2002)

To sum up, the historical development of Kuala Lumpur played a key role in shaping the present urban pattern whereby it's car-oriented. Under the Eleventh Malaysian Plan, modern transport system comprises of Light Rail Transit (LRT), KL Monorail, Rapid KL Bus, Electric Train Service (ETS), Express Rail Link (ERL), and most recently the brand new Mass Rapid Transit system (MRT). The study is interested in the impact of the recent MRT in the city landscape. From the research that has been done on patterns and processes of urban growth, it has been beneficial to policy decision-taking and urban design (Whitehand, 2001; Kropf, 2011).

1.1.1 Morphological Periods

This sub-section presents the historical development of Kuala Lumpur city. The city's transformation is divided into four distinct morphological frames. The city grew rapidly and with growth came distinct material forms in the townscape. Studies on urban morphology have proven to provoke a broader senses of understanding and exploring aspects of urban form (Goethe, 1952; Larkham, 2002). Conzen (1960) argues, a crucial part of understanding the historic city form is through the morphological periods, which Clark (1985); Small and Witherick (1986); Goodall (1987); Larkham (1988); Samuels (2013); Oliveira and Monteiro (2013); Oliveira et al (2016) agreed on. In England, morphological studies of traditional cities have been described to have similarity to some Asian cities (Kwanda, 2012; Whitehand et al 2014; Feng, 2014). The growth of the Early Malay towns has attracted attention as a distinct subject of geographical investigation from both foreign and local scholars (McGee, 1963; Gullick, 1994; Hashim and Yaacob, 2011; Mohamed et al, 2017).

Kuala Lumpur is one of the most important historical, cultural, industrial, and commercial cities in Malaysia (Boori et al, 2015). Historically, river transport played a significant role in terms of Kuala Lumpur formation and strategic location. However, the river appear to be not functioning well at a certain point, but other transport networks influenced the growth of the settlement. In this sense, historical development of Kuala Lumpur can be divided into four morphological frames; river system (before 1881), street system (before 1886), railway system (before 1948), and the public transport system (1948-2019).

1.1.1.1 River system

Kuala Lumpur formation at the confluence of two major rivers (Klang River on the east and Gombak River on the west) in the 1850's ran through the town and merged in the centre forming a 'Y' shape. Figure 1.4 shows that the Y shape divided the town into three significant land settlements, and continued southward to Port Klang. Kuala Lumpur took control over regular traffic transiting the rivers in which is carrying mining workers, food supplies and tin ore. Sir Swettenham (colonial official) argued that even in the slump state of Kuala Lumpur in late 1870s, the strategic river location drew commerce towards it (Gullick, 1983). Prior to 1881 flood disaster, the west bank (British) was unoccupied settlement (see Figure 1.4). The east bank included old market square nearby the river landing area, which served the commerce activities of the settlement. To sum it up, the river and strategic location facilitated the physical growth of the town at the west bank at that time.

Figure 1.4 Kuala Lumpur in 1889 (author's interpretation, map adapted from Latip et al, 2009)

1.1.1.2 Street system

The period before 1886, initial river transport was supplanted by cart tracks. This cart tracks ran through the surrounding jungle to nearby mining areas (Gullick, 2000). Figure 1.5 shows that around the old market square two-foot tracks extended within the Malay and Chinese settlement; one foot track going upstream towards Ampang and another one going towards Petaling tin-mining area (Gullick, 1983). These early street patterns ran through Market Street crossing the wooden bridge, which was the only entrance point between the west bank and east bank. At the early state of the British Residency, the streets in and around the town, grew linear to what became an extension of the High Street (Jalan Bandar). This street system was continuous in nature of a whole structure; the Market Street, Cross Street and High Street, around the Market Square and gambling booths (see Figure 1.5). Thus, main streets were perpendicularly connected to the High Street (presently known as Jalan Tun H. S. Lee), which ran parallel with the river. The market street was also linked to Petaling Street. Cross Street was later connected to Pudu in the east, leading to a mining area (Gullick, 2000).

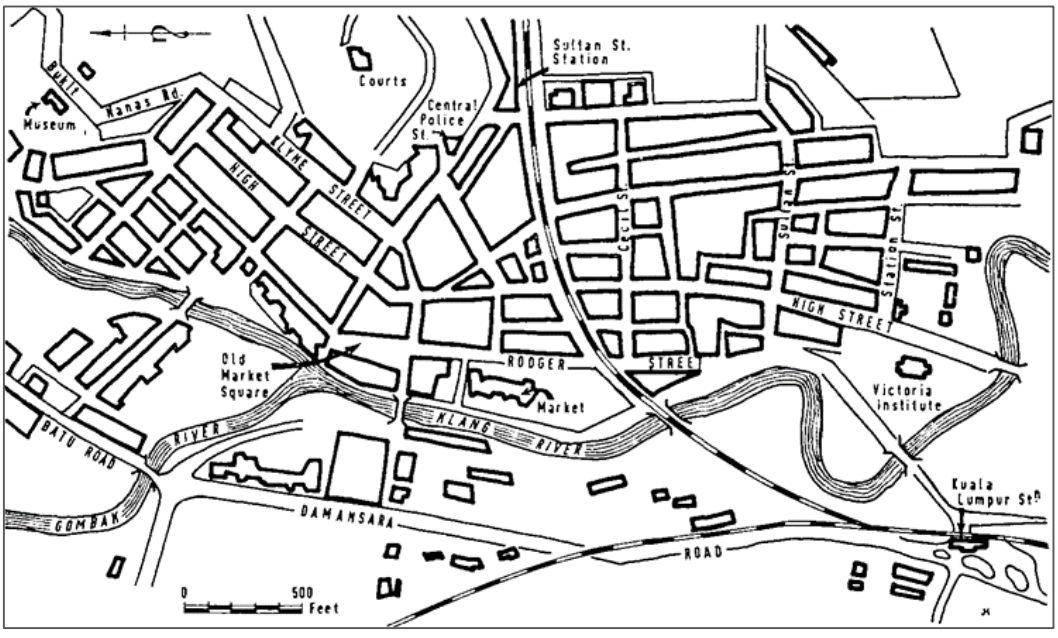


Figure 1.5 Street system of Kuala Lumpur central area in 1895 (Hamzah, 1965)

British residency period in Kuala Lumpur shaped the townscape significant in term of new town model (Lee, 1987). According Gullick (1983), Shop houses lined the main streets and the tallest building was merely six storey tall. The British laid out a well-defined street pattern within their staff quarters on the west bank. A fifteen miles road have been constructed at the south of the town. Thus, it is the first significant attempt to replace the river transport around this time. However, the stretch of the road was considered to be too long-distance and replaced with the new railway in 1886 (Kaur, 1980). Subsequently, the river, the high street, and the road corridor between them created a rectangle, which later became the town centre. In the mid-18th century, there were Malay settlements in the interior of Selangor, linked with Klang, by the river and by a jungle cart track (Gullick, 1990).

1.1.1.3 Railway system

The epoch before 1948, historicity of Kuala Lumpur is largely about British intervention in the Malay states affairs, whereby it lead to the formation of the FMS's. Fisher (1948) argues, under the British administration within a short time the FMS's were solvent and experiencing economic boom. Kaur (1980) states that British railway transport influenced the rapid expansion of Kuala Lumpur. The first phase of the railway transport system in 1885 is discussed by Kaur (1980). In 1886, a second rail line that followed connected Klang to Kuala Lumpur (see Figure 1.6). The rail lines were intended to solve the growing river traffic challenges. In addition, railway influenced large morphology growth of Early Malay Towns (Leinbach, 1975).

In 1896, the second phase in the British railway geography began, it aimed to establish an intimacy connection between the FMS's. Without doubt, railway system played a vital role in the rapid expansion of Early Malay Towns (see Figure 1.6). Railroads expanded the colonial towns and thus merged with its neighboring regions (Hamzah, 1965). The railway system bonded the FMS together in one large communications network (Butcher, 1979). Figure 1.6 shows that railway created seamless connection between all the four original railroads. In this regard, the railroads extended throughout the main mining towns, and districts (namely Perak, Selangor and Negeri Sembilan), and linked up with their respective ports.

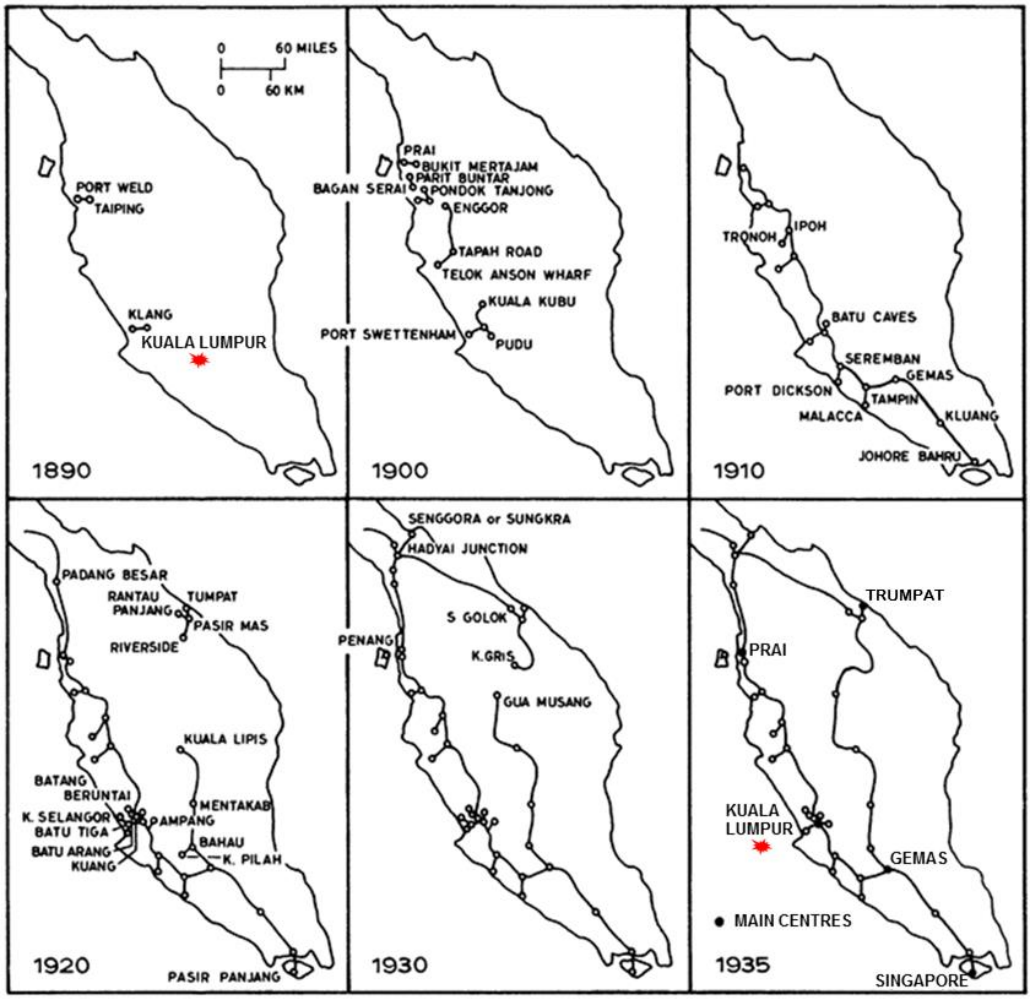


Figure 1.6 The railway geography of British Malaya (Kaur, 1980)

Historically, the central area of Kuala Lumpur is more or less defined by railway system (Hamzah, 1965). Hence, the railway stations represented a breaks in traveling; it has been associated with the rapid development of railway towns (Abd et al, 2008). The completion of railway from Butterworth to Johor Bahru created new town of Kluang (Parmer, 1987). The physical development that emerged as a result of railway projects provided a psychological lift in which Leinbach (1975) describes as lifting the feeling of remoteness. Such example of new towns owing to transport geography is Alor Star and Tapah in which were merely collections of homesteads a decade earlier. The railway system played a crucial role through inter-city and inter-state transportation service. Ultimately, the national spread out of road networks within interior urban environment shaped the urban forms in KLMA. This lead to a raise in vehicle use that dates back to 20th Century (Mohamad and Kiggundu, 2007).

1.1.1.4 Public transport system

Public transport system is the third phase of railway development (1948-2019). At this epoch, the transport system appears to be no longer functioning for solely mining industry and agriculture. The transportation service is reoriented within the urban environment and particularly central parts of KLMA. This is contrary to initial transport development objective that focus primarily on commerce and port concentration. The new Keretapi Tanah Melayu system (KTM) is the suburban public rail service around this time; KTM service operated within the territorial boundaries of Kuala Lumpur region. Subsequently, the transport system was combined with other new rails (LRT Start & Putra & Montreal) LRT system, which were integrated under the new RAPIDKL. The LRTs were used for intra-city urban public transport, and other special functions, such as transporting passengers between airport buildings.

1.1.2 Material Residues

Colonial period imparted Kuala Lumpur townscape significant in a style adapted from the British post-war new towns model (Lee, 1987). The colonial towns grew rapidly and with growth came distinct material residues, each of which left distinct architectural forms. An interesting example is Kuala Lumpur shophouse whereby Figure 1.7 thus show that there is a relationship between the morphological periods and typological processes. Material residue helps to understand the historical development of the old towns (Conzen, 1960). The epoch before 1880, Kuala Lumpur strategic location attracted Chinese tin miners to migrate and British officials to relocate from Klang to Kuala Lumpur (Gullick, 1990). The traditional buildings (such as shop houses, terrace houses) were influenced by the Chinese and British building styles adopted to Malaysian landscape. Even today, shophouse buildings lined the commercial streets in KLMA.

The centre parts of KLMA has rich cultural heritages such as historical buildings and parks that has been formed for many decades. The adopted structure planning system of England introduced the terrace house and so on, which also refers to pattern of close building development. The British close building development node

helped conditionality of density to planned township. In this sense, the terrace house and shophouse had suited the particular socio-economic needs of its society at the time. The first shophouse sited around the old market square is Yap Loy's resident (see Figure 14). In sum, Kuala Lumpur shophouse reflects the historicity of Kuala Lumpur as follows:

a. Pre era– These shophouses were simple attap huts introduced by Chinese merchants to service the tin miners.
b. Post era – The façade of the shophouses developed according to style in Europe, but the basic plan was not modified.

Figure 1.7 Kuala Lumpur shophouse (Wagner, 2017)

1.2 Background Study

The city expansion entails physical challenges and it has profound impacts on the issue of urban morphology (Ravari and Mazloomi, 2015). The rapid expansion of Kuala Lumpur contributed to the growing problems of traffic congestion. The urban sprawl created long distance travel demand for daily routine. Several reports has indicated that Kuala Lumpur is choked by traffic congestion challenges. The report's projection showed that congestion is going to get worse if nothing is done. This lead to the recent additional MRT in the city landscape. In Europe, train stations and their surroundings areas have been experiencing a renaissance in the last two decades (Peters and Johannes, 2012).The question is, are the MRT stations going to expedite the urban development in KLMA? Moreover, historical development of Kuala Lumpur have been closely related to transportation system.

SPAD (2012) states that the Klang Valley MRT (KVMRT) project is a backbone of the existing public transport system. The KVMRT Sungai Buloh-Kajang (SBK) line was announced in 2010 and the project launched in July 2011. The KVMRT SBK line covers the ten local authorities, which is recently described as Greater Kuala Lumpur region. Kuala Lumpur city is located at the centre (DBKL), and thus adjoined with other cities and towns in the state of Selangor (see Figure 1.8).

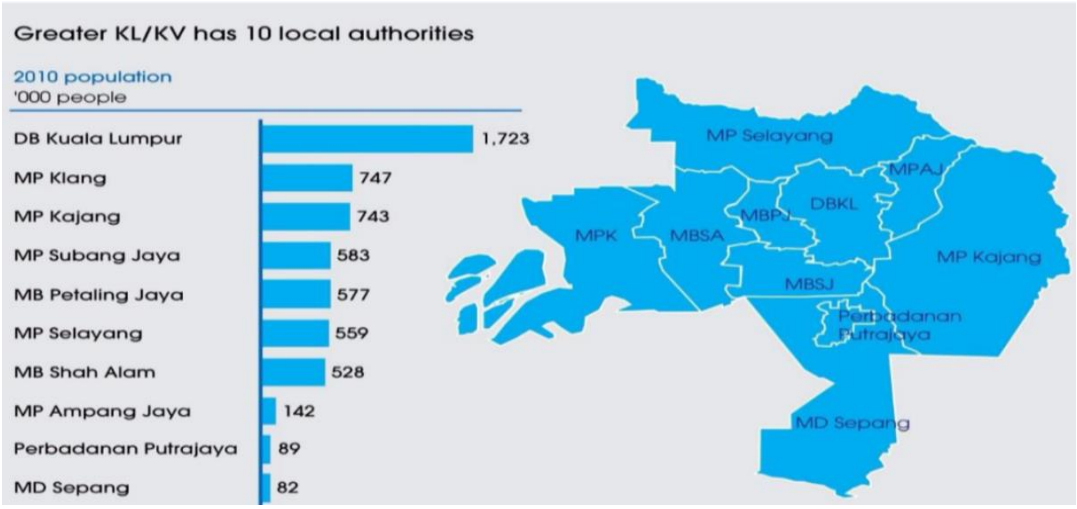


Figure 1.8 Greater Kuala Lumpur map and Population by Local Authority (Chat Property Malaysia, 2014)

The KVMRT SBK line that is connecting the urban quarters in Greater Kuala Lumpur region is planned above the ground. On the other hand, the SBK line that is passing through the central part of Kuala Lumpur city is planned underground. The KVMRT appears to be playing a central role in connecting residential districts, business centres, commercial centres, key city employment areas etc. Historically, road transport has substantially supported planned townships or new towns. However, they are somewhat car-oriented in their layout and their centres of activity rarely coincide with public transport nodes (Barter, 2004). This contrary to MRT in which SBK line has integrated with public transport nodes. It is significant to study the recent MRT in the city landscape whereby it can contribute to its urban morphology.

This chapter covers eleven sections that includes background study, problem statement, research gap, research aim, research objectives, hypothesis, research methodology, research significant, research scope and limitation and ended in the summary of the thesis structure.

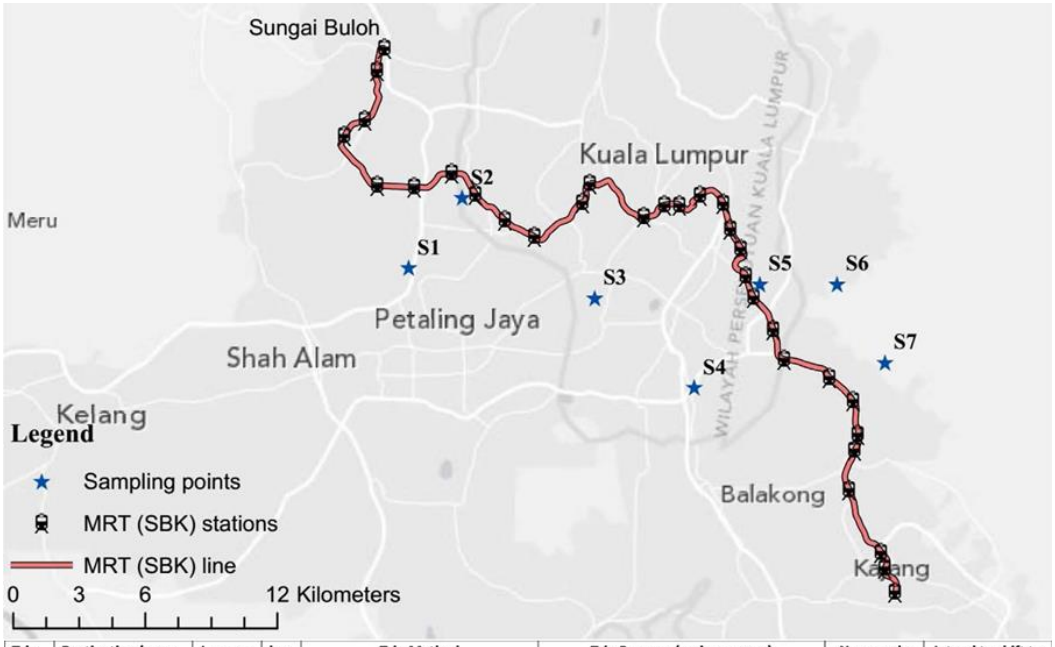
1.3 Problem Statement

Kuala Lumpur has undergone massive development since Malaysia gained its independence in 1957. Historical development of Kuala Lumpur reflects a rapid economic growth and urban sprawl. The city grew rapidly as time went by, and with this growth came traffic challenges. Significant influence of road networks on planned township or new towns in the early 1990s is discussed by Barter (2004, p. 13). Hence, the lack of integration between public transport nodes limited the full potential of the RAPIDKL. Barter (2004) argues that many urban areas did not have access to the urban rail service at the time. Thus, maybe be likened to a raise of vehicle use and car-oriented urban areas (Leinbach, 1975; Mohamad and Kiggundu, 2007). Similar report from Liu and his colleagues have highlighted that transport system can have significant impact on urban areas (Ravari and Mazloomi, 2015).

Transport is arguably the single biggest issue for environmental debates relating to urban form (Jabareen, 2006). Other ASEAN member states face similar problem of rapid motorisation and urbanisation (United Nations Habitat, 2011). Thus, the ASEAN has agreed to actively pursue integration of transport and land use planning (SPAD, 2012). In the Malaysian context, traffic problems has become a major source of CO_2 emission in KLMA. It is argued that urban sprawl of Kuala Lumpur due to decentralisation has increased private car dependency (Kasipillai and Chan, 2008). According to Newman and Kenworthy (1996) study, the ASEAN cities such as Kuala Lumpur and Bangkok have large footloose residential urban area based on predominantly car access since 1980s and 1990s.

Traffic congestion impairs productivity in which results in economic costs in addition to environmental problems, whereby affect the society in term of public health. In 2009, the Government of Malaysia, led by then new Prime Minister, highlighted the concern that Kuala Lumpur would never become a world-class city without efficient, modern, reliable, and seamless public transportation. The report revealed that Kuala Lumpur might become gridlocked like other Southeast Asian cities (such as Manila, Yangon, Bangkok, and Jakarta). It was in light of this that led to the recent MRT in the city landscape. Similar to the international community, many scholars have agreed that mass transit system is a crucial component for sustainability of urban form (Jabareen, 2006).

Urban transport and land use connection has played a significant role in the sustainability of Asian cities such as Singapore and Hong Kong. Kuala Lumpur can also contribute to the attainment of the Low Carbon Society Vision 2030. Moorthy and Jeronn (2014) argues, the forthcoming MRT can solve the growing problems of agonizing traffic woes. A similar study by Kwan et al (2018), concluded that MRT can substitute private vehicle need for daily routine in KLMA (see Figure 1.9). Urban form is a composite of characteristics related to land use planning, infrastructure design and transport system (Handy, 1996). The study of urban form, otherwise known as urban morphology is traditionally rooted in the Western culture studies (Khalaj and Lashkari, 2012). Recent studies in urban morphology, particularly to Chinese historical urban form has contributed to informing conservation policy and management (Whitehand et al, 2011b). Thus, it falls in the domains of architectural, urban planning, archaeology and urban geography (Whitehand and Gu, 2006). In the context of urban planning and design, the idea has been applied as an integrated framework in typomorphological paradigm that aimed to explore and understand the spatial structure and the people and processes shaping it.



Trip #	Destination (name of place/road/ building)	Journey time	km	Trip Method (circle the option)		Trip Purpose (main purpose) (circle the option)		No. people in vehicle (inc.yourself)	Intend to shift to MRT/LRT IF available
Example	Primary School Jalan Davidson	7.00 - 7.15 (am) pm	3	1. car (driver) 2. car (passenger) 3. motorcycle 4. bus (no.:_____) 5. rail (st.:_____) 6. taxi	7. walk 8. bicycle 9. commercial truck 10. other: _____	1. go home 2. work commute 3. drive passenger 4. school 5. eat a meal 6. shopping	7. change travel mode (e.g. bus/LRT station) 8. social/recreation 9. other work/business 10. personal business 11. other: _____	adult :_1_ children:_1_ age: _11_;__ ___;___;___	(Yes) No/ NA Why: _____ _____ _____ _____

Figure 1.9 The MRT (SBK) line and the survey of trip characteristics (Kwan et al, 2018)

In summary, the KVMRT is low cost and low carbon mobility. It can significantly contribute to the reduction of anthropogenic carbon emission intensity. Recent effort in Klang Valley urban rail-based transport had led to emissions lessening of 214.93 kt CO2eq (Malaysia Paris Agreement report, 2015). Hence, it is crucial to explore and understand better the impact of the recent MRT and its social signicance. A similar study by Zafer (2013), presented an opportunity for a wide range of urban design and management strategy. In the Malaysian context, there appear to be unexplored potential to integrate the understanding of urban morphology with urban design and planning (Mohamed et al, 2017), whereby it explains the discussed typomorphological issues and their negative consequences. At a time when there is considerable interest in the planned growth of Greater Kuala Lumpur. The urban development pattern in KLMA must be critically examined.

1.4 Research Gap

The historicity of Kuala Lumpur proved that transport system has influenced urban development patterns. Hence, it is crucial to redefine the urban pattern being shaped by MRT since it can contribute to its urban morphology. Based on Moorthy and Jeronn (2014) study, the upcoming MRT has influenced the increase of real estate activities in KLMA. A similar trend has been stated in reports from Su-Lin (2013); Tatt and Lin (2015), the studies highlighted the sudden uproar of real estate activities around the upcoming MRT stations. Furthermore, the association of Malaysian Real Estate and Housing Developers (Rehda) highlights that the KVMRT will generally have a positive impact on real estate sector and urban economy.

The problem of urbanisation in many countries is unchecked urban pattern whereby it results into incompatible urban form (Conzen, 1960). Rossi (1982), indirectly advocates the autonomy of architecture in shaping the city as epitomized in the reversed relationship between building and city. The widely known selection of cases to conduct typomorphological studies has focused on the historicity of Europe, South America and recently Chinese. Thus, in the UK in Ludlow and Cyprus in Famagusta, the walled city is selected for morphological analyses. One significant reason to choose traditional town of Famagusta in Cyprus is its physical location and origin. It has substantially contributed to the understanding, intervening, and helping cities grow sustainably. Conzen (1960) has extensively conducted urban morphology studies in the UK, which the morphological study criteria can be adopted in the Malaysian context. In the Malaysian context various development plans (that is, the national physical plan; a structure plan, a local plan and a special area plan) has been formulated under the Eleventh Malaysian Plan. This dissertation attempts to explain the current structure of a local plan by examining its development and its social significant.

1.5 Research Aim

To document typomorphological phenomena development around the Mass Rapid Transit stations in Kuala Lumpur, Malaysia.

1.6 Research Objectives

The following research objectives have been set out to achieve the aim.

1. To identify the MRT stations and their urban surroundings for typomorphological studies.
2. To analyze the urban landscape change around the selected MRT stations in Kuala Lumpur.
3. To translate the perception of the public on the way MRT stations are been used in their urban surroundings.
4. To develop the relationship between the physical and social aspect of station area development.

1.7 Hypothesis

This research hypothesis set as the following.

1. High density high-rise development happens closer to Mass Rapid Transit stations in Kuala Lumpur.
2. Mass Rapid Transit characteristics has a significant effect on residential satisfaction.

1.8 Research Methodology

In responding to the problem statement outlined and the research objectives. The scientific method by which these objectives could be achieved is needed. Two basic patterns of study have emerged from the background of study; the cultural and physical contexts. To aid such understanding, the discussion is divided into the three schools of thought discussed by Anne Vernez Moudon (1997). The three main schools

provides the research framework that is informed by typomorphological understanding. The scope of the review is limited to research articles published between 1850 and 2019. Thus, sources include literatures in theory of architecture, urban geography, and home environment. The use of buildings or town plans as a basic for data required in understanding cities has led to major development in theoretical and analytical elements of urban morphology research (Gauthiez, 2004).

A qualitative, descriptive, exploratory design was employed with the intention to explain the physical contexts of the study. Purely descriptive research operates at a lower level of description by merely seeking information about isolated variables, whereas explanatory research goes beyond this step to a description of relationships among variables (including physical and social attributes). The measurement and social context falls into quantitative research in which presents detailed information about the built form, density, Floor Area Ratio (FAR), and survey questionnaire. This mix methods can provide a better understanding of the city physical form and the people and processes shaping it. The mixed-techniques is used through collecting relevant qualitative and quantitative data. For both data types, a deductive research method was chosen to test the hypothesis and achieve the research objectives.

Urban morphology is an interdisciplinary field with different approaches and technical terms. This field of science has three main schools (English, Italian and French) in which will be discussed in Chapter 2. One significant reason to choose Kuala Lumpur is its rich history and strategic location for Malaysian Low Carbon Society Agenda. The English school of thought can be applicable to Malaysian context due to the facts; the form and content of structure plan of Kuala Lumpur are thus almost exactly the same as those of Britain. Lee (1999) states 'Malaysia adopted almost in toto the structure planning system of England and Wales as her own'. In this sense, the study focus into the geographical dimension of the English school.

Furthermore, an appraiser studies on survey criteria of resident's satisfaction has widely examined characteristics of the individual households (either cognitive/behavioural) and characteristics of the environment, both physical and social (Weidemann and Anderson, 1985; Amerigo and Aragones, 1997; Hur and Morrow-

jones, 2008; Abdul and Nurul, 2011). However, isolated variables such as age, income, duration of residence, house ownership, household types, has impact residential satisfaction variously, positively or negatively across different countries/cultures.

The study primary source of data collection is Dewan Bandaraya Kuala Lumpur (DBKL) city planning department (KLCH, 2018). The secondary source of data collection from publications, transport planning authorities, articles, achiever and books. The main research design consists of observation and mapping; after meticulous fieldworks (including photographic surveying and data gathering). The physical factors that is influential to residential satisfaction around MRT station is measured empirically, using a survey questionnaire. Field work is an indispensable part of data acquisition in both the physical and social aspects, which not only entails comprehensive photographic surveying but also offers opportunities to observe in real time.

First, we commend DBKL for highly cooperating and also granting an interview with the city town planner. Hence, the plans collected for the study are unofficially inaccessible to researchers and the general public. Secondly, we commend the transport planning authority (MRT Corporation) for granting an official access to conduct the questionnaire survey at the KVMRT stations.

To sum it up, the research methodology is employing a combined multi-strategy approach by using both qualitative and quantitative research methods. The qualitative aspects of urban morphology is known as formology which is the most important part by its cartographic analysis, one can get the overall structure of the area. Making use of formology, we can provide detailed information about the physical reality. The details of the research design theoretical foundations are presented in Chapter 2 and Chapter 3. The results presented in pictorial description in Chapter 4 complies with the unified criteria of urban morphology.

1.9 Research Significance

Under the Eleventh Malaysian Plan, urban development strategies for the next 20 years are allied with the triple bottle line of sustainability (KLSP, 2020). The study attempt to explain the present structure of a local plan, by examining its development and social implication. Hence, forms of the contemporary cities has been perceived largely as a source of environmental problems. Similar research subject has presented an opportunity for policy decision-taking and management strategy to help cities grow sustainably. In the European context, Peters and Johannes (2012) describes an EU-level policy documents that actively tout the spatially transformative potential of rail for cities. Amongst academics and practitioners working in the fields of urban planning and design, there has been an on-going discussion regarding the relationships between urban morphology and environmental sustainability (Sarralde et al, 2015).

Research on the so-called 'reality check' of these strategic places in cities is based on concerns with sustainability (environmentally, socially, and economically). Following recently published Kuala Lumpur Low Carbon Society Blueprint 2030. The study contributes to fill the gap in Malaysian urban morphology research. The richness of Kuala Lumpur cultural landscape holds great potential for typomorphological studies. As Whitehand (2007b) has reminded us, the weak relationship between research and practice is an acknowledged problem in a number of fields. Typomorphological investigation of a city form is among the most important subjects in urban planning and design, especially for future Low Carbon Society, whose importance lies in the application of such studies. In the Malaysian context, this evidence-based approach can significantly contribute to establishing a relationship between research and practice, in view of informing the management creating policy decision.

1.10 Scope and Limitation

This typomorphological studies has some limitations. The conceptual research design adopts the in-depth physical dimensions situated in the English and Italian schools. However, excludes the French school detailed social life, political and economic context. Thus, the French school can be solely an in-depth research topic in itself that can contributes to urban morphology, which are excluded in this thesis (the reason for excluding the French school is discuss in Chapter 2).

Furthermore, the study survey questionnaire also has limitations. To ensure the reliability of the questions, a pilot testing was conducted which revealed the prospect respondents would have only 4-7 minutes in between the train stops to answer the survey questionnaire. Therefore, the survey questions were designed to appear brief, direct and precise scope. The study scope is limited to Kuala Lumpur boundary, and case study perimeter of 800m radius from the MRT station building.

Lastly, the case study criteria of physical form of the urban tissue has some limitation. Thus, an investigation of the built landscape covers mainly residential, commercial, mixed-use developments. Although there are also public building, institutional building, religious buildings etc.

1.11 Structure of Thesis

The thesis progression is described in four sections comprising of six interconnected chapters that are organised logically and systematically in addressing the research objectives. The details are shown in Figure 1.10 and subsequently described in detail below.

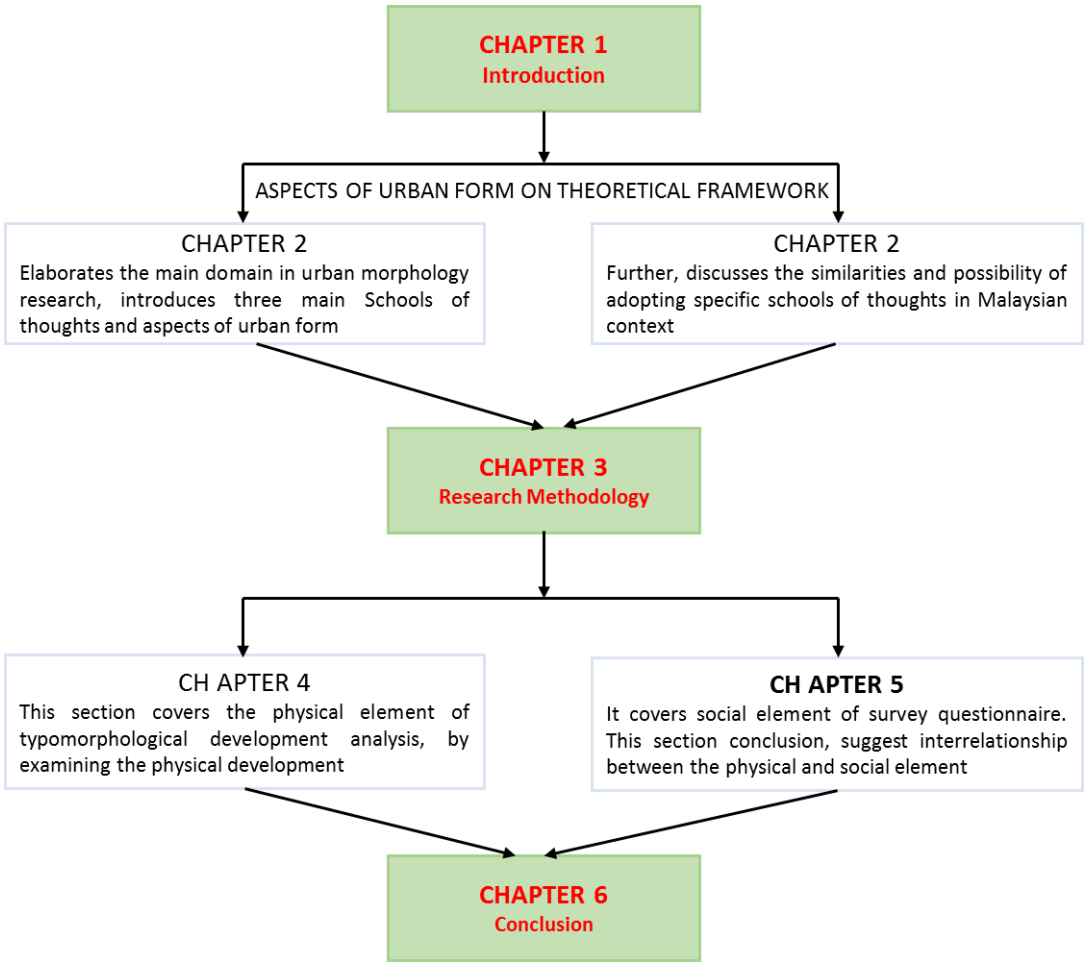


Figure 1.10 Summary of thesis structure

Section 1: Introduction

This consists of the preamble as well as opening pages which include abstract, acknowledgement, table of contents, dedication and certification, list of tables and figures, list of appendices and the glossary.

Chapter One: The thesis starts with a short introduction to the growth of a city. The section presented the historicity of Kuala Lumpur and applied Conzen's concept of morphological period to explain the historical development. In addition, the problem the research intends to address is also stated to portray the picture for comprehension of the thesis, thereby revealing the research gap. Furthermore, the research goal is defined by clearly stating the aim of the study. Subsequently, the study

objectives, which later translates into research hypothesis, were also clearly spelt out. Before describing the outline of the research methodology, the research significance is itemised, and subsequently, scope and limitations of the study.

Chapter Two: The review of literature discusses the urban morphology schools of thoughts and established the theoretical framework for this thesis. On the other hand, reviews the aspects of urban form, and discusses the possibility of a cross-cultural application of Gianfranco Cannigia's theories of typomorphological understanding, and the evolutionary insights of MRG Conzen into the termed typomorphological development. Discusses the suitability for typomorphological implication in Malaysian context.

Chapter Three: the section covers research methodology and explains research subjects, further clarifies the particularity of Malaysian urban landscape, the Fringe-belt concept adopted in the study context. Subsequently, it presents the statement of account of fieldwork conducted, data collections, and the processes. Finally, the research method employed for each objective, and the technique of analysis are presented.

Chapter Four: attempts the conceptual research design framework on typomorphological analysis of the selected cases. This chapter focuses on the physical aspects of the urban landscape change, particularly the synchronic and diachronic approach. The conducted cartographic analyses led to the results described. The results presented in pictorial description complies with the unified criteria. Using mainly graphs, the chapter presents results, finding and discussion points that generate an analytical outcome.

Chapter Five: attempts to explain the public perception statistically, based on one-way analysis of variance and regression. This chapter focus on the social aspects, which presents the resident's perception on the MRT characteristics at certain degree. Subsequently discusses the results that finally triangulate the typomorphological development findings.

Section Four and Five: Conclusion

Chapter six: sums up this thesis finding; it covers the conclusion made based on the findings. The chapter demonstrates the research claim and emphasis on the main finding and suggests tracks for future research.

Reference: this presents the outline of cited works in the thesis dissertation.

Appendices: consist of supporting documents that contributed to carrying out of the research.

REFERENCES

Alexander, C. (1965) 'A city is not a tree', Published in two consecutive: *Issues of Architectural Forum*, 122 (1): 58-62; and 122 (2): 58-61.

Alexander, C. (1987) *A new theory of urban design*. New York: Oxford University Press.

Allen, S. (2000) *Practice: architecture, technique and representation*. Amsterdam: Overseas Publishers Association.

Allport, F. H. and Vernon, P. E. (1931) *A study of values*. Boston, MA: Houghton-Mifflin.

Alonso, W. (1964) *Location and land use: toward a general theory of land rent*. Harvard University Press.

Abdul, M., and Nurul, M. (2011) 'Social housing programme of Selangor Zakat Board of Malaysia and housing satisfaction', *Journal of Housing and Built Environment*, 26(2), 143–164. doi: 10.1007/s10901-011-9216-y.

Amerigo, M., and Aragones, J. (1997) 'A theoretical and methodogical approach to the study of residential satisfaction', *Journal of Environmental Phychoilogy*, 17:47-57.

Andersson, L, M., and Bateman, T. S. (1998) 'Championing Frankfort-Nachmias, C, & Nachmias', Research methods in the social sciences. London: Edward Arnold.

Bandini, M. (1984) 'Typology as a Form of Convention', *Architectural Association School of Architecture*, 6(6), 73–82.

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

Bendassolli, P. F. (2013) 'Theory Building in Qualitative Research: Reconsidering the Problem of Induction', Forum Qualitative Sozialforschung / Forum:Qualitative Social Research, 14(1).

Boori, M. S., Netzband, M., Choudhary, K. and Voženílek, V. (2015) 'Monitoring and modeling of urban sprawl through remote sensing and GIS in Kuala Lumpur, Malaysia', *Ecological Processes*, 4(1), 15.

Bobek, H. (1959) *Features and Formation of the Great Kavir and Masileh*. Teheran.

Bloch, R. (1952) 'Goethe , Idealistic Morphology , and Science', *American Scientist*, 40(2), 313–322.

Bramley, G. and Power, S. (2009) 'Urban form and social sustainability: The role of density and housing type', *Environmental Planning B* , 36(1), 30-48.

Brown, L. A. (2014) 'The city in 2050: A kaleidoscopic perspective', *Applied Geography*. Elsevier Ltd, 49, 4–11.

Brook, L. (2004a) 'Liveability and sustainable development: bad habits & hard choices', *Final Report for the ODPM*, New Horizons Program.

Bunell, T. and Barter, P. A. (2002) 'City profile Kuala Lumpur metropolitan area', *Cities*, 19(5), 357–370.

Calhoun, C. J. (ed.) (2002) *Dictionary of social sciences.* Oxford University Press, Oxford.

Caliskan, O. and Marshall, S. (2011) 'Urban Morphology and Design: Introduction', Built Environment, 37 (4), 381-392.

Caniggia, G. and Maffei G. L. (2001) *Architectural Composition and Building Typology: Interpreting Basic Building*. Firenze: Alinea.

Cataldi G (ed) (1998) Designing in stages: theory and design in the typological concept of the Italian school of Saverio Muratori. In: Petruccioli A (ed) Typological process and design theory. Aga Khan Program for Islamic Architecture at Harvard University and MIT, Cambridge, MA, 35–54.

Cataldi, G. (2003) 'From Muratori to Caniggia: The origins and development of the Italian school of design typology', *Urban Morphology*, 7(1), 19–34.

Cataldi, G., Maffei, G. L. and Vaccaro, P. (2002) 'Saverio Muratori and the Italian school of planning typology', *Urban Morphology*. International Seminar on Urban Form, 6(1), 3–14.

Cataldi, G., (2009) 'The planning typological approach', *Urban morphology*, 13(2), 129-43

Chat Property Malaysia (2014, December 17) Klang Valley map. Retrieved at http://www.chatpropertymalaysia.com/greater-kuala-lumpur-what-do-you-know/ on 7th Novermber 2016.

Cheng, V. (2009) 'Understanding density and high density', In E. Ng (Ed.), designing high-density cities for social and environmental sustainability. 3-16.

Churchill R. (2004) ‘Urban cartography and the mapping of Chicago’, George Rev, 94(1):1–22.

Churchman, A. (1999). Disentangling the concept of density. Journal of Planning Literature 13(4), 389-411.

Clark A.N. (1985) Longman dictionary of Geography, Longman, Harlow Cobham, C.D., 1969, Excerpta Cypria: Materials for a History of Cyprus, Kraus Reprint Co. New York.

Chen, F. and Romice, O. (2009) ‘Preserving the cultural identity of Chinese cities in urban design through a typomorphological approach’, *Urban Design International*, 14(1), 36–54.

Cömert, N. Z. and Hoskara, S. Ö. (2013) ‘A typo-morphological study: The CMC industrial mass housing district, Lefke, Northern Cyprus’, *Open House International*, 38(2), 16–30.

Conzen, M. P. (2001) ‘The study of urban form in the United States’, *Urban Morphology*, 5(1), 3–14.

Conzen, M.R.G. (2004) Thinking about Urban Form: Papers on Urban Morphology, 1932–1998, In: M.P. Conzen (ed.) Oxford, UK: Peter Lang.

Conzen, M. R. G. (1960) *Alnwick, Northumberland: a study in town-plan analysis*. London: The Institute of British Geographers.

Conzen M. R. G. (1968) ‘The use of town plans in the study of urban history’, In: Dyos HJ (ed) The study of urban history. Edward Arnold, London, 113–130.

Conzen, M. R. G., and Whitehand J. W. R. (1981) The Urban Landscape: Historical Development and Management. London: Academic Press.

Corsini, MG. (1997) Residential building types in Italy before 1930: the significance of local typological processes. Urban Morphology, 1:34–48.

Coleman, A. (1985) Utopia on Trial: Vision and Reality in Planned Housing (London, Hilary Shipman).

Colquhoun, A. (1991) Twentieth-century concepts of urban space, in: A. Colquhoun (Ed.) Modernity and Classical Tradition: Architectural Essays 1980±1987 (Cambridge, MA, MIT Press).

Creswell, J. W. (2012) Educational Research Planning, Conducting and evaluating Quantitative and Qualitative Research (Fourth). Boston, USA: Pearson.

Creswell, J., Plano, C.V., Gutmann, M. and Hanson, E. (2003) Advanced mixed methods research designs. In: A. Tashak- kori and C. Teddlie (eds.) Handbook

of Mixed Methods in Social and Behavioural Research. Thousand Oaks, CA: Sage, 209–240.

Darin, M. (1998) 'The study of urban form in France', *Urban Morphology*, 2(2), 63–76.

Dasimah, O. (2001) New towns development and the quality of life in Malaysia, Paper presented at Sixth Southeast Asian Geographers SEAGA 6 Conference.

Dempsey, N., Brown, C. and Bramley, G. (2012) 'The key to sustainable urban development in UK cities? The influence of density on social sustainability', *Progress in Planning*, 77(3), 89–141.

Dokic, V. (2009) 'Morphology and typology as a unique discourse of research', *Serbian Architectural Journal*, 107-130.

Epp, E. (1987) *A Typomorphological Approach to Understanding Urban Residential Districts*. Master Thesis, University of Manitoba, Canada.

Feng, Q. (2014) *A Typo-morphological Enquiry into the Evolution of Urban and Architectural Forms in the Huangpu District of Shanghai , China*. Master Thesis. Concordia University Montreal, Quebec, Canada.

Fauza, Ab G. (2001) Growth and inequality in the Klang Valley region: Implications for regional development planning. *Paper presented at Sixth Southeast Asian Geographers SEAGA 6 Conference, Bangi, 12–15 November.*

Feng, Q. (2014) *A Typo-morphological Enquiry into the Evolution of Urban and Architectural Forms in the Huangpu District of Shanghai , China*. Concordia University Montreal, Quebec, Canada.

Fisher, C. A. (1948) 'The railway geography of British Malaya', *Scottish Geographical Magazine*, 64(3), 123–136.

Fotheringham A., Batty M, Longley P (1989) Diffusion-limited aggregation and the fractal nature of urban growth. *Papers of the Regional Science Association*, 67: 55–69.

Focultant M. (1977) Discipline and Punish: the birth of the prisons, Pantheon, New York.

Gaubatz, P. (1978) 'Understanding Chinese Urban Form: Contexts for Interpreting Continuity and Change', *Built Environment*, 24(4), 251–270.

Gaubatz, P. (1999) 'China's urban transformation: Patterns and processes of morphological change in Beijing, Shanghai and Guangzhou', *Urban Studies*, 36(9), 1495–1521.

Gauthiez, B. (2004) ‘The history of urban morphology’, *Urban Morphology*, 71–89.

Gilliland, J. and Gauthier, P. (2006) ‘The study of urban form in Canada’, *Urban Morphology*, 10(1), 51–66.

Gaubatz, P. (1978) ‘Understanding Chinese urban form: contexts for interpreting continuity and change’, *Built Environment*, 24(4), 251–270.

Gaubatz, P. (1999) ‘China’s urban transformation: patterns and processes of morphological change in Beijing, Shanghai and Guangzhou’, *Urban Studies*, 36(9), 1495–1521.

Ge, J. and Hokao, K. (2006) ‘Research on residential lifestyles in Japanese cities from the viewpoints of residential preference , residential choice and residential satisfaction’, 78:165–178.

Gehl, J. (1971) *Life between buildings: Using public space*. New York: Van Nostrand Reinhold.

Gilliland, J. and Gauthier, P. (2006) ‘The study of urban form in Canada’, *Urban Morphology*, 10(1), 51–66.

Ginsberg, Y., and Churchman, A. (1984) ‘Housing satisfaction and intention to move: Their explanatory variables’, *Socioeconomic Planning Sciences*, 18, 425–431.

Goodall B, (1987) The penguin dictionary of human geography, Penguin, Harmondsworth. UK.

Goh, B. L. (1988) ‘The Future of Urban Planning in Malaysia’, *Habitat International*, 12(4), 5 – 12.

Grover, R., Emmitt, S. and Copping, A. (2017) ‘The typological learning framework: the application of structured precedent design knowledge in the architectural design studio’, *International Journal of Technology and Design Education, Springer Netherlands*, 28(4), 1–20.

Goran, T., and Ljung, P. (2006) *More Urban less poor: an introduction to urban development and management*. Earthscan. London, UK.

Gullick, J M (1983) *The Story of Kuala Lumpur 1857–1939*. Eastern Universities Press, Singapore.

Gullick, J. M. (1994) *Old Kuala Lumpur*. Oxoford University Press.

Gullick, J.M. (2000) *A history of Kuala Lumpur 1857-1939*. Malaysian Branch of the Royal Asiatic. Selangor

Güney, Y. Đ. (2007) ‘Type and typology in architectural discourse’, *BAU FBE Dergisi*, 9(1), 3–18.

Gu, K., Kian Y., Whitehand J.W.R., (2008) 'Residential building types as an evolutionary process: the Guangzhou area, China', *Urban morphology*, 12(2), 97-115.

Hamaina, R., Leduc, T. and Moreau, G. (2012) 'Towards urban fabrics characterization based onbuildings footprints'. Edited by J. Gensel, D. Josselin, and D. Vandenbroucke. Berlin, Heidelberg: Springer Berlin Heidelberg (Lecture Notes in Geoinformation and Cartography), 327–346.

Hamzah Sendut (1965) 'The structure of Kuala Lumpur: Malaysia's capital city', *The Town Planning Review*, 36(2), 125–138.

Hashim, N. R. and Yaacob, M. N. (2011) 'Urban landscape changes in Kampung Baru , Kuala Lumpur, from 1969 to 2004 as observed on maps', *Journal of Design and Built Development*, 9:49–58.

Harun, N. Z. and Said, I. (2008) Morphology of Padang : a case study of Dataran Merdeka , Kuala Lumpur, *International Seminar in Sustainable Environment & Architecture* (SENVAR), 1–3.

Hall, T. (2013) 'The potential influence of urban morphology on planning practice', *Urban Morphology*, 17(1), 54–55.

Hsu, Min-Fu (1992) 'The impact of Japanese colonization on the traditional Tainan city (1895-1945)', *Journal of Architecture* (Taiwan), 7: 49-92.

Heineberg, H. (2007) 'German Geographical Urban Morphology in an International and Interdisciplinary Framework', *Urban Morphology*, 11 (1), 5-24

Hillier, B. (1996) 'Cities as movement economies', *Urban Design International*, 1(1), 41–60.

Hoyt, H. (1939) The structure and growth of residential neighborhoods in American cities (Federal Housing Administration, Washington DC).

Hur, M., and Morrow-jones, H. (2008) 'Factors that influence Resident's Satisfaction with Neighborhoods. Environment and Behavior', 40(5), 619–635.

Hyett, N., Kenny, A., and Virginia, D.S. (2014) 'Methodology or method? A critical review of qualitative case study reports', *International Journal of Qualitative Studies on Health and Well-Being*, 9.

Ibrahim, M. B. and Omer, O. A. (2014) 'Evolution and changes in the morphologies of Sudanese cities', *Urban Geography*, 35(5), 735–756.

Jabareen, Y. R. (2006) 'Sustainable Urban Forms', *Journal of Planning Education and Research*, 26(1), 38–52.

Jacobs, J. (1961) *The Death And Life Of Great American Cities, New York: Random House.*

Jin, W. (1993) 'The historical development of Chinese urban morphology', *Planning Perspectives*, 8(1), 20–52.

John A. and Kilpatrick, R. L. (2007) 'The Impact of Transit Corridors on Residential Property Values', *Journal of Finance and Economic Research*, 304-316.

Jin, W. (1993) 'The historical development of Chinese urban morphology', *Planning Perspectives*, 8(1), 20–52.

Kwanda, T. (2012) 'The morphological framework of the Chinese and the European districts in Surabaya, 1787-2005', *Dimensi (Jurnal Teknik Arsitektur)*, 38(1),1.

Katz, Peter, Scully, Vincent, and Bressi, Todd W. (1994) The new urbanism: toward an architecture of community. New York, NY: McGraw-Hill.

Kallus, R. (2001) 'From Abstract to Concrete: Subjective Reading of Urban Space', *Journal of Urban Design*, 6(2), 129–150.

Kaur, A. (1980) 'Road or Rail? competition in Colonial Malaya 1909-1940', *Malaysian Branch of the Royal Asiatic Society*, 53(2), 45–66.

Kaur, A. (1980) 'The Impact of Railroads on The Malayan Economy, 1874-1941', *The Journal of Asian Studies*, 39(4), 693–710.

Khairul K. (2013) How will MRT Impact the Property Market? New Straits Times, Retrieved at http://www.nst.com.my/red/how- will-mrt-impact-the-property-market-1.350116.

Khirfan, L. (2010) 'From Documentation to Policy-Making : Management of Built Heritage in Old Aleppo and Old Acre', *Taditional Dwellings and Settlements Review*, 21(2), 35–54.

Khwairakpam, D., Rahul Singh, W., and Naorem, V. (2015) Strategy for urban infrastructure development in identified towns of Manipur state. *International Journal of Humanities and Social Science Invention*, 4(1), 42.

Kuala Lumpur International Airport 2/Klia2 (2017, February 17) MRT SBK Line. Retrieved March 21, 2019, from https://www.klia2.info/rail/mrt-sbk/.

Kuala Lumpur City Hall (2008). Kuala Lumpur Development Control Plan (KL DCP). Dewan Bandaraya Kuala Lumpur, Malaysia.

Kuala Lumpur City Hall (2019). City planning department (DBKL), Dewan Bandaraya Kuala Lumpur, Malaysia.

Kasipillai J, Chan P. (2008) ‘Travel demand management: Lessons for Malaysia. Journal of Public Transportation’, 11(3): 41–55.

Kim, T.K., Horner M.W., and Marans R.W. (2005) ‘Life Cycle and Environmental Factors in Selecting Residential and Job Locations’, *Housing Studies,* 20 (3), 457–473.

Kim, K.J. (2012) ‘The study of urban form in South Korea’, *Urban morphology,* 16(2), Birmingham Heron press, 150-164.

Kristjánsdóttir, S. (2001) The integration of architectural and geographical concepts in urban morphology: preliminary thoughts. Paper presented at the International Seminar on Urban Form.

Krier, L. (1998) *Architecture: choice or fate.* Windsor: Andreas Papadakis.

Krier, R. (1979) *Urban Space.* Academy Editions, London.

Krier, R. (1979) Typological and morphological elements of the concept of urban space. London: Architectural Design.

Kropf, K. (2009) ‘Aspects of urban form’, *Urban Morphology*, 13(2), 105–120.

Krof, K. (2011) ‘Morphological investigations: Cutting into the substance of urban form’, *Built Environment*, 37(4), 393-408.

Koter, M. (1990) The morphological evolution of a nineteenth-century city centre: Lodz, Poland, 1825-1975, in: T. R. Slater (Ed.) The Built Form of Western Cities, pp. 109-141. Leicester: Leicester University Press

Kwan, S. C., Sutan, R. and Hashim, J. H. (2018) ‘Trip characteristics as the determinants of intention to shift to rail transport among private motor vehicle users in Kuala Lumpur, Malaysia’, *Sustainable Cities and Society*. Elsevier, 36(1), 319–326.

Lavin, S. (1992) *Quatremere De Quincy and the Invention of a Modern Language of Architecture*. Cambridge, MA: The MIT Press.

Land Public Transport Comission/SPAD (2012) ‘Land public transport master plan: Greater Kuala Lumpur / Klang Valley’, *Land Public Transport Agency Malasia*.

Larkham, P.J. (1998) Urban morphology and typology in the United Kingdom. In: Petruccioli A (ed) Typological process and design theory. Aga Khan Program for Islamic Architecture, Cambridge, 159–178

Larkham, P. J. (2006) ‘The study of urban form in Great Britain’, *Urban Morphology*, 10(2), 117–41.

Larkham, P.J. (2002) Consolidated urban morphology reading list. Retrieved January 2011, from htt p://www. urbanform.org/bibliography.html.

Larkham, Peter, and Jones, A. (1991) *A glossary of urban form*. London: Institute of British Geographers.

Latip, N., Heath, T. and Liew, M. (2009) 'A morphological analysis of the waterfront in city centre , Kuala Lumpur', in *iNTA-SEGA 2099: Briding Innovation, Technology and Tradition*.

Lee, B T (1987) New towns in Malaysia: development and planning policies. In New Towns in East and Southeast Asia: Planning and Development, eds D R Phillips and A Yeh. Oxford University Press, New York.

Lee, G. B. (1988) 'The future of urban planning in Malaysia', *Habitat International*, 12(4), 5–12.

Leinbach, T. R. (1975) 'Transportation and the development of Malaya', *Annals of the Association of American Geographers*, 65(2), 270–282.

Levy A. (2005) 'New orientations in urban morphology', *Urban Morphol*, 9(1), 50–53.

Levy, A. (1997) 'The typomorphological approach of G. Canniggia and his school thought', *Urban morphology*, Heron press, Birmingham U.K, 1:52-56

Li, Y. (2013) A Typo-morphological Enquiry into the Evolution of Residential Architecture and Urban Tissues of the Guangfunan area of Guangzhou, China. Master Thesis, Concordia University Montral, Quebec, Canada.

Longley PA., Goodchild M., Maguire D., and Rhind D. (2001) *Geographic information systems and science*. Wiley, Chicheste.

Longley P.A., Mesev V. (2000) 'On the measurement and generalization of urban morphology', *Environment and Planning A*, 32: 473–488.

Longley PA, Mesev V (1997) 'Beyond analogue models: Space filling and density measurement of an urban settlemen', *Regional Science*, 76: 409–427.

Longley, P. A. and Mesev, V. (2005) 'Measurement of density gradients and space-filling in urban systems', *Regional Science*, 81(1), 1–28.

Lu, M. (1999) 'Determinants of residential satisfaction: Ordered logit vs. regression models. Growth Change', 30:264–287.

Madrazo, L. (1984) 'Durand and the Science of Architecture', *Journal of Architectural Education*, 48(1), 12–24.

Maretto, M. (2012) 'The early contribution of Saverio Muratori: between modernism and classicism', *Urban morphology*, Birmingham Heron press, 16(2) ,122-132.

Marshall, Stephen, and Caliskan, O. (2011) 'A joint framework for urban morphology and design. Built Environment', 37(4), 409–426.

Martin, L., and March, L., eds. (1972) *Urban Space and structures.* Cambridge University Press

M. B. (1941) 'Malaya and Its Communications'. *Bulletin of International News*, 18(20), 2003–2007.

Madrazo, L. (1995) The concept of Type in Arhcitecture : An Inquiry into the Nature of Architectural Form.

Madanipour, A. (1996) Design of urban space: an inquiry into a socio-spatial process, John Willey and Sons Ltd, West Sussex, England.

Malagon-Maldonado, G. (2014) Qualitative research in health design. Health Environments Research and Design Journal, 7(4), 120-134.

Marzot, N. (2002) 'The study of urban form in Italy', *Urban Morphology*, 6(2), 59–73.

McCrea, R., Shyy T.K., and Stimson R. J. (2014) 'Satisfied Residents in Different Types of Local Areas: Measuring What's Most Important', *Social Indicators Research*, 118 (1), 87–101.

McGee, T. G. (1963) 'The Cultural Role of Cities, a Case Study of Kuala Lumpur', J*ournal of Tropic Geography*, 17: 178-196.

McGee, T.G. and Robinson, (1995) *The Mega-Urban Regions of Southeast Asia*. UBC Press. Vancouver.

Menghini, A. B. (2002) 'The city as form and structure: the urban project in Italy from the 1920s to the 1980s', *Urban Morphology*, 6(2), 75–86.

Mohamad, J., and Kiggundu, A. T. (2007) 'The rise of the private car in kuala lumpur, Malaysia', *IATSS Research*, 31(1), 69–77.

Mohamed, S. A., and Harun, N. Z. (2018) 'Urban morphological analysis framework for conservation planning and managementr', 16(1), 360–371.

Mohamed, S. A., Harun, N. Z., and Abdullah, A. (2017) 'Typo-morphology as an approach for the conservation of the early malay towns', *Asian Journal of Environment, History and Heritage*, 1: 143–154.

Mohamed Zaid, S. (2015) 'Measuring Operational Affordability of Public Low-Cost Housing in Kuala Lumpur. Case study of People's Housing Programme Public

Low-Cost Housing in Kuala Lumpur', *International Journal of Social Sciences*, IV(4), 54–74.

Mohit, M. A., Mansor, I., and Razida, Y. (2010) 'Assessment of residential satisfaction in newly designed public low cost housing in Kuala Lumpur, Malaysia', *Habitat International*, 34: 18-27.

Mohit, M. A., and Nazyddh, N. (2011) 'Social housing program of selangor Zakat board of Malaysia and housing satisfaction. *Journal of Housing and the Built Environment*', 26: 143-164.

Mohit, M. A. and Adel Mahfoud, A.K. (2015) 'Appraisal of residential satisfaction in double-storey terrace housing in Kuala Lumpur, Malaysia', *Habitat International*. Elsevier Ltd, 49: 286–293.

Moorthy, R. and Jeronn, N. (2014) 'Public transportation effect on the rising of property prices in Malaysia : a correlation study of MRT project', *Review of Integrative Business & Economics Research*, 3(2), 350–357.

Moore, P.W. (1982) 'Zoning and neighborhood change: the annex in Toronto, 1900-1970', Canadian Geographer 26: 21-36.

Moudon, A. V. (1994) 'Getting to know the built landcape: Typomorphology', in *Ordering Space: Types in Architecture and Design*. In: K.A. Franck & L.H. Schneekloth (Eds), 289–311.

Moudon, A. V. (1997) 'Urban morphology as an emerging interdisciplinary field', *Urban Morphology*, 1(1), 3–10.

Moudon, A. V. (1986) *Built for change*. MIT Press, Cambridge, MA.

Montgomery, J. (1998) 'Making a city: Urbanity, vitality and urban design', *Journal of Urban Design*, 3(1), 93–116.

Mugavin, D. (1999) 'A philosophical base for urban morphology', *Urban Morphol*, 3:95–99.

Nachmias, D., and Nachmias, C. (1981) R*esearch Methods in the Social Sciences*. New York, USA: St. Martin's Press.

Newman, P. and Kenworthy, J., (1999) 'Sustainability and cities: overcoming automobile dependence', University of Chicago Press.

Newman, P.W.G. and Kenworthy, J. R. (1996) 'The land use-transport connection An overview', *Land Use Policy*, 13(1), 1–22.

Newman, O. (1972) *Defensible space: people and design in the violent city*. London: Architectural Press.

Nezhadmasoum, S. and Comert, N.Z. (2017) Historic-geographical and typo-morphological assessment of Lefke town, North Cyprus. *Proceedings 24th ISUF 2017 - City and Territory in the Globalization Age*. 27th -29th September. Valencia: Universitat Politècnica València: 1589–1599.

Nicola M. (2002) 'The study of urban form in Italy', *Urban Morphology*, 6(2), 59–73.

Nozzi, D. (2003) Road to ruin. An introduction to sprawl and how to cure it. Westport: Praeger Publishers. NRC, 2008. Nota tegen rommelig bouwen. NRC Handelsblad, 28 June. Nycolaas

Nor R., H., and Naziaty Mohd Y. (2011) 'Urban landscape changes in Kampung Baru , Kuala Lumpur , from 1969 to 2004 as observed', *Journal of Design and Built Development*, 9: 49–58.

Nurizan, Y., and Hashim, A. H. (2001) *Perumahan dan Kediaman*. Malaysia: Universiti Putra Malaysia

Oliveira V., and Monteiro C. (2013) 'What is Urban morphology made of ? ', *Urban Morphol*, 17: 118–120

Oliveira V., Silva M., and Samuels I. (2014) 'Urban morphological research and planning practice: a Portuguese assessment', *Urban Morphol*, 18: 23–39

Oliveira V., (2016) 'Urban morphology: an introduction to the study of the physical form of cities', Springer, Dordrecht.

Oliveira, V. and Medeiros, V. (2016) 'Morpho: Combining morphological measures', *Environment and Planning B: Planning and Design*, 43(5), 805–825.

Oliveira, V. (2019) J.W.R. Whitehand and the Historico-geographical Approach to Urban Morphology. Edited by V. Oliveira. Cham: Springer International Publishing (The Urban Book Series).

Panerai, P., Jean C., Jean-Charles Depaule, and Ivor S. (2004) Urban Forms: The Death and Life of the Urban Block. English edition and additional material by Ivor Samuels. edn. Oxford: Architectural Press.

Patton, M.Q. (1990) Qualitative evaluation and research methods (second). California: SAGE.

Parmer, J. N. (1987) 'The British Legacy', *The Wilson Quarterly*, 11(5), 54–69.

Peters, D. and Johannes, N. (2012) 'Train station area development mega-projects in Europe : towards a typology', *Built Environment*, 38(1).

Perez-Gomez, A. (1983) Architecture and the Crisis of Modern Science. Cambridge. MĐT Press.

Pinho, P., and Oliveira, V. (2009) Different approaches in the study of urban form. *Journal of Urbanism*. 2: 103–125.

Pont, M.B., and Haupt, P. (2007) 'The Spacemate: Density and the typomorphology of the urban fabric', in *Urbanism Laboratory for Cities and Regions. Progress of Research Issues in Urbanism*, 1–19.

Pont, M.B., and Haupt, P. (2009) Space, density and urban form.

Pope, J. (2004) 'Conceptualizing sustainability assessment. Environmental Impact Assessment Review', 24: 595-616.

Propwall (2010) The Nomad Residences, Bangsar. Retrived October 12, 2019, from http://www.propwall.my/photos/437058/the-nomad-residences-bangsar-photo-by-david

Quatremère de Quincy, Antoine-Chrysostôme, (1998) Type. In Oppositions Reader, K. M. Hays, ed. New York: Princeton Architectural Press Rampley,

Rashid, M. (2017) 'The Geometry of Urban Layouts', in *The Geometry of Urban Layouts*. Cham: Springer International Publishing, 19–45.

Rapoport, A. (1990) History and precedent in environmental design (Plenum Press, New York).

Ravari, A. A., and Mazloomi, M. (2015) 'A framework for urban morphology with respect to the form', *Armanshahr Architecture & Urban Develop*, 8(14), 91–103.

Ren, C., Ng, E., and Katzschner, L. (2010) Urban climatic map studies: a review. International Journal of Climatology.

REHDA (2008) The Way Forward for the Construction Industry. REHDA Bulletin: Towards Sustainable Development. REHDA, Real Estate and Housing Developers Association Malaysia, Kuala Lumpur.

Rossi, A. (1984) *Architecture and the city*. Cambridge, Mass: MIT Press.

Rowley, Alan. (1994) 'Definitions of urban design: The nature and concerns of urban design. Planning Practice and Research', 9(3), 179–197.

Rowe, Peter (1987) *Design Thinking*. Cambridge, Mass: MIT Press.

Kjellström, E., and Jacob, D. (2012) 'The study of urban form in South Korea Kwang-Joong', *Urban Morphology*, 16(2), 149–64.

Samuels, I. (2008) 'Typomorphology and urban design practice', *Urban Morphology*, 12: 58-62.

Samuels, I. (2013) ‘ISUF task force on research and practice in Urban morphology’, *Urban Morphol* ,17: 40–43

Samuels I (2014) Foreword. In: Larkham PJ, Conzen MP (eds) Shapers of urban form: explorations in morphological agency. Routledge, New York, pp xxi–xxiv

Sarralde, J.J., James Quinn, D., Wiesmann, D., and Steemers, K. (2015) ‘Solar Energy and Urban Morphology: Scenarios for Increasing the Renewable Energy Potential of Neighbourhoods in London’, *Journal Renewable Energy*, (73), 10.

Shayesteh, H., and Steadman, P. (2015) ‘Coevolution of urban form and built form : a new typomorphological model for Tehran’, 42: 1124–1147.

Shayesteh, H. and Steadman, P. (2016) ‘Typo-morphological analysis of housing layout and density in Tehran’, in *Urban Change In Iran*.

Shirane, T., Nakamura, K., Masuda, N. and Kasuya, T. (2016) ‘Study of development of urban environments, mainly in the vicinity of underground stations’, *Procedia Engineering*. Elsevier B.V., 165, 326–333.

Skyscraper City (2017, Janurary 7) The Old Kuala Lumpur. Retrieved March 12, 2019, from http://www.skyscrapercity.com.

Slater, T. R. (1981) ‘The analysis of burgage patterns in Medieval towns, Area’, 13: 110-119.

Slater, T. (1990) English Medieval new towns with composite plans: evidence from the Midlands, in T.R. SLATER (Ed.) The Built Form of Western Cities, 68-83.

Slater, T.R. (1990a) ‘Starting again: recollections of an urban morphologist’, in Slater, T.R. (ed.) The built form of Western cities (Leicester University Press, Leicester) 23-36.

Slater, T.R. (1990b) ‘English medieval new towns with composite plans: evidence from the Midlands’, in Slater, T.R. (ed.) The built form of Western cities (Leicester University Press, Leicester) 60-82.

Small J., and Witheric M., (1986) A modern Dictionary of Geography, Edward Arnold, England.

Steadman, P., (1983) Architectural morphology: an introduction to the geometry of building plans. Pion, London.

Stojanovski, T. (2017) ‘What explains neighborhood type statistically? Mixing typomorphological and spatial analytic approaches in urban morphology’, 1265–1282.

Tatt, S., and Lin, A. (2015) 'Factors affecting prices of condominiums nearby developing MRT stations in Kuala Lumpur', *21St Annual Pacific-Rim Real Estate Society Conference*, pp. 18–21.

Victor P. (1945) 'Malaya Under The British', *World Affairs*, 108(1), 33–38.

Vidler, A. (1978) 'The third typology, in Delevoy (ed) Rational Architecture', 28–32.

Vidler, A., (1977) "The Idea of Type: the Transformation of the Academic Ideal, 1750-1830" Oppositions, 8: 93-113.

Wagner, A. (2017) Malaysian Shophouses : Creating Cities of Character.

Wei-Kuang, Liu (2011) Managing change: tensions between urban morphology and everyday life in the heterotopic urban context of tainan. University of Edinburgh.

Weidemann, S., and Anderson, J. R. (1985) A conceptual framework for residential satisfaction. *Home Environments*, 153–182.

Whitehand J.W.R. (1992a) 'Recent advances in urban morphology', *Urban Stud*, 29: 619–636.

Whitehand, J.W.R. (1981) The urban landscape Historical development and management, Whitehand JWR(ed) Academic Press; New York London

Whitehand, J. W. R. (2001) 'British urban morphology : the Conzenian tradition', 5: 103–109.

Whitehand, J. W. R., Gu, K., Conzen, M. and Whitehand, S. (2014) 'The typological process and the morphological period : a cross-cultural assessment', *Environment and Planning B: Planning and Design*, 41, 512–533.

Whitehand, J.W.R., and Gu, K. (2006) 'Research on Chinese urban form: Retrospect and prospect. Progress in Human Geography', 30(3), 337–355.

Whitehand, J.W.R., (1964) Settlement patterns in the Chilterns. Unpublished PhD thesis, University of Reading, UK.

Whitehand, J.W.R., (1965) 'Building types as a basis for settlement classification. In:WhittowJB,Wood PD (eds) Essays in geography for Austin Miller. University of Reading, Reading', 291–305.

Whitehand, J.W.R. (1969) 'Traditional building materials in the Chilterns: a survey based on random sampling', *Oxoniensia*, 32: 1–9.

Whitehand, J. W. R., (1987a) Urban morphology. In Michael Pacione (Ed.), Historical geography: Progress and prospect, 250–276

Whitehand, J.W.R., (1972) ‘Building cycles and the spatial pattern of urban growth’, Transactions of the Institute of British Geographers, 56: 39-55.

Whitehand, J.W.R., (1975) ‘Building activity and intensity of development at the urban fringe: the case of a London suburb in the nineteenth century’, Journal of Historical Geography, 1: 211-24.

Whitehand, J.W.R., (1992a) ‘Recent advances in urban morphology’, Urban Stud 29: 619–636

Whitehand, J.W.R., (1992b) ‘The makers of British towns: architects, builders and property owners, c 1850–1939’, *J Hist Geogr*, 18: 417–438

Whitehand, J. W. R., and Morton, N. J. (2003) ‘Fringe belts and the recycling of urban land: An academic concept and planning practice’, *Environment and Planning B: Planning and Design*, 30: 819–839.

Whitehand, J.W.R., and Morton, N.J. (2004) ‘Urban morphology and planning: the case of Fringe belts’, *Cities*, 21: 275-89.

Whitehand, J. W. R., and Morton, N. J. (2006) ‘The Fringe-belt phenomenon and socio-economic change’, *Urban Studie*s, 43(11), 2047–2066.

Whitehand J.W.R., (2007) Conzenian urban morphology and urban landscapes. In: Proceedings of the 6th international space syntax symposium, _Istanbul, II.

Whitehand, J. W. R., Gu, K., Conzen, M. P. and Whitehand, S. M. (2014) ‘The Typological Process and the Morphological Period: A Cross-Cultural Assessment’, *Environment and Planning B: Planning and Design*, 41(3), 512–533.

Widiastuti, I. (2013) ‘The Living Culture and Typo-Morphology of Vernacular Houses in Kerala’, 2(4), 41–53.

Widyastuti, D. T., Ikaputra, Parikesit, D., and Hari Wibisono, B. (2016) ‘Defining local concept of urban rail station area development through best practices approach of rail-transit oriented development’, *Civil Engineering and Urban Planning: An International Journal*, 3(3), 01–11.

Woodside, A.G. (2010) Case study research: theory, methods and practice. Emerald Group Publishing Limited.

Yamane, T. (1967) Statistics: an introductory analysis for economics. New York: Harper and Row.

Ye, Y., Li, D., and Liu, X. (2018) ‘How block density and typology affect urban vitality: an exploratory analysis in Shenzhen, China’, Urban Geography, 39(4), 631–652.

Zafer, N. (2013) Testing an integrated methodology for urban typo-morphological analysis on Famagusta and Ludlow. PhD Thesis. Eastern Mediterranean University, Gazimağusa, North Cyprus.

Zheng, S. (2017) Typology as a strategy for urban design. *Conference on Architecture Engineering and Environmental Design*, May 20, 2017.

Appendix C

Sample questionnaire

Questionnaire for Study on Resident's satisfaction about development around MRT SBK Line 1

Borang Soal Selidik untuk Kajian Kepuasan Penduduk Kediaman terhadap Pembangunan di sekitar MRT SBK Line 1

Dear Sir/Madam,

I am a Master student at **Universiti Teknologi Malaysia**, currently conducting a research survey of resident's satisfaction on understanding the developments surrounding MRT line. This questionnaire is designed to elicit responses in relation to transit oriented development. To evaluate residential satisfaction, we employed two groups of attributes including building and neighborhood characteristics. All the data collected are strictly related to case study context. Any information given on the subject will be used solely for academic purposes and will be treated strictly **CONFIDENTIAL**. Your candid assistance will be highly appreciated to kindly tick (x) or fill in as appropriate. Thank you.

Tuan/ Puan,

Saya merupakan seorang pelajar Sarjana di Universiti Teknologi Malaysia, sedang menjalankan kajian penyelidikan 'Kepuasan Penduduk di Kawasan Kediaman terhadap Perkembangan Pembangunan di sekitar MRT SBK Line 1. Borang soal selidik ini bertujuan untuk mendapatkan respon berkaitan dengan pembangunan berorientasikan transit. Dalam menilai kepuasan penduduk di kawasan kediaman, terdapat dua atribut termasuk ciri-ciri bangunan dan kejiranan. Kesemua data yang dikumpulkan adalah berkaitan dengan konteks kajian. Sebarang maklumat yang diberikan oleh responden adalah SULIT dan bertujuan untuk akademik sahaja. Anda diminta untuk menandakan (x) dan mengisi jawapan di ruang yang disediakan. Segala kerjasama anda amatlah dihargai dan didahului dengan ucapan terima kasih.

SUPERVISOR/ *Penyelia*: PROF. Ts DR. MOHD HAMDAN BIN AHMAD

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Socio-Economic Characteristics of Respondents /*Karakteristik Socio-ekonomi Responden*

Please indicate Local ( ) or International ( )/*Sila tandakan: Tempatan ( ) atau Antarabangsa ( )*

Q1	**Travel time from resident to MRT station / *Waktu perjalanan daripada kediaman ke stesen MRT***
(a) 5- 10 minutes ( ) *5-10 minit.*	(b) 10– 15 minutes ( ) *10-15 minit*
(c) 15 - 20 minutes ( ) *15-20 minit*	(d) 20 - 30 minutes ( ) *20-30 minit*
(e) Not sure ( ) *tidak pasti*	
Q2	**MRT commuter destination / *Destinasi ketika menaiki komuter MRT***
(a) work ( ) *Kerja*	(b) school ( ) *sekolah*
(c) shopping ( ) *membeli-belah*	(d) accessibility to public transport ( ) *kemudahan pengangkutan awam*
(e) healthcare ( ) *penjagaan kesihatan*	
Q3	**Duration of tenure in MRT neighbourhood / *Tempoh menetap di kawasan kejiranan MRT***
(a) 0-1 years ( ) *0-1 tahun*	(b) 1-2years ( ) *1-2 tahun*
(c) 3-4 years *3-4 tahun*	(d) 5 year and above ( ) *5 tahun dan keatas*
(e) Not staying around MRT ( ) *Tidak tinggal di Kawasan MRT*	
If answered period to MRT commencement or existing before, please indicate Area name formerly you resided below *Sila nyatakan nama kawasan MRT dan tempat tinggal anda di ruang yang disediakan.*	
Q4	**House type of residence / *Jenis kediaman perumahan***
(a) single unit house ( ) *Rumah satu tingkat*	(b) multi-storey apartment ( ) *pansapuri bertingkat*
(c) house complex ( ) *rumah komplek*	(d) condominium ( ) *kondominium*
(e) others ( ) *lain-lain*	
Q5	**Residents are satisfied about housing amenities** (include quality of access road, sport facilities, green space and so on) ***Kepuasan penduduk terhadap kemudahan yang disediakan di kawasan kediaman*** *(termasuk kualiti jalan, kemudahan sukan, kawasan hijau dan sebagainya)*
(a) strongly disagree ( ) *Sangat tidak setuju*	(b) disagree ( ) *tidak setuju*
(c) neutral ( ) *neutral*	(d) agree ( ) *setuju*
(e) strongly agree *sangat setuju*	
Q6	**What type of new development as resident would you need** (Please include the name of MRT neighbourhood) ***Sebagai seorang penduduk, apakah jenis pembangunan baru yang anda inginkan?*** *(Sila nyatakan nama kawasan kejiranan MRT anda)*

Appendix D

LIST OF PUBLICATIONS

CONFERENCE PROCEEDINGS

i. **Angya, U. S.,** & Toe, D. H. C. (2018). Prospect of a Southeast Link on Belt and Road Connectivity: an assessment of Seremban, Malaysia from its Strategic Position. *Proceedings of the 2018 Paper presented at the 3rd Belt & Road Conference on Connectivity in Asia*. 24-27 June. RMIT University, Ho Chi Minh City, Vietnam.

ii. **Angya, U. S.,** & Ahmad, M. H. (2019). Assessing the characteristics of Mass Rapid Transit Station and Residential Satisfaction in Kuala Lumpur Conurbation, Malaysia. *Proceedings of the 2019 Paper presented at the 1st International Graduate Conference of Built Environment and Surveying*. 24-25 June. Universiti Teknologi Malaysia, Johor: 323 – 332.