Character of Traditional Street: An Overview of Physical Components Associated with Building, Landscape and Street Pattern in Royal Town

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Abstract. Streets are the most ubiquitous public spaces, serving a multitude of functions which tied to an extremely narrow range of historical, geographical and cultural settings. Streets record and determine the history of city form, more than any other element of the urban infrastructure. It has attributors in making it a successful street with its own unique identity. However, in the present situation these attributes are almost eroded by the uncontrolled development and modernity. Streets in Malaysia’s royal town are no exception from this issue. This paper attempts to review the attributes of the physical components in contributing to street character of Kuala Kangsar, the royal town of Perak, Malaysia. The study covers a thorough literature review of physical components and its elements to determine the most important components captured. From this in-depth review, the study managed to identify three prominent physical components which strongly influenced the physical character of street in royal town. The study reveals that building, landscape and street pattern are the most extrusive components among others. These physical components will create physical qualities such as attractiveness, visibility, permeability, legibility, human scale and safety in creating street characters that symbolize the historical and cultural context. Therefore, establishing these attributes help to preserve the unique and invaluable historical heritage that has become the identity of the place.

1.0 Introduction

History of a town is written in its fabric. Streets are the first significant element which forms the image of a town. It is a physical manifestation of the public realm whereby it forms an interaction of human population with the architectural fabric. It is defined as one of the essential elements that acts as a public open space through its function as a communication channel and for social and activity space (Moughtin 2006; Krier 1979). Tibbalds (2001) highlighted that it is very easy for a city to lose its heritage. Streets record and determine the history of city form, more than any other element of the urban infrastructure (Moudon 1987). Mehta (2013) stated that in the infrastructure of a town, physical element of the street is the most essential element that forms the history and civilization of a place. The study of such physical elements can be seen from various perspectives either literally or metaphorically because the street is influenced by social, economic and political culture in developing an environment of high social value and sustainable living. Physical elemental aspects have been selected as the scope of the study because based on Ja’afar (2014); A Bashri & Shuhana (2012); Mulyadi (2008) and Shuhana (1997), physical
elements have a significant impact on the character of the streets as well as creating sense of place. Thus, the scope of the study is to review the attributes of the main physical components in contributing to street character of the royal town of Kuala Kangsar. The study covers a thorough literature review of physical components and its elements to determine the most prominent components captured. The first part of this paper outlines the historical development of Kuala Kangsar, Perak as the case study. While the second part focuses on scientific findings which stipulates that buildings, landscapes and street patterns are the major components that contribute to a successful street.

2.0 The Royal Town of Kuala Kangsar
Kuala Kangsar is the royal town of Perak, Malaysia located at the downstream of Kangsar River, where it flows into the Perak River. According to Sodangi et al. (2013) from Heritage Trust of Malaysia (1990), Kuala Kangsar has been the home to Perak’s royal family since Sultan Muzafar’s reign in the 18th century. In the context of this town’s history, physical components such as buildings, landscapes and street patterns have significant significance to street characters in this royal town. The town inherited rich legacy of heritage buildings with unique architectural and historical values such as royal palaces, colonial buildings, mosques, traditional Malay houses and monuments which act as landmarks to reflect its character, sense of place and place attachment to the local and foreign visitors. Istana Kenangan, Istana Iskandariah, Sultan Azlan Shah Museum, Ubudiah Mosque, Malay College, Kuala Kangsar Clock Tower are among the examples of buildings named. From the landscape aspects, the town is the site of the first rubber tree planted in Malaysia by an English botanist Henry Nicholas Ridley. The waters of Sungai Perak, which flow through the town has become one of the attractions for its activities and tourism industry thus creating a sense of place through its relationship between people and its atmosphere. Street pattern are narrow and pleasant and great for a stroll as it winds round the grassy hill of Bukit Chandan, a majestic hill where the royal palaces are located. Today, the town which holds historical values, still holds its old world’s charms - preserved colonial buildings, streets with century-old shady trees as well as well-landscaped gardens surrounding the royal enclave of Kuala Kangsar. It is a royal town intertwined with some colonial heritage and spectacular natural sceneries.

3.0 Problem Statement
The existence of royal towns in Malaysia based on a study by NA Samsudin et al. (2018), affirmed that these heritage areas (including the streets) will be diminishing throughout time due to improper planning and modernization of the royal towns if there are no actions taken to protect its identity and characters. N Zalina et al., (2015) highlighted that industrialization has caused the growth of urbanization within the area of royal town, affecting valuable elements of its urban heritage. While part of the city fabric along heritage streets in Johor Bahru were already torn down to meet the demands of the modern society. Action by local authorities are being taken to preserve the identity and character of streets and other places that are shaped by the physical elements, image and activities (Ismail, W. H. W, 2015). Another royal town in Alor Setar, Kedah according to SM Shukri et al., (2017) experienced rapid development and urbanization causing irreversible transformation of their form and character and perhaps in turn, with loss of historic identity and lose their function in meeting people’s needs towards the places and the streets connecting it. The findings show that poor connectivity among the physical elements had influenced the identity of the royal town itself.

According to Fauziah et al (2014), cities with historical heritage such as Kuala Kangsar need to emphasize the importance of place identity and reinforce its local uniqueness to make the appearance of the town and streets more distinctive. Study by R Hashim (2001) mentioned that another royal town at Pekan, Pahang has experienced both rapid economic growth and physical development which affects the royal townscape including its streets. Result shows that many buildings have been demolished and replaced with new buildings that lack of local characteristics. Consequently, the new development has become a threat to the preservation of the local cultural heritage values including its heritage streets. Based on the issues outlined above, the scenario had threatened the character of town and the streets
surrounding it resulting in the loss of street character in a royal town. Hence it is very crucial to establish the physical components in shaping the street character, identity and meaning of towns.

4.0 Theoretical Framework Based on Street Character Theory

Based on a study by Ja’afar (2014) and Musaab & Rawia (2017), street is divided into two, namely physical appearance and function. Street appearance refers to buildings, landscapes, street patterns, quality of view, location, street structure, movement patterns, parking, street widths, street network patterns and sensory (Nor Haslina 2014; Abbaszadeh 2011; Lindsay et al 2009; Moughtin & Martens 2006; Oktay 2005; Lillebye 2001; Appleyard 1980). While function refers to the activities that occur around it because the activity contributes to the success of the street thus creating the atmosphere of the place (Ja’afar 2014; Ja’afar 2011; Gehl 2010; Shuhana 1997). Hence, this study will discuss the physical components from both aspects. Based on the detailed review on the elements and attributes that contribute to the design and the character of street, a theoretical framework has been developed to enable this lengthy description to be viewed graphically (refer Figure 1). It can be concluded that the main components that contribute to the physical character of the streets are buildings, landscapes and street patterns.

Figure 1: Theoretical Framework

5.0 Physical Components Associated with Street Character of Royal Town

In the urban design field, there are four fundamental elements that make up an environment namely physical, behavioral, psychological and social (A Bashri, 2012) This paper focuses only on the physical aspects of the street because according to Musaab & Rawia (2017), Ja’afar (2014) and Lindsay (2009), streets or paths are the basic things that are closely related to the character of a place. Good street design is very important in creating a successful street. Successful street design is a summary of the physical environment formed from the relationship of the various components and elements in which this relationship intertwined with each other to produce a unique street character (Jaafar, 2014; Liang 2010; Oktay 2005; A Bashri & Shuhana 2008. 2005; Thomas 2002; Kropf 1996).

5.1 Building as Physical Component - Building is the most dominant physical component and is the major contributor to shaping street characters. Buildings and streets are two essential elements that have a significant impact on the image of a town (Amirhossein et al. 2013) and these buildings affected the street character through its appearance and function (Nor Haslina 2014; Moughtin & Martens, 2006; Alfrey, 2010).
Figure 2: Summary of physical element and physical character for building component

| BUILDING COMPONENTS | APPEARANCE | FUNCTION |
|---------------------|------------|----------|
| PHYSICAL CHARACTER  |            |          |
| Accessibility       |            |          |
| Safety & Comfort    |            |          |
| Attractiveness      |            |          |
| Human Scale         |            |          |
| Legibility & Visibility |      |          |
| Continuity & Consistency |     |          |
| Attractiveness      |            |          |
| Safety & Comfort    |            |          |
| Accessibility       |            |          |

**5.1.1 Building Appearance** - Based on literature review, physical elements that derived from the appearance of building components are - building location, types of building, size, height, age, building condition, building structure, facade walls, facade openings, architecture style, roof design, facade modification, signage and quality of view (Nor Haslina 2014; Shuhana 2011; Abbaszadeh 2011). These physical appearance features characters such as attractiveness, legibility, visibility, safety and comfort (refer Figure 2). Venturi et al. (1986) highlighted that building appearance which includes design, form, facade and architectural style makes it identifiable, legible and visible. These elements should relate to each other in scale to create a viable urban streetscape create a consistent building edge that frames and activates the public realm. Moughtin & Martens (2006) stated that building facade can be used to analyze the aesthetic and urban design qualities as it is a physical element associated with the principle of architectural composition such as scale, rhythm, position, harmony, balance and unity. While openings on building facade attempts to produce rhythm and pattern that highlight the uniqueness of the building details.

To preserve the town and street characteristic, physical elements at the building façade such as doors, windows, arcades and balconies play a significant role in demonstrating architectural continuity (A. Abbasiasbagh, 2013, Matthew 2003). Building appearance is also influenced by the building-to-human scale factor, where human scale refers to the height of the building as opposed to the human eye view of the surrounding building with the right scale of view (Jacobs 1993). Building signage which contributes to pedestrian legibility are important in the consistency and continuity of overall building architecture (Shirvani 1985) which aimed at reducing the negative visual impact and avoiding confusion with traffic signs. Apart from that, other elements such as building skyline, roofscape, building shape and layout, details and articulation of facade, window and door orientation to the streets are elements of building appearance that creates unique quality of view (Ja’afar 2014; Baper & Hassan 2012).
5.1.2 Building Use/Function - Function and use of buildings and the streets in its surroundings are related to the type of economy/goods/services offered around it (Nor Haslina et al 2011; Shuhana et al., 2004). Reviews by Norhafizah (2014); Miskell (2008); Gehl (2000); Tibbalds (1992) proved that the types and functions of the building are the main factors affecting the physical character of a street and thus contribute to the success of a place. According to previous study, there are four categories of buildings based on their functions and uses: mixed used buildings, commercial, residential and civic buildings (Ja’afar 2014; Shuhana 2011; Abbaszadeh 2011). The functions and uses of the building play a key role in shaping local activities and human behaviors to create a sense of place or place attachment that makes it memorable (Appleyard, 1980). Functions for each type of building use will be examined in relation to the outdoor and indoor activities of the building as well as its impact on the lower floors and the upper floors of the building.

5.2 Landscape as Physical Component - The landscape component also affects the design and character of the street through two aspects - appearance and function. Landscapes have a broad meaning in which it encompasses the geological structure of the land, flora and fauna, the pattern of human activity or the interaction between natural resources and human needs that emphasize the beauty and aesthetic value, architecture and overall ecology and history of a place. According to Ahmad Fauzi (2015), landscapes are divided into two - soft landscape and hard landscape. Soft landscape covers a wide variety of plants found in public parks such as trees, shrubs, palms and ground covers. It plays a vital role in applying natural values and elements of nature into the built environment (Moughtin et al. 1995). Meanwhile hard landscape refers to all types of man-made structures such as buildings, public utilities, infrastructure, antiquities and disabled facilities (Hussain & Ahmad 2010)

Figure 3: Summary of physical element and physical character for landscape component

| PHYSICAL ELEMENT | PHYSICAL CHARACTER | SOFT LANDSCAPE | HARD LANDSCAPE | REFERENCES |
|------------------|--------------------|---------------|---------------|------------|
| Attractiveness   |                    | *             | *             | Nor Haslina 2014; A. Bashri 2012; Nor Haslina 2011; Mackett et al 2008, Anwar 2006; Voluolini 2006, Tyrell 2004, A Bashri & Zubir 2004, SZA Idil 1993 |
| Visibility       |                    | *             | *             | Nor Haslina 2014; A. Bashri 2012; Nor Haslina 2011; Mackett et al 2008, Anwar 2006; Voluolini 2006, Tyrell 2004, A Bashri & Zubir 2004, SZA Idil 1993 |
| Comfort          |                    | *             | *             | Nor Haslina 2014; A. Bashri 2012; Nor Haslina 2011; Mackett et al 2008, Anwar 2006; Voluolini 2006, Tyrell 2004, A Bashri & Zubir 2004, SZA Idil 1993 |
| Safety           |                    | *             | *             | Nor Haslina 2014; A. Bashri 2012; Nor Haslina 2011; Mackett et al 2008, Anwar 2006; Voluolini 2006, Tyrell 2004, A Bashri & Zubir 2004, SZA Idil 1993 |

5.2.1 Landscape Appearance - Soft landscapes that surround the natural environment such as hills, rivers and seas influence urban structures and patterns through its responsive builds on topographic...
profiles, therefore create sense of attractiveness and visibility (Shuhana 2011). Physical elements of soft landscape appearance are - types of vegetation, geographical and topographical, water element, location of landscape and quality of view. Attractiveness, visibility, human scale, comfort and enclosure are the characters generated by these elements. While hard landscape appearance is categorized into three main elements - pavement, pedestrian path and street furniture (Ja’afar 2014). Street pavement (involving textures, materials, design patterns, orientations and layout arrangements) are used to create comfort, legibility and visibility for street users. Street furniture which is divided into three types of amenities - pedestrian, traffic and utility, consists of elements for example bench, streetlight, bus stop, toilet etc. resulting in a comfortable and safe street environment. Besides that, signage, traffic sign, artificial light, pedestrian path and its compliance to the needs of the disabled are also important in ensuring safety, comfortability, visibility and accessibility.

5.2.2 Landscape Use/Function - The function of street is related to human interaction between building and its surrounding landscape (Ja’afar 2014; Shuhana 1997). Gehl (2010) notes that activity within the natural setting is one of the key factor in creating a successful street. A study by Nor Haslina (2014) and Shuhana (2011) concluded that the landscape component greatly influenced the character and activities held along the street. Rapoport (1977) uses landscape components as a variable for analyzing activities because activity on the street produces high legibility. Lynch (1960) considers that activities are divided into two - human activities and activities arising from mechanical movements such as vehicles. Therefore, the function of landscape component is viewed from the aspect of human activity or vehicle and the relationship between human behavior and the surrounding landscape (Shuhana 2011; A. Bashri 1988). According to Mehta (2006) and Jacobs (1993), human activities associated with the natural environment will form a high quality of transparency and provide a safe and comfortable street environment (refer Figure 3).

5.3 Street Pattern as Physical Components - Street pattern is the result of the combination of three main elements known as land, building and street. The diversity of designs and patterns of these elements has produced several types of street patterns such as linear, grid and others (Alfrey 2010). The study of street pattern is assessed in terms of the historical and cultural heritage impacts as it greatly influences the pattern of the street and the character of place. Shuhana (2011) and Marshall (2005) defines street pattern as a building block layout pattern that affects the space of a town. A street pattern is formed when all the patterns, characters and features are combined. This will then result into a street pattern enclave within a balanced environment that have physical qualities such as accessibility, permeability, legibility and visibility (refer Figure 4).

5.3.1 Street Pattern Appearance - The appearance of street pattern is divided into several elements namely movement pattern, structure and street image, location and quality of view. The movement pattern on the street permeability is related to the quality of connectivity and its linkages. According to Ja’afar (2014), movement patterns are assessed based on permeability studies. Permeability is an element of physical quality that illustrates the extent to which an environment can allow one to pass through one place to another. To facilitate users to easily explore streetscape and townscape, connectivity and linkages are intertwined with these movement pattern elements (Shuhana 2011; Bentley et al. 1985). Priority sequences for types of movement patterns in public spaces are preceded by pedestrians, cyclists, public transport users and lastly private vehicles (Ja’afar 2014; CABE 2010). According to Lynch (1960), the image of a city including its street has a strong connection with the five main elements - path, edges, districts, nodes and landmarks, whereby these elements are a major contributor to legibility of the street.

5.3.2 Street Pattern Function – The function of street is largely related to human activity that interacts with a place as well as how buildings and landscapes are used (Shuhana 1997). Activity is behavior response through social, cultural, economic and weather aspects of their environment. Activity provides strength, enthusiasm and character on streets and open space because physical space and activity are
two complementary elements. Activity and space are two elements of the urban design principles that are interconnected. The presence of this activity will create a specific function/activity through the location and character of place. The presence of these activities presents distinctiveness, environmental character and the quality of view of the town (Shuhana 2011; Anwar 2006). Lynch (1960) notes that the existence of special function and activities along the street pattern highlights the attraction of the place and able to give a strong memory to the observer. A study by Abazzadeh (2011, 2009) also concludes that special activity creates an element of attractiveness to encourage the presence of the public on the street. All these lead to accessibility, legibility and safety which contributes to the success of the place (Alvarez 2009; Norhafizah 2012; Ja’afar 2014).

Figure 4: Summary of physical element and physical character for street pattern component

| STREET PATTERN COMPONENTS | PHYSICAL ELEMENT | PHYSICAL CHARACTER | APPEARANCE | FUNCTION | REFERENCES |
|---------------------------|------------------|--------------------|------------|----------|------------|
|                           |                  |                    | Location   | Movement Pattern | Nor Haslina 2014 & 2006; Shuhana et al 2012; Walk San Diego 2011; Wallhead 2011; Borgett 2011; CABEL 2010; Barrie 2010, New Heaven 2010; Davies 2000; Lindsay 2009; Crankshaw 2009; Laslser et al 2008; Taylor 2006; NYBC 2012; Bentley et al. 1985; Shirvani 1985; Jacobs 1993; Ralph 1972 |
|                           |                  |                    | Structure & Street Image | Quality of View | M. Mahmoodi 2014; Nor Haslina 2014 & 2011; South Dublin City Council 2011; Shuhana 2011; Abazzadeh 2011; English Heritage 2010; Lindsay et al 2009; Islam & Ismail 2009; Taylor 2006; Shokouhi 2003; Watson et al 2003; Lynch 1960; Knopf 1996; Cullen 1985; Rapoport 1990; Worsen 1970 |
| Permeability               | *                |                    | Accessibility |                | Sharifah Salwa 2013; Borgett 2012; Shuhana 2011; Barrie 2010; Haslina 2006; Marshall 2005; Davies 2000 |
| Legibility                 | *                | *                  | Attractiveness |                | Nor Haslina 2014; Shuhana 2011; Abazzadeh 2011 & 2009; Alvarez 2009; Mulyadi 2008; Anwar 2006; Lynch 1980 |
| Visibility                | *                | *                  | Legibility    |                | Nor Haslina 2014 & 2011; Shuhana 2011; Mulyadi 2008; Anwar 2006; Taylor 2006; Montgomery 1995; Rapoport 1990 |
| Accessibility             | *                | *                  | Safety        |                | Sharifah Salwa et al 2015; Norhafizah 2012; PPS 2011; Selamat 2005 |

6.0 Conclusion
The findings of the study show that three prominent physical components known as buildings, landscapes and street patterns serve as benchmarks that need to be emphasized in establishing street characters of royal town. These three components are interconnected where each component covers the two main aspects of appearance and function. The presence of historic building structures and all the architectural building elements have contributed to the uniqueness and character of the street. The existence of soft landscape and hard landscape elements are capable of producing a distinctive quality of view, contributes to social interaction and comfortable atmosphere as well as highlighting the character of the town and street. While street pattern that emphasizes on movement pattern and the five physical elements namely nodes, paths, districts, landmarks and edges contribute to an identifiable, accessible and clear form of environment. These physical components will ultimately contribute to physical qualities of the streets namely attractiveness, legibility, visibility, permeability, human scale and special activities.

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