

Methodological Framework of Structured Case Study in Urban Morphology: Preparedness to Pandemic from Theory Building

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ABSTRACT

The morphological patterns of the Malay town are analysed using three main elements of urban form: road networks, building plots, and open space. However, considering the physical aspects of a city, as well as the impact of geography, social, economic, and political forces, allows us to establish a city's particular character, which may be altered by multiple socioeconomic changes brought on by the pandemic. There are few well-documented systematic procedures for examining the morphological changes associated with Malay settlement features, implying considerable differences in the approaches used. By describing techniques and analysing the urban form, this article aims to spark discussion on what an antifragile built environment might look like. It also aims to shed light on how to create dynamic pseudo adaptability in the old and historic town, particularly in terms of scale, urban morphology, and social life, by establishing a systematic analytical framework for the analysis of urban morphology. To exemplify the process of building the methodological structure, a single case study was undertaken in Kota Bharu's Old Settlement Zone. The case study is subdivided into four sections: a) conceptual structure, b) case study design framework, and c) mapping research framework. It is defined through an iterative process that described the specifics of crucial features to establish an extensive methodological framework for the Malay settlement by thoroughly developing and scrutinising methodological processes. Because the current pandemic is sharpening our understanding of the link between local and global action, as well as the power inherent in the application of professional and technical knowledge and practice, this paper hoped to help with the development of policies and guidelines, as well as the evaluation of proposals for post-pandemic urban morphological assessments.

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1. Introduction

Case studies are frequently used in urban research, both openly and explicitly, to address bigger urban challenges that necessitate

multidisciplinary and exploratory approaches that are more flexible, grounded, and narrative (Campbell, 2003). The fundamental characteristics of case studies, in particular, the emphasis on exploratory aspects to obtain an in-depth

understanding of contemporary phenomena of interest; where control over the phenomenon is minimal and separating the phenomenon from its context is difficult (Yin 2018), have proven to be advantageous and well-suited with action-oriented research fields as rooted in urban research. Typically, the urban study focuses on space or spatial as an observed phenomenon with a context. However, when the world is engulfed in a pandemic, this propensity may have shifted to some level. Lifestyle changes, land-use changes, and property ownership are all considered as key impacts in urban design following the end of the pandemic.

This article intends to generate conversation about what an antifragile constructed environment might look like by describing approaches and analysing the urban form (Sartorio et al. 2021). It also intends to provide a systematic analytical framework for the analysis of urban morphology to shed light on how to produce dynamic pseudo adaptability in the old and historic town, particularly in terms of scale, urban morphology, and social life. Due to the tight link with other correlated social characteristics, such as demography, economy, and culture, which often have an impact on urban space, establishing and delineating the clear boundary between phenomena and environment is a limitation in this regard. These factors have influenced the multi-faceted context of urban space, which has become the focus of urban research in the search for a cause-and-effect knowledge of the complex relationship to guide modern action through urban design, planning, and management.

After discovering gaps in research and practice connected to the methodological component of urban morphological analysis to develop a requirement for quality research within the paradigm and technique chosen, it is clear how urban morphological analysis research is carried out. As a result, the goal of this research is to create a systematic methodological framework for urban morphological analysis using a structured case study strategy as a post-pandemic urban design preparation strategy. The methodological framework established provides insight into establishing the preliminary roadmap for performing the urban morphology study using the case study area of the Old City Center in Kota Bharu, Kelantan as a paradigmatic case to reflect the portrayal of traditional Malay town. In relation to the interpretivist study paradigm, the application of the created framework illustrated in this research was built upon. It provides a comprehensive discussion and graphical representation of the framework by framing the contour of key methodological considerations in relation to design, planning, and analysis for achieving a sound interpretative urban morphological analysis research while also addressing issues of research legitimization in qualitative case studies.

2. Literature Review

2.1 *Historic Cities During the Pandemic Strike*

Although it is unlikely that invisible destruction caused by virus attacks on humans and system drivers in the city will alter the design and morphological components of the city, changes in building ownership and restrictions on the use of public space

could potentially alter a city. Prolonged and mutated virus attacks have a long-term effect on two aspects of a city, particularly a historic or traditional city. Apart from being unique in terms of tangible and intangible heritage and a place that promotes residents' quality of life, the historic city is also known as a virus-prone area for the elderly. These historic cities are also popular tourist destinations in nearly every state in the country. Taiping, Bandar Hilir, and Kota Bharu are among the historic cities that consistently attract a large number of tourists each year. Additionally, the implementation of the Movement Control Order (PKP) has had a detrimental effect on the country's tourism industry, as well as numerous businesses in related industries such as lodging, transportation, shopping, food and beverage, arts and culture, and event planning (MICE). Some businesses continue to exist, while others are forced to close their doors or seek alternative sources of revenue. After more than a year of navigating an uncertain situation, the community anticipates that these trying times will soon pass. Tourism industry activists, in particular, must wait until the end of the year to catch its rays, whether they want to or not. Globally, the United Nations World Tourism Organization (UNWTO) forecasts that the tourism sector will take two to four years to recover. This is a lengthy period and undoubtedly presents a significant challenge to all parties involved directly or indirectly in the country's tourism industry. These changes and various forms of challenges must undoubtedly be taken seriously if the old cities are to continue functioning after Covid19.

While it is undeniable that an increasing number of people are coming to terms with the new norm of online life, the desire to move and socialise, as well as travel, appears to precede the desire to create virtual tours (Krause et al, 2020). Thus, this study aims to develop a method for systematically analysing the components of urban morphology to ensure that no critical element is overlooked when considering how to redevelop old cities that have been ravaged by pandemics. As a result, it is critical that the findings of this study aid in the planning and shaping of the city's shape after the outbreak is over (Larson et al, 2020). This study is also consistent with the fourth phase of the National Recovery Plan, when the domestic tourism sector is expected to be fully operational by the end of this year, allowing for the reduction of COVID-19 infectious cases.

2.2 *Urban Morphological Analysis of Malay Town*

Spurred by the growing concern on gentrification of traditional urban areas that erodes the character of urban fabric in traditional Malay town, there was a surge of research organized around identifying the distinctive characterization and conservation of Malay town as catalyst to apprehend the value of Malay urbanism which indeed closely related to urban morphological research. While the existing and available studies deeply ingrained with heritage and socio-cultural aspects, yet the exploratory methods for conducting socio-historical analysis of Malay town based on the application of the concepts and approaches derived from these two research traditions is still untapped to be contextually adapted to the distinctive growth and expansion of Malay town. In as much, there is an ambiguity in the development of systematic urban morphological analysis method due to the lack of

uniformity to describe clear concepts and processes (Oliveria, 2011; Conzen, 2013; Scheer, 2015) and clearly evident in the context of Malay town, which depict how Malay towns needs to be analysed. This is further complicated by the lack of understanding on the characteristics of an organic growth of urban development and expansion of Malay towns to be contextually adapted into the urban morphological analysis process.

This is due to the distinct form of urban growth which apparently shaped the divergent doctrine of urbanization between cities in Europe and cities in Southeast Asia particularly in Malay Archipelago. An influential work by McGee (1969) highlighted the spatial imbalance and urban primacy as dominant features which diverge the growth of urban patterns in Southeast Asia with the West. Additionally, Julaihi (2010) specifically elucidates such situation appear in the formation and development of Malay town which were formed organically through the basis of the community’s need for survival, while European Medieval cities were originally developed and planned as a fortification for defense therefore influenced the uniformity in its spatial patterns. Such determinants therefore affect the form of the town which evolved according to a common spatial pattern as a response to a particular and dominant circumstance, such as the port or the estuary trading activities, developed particularly in the mid-19th century. Consequently, the identification of the urban structure, spatial patterns and changing process distinctive to the contextual urbanization of Malay town is important to reveal an explicit understanding on the formation and growth of the Malay towns resulting to the major changes in its morphological character.

3. Methodology

The concept of structured case study represented in the methodological framework developed is elucidated by two main aspects, namely structured and case as exemplify from the work by Carroll & Swatman (2000). The outline of these two aspects were as follow:

3.1 Structured

The term structure refers to the use of formal process model for constructing theory from case study evidence. It provides a roadmap picturing how to execute research through three structural components as highlighted by Carroll & Swatman (2000) that involves: the conceptual framework, the research cycle and the literature-based scrutiny of theory built. Additionally, the devised structural components formulated by Carroll & Swatman (2000) initially were built on the existing works and extends from Yin’s case study protocol (1984) and Eisenhardt’s eight step roadmap (1989) which describe theory building process in an inductive way within the positivist paradigm. Nevertheless, in the context of interpretivist research to explore a poorly understood situation such as how actually the Malay town were formed and growth structurally, it requires inducing the theory from field work to form a full and in-depth representation of understanding through constructing and articulating such urban development process. Figure 1 illustrates a schematic overview of how the three-phase of structural components forms a structuring system applied in this study. It describes the iterative process in accordance with the nature of urban morphological study as qualitative and the interpretative. The coherent and integrated structured system developed guide the research in constructing a heuristic method for analyzing the process of change in Malay town.

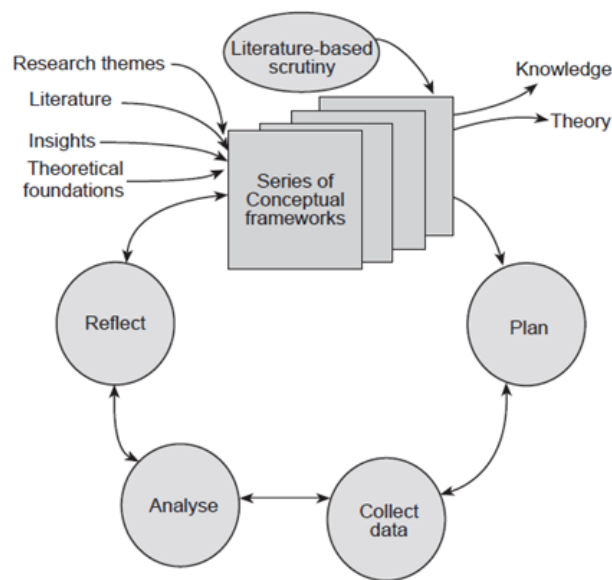


Figure 1 The structured-case research method (Carroll & Swatman, 2000).

3.2 Case study

The case refers to the structure of the case study, described by Yin (1984, 2018) as a case study design. In this context, the structure of the case adopted are following the framework established by Stake (1995). Stake’s work has been particularly influential in defining the case to scientific inquiry by characterizing the different types of case study, although not mutually exclusive categories and specifically detailing the aspects or units that form the case. Through this, it assists in establishing criteria for performing rigorous urban morphological study by delineating the ambiguity of the boundary between phenomenon and context via setting the bounded system to observe the changing process of urban form (Stake, 1995; Merriam, 1998; Yin, 2018). The following discussion concern two stages encountered in delineating the structure of the case, that are: identifying the boundary of study area and framing the boundary system of case study.

3.3.1 Case study area

The city of Kota Bharu, Kelantan is located in the eastern part of Peninsula Malaysia (latitude 6°8'0.9 N and longitude 102°14'18.0 E). The strategic location of Kota Bharu near the Kelantan River stimulates the socio-economic growth of the area which shaped

the structure and patterns of its physical urban form. Such process embodied from the diversity of its holding function such as the state capital and administrative, economic and cultural center for the state of Kelantan since 1845 with the establishment of the Istana Balai Besar by Sultan Muhammad II. From physical planning development, Kota Bharu is divided into 15 Planning Blocks (PB). The study area concentrated in Planning Block 1 (PB1) namely the central part of Kota Bharu. Based on the administrative and operational area, BP1 Kota Bharu consists of 28 Small Planning Blocks also known as Section.

In narrowing the scope of the study area as to assist in detailing the analysis process based on the level and scale of the urban hierarchical form, the focus of the study area in PB1 Kota Bharu is particularly concentrated on the Old Town Center of Kota Bharu locally known as Bandar Lama Kota Bharu. The specific area covers four BPK / Sections namely BPK1.5 / Section 5, BPK1.6 / Section 6, BPK1.7 / Section 7, and BPK1.19 / Section 9. The selection basis of the four BPK areas is considered based on several criteria which can be categorized into two main determinants, namely the physical factors or ‘strength’ of the area and the site conditions that make up the ‘weaknesses of the area as summarized in Table 1.

Table 1 Study Area Selection Factors.

Determinant	Criteria
Physical Factors of the Study Area (Strength)	<ul style="list-style-type: none"> • The earliest urban area that was developed since the opening of the capital city of Kota Bharu in 1845, therefore has a long period of urban development to be studied. • Has undergone various stages of the process of formation and transformation of urban form and exhibiting significant morphogenetic characteristics. • Has a variety of land uses to describe the complexity of a city. • Has a reasonable area size, which is between 50 to 150 hectares to allow pattern analysis to be done.
Conditions of the Study Area (Weakness)	<ul style="list-style-type: none"> • Dysfunctional areas with rich in historical fabrics. • Insensitive changes to traditional urban block formation patterns. • Unresponsive development of physical structure with local historical values that emphasize purely on aesthetic henceforth erode the urban fabric of Malay town tied to the relationship of elements and functions of urban form.

4. Findings and Discussion

4.1 Structured Components of Methodological Framework

The discussion of the significant findings obtained central around the process of structuring the analytical methodological phases that involved in the formation of the systematic methodological framework for urban morphological analysis of Malay town specific to the case study area of Kota Bharu Old Town Centre. In reviewing the concept of the structured case, three structured components referring to the conceptual framework, the research cycle and the literature-based scrutiny of theory built presented as

a descriptive guide for research process which illustrates a clear, coherent and integrated structure of methodological framework from interpretative research.

In the context of this research, the composed of three structural components stated were dissected and conform into three phases to guide in building the systematic methodological framework, that are: Phase 1 establishes the formation of the conceptual framework of the study on urban morphological analysis of Malay town, Phase 2 divulge into the formation of a framework for case study design of Kota Bharu Old Town Centre, and Phase 3 outlines the formation of mapping analysis framework. The integration and overlapping of these series of conceptual frameworks provide an effective roadmap to establish a systematic

methodological framework for the urban morphological analysis process of Malay towns. To aid in understanding the process involved in formulating the methodological framework, Figure 2 depicts a schematic representation of the structure of cycles involved which have been adapted from practice-based models of

organizational and action research as well as incremental process improvement wheel as employed by Carroll & Swatman (2000).

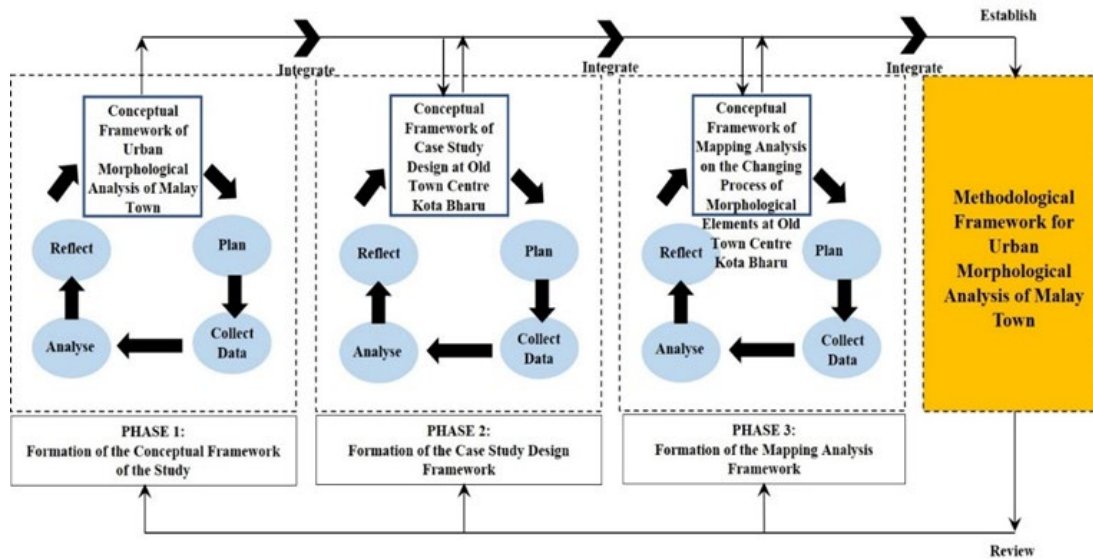


Figure 2 Structure of Cycles in Establishing Methodological Framework (Adapted and revised from Carroll & Swatman, 2000).

4.1.1 Phase 1: Formation of the Conceptual Framework of the Study

In order to form the conceptual framework of the study, it is necessary to possess an in depth understanding of the definitions, concepts and theoretical functions proposed in this research, as well as their relevance to the research paradigm that forms the belief system. From an interpretivist perspective, a theory refers to assumptions about the relationship between concepts that are designed to provide a systematic explanation or description. Accordingly, in the context of this study, theory is interpreted as an arrangement of a set of concepts and their relationship in a coherent and systematic manner, in order to explain the phenomenon of urban change of shape that occurs through the method of urban morphological analysis.

The essence of the theoretical basis for understanding and evaluating the process of transformation for a Malay towns is closely linked to two theories, namely: The Conception of Change in Urban Form (Lynch & Rodwin, 1958; Kropf, 2001) which is the assimilation of Theory of Evolution (in Built Environment) and Theory of Figure Ground Analysis (Trancik, 1986), which is a branch of Theory of Urban Design. The conceptualization of the relationship between these two theories and the study of urban morphology identified by Moudon (1997) and Oliveria (2011) can be seen through three important aspects that form similarities in various methods of urban morphological analysis, that is: Consists of four elements of urban form which are buildings, streets, plots or lots, and open spaces; Analyzed based on different resolution scales; and

Understanding by continuously following the process of formation and transformation of physical form and urban space.

4.1.2 Phase 2: Formation of a Case Study Design Framework

Case study design represents a specific planning to guide in executing the research process systematically. There are four main aspects govern the formation of the case study design framework namely: Study discipline; Goals and objectives of the study; Types of case studies; and Structure or form of the case study. These four aspects are indeed interrelated and crucial to be formally defined at the initial stages of research as to provide a clear orientation to the design of the case study in a structured manner at each phases of the research. Moreover, by establishing a structural system to the case study design assist researcher in achieving and demonstrating high quality of qualitative research while simultaneously address the issue of research legitimization related to the validity, reliability and generalizability of the single case design. The structural components of case study design to form the framework of the urban morphological analysis process is explained based on the following aspects:

- (a) Case Design: Interpretative-Historiographical Study Design

Though urban morphological analysis provides various techniques of spatial representation based on the research tradition of urban morphological schools; the identical aim of

such analysis is to provide a systemic conceptual framework to understand the structure of urban form of the area. Through examining the process of change in its urban formation and growth observed in relation to the spatial patterns formed by the integrated elements of urban form, namely: the building, the plot and street; the assessment of the analytical process is closely linked to the aspect of time-series analysis either diachronically or synchronically. The time-series comparison therefore well corroborates to the historiographic research design considering the observational evidence that offered the most appropriate means of assessing the series of change in urban form throughout the development process.

Certainly, the historiographical aspect is one of the key elements in both approaches; for instance, Conzen (2013) depicted through the use of historiographical process while Muratori emphasized the elements through the concept of operational history. It gives a holistic description on the evolutionary process of urban form being examined elongationally which described from the historical chronological perspective to frame a thorough understanding of the structural changes imprinted on the spatial patterns of the area. By applying the historiographical aspect in case study design, casual assessment could be established through comparing to the time series analysis, rather than a single point in time. In such a way, it adds to the complexity, depth as well as offering a greatest potential for legitimization of the findings.

(b) Type of Case Study: Instrumental Single Case Study

The rationale selection of a single case design focused at Kota Bharu Old Town Centre is in accordance to the purpose of the case, which serves as a representative case or a typical case as referred by Yin (2018) or paradigmatic case as noted by Flyvbjerg (2001). Apart from the conforming criteria of the site based on two main determinants (physical and site conditions) as described previously in Table 2, the preference of Kota Bharu selected through purposive sampling strategy were made to describe as a prototype case in representing the morphology of Malay town. Similarly, Stake (1995) employed the term instrumental as case study type to emphasize the issue or problem rather than the case itself as determinant for the selection of the study area.

(c) Case Study Exploration Type: Embedded Exploration

With reference to the structure or design case study, the embedded design framework is used because of its importance in multiple unit analysis in the framework or types of case

studies that are necessary to link the concept to empirical data. Concept unit analysis is the observed unit or units of observation (Babbie 2010; 1998). The application of the analysis unit in the case study strategy and in the context of this study refers to the observation of the process of urban transformation that is examined through the embedded environment of an urban space, which also refers to the morphological elements of the city (roads, buildings, plots and open spaces). This observation unit therefore falls within the category of social artifacts, i.e., objects or products produced by human behavior as described by Babbie (2010).

(d) Case Study Boundaries: Time Dimensions and Area Dimensions

Since the unit of analysis is related to the process, it is therefore important to identify the time boundary aspect of the time dimension, i.e., the start and end of the process under study (Baskarada 2014). The need to determine the boundaries of time dimensions was also emphasized by Creswell (2013) who stated the need for the boundaries of time and place, while Stake (1995) focused on the boundaries of time and activity. This is in relation to the epistemology of urban morphological studies that need to be observed longitudinally or also referred to as developmental studies; where observations on the process of urban transformation need to be observed over a long period of time so that the findings of the study can be placed specifically, contextually and holistically.

In addition, observations on the process of urban transformation must also have clear boundaries for the collection of relevant data, thereby helping the process of interpreting the data by referring to external factors that are socio-cultural aspects which are important catalysts for the process of change, which can be done in an in-depth manner and collectively. By setting boundaries of consistent time and area dimensions, avoiding the complexity and context of the extensive case study and ensuring that the study conducted is within a reasonable scope of research (Baxter & Jack 2008). The boundary dimension of time established in this study was divided into three phases: the traditional Malay rule phase or the pre-colonial, colonial and post-independence phases. This time phase is observed based on the four boundaries of BPK / Section area observed in Kota Bharu Old Town Center, namely BPK / Section which is the specific area of case study, namely BPK1.5 / Section 5, BPK1.6 / Section 6, BPK1.7 Section 7 and BPK1.19 / Section 9. Figure 3 shows a case study design framework that illustrates the systematic structuring of each aspect described above.

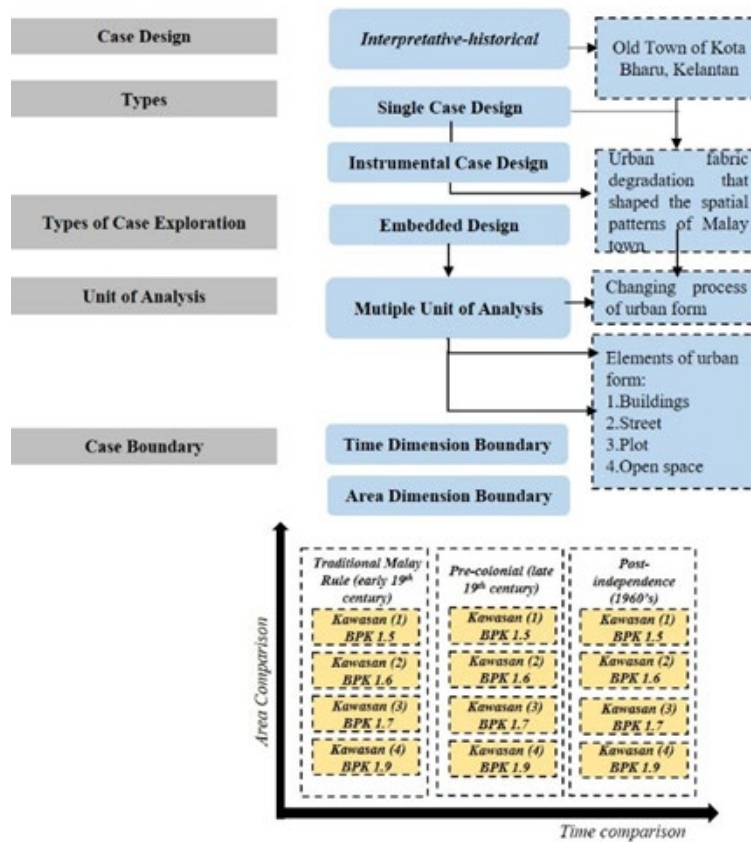


Figure 3 Conceptual Framework of Case Study Design for Urban Morphological Analysis at Old Town Centre Kota Bharu.

4.1.3 Phase 3: Formation of the Mapping Analysis Framework

The case study design specified in Phase 1 is then used to guide the development of a mapping analysis process framework in the Kota Bharu Old City Center study area in a clear, structured and contextual manner. This phase is explained based on two technical syntax in the urban morphological epistemology that underlines the analysis process as follows:

(a) Morphological Phase

The nature of the study of urban morphology is longitudinal in nature and involves interpretative aspects of the process of changing the shape of the city through the phase transition of time, thus requiring a formal urban data collection process (formal urban data). Aspects of formality include scales, years of specific data and geographically identifiable geographical areas (Scheer, 2015). The nature of the data is therefore objective and measurable, which helps to improve the validity and reliability of the study data. In addition, the data obtained are also analysed in relation to each other in order to understand the process of urban transformation that has occurred. The process of analysing can be done in two forms, i.e., diachronic comparison or synchronic comparison. Diachronic comparisons refer to comparisons by looking at the same study area over different time periods; while synchronic comparisons refer to

comparisons of different study areas over the same time period (Caniggia & Maffei, 2001; Cochlo & Forma Urbis Lab, 2014).

In the context of this study, which focuses on the design of embedded exploration, the comparison of data is sequential and moves at the same scale between diachronic, i.e., the transition phase of the urbanization process and synchronic, i.e., the study of changes in each of the four different BPK / Section areas in the Old City Centre of Kota Bharu.

(b) Morphological Zone

Urban morphological zone is a group of homogeneous urban areas, determined based on morphogenetic characteristics and contributing to urban function and tissue (EEA, 2014). The concept of urban tissue is interrelated with the types of land use that are commonly used in zoning systems for urban planning and development. However, clear differences can be observed through the classification objectives between morphological zones and land use zones where morphological zones classify areas according to aspects of urban shape rather than based on the type of land use. This aspect of urban design is in principle rooted in the Muratori research tradition through a typological process approach (see Caniggia & Maffei, 2001) which aims to understand the process of urban change based on a detailed study of the structure and history of its formation process. This requires a reinterpretation of the concept of zoning used to form the framework of the mapping analysis process by adapting the

physical aspects of the study area with socio-cultural aspects that are interrelated and overlapping. Through such an approach, it can increase the sensitivity of the morphological zone classification system formed with a broader nuance covering aspects of urban form as well as aspects of functions / activities; thus, increasing the level of control in areas of historical or cultural significance (Kropf, 2017).

The determination of morphological zone boundaries within the four BPK / Kota Bharu Old Town Centre Section is determined by taking into account the following four criteria, that are: (i) Physical form based on inventories of structures or tangible physical components (tangible evidence); (ii) Socio-economic functions based on Component Analysis that forms an understanding of urban concepts; (iii) Land use pattern; and (iv) Exhibited or derivative cultural processes as well as evolving changes. From these criteria, there are five morphological zones identified based on significant morphogenetic characteristics. Each of these morphological zones is determined by location and mapped to determine the boundaries of the area. The findings of this division of morphological zones are not only helpful in aspects of more focused and in-depth research; but it is important to identify areas that have characters that are significant to the preservation of a Malay city.

5. Conclusions

With reference to a single case study in Old Town Kota Bharu, Kelantan, this study set out to create the analytical process of establishing a methodological framework for urban morphological analysis of Malay towns. It was discovered that the structured case technique used provides a clear graphical format that depicts the research process' intrinsic iteration. These structures are linked to theoretical and practical tasks in building a systematic methodological framework of Malay town urban morphological analysis process, which is rarely investigated in scholarly study and rarely addressed in national town planning principles and current practice. As a result, a structured case ensures that the research method is consistent, accurate, and reliable, indicating the research's legitimacy. The establishment of a systematic methodological framework will serve as a guideline for a more in-depth investigation of the relationship between the morphological elements of urban form unique to Malay towns in order to gain a better understanding of how Malay towns were formed, grew, and developed. Such knowledge is necessary to guarantee that rules for urban design and conservation planning are developed based on a realistic and responsive approach to the genuine character of Malay urban fabric, particularly during the drafting of the development plan for the redevelopment of Malay town. Along with providing exposure to how to assess urban morphological components through a case study, this study intends to pave the path for significant old cities and towns to quickly recover following a pandemic attack through more strategic and efficient urban design and development.

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