HABITABLE BRIDGE ACTS AS SMART GROWTH INITIATIVE DESIGN INTERVENTION OF URBAN SPRAWL

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DEDICATION

This thesis is dedicated wholeheartedly to my parents, wife, daughters, in-laws, family, and everyone who has helped me throughout the process. Thank you for encouraging me and continually giving me moral, spiritual, and emotional support for me to complete this thesis.

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ABSTRACT

Urban sprawl has become a major concern in every big city in the world. Malaysia, as a developing country, can not shy away from this problem too. This is because of the poor planning and lack of awareness on the impact of the urban sprawl to the social, economic and environmental aspect. This will become a major issue as 2.5 billion more people move to cities by 2050, accounting for approximately 68 percent of the global population. Due to scarcity and rising land values, the population has shifted to the city's outskirts, causing urban shrinkage and making the city less competitive and appealing. As a result, there is a movement such as New Urbanism and Smart Growth development to improve urban planning and reduce the impact of urban sprawl. Malaysia's National Urban Policy also incorporates smart growth development to improve urban planning, with one of the key thrusts being to promote the optimum use of existing infrastructure and to revitalise the attractiveness and liveliness of urban centres. As a result, there is an opportunity to find an alternative way to reduce the expansion of the urban periphery while also bringing people back to the city. The aim of this study is to look into the use of habitable bridges as a design intervention in urban sprawl cities through smart growth development. The objective of this research is to investigate the use of smart growth theory, architecture, and the environment to build a habitable bridge. Next, a habitable bridge that improves accessibility and walkability of the surrounding neighbourhood is proposed, and finally, a habitable bridge is proposed to reduce the impact of urban sprawl in a city. The qualitative paradigm was used to conduct this study because the adaptation mechanism is heavily reliant on feasibility literature and qualitative data rather than quantitative data. The paper focuses on subjective and exploratory findings in order to prove the theory that architecture and smart growth are linked. The method is largely implemented through a literature review and observations of urban sprawl sites, with secondary data derived from case studies and qualitatively assessed through a feasibility study. The analysis is carried out at the end of this dissertation by incorporating the smart growth theory in the habitable bridge as an intervention of the urban sprawl city.

ABSTRAK

Kawasan bandar telah menjadi kebimbangan utama di setiap bandar besar di dunia. Malaysia sebagai sebuah negara membangun juga tidak boleh lari daripada masalah ini. Ini adalah kerana perancangan yang lemah dan kurang kesedaran tentang kesan rebakan bandar terhadap aspek sosial, ekonomi dan alam sekitar. Ini akan menjadi isu utama apabila 2.5 bilion lagi orang berpindah ke bandar menjelang 2050, mencakupi kira-kira 68 peratus daripada populasi global. Disebabkan kekurangan dan peningkatan nilai tanah, penduduk telah beralih ke pinggir bandar, menyebabkan pengecutan bandar dan menjadikan bandar itu kurang kompetitif dan menarik. Akibatnya, wujud gerakan seperti Urbanisme Baharu dan pembangunan Pertumbuhan Pintar untuk menambah baik perancangan bandar dan mengurangkan kesan rebakan bandar. Dasar Perbandaran Negara Malaysia juga menggabungkan pembangunan pertumbuhan pintar untuk menambah baik perancangan bandar, dengan salah satu teras utama adalah untuk menggalakkan penggunaan optimum infrastruktur sedia ada dan untuk menghidupkan semula daya tarikan dan kemeriahan pusat bandar. Akibatnya, terdapat peluang untuk mencari cara alternatif untuk mengurangkan pengembangan pinggir bandar sambil membawa orang kembali ke bandar. Matlamat kajian ini adalah untuk melihat penggunaan jambatan yang boleh dihuni sebagai intervensi reka bentuk di bandar-bandar luas bandar melalui pembangunan pertumbuhan pintar. Objektif penyelidikan ini adalah untuk menyiasat penggunaan teori pertumbuhan pintar, seni bina, dan persekitaran untuk membina jambatan yang boleh dihuni. Seterusnya, jambatan yang boleh dihuni yang meningkatkan kebolehcapaian dan kebolehjalanan kejiranan sekitar dicadangkan, dan akhirnya, jambatan yang boleh dihuni dicadangkan untuk mengurangkan kesan kawasan bandar di sesebuah bandar. Paradigma kualitatif digunakan untuk menjalankan kajian ini kerana mekanisme penyesuaian banyak bergantung kepada literatur kemungkinan dan data kualitatif berbanding data kuantitatif. Kertas kerja ini memberi tumpuan kepada penemuan subjektif dan penerokaan untuk membuktikan teori bahawa seni bina dan pertumbuhan pintar dikaitkan. Kaedah ini sebahagian besarnya dilaksanakan melalui kajian literatur dan pemerhatian tapak rebakan bandar, dengan data sekunder diperoleh daripada kajian kes dan dinilai secara kualitatif melalui kajian kebolehlaksanaan.

Analisis dijalankan pada penghujung disertasi ini dengan memasukkan teori pertumbuhan pintar dalam jambatan yang boleh dihuni sebagai campur tangan bandar terbentang bandar.

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LIST OF ABBREVIATIONS

SDG	-	Sustainable Development Goal
SGD	-	Smart Growth Development
TOD	-	Transit Oriented Development
UN	-	United Nation
NU	-	New Urbanism
NUP	-	National Urban Policy

CHAPTER 1

INTRODUCTION

1.1 Background Study

As the world's population expands, the need for land settlement is critical to the creation of new housing areas and make land as one of the most important resources. Because of the limited land area in the urban area, the value of the land has increased, promoting sprawl to the urban periphery. Undefined transition zones between rural and urban areas are known as urban sprawls. Population increase, socioeconomic issues, technological innovation, and development regulations are all elements that lead to urban sprawl. The infinite bounds of urban sprawl appear to be a significant issue, as urban sprawls are the outcome of unregulated and unplanned growth. To eliminate these issues, mechanisms should be developed for resolving uncertainties in urban sprawl.

This can also be observed in Malaysia. Rapid urbanisation is occurring at an alarming rate in this country. The majority of this urbanisation is focused on three major cities: Kuala Lumpur, Penang, and Johor Bahru. This tendency of urban sprawl shows no signs of slowing down. Without adequate planning, the city will suffer a number of consequences. Then there's a global movement led by the United Nations (UN) to create a roadmap for achieving the Sustainable Development Goals (SDG). Also there are theories like Smart Growth Development (SGD), New Urbanism (NU), and Transit-Oriented Development (TOD) are introduced referring to SDG guidelines to address the urban sprawl problem.

1.2 Problem Statement

This urban sprawl problem will have a negative domino effect, and it may not be a concern right now, but it will be in the future. We always do things without considering the ramifications. The focus of this study will be on urban sprawl in Johor Bahru. More than 3500 homes in Johor Bahru city were razed for the sake of infrastructure upgrades, demonstrating this sprawling effect. We already generate a lot of waste as a result of the destruction of buildings. The people will then require a new home, which will necessitate the exploration of further land and the cutting down of trees in order to obtain the land. Then we will have to spend more money on infrastructure like roads, electricity, and water supply to the new area. The population in the new area requires efficient transportation to get to work in the city, and they prefer private transportation over public transportation. This effect will have an impact on the use of energy such as oil and gas for transportation, which will pollute the environment.

The problem may persist because, from an economic standpoint, the city's population has been shrinking as people begin to move out due to affordability issues. Johor Bahru city is gradually declining as there is no population to support the businesses in the city centre. When people move far away from the city to achieve affordability, they must rely on automobiles to travel to work in the city, which has a social impact in that the person loses time while travelling due to heavy traffic congestion and loses time finding a parking spot in the city. It will have an impact on city development because the city will need more parking space to address this issue. Loss of time due to travel also has an impact on a person's life behaviour, as travelling has been consuming time for other purposes such as self-development and time with family, which has resulted in a social issue.

This research focusing on bringing back people to live in the city and using a habitable bridge as a tool to solve land scarcity, affordability, and enhance environmental quality while also reclaiming public space for people that was stolen by transportation development.

1.3 Research Aim

The purpose of this research is to discover an alternative method of reducing the expansion of the urban periphery while also attracting people back to the city. The aim of the research is to investigate the usage of habitable bridges as a design intervention in urban sprawl cities through smart growth development as a means of reducing congestion.

1.4 Research Question

The objective is to analyse and reflect, by answering the following three questions:

I. What role does the development of smart growth play in an urban sprawl?
II. How to improve in terms of connectivity, walkability, and neighborhood livability due to the adverse effects of urban sprawl?
III. Why is a habitable bridge necessary to reduce the impact of urban sprawl in a city?

1.5 Research Objectives

The goal of the research will be to address four objectives:

I. To explore the possibility of smart growth theory, architecture, environment in building a habitable bridge.
II. To propose a habitable bridge that improve accessibility and walkability of the surrounding neighbourhood
III. To reduce impact of urban sprawl in a city through habitable bridge

1.6 Significance of Research

On September 25, 2015, Malaysia and 192 other world leaders endorsed the 2030 Agenda for Sustainable Development (2030 Agenda) at the United Nations General Assembly in New York. This global commitment to a more sustainable, resilient, and inclusive development is embodied in the 17 Sustainable Development Goals (SDGs). As a result, the study is meant to address the issue and is part of the commitment to achieving the following SDGs goals.:

Figure 1.1 Sustainable Development Goals (SDG UN,2015)

The habitable bridge will fall under this 6 Sustainable Development Goals:

I. SDG 3: Ensure healthy lives and promote well-being for all at all ages.
II. SDG 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
III. SDG 10: Reduce inequality within and among countries
IV. SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable

V. SDG 13: Take urgent action to combat climate change and its impacts
VI. SDG 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forest, combat desertification

As a result, this research will present an experimental based design strategy for creating a habitable bridge that is both sustainable and resilient for the people and the environment by maximising the mono function land use such as roads and highway. This includes making efficient use of existing infrastructure to prevent land expansion to the outskirts of cities while also reducing land pressure and living on the land. The habitable bridge will also maximise land use by integrating mixed-use development that will bring the community's essentials within reach, reducing the amount of energy and pollutants required to travel great distances and reconnecting the surrounding neighbourhoods by restoring public space.

1.7 Research Methodology

The qualitative paradigm was used to conduct this study since the adaptation mechanism is mostly dependent on feasibility literature and qualitative data rather than quantitative data. The focus of the paper is on subjective and exploratory findings in order to prove the theory that architecture and smart growth are linked. The method is largely implemented through a literature review and observations of urban sprawl sites, with secondary data coming from case studies and being assessed qualitatively through a feasibility study.

The site observation is also essential because the discussion focuses on an issue related to urban sprawl and smart growth development. To construct an efficient habitable bridge, all data is required, and applicable technique must be performed in order to be analysed, according to the observation, which is highly supported by literature.

1.8 Summary

The first chapter covers the background research and issues surrounding the effects of urban sprawl on the community and environment. The significance of the study is discussed in order to guide the exploration original study direction. The research goal and objectives are determined by the issues and hypotheses presented. Forming an architectural design plan necessitates extensive readings, literature evaluations, and analysis.

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