

**UNIVERSITI TEKNOLOGI MARA**

**THE  
BUILT ENVIRONMENT FACTORS  
AND CYCLING BEHAVIOUR  
IN  
PUTRAJAYA, MALAYSIA**

**NORHAZLAN BIN HARON**

Thesis submitted in fulfilment  
of the requirements for the degree of  
**Doctor of Philosophy**  
**(Design and Built Environment)**

**College of Built Environment**

**March 2023**

## ABSTRACT

Cycling as one of modes of transport in urban and residential areas has been determined as a solution for urban issues such as congestion and traffic conditions in residential area because it reduces the use of motorised vehicles and possesses health benefits factor. Furthermore, it is an active and environmentally friendly mode of travel. However, built environment factors in community seem to be less associated with cycling behaviour. Therefore, this study seeks to explore the built environment factors that influence the cycling behaviour, specifically in Putrajaya. Associations between these factors have been documented as barriers and a compliance for influences on residents for consuming and conducting cycling activity variables. The conceptualisation of variables, measurement of the variables, and examination of relationships between the listed variables has been conducted to determine the most influence-built environment factors for cycling behaviour. The variables are personal characteristics of cycling behaviour, personal factors for health and barriers, and built environment factors. The personal items include the social support aspects such as, socioeconomic factors. Meanwhile, built environment factors include weather, land use form, accessibility, transport safety, and street connectivity. Survey approach was selected for this study through the use of questionnaire. The study was conducted in three selected areas in Putrajaya: precinct 7, 8, and 9. The selected areas were recommended by Perbadanan Putrajaya because they have mix land use within residential area, public facilities, and commercial area. The location for each precinct was also stated as near to workplace. The data population for the selected areas was based on the data of ratepayer record retrieved from the local authority. The list of questions included in the questionnaire covers on personal characteristics, cycling behaviour, built environment, and perception on cycling behaviour. All of the listed questions and variables have been evaluated and validated using a pilot survey and certified by experts amongst the academicians, cycling club members, and local authorities to provide a deeper understanding of the examined issue, sort suitable questions for the survey, and determine the right time frame before conducting the actual survey. Targeted respondents for this study were selected people in Putrajaya that has been active with cycling activity. From the survey, 118 respondents' responses were collected from the members of cycling club, cycling association, and officers of the local authorities. All targeted respondents were active and familiar with cycling activity during weekends or leisure time with their friends or/and family. Through the use of descriptive analysis and after finalising the suitable variables by Factor Analysis, the finding reveals the suitable and reliable factors to make the potential future intervention factors. The listed factors that have been identified to enhance cycling behaviour are individual experiences, impression about built environment, as well as personal and social factors in cycling activity. The implications and recommendation from this research contribute to the existing body of knowledge on cycling behaviour. In addition, the finding of this study can become a point of reference and guidance for policy makers and urban development agencies to design suitable intervention strategies, specifically in terms of intervention at social and physical level for provision of cycling facilities.

## ACKNOWLEDGEMENT

In the Name of Allah SWT, the Most Beneficent, the Most Powerful, and the Most Merciful, peace be upon our Prophet Muhammad and upon all his Family and Companions.

Firstly, I would like to express my gratitude to Allah SWT for giving me this opportunity to face a challenge in the journey of seeking knowledge. Thanks for giving me the strength, both mentally and physically, against all of the circumstances in completing this long and challenging journey successfully. The constraints due to the COVID-19 pandemic, Movement Control Order (MCO), and all of the challenges during that period have been successfully overcome.

My deepest appreciation goes to my honourable supervisors, Associate Professor TPr. Gs. Dr. Halmi b. Zainol, for giving abundance of knowledge and guidance, while always being supportive throughout my PhD journey. You were not only act as my supervisor, but you also have become my cycling partner. My deep appreciation also continues to my second supervisor, Dr. Hjh. Wan Rabiah bt. Wan Omar who has always been giving a lot of guidance, advice, and support throughout my research journey.

I also would like to express my sincere appreciation to Faculty of Architecture, Planning and Surveying, Institutes of Graduates Studies, Universiti Teknologi MARA, Perak Branch, Seri Iskandar Campus for giving the approval, providing the facilities, and offering continuous support along the research process. The appreciation is also dedicated to my colleagues of the Program Perancangan Bandar dan Wilayah department, UiTM Perak Branch. Special appreciation is conveyed to Mr. Sim Ee Chai, Senior Planning Officer in Perbadanan Putrajaya, Mr. Farabi b. Yusoff, Head of Smart City in Plan Malaysia, Ts. Hawa bt. Mohamed Jamil, Research Officer in Road Traffic and Infrastructure Unit (RTI), Malaysian Institute of Road Safety Research, Associate Professor TPr. Dr. Syahriah bt. Bachok, Academician in International Islamic University Malaysia, Pak Adib Noh, President of Putrajaya Cycling Club who is also the writer of “The Joy of Cycling in Putrajaya”, and GB Noraini bt. Ibrahim, President of Pinky Rider Cycling Club in Putrajaya. My appreciation also goes to all team members of various cycling clubs in Putrajaya, Kuala Lumpur, and Selangor. Not to forget my cycling buddies, KEBAS, SIP, MIPCC, SICA, Friendship Cycling Team and others who are not listed here. Special thanks to my classmate colleagues (Petairian) and friends for support and encouragement.

Finally, this thesis is dedicated to my beloved parents, Haron b. Mohd Noh and my brothers; my lovely wife, Norhayati bt Ghani; my boys, Nazran and Nazim; and to all of my family members. Thank you for the prayers, sacrifices, patience, and understanding for the past few years. I love all of you.

Alhamdulillah

## TABLE OF CONTENTS

	<b>Page</b>
<b>CONFIRMATION BY PANEL OF EXAMINERS</b>	<b>ii</b>
<b>AUTHOR'S DECLARATION</b>	<b>iii</b>
<b>ABSTRACT</b>	<b>iv</b>
<b>ACKNOWLEDGEMENT</b>	<b>v</b>
<b>TABLE OF CONTENTS</b>	<b>vii</b>
<b>LIST OF TABLES</b>	<b>x</b>
<b>LIST OF FIGURES</b>	<b>xiii</b>
<b>LIST OF ABBREVIATIONS</b>	<b>xiii</b>
<b>CHAPTER ONE : INTRODUCTION</b>	<b>1</b>
1.1 Research Background	1
1.2 Statement of Problem	4
1.3 Research Questions	7
1.4 Research Aims and Objectives	7
1.5 Scope and Limitations of Study	7
1.5.1 Research Scope	8
1.5.2 Research limitation	10
1.6 Significance of the Research	10
1.7 Research Methodology	11
<b>CHAPTER TWO : REVIEW OF LITERATURE</b>	<b>14</b>
2.1 Introduction	14
2.2 Cycling Activity Behaviour	15
2.2.1 Cycling Recreation and Physical Activities	16
2.2.2 Cycling Impact and Benefit for Health	19
2.2.3 Cycling and Consequences of Transport	21
2.3 The Influential Determinant of Cycling Behaviour	23

# CHAPTER ONE

## INTRODUCTION

### 1.1 Research Background

Evidently, the increasing proportion of people in countries around the world and changing of the behaviour of a population have been described as a challenge to the urban environment. This is due to the fact that the increase number of people leads to the overuse of automobiles in both urban and residential areas. Subsequently, the issues related to the urban environment, namely pollution, congestion environmental damage and serious health problem, also increases and develops to an alarming rate. Nevertheless, because of the benefit of cycling activity, provision of cycling facilities, and level of awareness on health, cycling has become as one of the preferred modes of transport in the urban and residential areas. Cycling activity is widely recognised as an environmentally, friendly, and healthy mode of transport. In addition. the trend of cycling activity also has increased with the growing number of people. This scenario of physical activity has been determined as one of the solutions for urban issue. Therefore, bicycle is considered to have an increasingly important role in transport development due to its environmental and health benefits (Anthony, 2020; Alexandros et al., 2021).

It is a fact that the government has made many efforts to escalate the number of public and non-motorised transport users to ensure a greater participation (Yvonne, Paul, Soren, & James, 2018). Yet, campaigns and policies to reduce car use and increase bicycle use have been based on informal conceptualisation, designs without prior research, and focus that is mostly in providing information about the negative consequences of automobile use. An example of campaign to reduce car use is Car Free day campaign organised by the local authority. The tools and development of the campaign are quite aggressive and efficient. Another example is Pelan Induk Laluan Basikal Bandaraya Shah Alam developed by Majlis Bandaraya Shah Alam.

Despite various campaigns and policies developed by the authorities, their objectives have not been completely achieved. The situation relating to cycling activity development highly concentrates on the development of facilities, while the guidelines for cyclists mainly centralise on a few physical areas which is not enough