Faculty of Technology Management and Technopreneurship

A COMPREHENSIVE PLANNING OF PRIVATE LAND TRANSPORT FOR SUSTAINABLE DEVELOPMENT AND COMMUNITY WELFARE AT AYER KEROH, MELAKA

Loo Heoy Shin

Master of Science in Technology Management

2018

A COMPREHENSIVE PLANNING OF PRIVATE LAND TRANSPORT FOR SUSTAINABLE DEVELOPMENT AND COMMUNITY WELFARE AT AYER KEROH, MELAKA

LOO HEOY SHIN

A thesis submitted
in fulfillment of the requirements for the degree of Master of Science
in Technology Management

Faculty of Technology Management and Technopreneurship

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2018

DECLARATION

I declare that this thesis entitled "A Comprehensive Planning of Private Land Transport for Sustainable Development and Community Welfare at Ayer Keroh, Melaka" is the result of my own research except as cited in the reference. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature : .....

Name :

Date :

APPROVAL

I hereby declare that I have read this thesis and in my opinion this thesis is sufficient in terms of scope and quality for the award of Master of Science in Technology Management.

Signature : ……...

Supervisor Name :

Date :

DEDICATION

To

My parents,

My colleagues,

Who without their support

The completion of this research would not have been possible

ABSTRACT

One of the goals in Sustainable Development is to make cities and human settlements inclusive, safe, resilient and sustainable. In this study, the researcher focuses on the sustainable transport because the aim is to reduce the traffic congestion and reduce Green House Gases (GHG) emission from private transport in Ayer Keroh. Ayer Keroh is selected as the research location because it consists of residential, industrial, commercial, state government administrative centre and tourist spot which cause it to be crowded with vehicles such as private cars, motorcycle, lorry and busses. Thus, the high usage of private transportation leads to serious traffic congestion and high emission of GHG in Ayer Keroh. Although effort to promote green transportation to reduce usage of private transport and GHG emission, most of the public in Melaka still prefer the usage of private transportation due to several reasons. Hence, the problems of traffic congestion and emission of GHG could not be reduced significantly. Therefore, this study aims to examine the factors influence the public to use private land transport system, to investigate the strategies to change the public behaviour to reduce the usage of conventional private land transportation and propose a comprehensive private land transport planning for MPHTJ. Mixed Method research method is used in this research and the research design is exploratory, since the novelty of the research and MPHTJ does not implement any sustainable transport system at Ayer Keroh. Furthermore, the qualitative data collected from the interview sessions with the staffs in MPHTJ and local representatives able to provide insight of the possible factors, strategies and planning of sustainable private land transport system. The quantitative data is collected from the survey to triangulate with the data collected from the interview session. There were 22 respondents for the qualitative data collection and 700 respondents from the quantitative data collection. From the findings of this research, it shows that land use development pattern, demographics and vehicle ownerships are the critical factors to affect the usage of private transport. Therefore, the effective strategies to modify the behaviour of community to utilize the conventional private transport need to be identified in order to achieve the objectives of the research. Eventually, a comprehensive sustainable private transport system planning is constructed based on the findings. This research is important to promote Ayer Keroh to become a sustainable city in the future.

ABSTRAK

Salah satu matlamat dalam Pembangunan Mampan ialah menjadikan bandar dan penempatan manusia inklusif, selamat, berdaya tahan dan mampan. Dalam kajian ini, penyelidik memberi tumpuan kepada pengangkutan yang mampan kerana tujuannya adalah untuk mengurangkan kesesakan lalu lintas dan mengurangkan pelepasan Gas Rumah Hijau (GHG) dari pengangkutan persendirian di Ayer Keroh. Ayer Keroh dipilih sebagai lokasi penyelidikan kerana ia terdiri daripada pusat pentadbiran kerajaan, perindustrian, komersil, pusat pentadbiran kerajaan negeri dan tempat pelancongan yang menyebabkan ia penuh dengan kenderaan seperti kereta, motosikal, lori dan bas persendirian. Oleh itu, penggunaan pengangkutan awam yang tinggi membawa kepada kesesakan lalu lintas yang serius dan pelepasan GHG yang tinggi di Ayer Keroh. Walaupun usaha untuk mempromosikan pengangkutan hijau untuk mengurangkan penggunaan pengangkutan persendirian dan pelepasan GHG, kebanyakan orang di Melaka masih memilih penggunaan pengangkutan persendirian kerana beberapa sebab. Oleh itu, masalah kesesakan lalu lintas dan pelepasan GHG tidak dapat dikurangkan dengan ketara. Oleh itu, kajian ini bertujuan untuk mengkaji faktor-faktor yang mempengaruhi orang ramai menggunakan sistem pengangkutan darat swasta, untuk menyiasat strategi untuk menukar tingkah laku awam untuk mengurangkan penggunaan pengangkutan darat konvensional dan mencadangkan perancangan pengangkutan darat swasta yang komprehensif untuk MPHTJ. Kaedah penyelidikan kaedah campuran digunakan dalam kajian ini dan reka bentuk penyelidikan adalah penerokaan, kerana penyelidikan baru dan MPHTJ tidak melaksanakan sistem pengangkutan yang lestari di Ayer Keroh. Selain itu, data kualitatif yang dikumpulkan dari sesi wawancara dengan kakitangan di MPHTJ dan wakil tempatan dapat memberikan pandangan tentang kemungkinan, strategi dan perancangan sistem pengangkutan darat swasta yang mampan. Data kuantitatif dikumpul dari kaji selidik untuk triangulasi dengan data yang dikumpulkan dari sesi wawancara. Terdapat 22 responden untuk pengumpulan data kualitatif dan 700 responden daripada pengumpulan data kuantitatif. Dari penemuan kajian ini, menunjukkan bahawa pola pembangunan penggunaan tanah, demografi dan kepemilikan kenderaan adalah faktor kritikal yang mempengaruhi penggunaan pengangkutan persendirian. Oleh itu, strategi yang berkesan untuk mengubahsuai tingkah laku masyarakat untuk menggunakan pengangkutan persendirian konvensional perlu dikenal pasti untuk mencapai matlamat penyelidikan. Akhirnya, perancangan sistem pengangkutan persendirian yang komprehensif dibina berdasarkan hasil penemuan. Penyelidikan ini penting untuk mempromosikan Ayer Keroh untuk menjadi bandar yang mampan di masa hadapan.

ACKNOWLEDGEMENTS

Along the journey of my Master Study in Universiti Teknikal Malaysia Melaka (UTeM), I have been encouraged and supported by many people. Without their encouragement, it would be impossible for me to complete my thesis smoothly. Here, I would like to take this opportunity to express my appreciation to several people who have contributed to the development and completion of this thesis.

First and foremost, I would like to express my sincere appreciation to my supervisor, Profesor Madya Dr. Chew Boon Cheong for his precious supervision, support and encouragement towards the completion of this thesis. Profesor Madya Dr. Chew guided me along the way so that I manage to complete the thesis smoothly. Moreover, his insightful comments and suggestions allow me to widen my research from various perspectives.

Furthermore, I would like to thank the financial support from Knowledge Transfer Program (KTP) along my Master journey. Besides, I would like to express my sincere acknowledgement to classmate, Yu Xin, Hafiz, Jess and CK for accompanying and encouraging me during the process. Special thanks to all the informants for their enthusiastic involvement in my research. Their names cannot be disclosed but their information has helped me to complete this thesis.

Eventually, my warmest thanks to my beloved parent and siblings for their moral support to me in completing this thesis. My father, Loo and mother, Tan always encourages me whenever I faced difficulties in doing my thesis. The supports and love from my family

have motivate me to be determination to make the completion of this thesis smooth and possible.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

KTP	-	Knowledge Transfer Programme
MPHTJ	-	Majlis Perbandaran Hang Tuah Jaya
ADB	-	Asian Development Bank
UN	-	United Nations
GCAP	-	Green City Action Plan
GHG	-	Greenhouse Gases
NGV	-	Natural Gas for Vehicles
EV	-	Electric Vehicles
ERP	-	Electronic Road Pricing
LEZ	-	Low Emission Zone
LaMiLo	-	Last Miles Logistics
ICT	-	Information and Communications Technology

LIST OF PUBLICATIONS

Loo, H. S., Chew, B. C., Hamid, S. R. and Ou Yang, Y. X., 2017. Enhance the Sustainability of Private Land Transport System at Ayer Keroh, Melaka. *AIP Conference Proceedings,* 1818 (1), p. 020029.

Loo, H. S., Chew, B. C. and Hamid, S. R., 2017. Exploring the Factors and Strategies in Implementation of Sustainable Land Transport System in Ayer Keroh, Melaka. *Journal of Advanced Manufacturing Technology,* p. 159-173.

CHAPTER 1

INTRODUCTION

1.1 Introduction

Sustainable development is always being concerned all over the world. Based on the classical explanation given by United Nations World Commission on Environment and Development in 1987, sustainable development is defined as "meets the needs of the present without compromising the ability of future generations to meet their own needs". In other words, sustainable also called as equitable and balanced which defined as development to continue indefinitely and simultaneously in three major interrelated areas: economic, social and environmental (Flint, 2012). There are 17 goals that set to transforming our world to sustainability and one of the goal is make cities and human settlements inclusive, safe, resilient and sustainable.

Meanwhile, four fields that concerned in this goals are: disaster risk reduction, national sustainable development strategies, sustainable cities and human settlements and sustainable transport. In this research, the researcher only focus on sustainable transport. This is because sustainable transport must be viewed and integrated as an essential ingredient in sustainable development strategies. United Nations (2015) explains sustainable transport as transport that meets the needs of the present without compromising the ability of future generations to meet their own needs.

CEO of Malaysian Green Technology, Ahmad Zairin Ismail expressed that sustainable transportat is extremely important to Malaysia's economy. Yahaya et al (2013)

declared that an environmental friendly, sustainable and less expensive private transport system need to fulfil some of the criteria. The construction of the transport system also try to avoid high construction cost and make sure that the people are utilising the system that has been designed. Besides, implementing the micture of zoning laws and reduce the incentives to the private transport in order to relief the congestion on road.

Looking at the larger state transport system, it is not adequate if the focus is only on implementation of eco-friendly technology public transport but neglected the high usage of private transport. Hence, it is important to consider the private transport system to achieve the overall sustainable transport system. According to the explanation of Transportation Dictionary (2008), private transport refer to the transport service that diminish to a group of people and not open to public at large. Dodd and Jackson (2014) further explain that private transport is refer to active transport (walking and cycling), motorcycle, car, van and truck.

Nation Master (2016) analysed that Malaysia are ranked at 47 among all the countries around the world when comparing the number of motor vehicles per 1000 people wih the amount of vehicles of 361 excluding the motorcycles and other two-wheelers. This statistic shows that among 3 Malaysian, one of them will own a private four wheeled transport in Malaysia. Since private transport mainly refers to private use, hence it is important to understand the behavior of the people in using private transport system and study on the behavioral modification to reduce the usage of private transport system in Melaka.

Melaka is the third smallest Malaysian state and it is dubbed as “The Historical State”. On 7 July 2008, Melaka City was listed as a UNESCO World Heritage Site. For administrative purpose, Melaka is divided into three districts (Alor Gajah, Jasin and

Central Melaka) and four local authorities (MBMB, MPAG, MPHTJ and MPJ). There are total 890,000 residents and 12.74 million of tourists accommodate Melaka in year 2015 (New Straits Times, 2016). The researcher selected Ayer Keroh as the research location based on several reasons. Ayer Keroh Toll act as the main entrance from the North-South Expressway (PLUS) to the center of historic city Melaka. Ayer Keroh accommodates with residential, industrial, commercial, tourist spots and state government administrative centre with the appearance of transport system. Under the administration of Hang Tuah Jaya Municipal Council (MPHTJ), Chew (2015) declares that the facilities cause Ayer Keroh becoming a well developed township.

On 20th October 2010, Malaysian Prime Minister YAB Dato Seri Najib Abd Razak declared Melaka as a Developed State using Organization for Economic Cooperation and Development (OECD) Indicators (Shah, 2014). On 1st October 2013, Melaka was established as Melaka Green Technology Corporation (MGTC) while this corporation mainly is to lead the green development initiatives in Melaka. In Green City Action Plan (GCAP) that produced on 22nd April 2014, it has listed six thematic areas which help in further enhanced the planning for green development in Melaka (Asian Development Bank, 2014).

1.2 Problem Statement

The transport system is one of the significant sources in GHG emission with responsible for 13% of emissions worldwide. On the other hand, it also responds to global carbon dioxide emissions by 23% and this figure is expected to increase by 57% worldwide in the period of 2005-2030 (Chew, 2012). Since there is consensus in science and politics, global GHG emissions must be reduced by more than 80% by the year 2050

to prevent disastrous global warming. Due to this issue, the transport sector is the main sector that needs to be pay concern to improve the transport system for low carbon.

Malaysia has renewed the government's pledge from 40 % to 45 % for GHG emission by year 2020 compared with 2005 levels (Loo, 2015). From the research made by Melaka Green Technology Corporation (PTHM) (2016), on-road transport has contributed up to 59.2 % on GHG emission in Melaka. Although the transport system in Melaka helps to generate the economic wealth and stimulated the socioeconomic development; at the same period, the transport system worsens the air quality, impacting environmental effects such as global warming, greenhouse effects and causing congestion.

Basic learning refers to the conditioning, biofeedback, assertiveness training, positive or negative reinforcement, hypnosis or aversion therapy. Behavioral modification is the basic learning to change unpracticed individual or group behavior. Functional assessment is act as the technique to reinforce adaptive behavior eliminate unwanted behavior. Hayne (2011) identifies a few characteristics for behavior modification such that: emphasise on defining problems, improving functioning by making environmental adjustments, precise methods and rationales, real life application of techniques, techniques grounded in learning and behavior theory, demostration that linking with imposed technique and emphasis on accountability.

In the field of transport, people always make decision on how to spend scarce money and time on transport (Litman, 2013). Not only money and time, mobility needs also reflect based on their options and preferences. Travel behavior is concern on the transport issues and challenges that involve the social and spatial dimensions. The situation is called as demand, which define as the amount and type of good people and business will consume

under different conditions. Travel demand reflect the ability and willingness for the people to pay and the value to attach to particular travel activity.

Although the transport system in Melaka helps to generate the economic wealth and stimulated the socioeconomic development; at the same period, the transport system worsens the air quality, impacting environmental effects such as global warming, greenhouse effects and causing congestion. Since Ayer Keroh is the most developed township in Melaka, hence it is important for the town act as role to other township in the implementation of sustainable transport system. The local authority need to establish a comprehensive private land transport planning to overcome the congestion issue and emission of GHG in Ayer Keroh, Melaka. Therefore, there are several research questions to be answered throughout the research study such as follow:

i. What are the factors that affect the public in keep utilizing private land transport system?
ii. What are the strategies that will change the public behavior in reducing the conventional private land transport usage?
iii. How to establish a comprehensive private land transport planning for the public at Ayer Keroh, Melaka?

1.3 Research Objectives

Throughout the study the researcher aims to achieve research objectives such follow:

i. To examine the factors that affect the public in keep utilizing private land transport system.
ii. To investigate the strategies that will change the public behavior in reducing the conventional private land transport usage.