CONCEPTUALIZATION OF PERCEIVED UTILIZATION OF PUBLIC BUS TRANSPORT SERVICE: EMPIRICAL EVIDENCE FOR MALAYSIA TRANSPORT SUSTAINABILITY

By

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
DV	Dependent Variable
IFS	Information service
IV	Independent Variable
LRT	Light Rail Transit
NKRA	National Key Result Areas
PBT	Public bus transport
PLUS	*Project Lebuhraya Utara-Selatan*
PPIAF	Public-Private Infrastructure Advisory Facility
PT	Public transport
PU	Perceived utilization
PUD	Perceived direct utilization
PUID	Perceived indirect utilization
PUR	Perceived recommendation to others
ROS	Reliability of schedule
SAC	Safety and comfort
SD	Standard Deviation
SPSS	Statistical Package for the Social Sciences
STK	Season ticket
THE PEP	Transport, Health and Environment Pan-European Programme
TKP	Ticket pricing
UN	United Nations

UNECE	United Nations Economic Commission for Europe
UNESCO	United Nations Educational, Scientific and Cultural Organization
URL	Universal Resource Locater
WHO	World Health Organization
WP29	World Forum for Harmonization of Vehicle Regulations (Working Party 29)

ABSTRAK

Peningkatan penggunaan kenderaan persendirian dan kemelosotan perkhidmatan bas awam (PBA) menunjukkan kecenderungan penduduk Malaysia untuk memandu daripada menggunakan PBA. Sepertimana yang sedia maklum, pembaikpulih perkhidmatan yang sedia ada secare keseluruhan adalah amat penting bagi meningkatkan kadar penggunaan PBA sejajar dengan misi NKRA ke-enam. Namun demikian, penyelidikan setakat ini tidak mampu mengenali punca sebenar penurunan kadar penggunaan perkhimatan awam ini. Oleh yang demikian, kaji-selidik ini telah dilaksanakan dengan menyediakan dua model penyelidikan bertujuan untuk menilai penggunanna PBA serta mengetahui kehendak dan kemahuan pengguna komuter dan bukan komuter di Malaysia. Teori pengurusan untuk kaji selidik ini dibentuk dengan berpandukan kepada "Theory of Reasoned Action" dan senarai soalan dirangka untuk mendapatkan jawaban terus daripada orang awam. Penyelidikan kuantitatif ini telah dilaksanakan menerusi peninjauan Internet dan temuramah berstuktur daripada 302 penduduk di Pulau Pinang. Daripada jawaban yang diterima, didapati bahawa pendorong utama untuk menigkatkan kadar penggunaan perkhidmatan bas awam adalah tiket bermusim, berikutan dengan perkhidmatan maklumat, harga tiket, ketepatan jadual waktu, keselamatan dan keselesaan. Walaubagaimanapun, ketepatan jadual waktu, keselamatan dan keselesaan adalah tidak secara langsung mempengaruhi penggunaan PBA. Penemuan empirikal juga menunjukkan bahawa responden dengan umur < 26 dan > 40 tahun adalah pengguna PBA yang paling berpotensi manakala pendapatan bulanan, pemilikan kenderaan persendirian, dan status komuter mempengaruhi sebahagian sahaja daripada penggunaan PBA. Kaji selidik ini juga mengenali tiga kombinasi paling cenderung dan disukai yang dipilih oleh responden: C1, C3 dan C7. Penemuan dalam kaji selidik ini berdeterminasi untuk

membantu pihak berkuasa PBA dalam perancangan untuk meningkatkan kadar penggunaan PBA dan melestarikan perkhidmatan PBA di Malaysia. Kelestarian sistem pengangkutan adalah penting bagi pembangunan ekonomi negara dan peningkatan kualiti hidup masyarakat. Lebih-lebih lagi, model yang disediakan di dalam kaji-selidik ini boleh dilentur demi menampung gaya pengurusan yang berubah-ubah. Akhirnya, kaji-selidik ini juga telah menunjukkan nilai yang penting dan mendapat maklum balas yang positif daripada pihak pengurusan Rapid Penang serta keprihatinan daripada pihak Kementerian Pengangkutan Malaysia.

ABSTRACT

The rising number of private vehicles and the ailing public bus transport (PBT) service industry is a testimony that the Malaysian citizens prefer driving to utilizing PBT. The overall improvement to the PBT is vital to encourage the modal switching and increase the utilization rate to meet the 6th NKRA. The hitherto research has not provided any comprehensive findings and hence prompted the conception of two models in this study to assess the perceived utilization of PBT services to understand the needs and expectations of commuters and non-commuters in Malaysia. The theoretical framework was constructed based on the Theory of Reasoned Action and the questionnaire was framed to solicit direct responses from the public. This exploratory quantitative research was performed via online survey and personal structured interview from 302 respondents in Penang. The empirical results showed that the most significant service driver influencing the overall perceived utilization is season ticket, followed by information service, ticket pricing, reliability of schedule, safety and comfort. Reliability of schedule, safety and comfort however were not significant on the perceived direct utilization. The findings also revealed that the respondents aged < 26 and > 40 were the most potential commuters while monthly salary, possession of private vehicle and status of commuter were partially influencing the perceived utilization. The study also identified three best preferred combinations rated by the respondents: C1, C3 and C7. The findings attempt to assist the PBT authorities in strategic planning to increase the utilization and to sustain the PBT service industry which could lead to economic growth and improved quality of life. Besides, the model is flexible to allow customization by management according to its set of constraints. Finally, the study shows its significant value with the positive feedback from Rapid Penang and attention from the Ministry of Transport Malaysia.

Chapter 1 INTRODUCTION

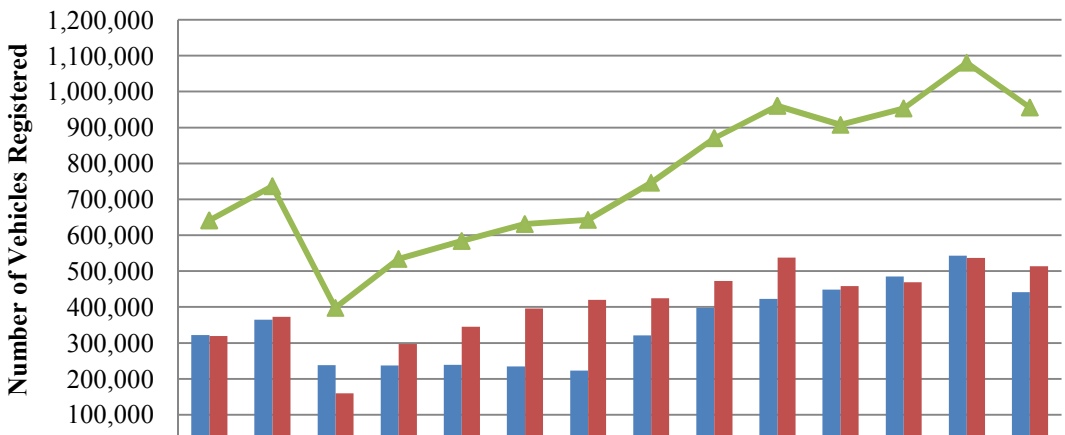
1.1 Introduction

This study aims to provide an insight into the underutilization scenario of public bus transport (PBT) services in Malaysia and conceptualize the perceived utilization of the service to reveal the real needs and expectations of Malaysian citizens. This exploratory study provides a set of PBT service drivers that is highly perceived by the commuters and non-commuters in Malaysia. The suggested models in the study endeavor to assist PBT authorities to come out with cost effective managerial strategies that are readily implementable within a relatively shorter duration to increase the utilization rate as well as to sustain the ailing PBT service industry in Malaysia. The background of study will be first introduced in this chapter, followed by motivation of study, problem statement, research objectives and questions, significance of the study and definition of important key terms in the study. The chapter ends by the description of the organization of remaining chapters.

1.2 Background of Study

In general, the public is concerned with the mode of transportation to reach desired destination on scheduled time with minimum cost and maximum flexibility. Automobile usage has increased many folds during the last few decades in most of the urban areas in developed and developing countries mainly attributed to the mobility and flexibility provided by private vehicles. In Malaysia, citizens favor private vehicle to public transport (PT) due to the advantages associated with its usage, such as the privacy, comfort, unrestricted usage from door to door and ability to reach any destination. This is in contrast with PT travel in Malaysia which is not reliable and

often known as "bad" which also necessitates the sharing of service with other strangers. There is in fact evidence showing that the economic growth, rising household income, as well as the involvement in car assembly and manufacturing industry are the major driving forces leading to the escalated dominance and high dependency on private vehicles in Malaysia (Mohamad & Kiggundu, 2007). Deficiencies and poor management in PT system have further worsen the condition and boosted the private motorized transportation in most of the cities in Malaysia (Kamba, Rahmat, & Ismail, 2007; Kasipillai & Chan, 2008). Data obtained from the Malaysian Road Transport Department further supported the scenario by showing the overall spectacular increase in the growth rate of new registration of private motor vehicles in Malaysia from 1996 to 2009. The growth continues yearly except it plummeted in 1998 (due to 1997 Asian financial crisis) and 2009 (due to 2008 global financial crisis) that had affected the demand of private motor vehicles (*Figure 1.1*).



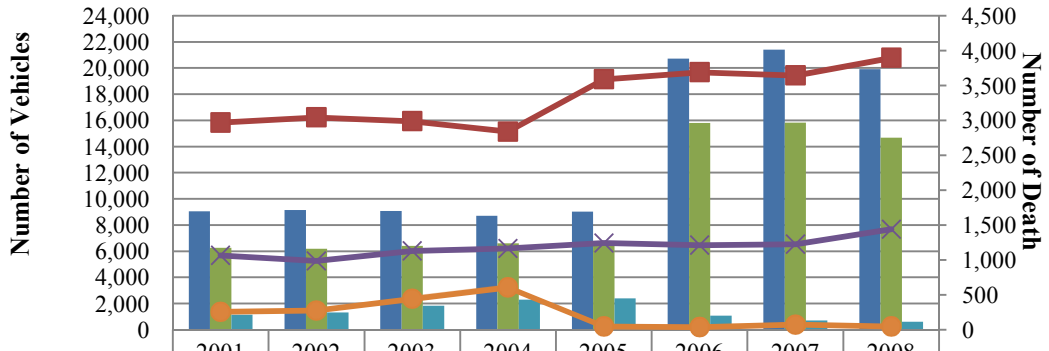
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Motorcycle	322,1	364,2	237,7	236,7	238,6	234,7	222,6	321,2	397,9	422,2	448,7	484,5	543,1	441,5
Motorcar	318,8	372,3	159,6	296,7	344,8	395,8	419,7	424,7	472,1	537,9	458,2	468,5	537,0	513,9
Total	641,0	736,5	397,4	533,4	583,5	630,6	642,3	745,9	870,0	960,1	907,0	953,1	1,080	955,4

Note: Adapted from the Malaysian Road Transport Department (personal communication, October 13, 2009 and March 22, 2010).

Figure 1.1. Malaysia: New Registration of Private Motor Vehicles, 1996-2009.

The inevitable rise of new vehicles registered yearly which grows in tandem with gradual economic growth especially in urban areas has caused tremendous problems to the country like massive traffic congestion, air and noise pollution and road accidents. These recently have raised the concern on the sustainability of transport system associated with the "Quality of Life" (Steg & Gifford, 2005). Among all, the major problem faced by Malaysia transportation is the rising number in accidents and casualties involving private motor vehicles. Statistical data from Malaysia Institute of Road Safety Research showed that the number of accidents and deaths has increased from 15,327 cases and 4,039 deaths in 1996 to 34,591 cases and 5,339 deaths in 2008 (*Figure 1.2*).

Malaysia: Number of Vehicles and Fatality Involved in Road Accident, 2001 - 2008



	2001	2002	2003	2004	2005	2006	2007	2008
Motorcycle	9,061	9,162	9,087	8,710	9,028	20,717	21,408	19,912
Motorcar	6,266	6,201	6,418	6,594	6,674	15,806	15,821	14,679
Bus	1,150	1,320	1,846	2,311	2,405	1,080	700	613
Motorcycle	2,971	3,046	2,991	2,842	3,591	3,693	3,646	3,898
Motorcar	1,068	989	1,132	1,168	1,244	1,215	1,228	1,441
Bus	258	276	444	608	48	39	75	48

Note: Bus category includes PBT (express bus, stage bus, mini bus, and excursion bus), school bus and factory bus; adapted from Malaysia Institute of Road Safety Research (personal communication, February 18, 2010); latest data of 2009 is not available.

Figure 1.2. Malaysia: Number of Vehicles and Fatality Involved in Road Accident, 2001-2008.

In addition, another major issue encountered by Malaysia transportation is the air pollution problem. Transport system has always been considered as a major source of environmental problems such as global warming, ozone depletion and air pollution which have emerged recently as a very disturbing issue for government and society. Report from Department of Environment revealed that the emission from motor vehicles is the major pollutant source in Malaysia contributing at least 79.2% of total pollutant (Table 1.1).

Table 1.1

Malaysia Air Emission Load and Pollutant Sources, 2008

Pollutant	Overall Emission Load (Metric Tonnes)	Motor Vehicles (%)	Industries (%)	Power Plant (%)	Others (%)
CO	1,451,746	97.1	1.1	1.6	0.2
SO_2	161,913	8.0	23.0	48.0	21.0
Particulate Matter (PM)	31,672	14.0	40.0	25.0	21.0
NO_x	409,972	49.0	21.0	27.0	3.0

Note: Adapted from Malaysia Environmental Quality Report 2008 (Malaysia Department of Environment, 2009); CO is the main pollutant which causes air pollution; latest data of 2009 is not available.

Although in general Malaysia's air quality is considered fairy good but recently it is found deteriorating especially in major cities like the Klang Valley and Penang caused by the growing fleet of private vehicles and the increased dependency on private motorized travels. The emission load from private vehicles has caused very negative impact to the air quality and the environment. Daily release NO_2 at Pudu bus

station and Cheng Lock crossings is believed to have exceeded WHO [1] standard of 0.15mg/m3 or 73 ppb (Mohamad & Kiggundu, 2007). Moreover, the greenhouse gas of carbon dioxide (CO_2) released by private vehicles though does not pollute the environment gives a very negative impact by thinning the ozone layer and worsening the global warming issue in Malaysia.

Owing to above problems caused by the private transportation usage, the transport sustainability issue has emerged as a hot topic in Malaysia. Long way back, developed countries especially Europe and Japan have already started to enforce regulations and control on transport system to minimize the hazard to the environment. Some of the countries adopt regulations that disallow the usage of road by private vehicles during peak hours to reduce the number of vehicles on the road as well as to encourage the utilization of PT. In Japan, expensive toll fee is imposed to disperse the heavy road traffic whereas in London, congestion charges are introduced to discourage driving during peak hours. In Malaysia, the similar congestion charging and area licensing scheme were proposed before but was rejected by the Cabinet mainly due to the inadequate PT services to cater for the PT demands when the scheme is implemented (Mohamad & Kiggundu, 2007).

Consequently, PT authorities in Malaysia are subjected to tremendous pressure and scrutiny from various parties to provide a robust PT system to facilitate modal shift from private transportation for a better environment and future. Accordingly, the transport system has emerged as one of the focus areas of sustainable development in Malaysia in order to achieve objectives such as providing an efficient and integrated PT system, reduction in road accidents and fatalities as well as achieving better air quality. According to the report from International Association of Public Transport

[1] WHO. The World Health Organization is the directing and coordinating authority for health within the United Nations. For more information, see http://www.who.int/about/en/.

(UITP), the energy consumption of a bus per commuter/km is only one-third of a car and buses only obligable about 5% of the CO_2 emissions which could lead to a better environment to live in (UITP, 2010). Furthermore, statistical data from Malaysia Institute of Road Safety Research (2001 - 2008) in *Figure 1.2* further demonstrates that bus is safer than other private motor vehicles with much lower rate of accidents and casualties.

A great number of initiatives have been executed by the government to increase the effectiveness of PT services in Malaysia. For instance the establishment of RapidKL (2004) and Rapid Penang (2007) was to revamp the ailing PBT service industry in the Klang Valley and Penang which are the two main commercial and industrial hubs in Malaysia. Nevertheless, although sufficient PBT services have been provided and with substantial PT infrastructure better than other Asian countries, the perceived underutilization of PBT service in Malaysia is still noticeable and prevailing. There is not much difference in the utilization rate with the new PBT services available and the shares of PT ridership for the entire nation is merely 16% (The Star, 2009d) and considered very low. It is also noticed that even for those who are utilizing the PBT service in Malaysia, most of them are occasional commuters with no consistent travel pattern either daily or weekly.

There are many reasons attributed to the questionable and unexplainable underutilization rate of PBT service in Malaysia. The main suspected reasons are the poor performance and inaccessibility of the service. PBT services are generally perceived as public goods and therefore obliged to perform well. Continuous underutilization will hence affect the operating and administrative cost and further worsen the reported loss account of the industry. What makes profit even more

complicated is the growing maintenance cost for damages due to anti-social activities which has an upward trend.

A solution should be found to provide a high quality and robust PBT service to fulfill the needs and expectations of the public. Towards this, an attempt is made in this study, to conceptualize a model which will investigate the pulse of the commuters and non-commuters in Malaysia to understand their real needs and expectations as well as their perceived utilization in the future. In return, appropriate managerial strategies can be applied by the PBT authorities to further improve the service with the aim to increase the utilization rate among Malaysian citizens. A sustainable PBT system should spur the economic growth and care for the welfare of the residents' quality of life. A solution is much valued especially with the recent decrease in fuel subsidy and increase in fuel price which has led to the complaint of Malaysian citizens that they will start to utilize PBT only if the service is improved and caters to their real needs and expectations.

1.2.1 Malaysian Government Initiatives on PBT Service Improvement

The rising problems caused by the high dependency on private transportation have raised the concern of the Malaysian government to promote the model shifting to PT usage. PBT service provision undeniably is viewed as an important component in Malaysia overall transportation planning and management. The great emphasis to improve PBT service can be seen in the recent announcement of Malaysia's first ever National Key Result Areas (NKRAs) by the Malaysian Prime Minister Datuk Seri Mohd Najib Tun Razak on July 27, 2009 (Jabatan Perdana Menteri Malaysia, 2010; The Star, 2009d). The NKRA was introduced together with the Key Performance Indicators as part of the Government Transformation Program (GTP) to ensure

Malaysia achieves its Vision 2020 by becoming a fully developed country of high income (The Star, 2009c). The NKRAs include:

1. Reduction of crime rate by 20% by the end of 2010.
2. Combating corruption to improve global perception.
3. Widening access to affordable and quality education.
4. Raising the living standard of the poor.
5. Improving infrastructure in rural areas.
6. Improving PT in the medium term.

"Improving PT in the medium term" is specifically included as the 6th NKRA to promote PT usage to the public and to increase the utilization rate. The government's goal is to increase the number of PT users from current 16% to 25% by the end of 2012 (The Star, 2009d). Accordingly, the Public Land Transportation Commission (PLTC) will be established and commenced in 2010 under the Prime Minister's Department as the sole authority to plan, integrate, regulate and enforce standard for transport system to further improve the overall development of PT system in Malaysia (MySinchew, 2009). According to the report, although first phase of PLTC's enforcement will cover peninsular Malaysia especially the Klang Valley area, it will eventually be extended to east Malaysia.

In fact, the government's initiatives in promoting PT utilization can be seen way back to 2006 where RM 31.8 billion was allocated for the PT sector under 9th Malaysia Plan (2006 - 2010) to improve the service performance (Government of Malaysia, 2006). An additional RM 35 billion was further allocated under Budget 2009 (2009 - 2014) to enhance the PT services in Malaysia, for the allocation of new buses and provision of better infrastructure facilities (Bernama, 2008). All these

initiatives have shown the Malaysian government's commitment and seriousness in improving the effectiveness and efficiency of PT system in Malaysia. Other initiatives in promoting PBT include the increase of quota for diesel subsidy, the reduce in toll charges by 50% for selected buses (except border entry points) for two years since September 15, 2008, sales tax exemption on the purchase of locally made assembled new buses and accelerated capital allowance on the expenditure incurred to the PBT service providers as well as road tax reduction to RM 20 per year for all buses. In addition, the government also seeks to reduce the cost burden of PT operators by providing a soft loan facility of RM 3 billion under the Public Transportation Fund, administered by *Bank Pembangunan Malaysia Bhd*., to provide financial support for the acquisition of buses and rail assets (Bernama, 2008).

Despite nation's initiatives, the great effort and support in improving PT services can be seen in the local state government's planning. For instance, the Kuala Lumpur Structure Plan 2020 aims to reverse the decline rate in PT utilization to achieve a PT to private transport ratio of 60:40 by year 2020 by providing comprehensive and integrated transportation network of high quality, convenience, user-friendly and easily accessible PT service (Kuala Lumpur City Hall, 2004). Whereas in Penang, the aim is to increase the road efficiency, expand and upgrade PT capacity with more efficient PBT system through the execution of Penang Structure Plan (JPBD, 2010). The most current initiative of the Malaysian government to promote PBT usage is found in the 2010 Budget Speech by the Malaysian Prime Minister Datuk Seri Mohd Najib Tun Razak on October 23, 2009 (Government of Malaysia, 2009). These initiatives include the expansion of specific bus lanes and putting more buses on the roads in Kuala Lumpur, the construction of four new hubs to cater for new bus routes in Penang, and the allocation of dedicated special bus lane

also on expressways with Touch 'N Go facilities at tall booths.

Concisely, the main purpose of the execution of above initiatives is to increase the effectiveness of PT services in Malaysia to help reduce problems such as the increased number of private vehicles, accidents, traffic congestion and air pollution through the upgrade of existing PT services nationwide and by creating more reliable, efficient and integrated PT system. The ultimate goal is to encourage greater utilization which in return can assist the public to enjoy a healthier lifestyle as well as to sustain Malaysia transportation system for a better environment and future.

1.2.2 PBT in Kuala Lumpur

Kuala Lumpur (often abbreviated as K.L.) is the capital of Malaysia and it is located in the center of Selangor state. Kuala Lumpur is also referred as federal territory governed by Malaysian Federal Government. It is the busiest city in Malaysia, home to the Malaysian Parliament, business, education and economic center of Malaysia. The world tallest twin buildings "Petronas Twin Towers" is the trademark of Kuala Lumpur. The main PT services in Kuala Lumpur include PBT, railway, LRT and taxis.

There are about four major PBT operators namely RapidKL, Metrobus Nationwide, SJ Bus and Selangor Bus operating approximately 15,000 bus trips per day in Kuala Lumpur to cater to the needs according to a report from the Urban Transportation Department of City Hall Kuala Lumpur (Mohamad & Kiggundu, 2007). Although sufficient number of buses is provided, the utilization rate is not high. The Kuala Lumpur Structure Plan 2020 revealed that the modal share of PT in Kuala Lumpur plummeted from 34.3% to 19.7% in particular PBT ridership partly caused by a higher rate of private vehicle ownership as well as the deficiencies of PT

services (Kuala Lumpur City Hall, 2004). The increasing dominance and dependency on private vehicles particularly of private cars has contributed pressure on the road networks in Kuala Lumpur and has caused serious traffic congestions, climbing accident rate and air pollution.

RapidKL (*Syarikat Rangkaian Pengangkutan Integrasi Deras Sdn. Bhd.*) is a government owned PBT service provider incorporated since July 26, 2004 to restructure the fragmented bus operations in the Klang Valley. Compared to other PBT operators, RapidKL has the widest route coverage, making up to 65% of the PT services in the Klang Valley by serving 4.8 million commuters every week via its integrated rail (*Kelana Jaya* Rail Line and *Ampang* Rail Line) and bus network (165 bus routes, 992 buses). RapidKL mainly serves six key areas in the Klang Valley and covers up to 980 residential areas by providing four types of services: *Tempatan* service, *Utama* service, *Bandar* service and Express service operating from 6am in the morning to 12 midnight. Their vision is "***to provide an integrated, safe, reliable, efficient public transport service in the Klang Valley, on a financially sustainable basis***" (RapidKL, 2010).

1.2.3 PBT in Penang

Penang (also known as "*Pulau Pinang*" in Malay) is the second smallest state in Malaysia, located at the north-west coast of Peninsular Malaysia. The capital of Penang state is George Town and was recently inscribed as an UNESCO World Heritage Site on July 7, 2008 (Penang State Government, 2010). Penang state is geographically divided into Penang Island and Province Wellesley (also known as "*Seberang Perai*") which are linked by the 13.5 km Penang Bridge and ferry transportation. The population of Penang residents was estimated around 1,577,300 in

year 2009 (Penang State Government, 2010). The main PT services in Penang is PBT although there was time when trams and trolleybuses were operating on the road.

PBT in Penang was first introduced in 1925 but had received many negative responses from the public mainly due to poor management and insufficient fund for improvement caused by low utilization rate. In fact, PBT in Penang has seen changes in operators and only a few of them have demonstrated success in promoting PBT as an essential service in Penang. The ailing and dysfunctional PBT services continued in spite of the problems. The unaddressed problems led to the Penang largest PBT service provider, Yellow Bus stopping its services on January 1, 2004 after operating for 58 years (Ng, 2004). Although immediate revamp was done to recover the existing bus network on April 1, 2006, it failed to improve the service as different bus companies operating in Penang continued to compete with each other to get commuters. This had caused bad traffic chaos and turmoil in Penang. These raised the necessity of and demand for higher quality of PBT service to evolve stronger subsequent to the protest staged by 50 commuters outside *Komtar* shopping complex in Penang Road complaining against the inefficiency of PBT operators in Penang. The major complaints included the rude behavior of bus driver, dirty seats, irregular schedule and no issuance of bus tickets (Ng, 2006).

To alleviate the PBT plight in Penang, Rapid Penang was established and launched on July 31, 2007 by former Malaysian Prime Minister Datuk Seri Abdullah Ahmad Badawi. Rapid Penang is owned directly by the Federal Government under the Ministry of Finance as a subsidiary company of RapidKL. It is the second PT operating company set up by the Malaysian government after the first RapidKL in 2004 (Rapid Penang, 2009). Rapid Penang soon became the leading PBT operator in Penang while other operators continue to run in Penang such as Yellow Milan, Red

Transit Link and Blue KGN-Hin. Compared to other operators, Rapid Penang takes quality issues seriously (*Appendix 2.3*) and has become an ISO-certified company in June 2009. Their vision is "***to be the preferred public transportation service in Penang***" (Rapid Penang, 2009).

There is no doubt that good quality service is rendered by Rapid Penang. They provide cleaner and cooler buses with no tinted windows and curtains like other old buses that look dirty and dull. New Rapid buses are also equipped with priority seats and sufficient measures of safety and comfort on board. Nonetheless, it is observed that the utilization rate of Rapid Penang is very low. Although the ridership per month is achieving 1.6 million as compared to the targeted 1.3 million catered by the existing 150 Rapid buses, the number of people utilizing PT services in Penang is still very low and merely 10% according to Chief Minister Lim Guan Eng. According to Lim, the goal is to achieve 40% of utilization as compare to Singapore where 60% of the citizens are taking PT (Mok, 2009). Hence in order to realize this objective, 200 new buses were added to Rapid Penang since July 2009 to provide 350 buses by the end of 2009 to cater 120,000 commuters daily on 49 routes in Penang island and mainland (Rapid Penang, 2009). In order to establish "1 ticket 1 seamless journey" (para. 5) initiative of the Malaysian Government Transformation Program (GTP), Rapid Penang also introduced RapidPassport and monthly student pass with the intention to encourage higher ridership by reducing queuing time and cost of travelling of the commuters (The Star, 2010).

1.3 Motivation of Study

The primary motivation of the study was the call by the Malaysian Prime Minister in his speech containing targeted key improvement areas and the remedial

measures to address the underutilization of PBT service in Malaysia. The utilization rate of PT services is reported as a mere 16% for the entire nation and he has suggested that one of the key areas of the government is to increase the PT users to 25% by end of 2012 (The Star, 2009d). The underutilization situation prevails in most of the cities in Malaysia and it is believed that the main reasons are the deficiencies of PT services and the public who favor own transportation to PT. The motivation also came from the desire to improve the unprofitable operations of PBT service in Malaysia. Over the decade, Malaysia PBT service providers suffered balance sheets which were lack luster. The socio-political system may have a bearing upon this performance. However in general, it is due to the high expectation of the public which is unmet by the PBT services. The operating and administrative costs are also rapidly increasing in spite of lower fuel prices as well as in keeping with inflationary pressures. The growing maintenance cost for damage repairs caused by anti-social elements makes profits even more exclusive. Finally, the study was also inspired by the author's experiences while living in Japan. It is noticed that although the Japanese car maker Toyota is the largest car manufacturer in the world, despite the high level of private vehicle ownership of the citizens, the shares and utilization of PT for daily transportation is very high in Japan. Most of the people commute with buses or trains to work or to school every day consistently. One of the significant examples of effective PT system in Japan is the outstanding rail system of the bullet train "Shinkansen" which is the best in the world. Accordingly, the primary motive of the study is to conceptualize the perceived utilization of PBT service in Malaysia to increase the utilization rate as consistent to the 6th NKRA of the government.

1.4 Problem Statement

Evidence shows that the high dependency on private vehicles in Malaysia is attributed to the economic growth, rising household income, establishment of the Malaysia national car project, fuel subsidies, deficiencies and the poor management of PT system (Kamba et al., 2007; Kasipillai & Chan, 2008; Mohamad & Kiggundu, 2007). Excessive private vehicles on major roads in Malaysia have created problems in traffic congestion which further induce accidents, air and noise pollution (Mohamad & Kiggundu, 2007). The PBT service appears to be incapable to compete with private vehicles in most of the cities in Malaysia specifically in Penang and Kuala Lumpur. Most people favor using their own transportation to utilizing PBT services. Some of them complain that the quality of the rendered PBT services is not high enough or the PBT authorities do not understand what their real needs and expectations. Consequently it is observed that even if sufficient PBT services and facilities have been rendered by the government especially after the establishment of RapidKL and Rapid Penang, the utilization rate remains low.

PBT authorities are therefore facing tremendous challenges to deal with the poor utilization rate and the resistance of the public to utilize PBT in order to solve the problems associated with the excessive usage of private transportation. They are concurrently subjected to pressure and scrutiny from various parties to provide high quality and robust PBT services to fulfill the needs and expectations of the public. PBT has no doubt become the key policy to achieve an integrated and sustainable transport system in Malaysia. The announcement of the 6th NKRA to increase the utilization of PT users is one of the initiatives by the Malaysian government (The Star, 2009d) to promote PT usage among the public. It is believed that the effective and robust PBT service provision is crucial and necessary in realizing the objective of

the 6th NKRA which is aimed to increase the utilization rate and to sustain the Malaysia transport system. Sustainable transport system encompasses the economic, social and environmental aspects. They are economic growth and a profitable return in PBT sector, a better environment and future with less accident rate, air pollution and the overall increase of the welfare of the residents' quality of life in Malaysia.

The situation hence raises the necessity of this study in order to understand the real needs and expectations of the commuters to encourage the ridership of the PBT. Research with the aim to increase the utilization rate is therefore much needed. At present, the research on PBT from the commuters' point of view is very limited and no research has been done on the perceived utilization of PBT service in Malaysia. This study will therefore focus on the investigation and conceptualization of perceived utilization of PBT service among the commuters and non-commuters in Malaysia by developing a conceptual model to provide an insight into the underutilization scenario of PBT services in Malaysia. Public involvement is included in the study as it plays a vital role in the transportation planning process (Hopes, Kramer, & Williams, 2006). The empirical findings from the study will be suggested to PBT authorities for suitable strategies development in an effort to increase the utilization rate to comply with the 6th NKRA and to sustain Malaysia transport system in the long run.

1.5 Research Objectives

The main purpose of this study is to conceptualize the perceived utilization of PBT service by using a strategic analysis approach with the aim to create a robust PBT system of optimum utilization rate. The study will justify the modification and enhancement of the current PBT system with respect to system inefficiencies and

commuters' dissatisfaction based on the valuable input of the public inclusive both commuters and non-commuters. The public involvement is a strategic approach that will result in a more precise reflection of the real needs and expectations of the perceived PBT services and consequently more likely to increase the utilization rate consistent with the objective of the 6th NKRA. In a nutshell, the study attempts to accomplish the following three main objectives:

1. To determine the best preferred combination(s) of public bus transport (PBT) service rated by the commuters and non-commuters in Malaysia.
2. To investigate the PBT service drivers influencing the perceived utilization of commuters and non-commuters.
3. To study the influence of social demographic factors on the perceived utilization of PBT service.

1.6 Research Questions

In order to achieve the above three objectives, the study attempted to answer the following research questions:

1. What is the best preferred combination(s) of public bus transport (PBT) service rated by the commuters and non-commuters in Malaysia?
2. What is the PBT service driver(s) influencing the perceived utilization of commuters and non-commuters?
3. What is the influence of social demographic factors on the perceived utilization of PBT service?

1.7 Significance of the Study

The study provides an in-depth understanding on the perceived utilization of PBT service which reveals the real needs and expectations of Malaysian citizens. Based on the best preferred combinations of the important service drivers highly perceived by the commuters and non-commuters in Malaysia, the utilization rate are more likely to be increased as the rendered service tailors to the needs and expectations of the major population of Malaysian citizens. The previous studies conducted were mostly concentrated on how the PT authorities should react in order to provide high quality of service to increase the satisfaction and demand of PT users and no research has been done yet on the perceived utilization. Consequently, with the new approach applied in this study by involving the commuters to develop a comprehensive perceived utilization of PBT model, it will be an eye opening experience of the Malaysia transportation management.

Essentially, the study makes significant contribution to the Malaysian government in achieving the 6th NKRA aiming to increase the number of PT users from current 16% to 25% by the end of 2012 (The Star, 2009d) as well as to sustain the PT system in Malaysia. The sustainability of transport system is a vital step in order to solve all the problems faced by PBT authorities today, including the financial losses in PBT sector, low utilization of PBT services as well as the escalation of traffic congestion, air pollution and accident casualties due to excessive use of private transportation, to the extent of jeopardizing economic growth and the quality of life of Malaysian citizens.

Although current study focuses only on PBT services in Malaysia, the same model could be extended to different types of PT due to the customization functionality of the model which allows the edition of the selected service drivers in

the model. Finally, the study shows its significant value and impact as a valuable study to the society in Malaysia. The questionnaire developed had caught Ministry of Transport Malaysia's attention and a telephone call was received on March 11, 2010 as they intend to adopt the questionnaire as part of their coming research on PBT services. The same positive feedback was received from Rapid Penang authority that the study is valuable in an attempt to promote PBT usage among the public. The results of the study was agreed to be shared with Rapid Penang authority as an acknowledgement of the help and coordination from Rapid Penang throughout the research study.

1.8 Definition of Key Terms

In an endeavor to better understand the methods and findings in the study, a conceptual definition of important key terms in the study is provided in this section.

Commuter

Definition: Commuter or passenger is "in relation to a person carried on a public service vehicle, does not include the driver or conductor or any ticket inspector on the vehicle in pursuance of his duties" (Act 333, 1987, p. 13). Two categories of commuter are defined in this study: regular commuter and occasional commuter. The regular commuter is defined as a commuter who travels by PBT every day, every week or every month consistently whereas the occasional commuter is defined as commuter who travels by PBT occasionally only on weekends or any selected days throughout a year.

Conceptual model

Definition: Conceptual is "the starting point for creating any summated scale". Conceptual model "specifies the theoretical basis for the summated scale by defining the concept being represented in terms applicable to the research context" (Hair, Black, Babin, & Anderson, 2010, p. 124).

Conceptualization

Definition: Conceptualization is defined as "an abstract, simplified view of the world that we wish to represent for some purpose" (Gruber, 1993, p. 907).

Public transport (PT)

Definition: PT is defined as "the set of services for the transportation of people according to a predefined schedule (fixing place and time) and subject to published conditions of use, employing multiple modes of transport" (Rűetschi, 2007, p. 14). According to Rűetschi (2007), PT is the "transport" service for ample of people, but not just individual and it eliminates the need of individual to drive. PT may consist of buses, subways, trains, light rails, monorails, trams, vans, ferries, or aircrafts.

Public bus transport (PBT)

Definition: PBT service refers to "services of establishments which have obtained permits from the Commercial Vehicles Licensing Board as operators of stage buses, express buses and mini buses. Operators of school buses and factory buses have been excluded. In this census only urban, suburban and interurban bus transport services are included" (Malaysia Department of

Statistics, 2008, p. 141).

Perception

Definition: Perception is defined as "the cognitive process by which an individual selects, organizes, and gives meaning to environmental stimuli. Through perception, individuals attempt to make sense of their environment and the objects, people, and events in it" (Ivancevich, Konopaske, & Matteson, 2008, p. 86).

Utilization

Definition: PBT utilization shows "the extent to which PBT is used, but not the availability of PBT" (Vehicle Utilization section, para. 1). Numerous measures of utilization include mileage (kilometers per vehicle per period) or hours (operational hours per vehicle per period). Utilization can be measured by hours of operation as a percentage of total time available, or the number of vehicles operated in a day as a percentage of total vehicles available (The World Bank Group and PPIAF, 2006).

Perceived utilization

Definition: Perceived utilization "is assumed to be an exponentially weighted average of past utilization" (Repenning, 1990, p. 23). It is the degree to which commuters or non-commuters believe that they will utilize the PBT service based on their perception on the rendered services if their needs and expectations are fulfilled. Three types of perceived utilization are considered in the study: perceived direct utilization (PUD), perceived

indirect utilization (PUID) and perceived recommendation to others (PUR). Perceived direct utilization reflects the willingness of Malaysian citizens to utilize the PBT service if their needs and expectations are fulfilled. Perceived indirect utilization indirectly indicates the utilization of the PBT service when and after recommended by others. Whereas perceived recommendation to others reveals the readiness of the commuters to recommend the PBT service to their friends, family or relatives.

Robust

Definition: A transport system is considered to be robust if it maintains its functionality under perturbations and able to produce less vulnerable plans of recovery actions in case any disruptions occur (Ahuja, Möhring, & Zaroliagis, 2009). It needs to absorb the unplanned demand so that users' waiting time is maintained and the high operational cost is avoided to satisfy the demand.

Sustainability

Definition: Sustainability or sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987) and it requires the reconciliation of economic, social and environmental aspects (UN, 2005).

Sustainable transport

Definition: Sustainable transport implies "the balancing of current and future economic, social and environmental qualities" (Steg & Gifford, 2005, p. 66). In transportation sector, sustainable transport goes beyond resource optimization of depletable resources: energy, human and ecological habitats, atmosphere carbon loading capacity and individuals' available time. The decisions tend to be made in larger policy goals in service provision including the economic growth and job creation, the intensity of land usage, and socioeconomic influences to wealth growth (Goldman & Gorham, 2006).

1.9 Organization of Remaining Chapters

This section outlines the organization of all five chapters in this study.

Chapter 1

This chapter presents the overview and direction of the study, including highlights of background, motivation of study, problem statement, research objectives, research questions, significance of study and finally the definition of key terms.

Chapter 2

This chapter describes relevant theory and literature from previously conducted researches in detail in order to identify the research gap as well as to strengthen the research framework in the study. The chapter will present two research frameworks with the justification of the chosen variables and the development of hypotheses.

Chapter 3

This chapter presents the research methodology of the study, including research design, measurement variables for each construct in the framework, population and sampling design, survey questionnaire design, data collection, data editing and coding as well as statistical analysis to be employed in this study.

Chapter 4

This chapter presents the data analysis of the research study, including the response rate and trend, demographic, vehicle ownership and the current PBT utilization profile of respondents, goodness of measures, descriptive statistics, correlation analysis, multidimensional scaling, hypotheses testing and finally the summary of the results based on the findings.

Chapter 5

Chapter 5 is the final chapter to recapitulate the research findings and research inferences based on the statistical results on Chapter 4. The chapter presents discussion on each research question, implications of the study and limitation, recommendation and suggestion for future research and finally the conclusion of the whole research study.