

# A PERCEPTUAL ASSESSMENT TOWARDS TELECOMMUTING AND ITS IMPLICATIONS ON COMMUTE TRAVEL

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MALAYSIA

2005



الجامعة الإسلامية العالمية ماليزيا  
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA  
بِوَسْطَةِ رَحْمَةِ رَبِّكَ أُنْبِئْنَا بِمَلَكِكِنَا

**A PERCEPTUAL ASSESSMENT  
TOWARDS TELECOMMUTING AND  
ITS IMPLICATIONS ON COMMUTE  
TRAVEL**

BY

WAN NURUL MARDIAH BT WAN MOHD RANI

A thesis submitted in fulfillment of the requirement for  
the degree of  
Master of Science (Built Environment)

Kulliyyah of Architecture and Environmental Design  
International Islamic University Malaysia

## ABSTRACT

The study focussed on exploring the implications of telecommuting on commute travel in Kuala Lumpur City Centre. In most city centres, commute travel often contributes to the peak hour traffic congestion. It was identified that major roads leading to Kuala Lumpur city centre during peak hours are over-saturated. Centralised business activities and high dependency on private vehicles are among the main factors. Based on the review of the literature, telecommuting is able to provide a substitute for the commute travel and to mitigate the traffic congestion if practiced at a full scale. Telecommuting allows employees work from home or from a designated teleworking centre instead of commuting into a central office. The primary survey revealed the perceptions of employees on travel characteristics, preference to telecommuting and several factors regarding the adoption of telecommuting. Method of analysis used was descriptive analysis such as frequency distribution, cross-tabulation, mean and statistical testing such as chi-square, correlation and Friedman. As expected, driving alone to the workplace was the most preferred mode of transport (48%). It was also revealed that more than half of the respondents felt stressed while commuting to work (54%). Accordingly, traffic congestion was reported as the main cause. The preference to practice telecommuting revealed that 50% of the respondents have shown a strong preference. Three main motivators towards the inclination of practicing telecommuting were “ability to reduce the stress of travelling to work”, “having more time to spend with the family” and “increased job satisfaction.” On the other hand, the three main obstacles were “lack of social interaction with other colleagues”, “increased home utility bills” and “lack of resources to accomplish work task remotely”. The estimation on the reduction of commute trips by private vehicles revealed that a reduction of 0.20 million (0.28%) in 2005, 0.67 million (0.79%) in 2010 and 1.91 million (2.1%) in 2015 will be achieved for the existing case with telecommuting frequency of one day per week. The estimated savings in VKMT for the existing case with one telecommuting day per week was projected to be approximately 5.3 million km (0.28%) in 2005, 17.45 million km (0.79%) in 2010, and 49.60 million km in 2015 (2.09%). The reduction in commute trips and savings in VKMT would subsequently increase as the frequency of telecommuting days increased. Hence, a maximum reduction in commute trips and savings in VKMT would possibly be achieved with maximum practice of telecommuting.

تركز الدراسة على استخدام وسائل للنقل الجماعي في وسط مدينة كوالا لمبور. في أغلب مراكز المدن، غالباً ما يساهم النقل الجماعي في تخفيف الحركة أثناء ساعات الذروة وازدحام المرور. حيث لوحظ أن معظم الطرق المؤدية إلى وسط مدينة كوالا لمبور قد ازدحمت خلال ساعات الذروة. إن تمركز النشاطات التجارية، والاستعمال العالي للسيارات الخاصة هو من بين العوامل الرئيسية لذلك. بناء على مراجعة الدراسات السابقة، فإن وسائل الاتصال التكنولوجي قادرة على توفير بديل للنقل الجماعي، و إيجاد حل لتخفيف ازدحام المرور إذا طبق بمقاييسه الكاملة. إلي جانب ذلك، فإن وسائل الاتصال التكنولوجي تسمح للعمال بالعمل من بيوتهم أو من وجهة مركز العمل بدلاً من التنقل إلى المكتب الرئيس. إن عملية الاستبيان الأصلي أفادتنا في تصورات الموظفين و العمال حول خصائص التنقل، و تفضيلهم وسائل الاتصال التكنولوجي المتنوع. وقد تبني هذه الدراسة منهج التحليل الوصفي مثل: توزيع التردد، الجداول، الوسيط و الاختبارات التحليلية مثل: تشاي سكوار، الارتباط و فرايدمن .

ومن المتوقع، أن قيادة السيارات المملوكة إلى مكان العمل كانت النمط المفضل للنقل (48%). كما تبين من البحث أن أكثر من نصف الموظفين والعمال أبدوا مدي شعورهم بالقلق أثناء تنقلهم إلى مكان العمل (54%). حتماً، أن ازدحام المرور قد تبين كعامل رئيس لذلك. و إن الدراسة قد أظهرت أن (50%) الموظفين والعمال يفضلون استعمال وسائل الاتصال التكنولوجي.

ويمكن ذكر ثلاثة من الدوافع الرئيسية في رغبة استعمال وسائل الاتصال التكنولوجي، وهي: "قابلية تخفيض القلق من التنقل إلى مكان العمل"، " إتاحة الفرصة أكثر للبقاء مع الأسرة" وزيادة الاقتناع و الرضا بالعمل".

من جهة أخرى، هناك ثلاثة عوائق رئيسية "ضعف التفاعل الاجتماعي بين الأصدقاء"، "ارتفاع فواتير استعمالات البيت" و "ضعف الموارد لانجاز المهام المنوطة عن بعد".

إن تخفيض رحلات التنقل الجماعي بالسيارات الخاصة تقديرياً يوحي بأن انخفاض 0.20 مليون ( 28%) في سنة 2005، 0، 67 مليون (0، 79%) في سنة 2010 و 1 91 مليون (2.1%) في سنة 2015 سيحقق في الحالة الحالية (ف ك ت م).

إن الادخار المقدر في التردد اليومي خلال أسبوع خطط له أن يكون 5.3 مليون كيلومتر (0.28%) في سنة 2005، 17.45 مليون كيلومتر (0.79%) في سنة 2010 و 49.60 مليون كيلومتر في سنة 2015 (2.09%). إن انخفاض عدد الرحلات الجماعية و الادخار في (ف ك ت م) سيرتفع تدريجياً كلما انخفض ازداد استخدام وسائل الاتصال التكنولوجي . إذن، إن انخفاض عدد الرحلات الجماعية و الادخار في (ف ك ت م) سيتم تحقيق أكبر نسبة ممارسة استعمال وسائل الاتصال التكنولوجي.

## APPROVAL PAGE

I certify that I have supervised and read this study and that in my opinion; it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a thesis for the degree of Master of Science (Built Environment)

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Environmental Design

## **DECLARATION**

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

Wan Nurul Mardiah bt Wan Mohd Rani

Signature .....

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## **ACKNOWLEDGEMENTS**

First and foremost, I would like to express my deepest thanks and appreciation to Asst. Prof. Dr. Abdul Azeez Kadar Hamsa, my supervisor and Prof. Dr. Mansor Ibrahim my co-supervisor, whose endless guidance, patience and support, have enabled and encouraged me to go through this tremendous study. Without them, this report would not be here with us today.

I would also like to take this opportunity to thank my colleagues and friends for giving me support in one way or another. My utmost gratitude also goes to the Dean of Kulliyah of Architecture and Environmental Design, lecturers and staffs; to the Highway Planning Unit, Ministry of Works, Master Plan Department, Kuala Lumpur City Hall, Road Transport Department, Kuala Lumpur City Hall and Department of Statistics, Malaysia for their cooperation in providing the necessary information required for the study.

Most important, I would like to share this joyous and meaningful moment with my loving parents, Wan Mohd Rani Abdullah and Khairiah Nik, my brothers, Wan Mohd Fakruddin Razi, Wan Mohd Kamiluddin Razi, Wan Mohd Nuruddin Razi and Wan Mohd Hayatuddin Razi; and my sister, Wan Nuradiah and Mohd Noorizhar Ismail for their endless support, motivation and understanding. I would also like to express my appreciation to the Ministry of Science, Technology and Innovation for providing me with the financial assistance throughout my study.

Ultimately, my absolute thanks and gratitude should go to the Supreme Creator, Allah s.w.t, who is All-Knowing, All-Wise. We as human can only plan and strive to succeed; it is he who wills it to happen.



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## LIST OF ABBREVIATIONS

CDA	Commercial Development Areas
DAGS	Demonstator Application Grant Scheme
DBKL	Dewan Bandaraya Kuala Lumpur
FIREBS	Finance, Insurance, Real Estate and Other Businesses Services
GEM	Gender Evaluation Methodology
ICT	Information Communication Technology
IT	Information Technology
KLCC	Kuala Lumpur City Centre
KLCPA	Kuala Lumpur Central Planning Area
KLMR	Kuala Lumpur Metropolitan Region
KTMB	Keretapi Tanah Melayu Berhad
LRT	Light Rail Transit
MDC	Multimedia Development Corridor
MSC	Multimedia Super Corridor
NITC	National Information Technology Council
PMT	Passenger Miles Travelled
PRT	People Rail Transit
PUTRA	Projek Usahasama Transit Ringan Automatik
RapidKL	Rangkaian Pengangkutan Deras, Kuala Lumpur
SARS	<a href="#"><u>Severe Acute Respiratory Syndrome</u></a>
SPM	Sijil Pelajaran Malaysia
STAR	Sistem Transit Aliran Ringan
STPM	Sijil Tinggi Pelajaran Malaysia
TDM	Transportation Demand Management
TMS	Traffic Management System
UK	United Kingdom
US	United States of America
US DOT	Department of Transportation, United States
VKMT	Vehicle Kilometres travelled
VMT	Vehicle Miles Travelled

# CHAPTER ONE

## INTRODUCTION

### 1.1 BACKGROUND OF RESEARCH

This study explored the possible implications of telecommuting on commute travel in Kuala Lumpur City Centre formerly known as Kuala Lumpur Central Planning Area (KLCPA). Commute travel in most city centres has contributed to massive traffic congestion especially during the peak hours. Hjorthol (2002) reported that the discussion of substitution of travel by telecommunication technologies such as teleworking has been going on for more than 20 years.

The convergence of computing and telecommunication technologies, particularly computer networks, has had a significant effect on the society and the economy. According to Holmes (2001), telecommunication flows and transportation flows tend to grow together. Telecommuting is generally known to be related to the development of computing and telecommunication technologies. The concept of telecommuting basically provides an option to the way one performs work; it also allows some changes in the way one lives.

‘Telecommuting’ or ‘Teleworking<sup>1</sup>’ is broadly defined as “partial or total substitution of telecommunication with or without the assistance of computers, for the twice daily travel to/from work” (Nilles, 1988). In other words, teleworking refers to a

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<sup>1</sup> Teleworking and telecommuting are used interchangeably throughout the thesis.

work arrangement whereby work tasks can be performed outside of the main office. Nilles (1994) also described telecommuting by stating that one can be connected logically while decentralizing physically. The development of telecommuting has taken place through the expansion of information and communication technology tools such as computers, computer networks and data systems. As a substitute for travelling to work, teleworking or telecommuting has the ability to act as an alternative to alleviate traffic congestion especially during the peak hours.

There are a few factors causing traffic congestion in most city centre. It was identified that socio-economic, economic and spatial structure are among the main factors that cause traffic congestion (Stern, Salomon and Bovy, 2002). Today, with rapid growth of economic development, employment opportunities have grown simultaneously. The increasing working population has resulted in an increase in travel demand especially into the city centre or the central business district (CBD). Apart from that, from the economic aspect, when income level increases, the opportunity to own a private vehicle has also increased. This resulted in a higher rate of car ownership and this significantly contributes to the higher use of private mode of transportation for various travelling purposes. On the other hand, the spatial structure in most city centres demonstrates that as cities become more developed, land value tends to increase and new housing areas tend to start and develop at a further distance from the city centres while employment remain in the city centre (Stern, Salomon and Bovy, 2002). This urban sprawl leads to the increase of movement in and around the city. Evidently, the enormous surge in the total amount of commute travel has caused most of the transport problems in urban areas.

In urban living, people would need to travel, which is usually for the purpose of work, shopping and leisure. A commute trip is referred to as a trip that is performed regularly. It was reported that commuting trips are responsible for 70% of the road congestion during peak hours due to the fact that during these periods, travel to school, work and shop merged (Illegems, Verbeke and S'Jegers, 2002). Travel to work is considered as one of the commute trips. Thus, as the working population increases, the number of commute trips increases accordingly.

Mokhtarian (1998) also indicated that telecommuting is often seen as a means of travel substitution to replace commuting between home and work that has mainly contributed to the peak hour traffic congestion. Saloman (2003) and Tayarran and Khoo (2003) revealed that telecommuting is one of the travel demand management measures. Basically, telecommuting has the ability to ease traffic congestion during peak hours through completely eliminating the work trip or shifting the work trips to non-peak hours. However, the benefits of telecommuting are directly associated with the number of actual teleworkers and telecommuting frequency.

## **1.2 PROBLEM STATEMENT**

One of the main characteristic of a central business district is its centralized business activities and its tendency to experience severe traffic congestion due to high travel demand. The increase in working population in city centres has resulted in the increase of traffic movement which has direct impacts on the increase in traffic congestion. Thus, city centres are often overloaded by massive number of commuters especially during the peak hours.

As a result of the centralized economic activities in city centres, the development of new housing areas at the peripheral of the city centre has been growing rapidly. This also contributes to increase in travel demand and longer travel distance. Eventually, urban transport problems continue to grow as the demand for travel increases, which is further hampered by the lack of road infrastructures.

The increase in car ownership is also one of the contributing factors towards urban transport problems. In Malaysia, as a result of the increase in average monthly household income from RM2020 in 1995 to RM2472 in 2000 with an average annual growth rate of 5.2%, private car ownership has also increased tremendously. In the year 1995, in Malaysia, for every 1000 persons there were 339.2 registered vehicles, and this figure increased to 421.9 in 2000. Meanwhile, for the Kuala Lumpur Federal Territory, the average monthly household income has increased from RM3371 in the year 1995 to RM4105 in 2000. Whereas the total number of registered vehicles for every 1000 persons in Kuala Lumpur Federal Territory has increased from 616.3 in 1995 to 985.7 by 2000 (*Malaysia, 2001; Kuala Lumpur City Hall, 2004*) (Refer to Figure 1.1). Furthermore, the percentage of those using public transportation is only 19.7% as compared to 80.3% for private transport (*Kuala Lumpur Structure Plan 2020, 2004*). The low usage of public transport is the result of high dependency on private vehicles among the commuters commuting everyday. Subsequently, the high travel demand does not only congest the roads but also contributes to the excessive noise, air pollution, traffic accidents and energy use. This would eventually result in long-term health problems and the destruction of the natural environment.

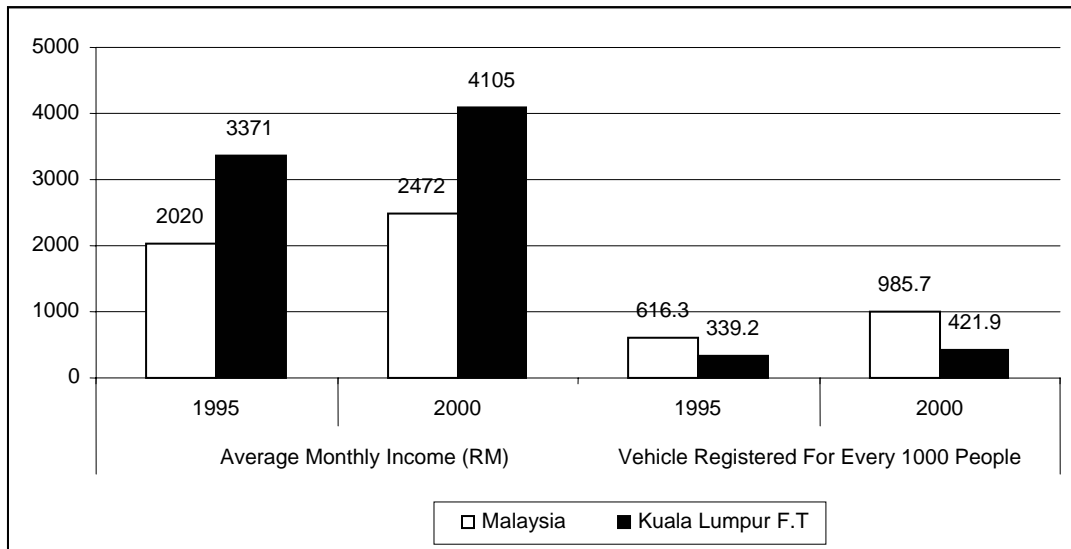


Figure 1.1: Average monthly household income and vehicle registered for every 1000 people in Malaysia and Kuala Lumpur Federal Territory

Source: *Malaysia (2001), Eighth Malaysia Plan (2000 – 2005) and Kuala Lumpur City Hall, (2004) Kuala Lumpur Structure Plan 2020.*

Traffic congestion has become an increasingly serious issue in Kuala Lumpur. Efforts to mitigate the problem includes the campaign of car-pooling, the staggered working hours for government servants (7.45 am to 4.00 pm and 8.15 am to 4.45 pm), redevelopment of the inner city areas with high density residential developments, and provision of LRT system (Sistem Transit Aliran Ringan, Monorail and KTM Komuter). Furthermore, the relocation of government offices to the Federal Territory of Putrajaya is also one of the efforts to reduce the concentration in the Kuala Lumpur City Centre. However, these efforts seem to be ineffective to alleviate the traffic congestion in the city centre as the increase in working population and car ownership is increasing rapidly. Hence, traffic congestion especially during the peak hours is becoming more severe each day.

### **1.3 OBJECTIVES OF RESEARCH**

- (i) To describe the traffic characteristics on major roads leading to Kuala Lumpur City Centre,
- (ii) To study the perceptions of employees on travel characteristics, preference to telework and the factors towards the adoption of telecommuting; and
- (iii) To estimate the implication of telecommuting on the reduction of commute trips and savings in vehicle-kilometres travelled (VKMT).

### **1.4 RESEARCH QUESTIONS**

- (i) What are the existing traffic characteristics on major roads leading to Kuala Lumpur?
- (ii) What would be the acceptance level of practising telecommuting by the respondents of the survey?
- (iii) What are the factors towards the preference of practicing telecommuting?
- (iv) What would be the likely reduction in commute trips and savings in vehicle-kilometres travelled through the practice of telecommuting?

### **1.5 SCOPE OF RESEARCH**

Firstly, the researcher focussed on gathering the information to describe the traffic characteristics on the roads leading to Kuala Lumpur City Centre. The information gathered was socio-economic data, traffic volume reports, traffic studies by local governments and private organization, and articles from newspapers. Apart from that,