

ROAD PREFERENCE SURVEY FOR COMMUTING TRIPS  
FROM / TO WORKPLACE

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## ABSTRACT

A road is an identifiable route, way or path between two or more places. Road is typically smoothed, paved and otherwise prepared to allow easy travel for the road user. Transportation, traffic system and road network are the most important element which can influence level of development of the country. The objectives of this study are to identify the existing residential locations of UMP's staff and their preferred commuting route to UMP and to determine their reasons in choosing the current residential locations and the preference commuting route to UMP. The roads involve is in between Jalan Kuantan – Gambang [FR2] and *East Coast Expressway* (LPT). At the moment, Jalan Kuantan – Gambang [FR2] is getting congested especially during AM & PM peak hours. On the other hand, *East Coast Expressway* (LPT) is under utilized due to a number of reasons. This study is basically carrying out based on that phenomenon and both roads had been selected as study area of this research. In this study, data collection is carrying out through e-survey, where the questionnaires had been distributed through e-mail to all staffs and lecturers of UMP. This kind of methodology is one kind of new method that being applied in final year project in UMP. The results show that, majority of the respondents prefers to choose Jalan Kuantan – Gambang [FR2] as their preferred road for commuting trips to workplace, which represent 89% of total percentage whereas 11% of respondents prefer to use *East Coast Expressway* (LPT) to go to workplace. The main reasons of Jalan Kuantan – Gambang [FR2] user is the location of their residential location, different with *East Coast Expressway* (LPT) user, as they more considering the factor of safety and comfortness of their daily journey to workplace. Poor accessibility of the highway from a main road may become the main reasons for the respondents not to use *East Coast Expressway* (LPT) as their daily commuting route to UMP. The action must be taken by responsible parties to plan and develop the new interchange of the highway in order to increase the numbers of road user. In the same time, it will reduce the congestion level of Jalan Kuantan – Gambang [FR2].

## ABSTRAK

Jalan adalah laluan yang boleh dikenal pasti, lorong atau jalan kecil di antara dua atau lebih tempat. Kebiasaannya, jalan adalah rata dan berturap, juga disediakan untuk memudahkan perjalanan bagi pengguna jalanraya. Pengangkutan, sistem trafik dan jaringan jalanraya adalah di antara elemen penting yang boleh mempengaruhi tahap pembangunan sesebuah negara. Objektif kajian ini adalah untuk mengenalpasti lokasi kediaman kakitangan UMP dan jalan ulang-alik pilihan mereka, juga untuk menentukan sebab-sebab pemilihan lokasi kediaman dan laluan ulang-alik ke UMP. Jalan-jalan yang terlibat adalah di antara Jalan Kuantan – Gambang [FR2] dan Lebuhraya Pantai Timur [LPT]. Pada ketika ini, Jalan Kuantan – Gambang [FR2] semakin sesak dengan kenderaan terutamanya pada waktu-waktu puncak (AM & PM). Sebaliknya, Lebuhraya Pantai Timur [LPT] kurang digunakan berpunca daripada beberapa faktor. Kajian ini dijalankan berdasarkan fenomena tersebut dan kedua-dua jalan tersebut telah dipilih sebagai kawasan kajian. Dalam kajian ini, pengumpulan data dijalankan melalui kaedah ‘e-survey’, di mana senarai soalan diagihkan melalui ‘e-mail’ kepada semua kakitangan dan pensyarah UMP. Kaedah ini adalah satu kaedah terbaru yang digunakan dalam projek tahun akhir di UMP. Hasil kajian ini menunjukkan, majoriti responden memilih Jalan Kuantan – Gambang [FR2] sebagai jalan pilihan untuk perjalanan ulang-alik ke tempat kerja, mewakili 89 peratus dari keseluruhan jumlah peratus manakala 11 peratus dari responden memilih untuk menggunakan Lebuhraya Pantai Timur [LPT]. Sebab utama pemilihan mereka adalah disebabkan kedudukan lokasi kediaman, berlainan dengan pengguna Lebuhraya Pantai Timur [LPT] yang lebih mengutamakan faktor keselamatan dan keselesaan bagi perjalanan harian mereka ke tempat kerja. Kekurangan laluan masuk ke lebuhraya dari jalan utama menjadi sebab utama responden tidak memilih Lebuhraya Pantai Timur [LPT] sebagai laluan ulang-alik harian ke UMP. Tindakan wajar perlu diambil oleh pihak yang bertanggungjawab untuk merangka dan membina persimpangan lebuhraya baru bagi meningkatkan bilangan pengguna lebuhraya tersebut. Pada masa yang sama, boleh mengurangkan tahap kesesakan di Jalan Kuantan – Gambang [FR2].

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## CHAPTER 1

### INTRODUCTION

#### 1.1 Background of Study

A road is an identifiable route, way or path between two or more places. Roads are typically smoothed, paved, or otherwise prepared to allow easy travel; though they need not be, and historically many roads were simply recognizable routes without any formal construction or maintenance. In urban areas, roads may pass through a city or village and known as streets, which serving a dual function as urban space easement and route. Economics and society depend heavily on efficient roads. Various types of road are in use around the world. Roads range in size from private driveways, to the stereotypical two-lane highway, to high capacity dual carriageway routes, such as freeways and motorways.

The names associated with a particular type of road vary around the world, and many names are partially equivalent but not exactly equivalent to each other. As a result, the name given to a road in one country could apply to a different type of road in another country. Many countries generally have an organized system of national roads usually designed by a route number or letter. These designations are generally displayed along the route by means of a highway shield; each system has its own unique shield design that will allow quick identification to which system the route belongs.

Some countries additionally have separate road systems coordinated and maintained by a sub national entity, such as a state or province. The Malaysian Expressway System which before begins with the North-South Expressway, is in the process of being substantially increased. It was built by private companies under the supervision of the government highway authority, which is *Malaysian Highway Authority* [LLM]. Expressway is the highest level of major roads in Malaysia, which has full access control; grade separated junctions, and mostly tolled. The expressways link the major state capitals in Peninsular Malaysia and major cities in Klang Valley. Meanwhile, highway is lower level with limited access control, some at-grade junctions or roundabouts, and generally with two lanes in each separated direction. There are generally untolled and funded by the federal government; hence the first one is called Federal Highway linking Klang and Kuala Lumpur.

## **1.2 Problem Statement**

Mobility of people and goods is an essential component of the modern world, with its emphasis on globalization and economic opportunity. However, the transportation infrastructure that enhances connectivity among human settlements often results in decreased connectivity among remaining natural habitats and wildlife populations. It is estimated that the transportation infrastructure affects at least 19% of the conterminous land area of the United States (Forman 2000) and 20% of the Netherlands (Reijnen et al. 1995). Areas larger than 100 km<sup>2</sup> that were unfragmented by roads decreased from 22% to 14% of the total land coverage of the old West German states between 1977 and 1998 (Bundesamt für Naturschutz 1999), and this trend is very likely to continue in most parts of the world (e.g., NRTF 1997).

Malaysian Federal Roads System is the main national road network in Malaysia. It was built and maintained by the Public Works Department Malaysia (JKR). Most of the federal roads in Malaysia are 2-lane roads. Malaysia implements a right-hand driving system where drivers drive on the left side of the road. However, there are in certain places where additional lanes are available. In town areas, federal roads may become 4-lane roads to increase traffic capacity. In hilly areas, additional third climbing lane is available for slower vehicles such as buses and lorries.

Federal Route 2 [FR2] is a main federal road in Malaysia. It connects Port Klang in Selangor to Kuantan in Pahang. *Gambang-Kuantan Highway* is a part of FR2, which is also known as Jalan Kuantan-Gambang [FR2]. It is the major highway in Kuantan, Pahang, Malaysia which connects Gambang to Kuantan. The length of the road is about 500 km and being initially constructed from year 1946 until 1948. Besides, *East Coast Expressway* (LPT) also a part of FR2 which connects Karak and Kuala Terengganu, which is 338 km in length. It is under restriction of private company named MTD Prime Sdn Bhd.

As additional information, Jalan Kuantan-Gambang [FR2] is the main road which connects all the intersections including the access road to Gambang Plaza Toll in the west of Kuantan Town and Kuantan Plaza Toll at Jalan Sg. Lembing in the east of Kuantan Town. At the moment Jalan Kuantan-Gambang [FR2] is having an adequate capacity to cater for the traffic demand. However, it's getting congested especially during AM & PM peak hours. On the other hand, *East Coast Expressway* (LPT) is under utilized due to a number of reasons. Probably, one of the reasons its being utilized due to a poor accessibility to the expressway itself from Jalan Kuantan-Gambang [FR2].

Most high capacity roads are built to a higher standard than general purpose roads. In order to provide for higher traffic volumes, access is restricted to certain categories of motorized vehicles and limited to a certain number of access points where grade separations and ramps enable through traffic to proceed without interruption. These high capacity routes are almost always divided. Motor vehicle traffic on roads generates noise pollution especially at higher operating speeds.

### **1.3 Significant of Study**

The significant of this study is to provide scarce information to the land developers and hopefully that information will help them in selecting the optimum location for new residential developments with a good accessibility of the road network within the study area of this project which is Jalan Kuantan–Gambang [FR2] and *East Coast Expressway* (LPT). Besides, it's also to provide valuable information to the expressway concessionaire or the road operator on the selection of a new interchange to cater for local traffic demand which currently using Jalan Kuantan-Gambang [FR2].

### **1.4 Objectives**

Below are the main purposes for conducting this research:-

1. To identified the existing residential locations of UMP's staff and their preferred commuting route to UMP.
2. To determine their reasons in choosing the current residential locations and the preferred commuting route to UMP.

## **1.5 Scope of Study**

This study involves all staffs and lecturers in Universiti Malaysia Pahang [UMP] as the respondent. The scope of this study is to identify and verify the location of the current residence and the preference road that being chosen / used by UMP's staff for their daily commuting trips to the workplace which is UMP. The study area involved in between Jalan Kuantan-Gambang [FR2] and *East Coast Expressway* [LPT]. Furthermore, all the supporting factors in choosing a particular route by the respondent could also be verify.

## **1.6 Research Questions**

In order to achieve the objectives of this study, the research questions were designed based on the criteria needed. The questions will be discussed further in Chapter 3 and all questions were answered in Chapter 4. From the research questions, we will able to know the preference road that being chosen by the respondents along with the supporting reasons of their choices.



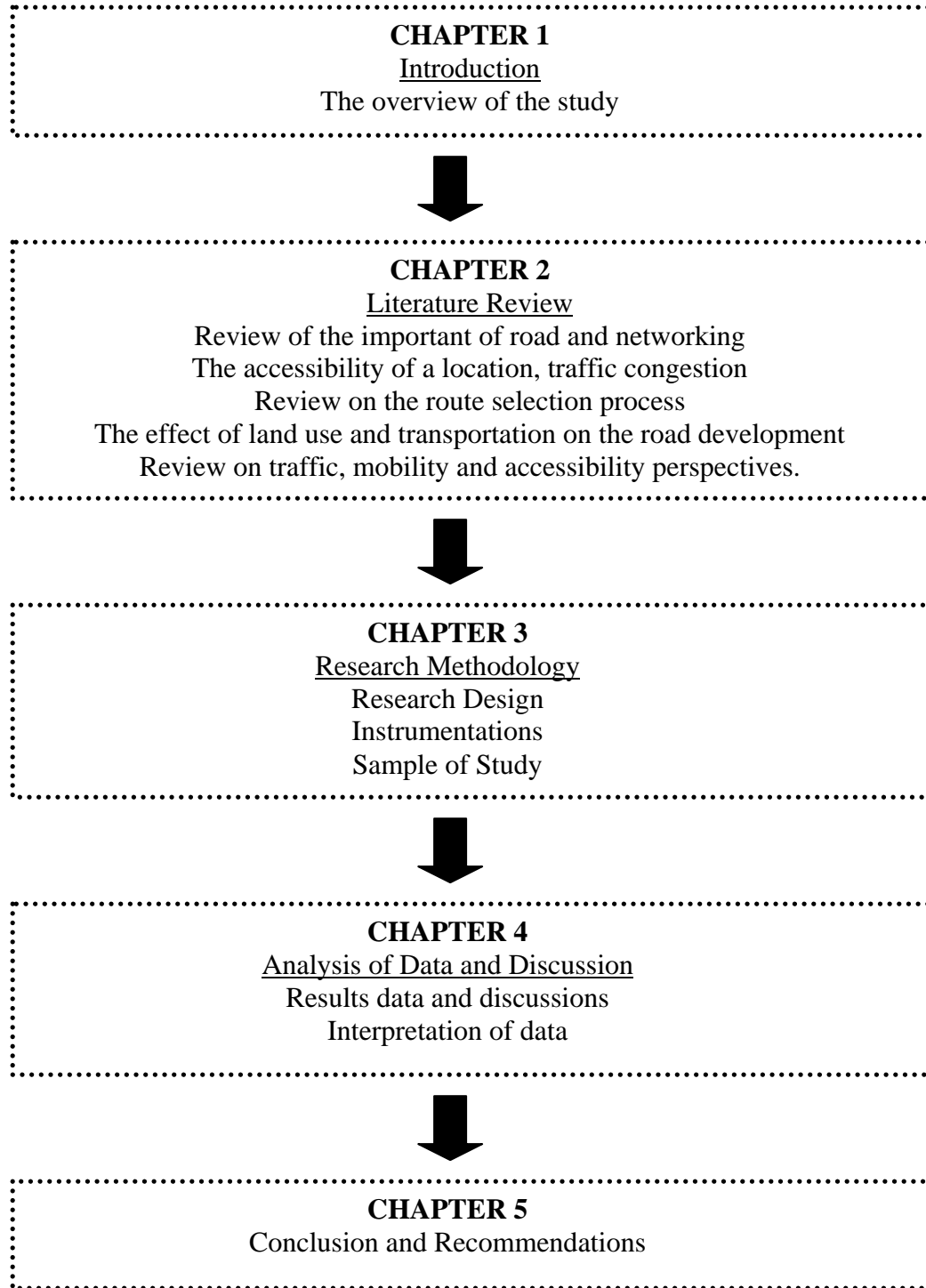
## 1.7 Definition of Terms

In this section, the definition of terms listed is a particular term which described the meaning of some terms that being used in this study. The terms involved including:

1.     Accessibility :  
It is the measurement on the capacity of a location to be reached by or to reach different locations.
  
2.     Congestion  :  
It occurs when transport demand exceeds transport supply in a specific section of the transport system. Under such circumstances, each vehicle impairs the mobility of others.
  
3.     Network     :  
It is the framework of routes within a system of locations, which identified as nodes.
  
4.     Route       :  
It is a single link between two nodes that are part of a larger network that can refer to tangible routes such as roads and rails.

## 1.8 Summary

In overview, the aim of this study is to identify the preference road that will be chosen by respondents for their commuting trips to / from workplace. The road involved is Jalan Kuantan-Gambang [FR2] and *East Coast Expressway* [LPT]. There are many probably factors which influenced their selection, including the road accessibility from their current residential, the condition of the road profile and the length or distance along with the time taken for the commuting trips to be undergoing. The problem will occurred when the capacity of the road cannot afford the traffic demand as the road user will increase year by year. It will require better accessibility of the road network and facilities to serve a comfortable and safe journey to the road user. Therefore, the factors which influenced the respondent of this research in choosing their preference road are identified including the supporting reasons towards their selection. All the information gathered will be discussed further in Chapter 4 which is the part of results and discussions. In addition, the last chapter would conclude this research and suggestions would be made based on the result that had been obtained. To make it clear, Figure 1.1 had been attached here, shows the overview of the whole process involved in this research.



**Figure 1.1 :** Overview of the research process

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

In this chapter discussed about the literature review on the important of road and its networking. Besides, it also discussed on related information about this research such as the accessibility of a location, traffic congestion and the process of route selection. Besides that, it does also discuss on the effect of land use and transportation on the road development and the perspectives on traffic, mobility and accessibility in briefly.

#### **2.2 Important of Roads**

A road is an identifiable route, way or path between two or more places. Roads are typically smoothed, paved, or otherwise prepared to allow easy travel. An important part of any road is the means by which the traffic engineering conveys information about the road and any regulations that affects the way it is used to users. If this done successfully it helps to make travel both safer and more efficient and it helps road users to ensure that they comply with the regulations governing the road that they are using.

Road infrastructures are moderately expensive to provide, but there is a wide divergence of costs, from a gravel road to a multi-lane urban expressway. Because vehicles have the means to climb moderate slopes, physical obstacles are less important than for some other land modes. Most roads are provided as a public good by governments, while the vast majority of vehicles are owned privately. The capital costs, therefore, are shared, and do not fall as heavily on one source as is the case for other modes. However, in many cases, governments have been inefficient custodians of road infrastructure.

Consequently, a growing number of roads have been privatized and companies specializing in road management have emerged, particularly in Europe and North America. This is only possible on specific trunks that have an important and stable traffic. Unlike governments, private enterprises have vested interests to see that the road segments they manage are maintained and improved since the quality of the road will be directly linked with revenue generation. The majority of toll roads are highways linking large cities or bridges and tunnels where there is a convergence of traffic. Most roads are not economically profitable but must be socially present as they are essential to service populations.

Governments can expropriate the necessary land for road construction since a private enterprise may have difficulties to expropriate without government support. Another important aspect about roads is their economies of scale and their indivisibility, underlining that the construction and maintenance of roads is cheaper when the system is extensive, but to a limit. However, all road transport modes have limited abilities to achieve scale economies. This is due to the size constraints imposed by governments and also by the technical and economic limits of the power sources.

In most jurisdictions, trucks and busses have specific weight and length restrictions which are imposed for safety reasons. In addition, there are serious limits on the traction capacities of cars, busses and trucks because of the considerable increases in energy consumption that accompany increases in the weight of the unit. For these reasons the carrying capacities of individual road vehicles are limited. Roads are thus costly infrastructures, but also sources of income:

1. Costs : They include rights of passage, development costs (planning), construction costs, maintenance and administration costs, losses in land taxes (urban environment), expropriation costs (money and time), and external costs (accidents and pollution).
2. Income: They include registration, gas (taxes), purchases of vehicles (taxes), tolls, parking, and insurance fees.

### **2.2.1 Traffic Definition**

Traffic can be defined as the movement of pedestrians and goods along a route, and in the 21<sup>st</sup> century the biggest problem and challenge for the traffic engineer is often the imbalance between the amount of traffic and the capacity of the route, leading to congestion. Traffic congestion is not a new phenomenon. Roman history records that the streets of Rome were so clogged with traffic that at least one emperor was forced to issue a proclamation threatening the death penalty to those whose chariots and carts blocked the way. More recently pictures of our modern cities taken at the turn of the century show streets clogged with traffic. Traffic engineering is used to either improve an existing situation or, in the case of a new facility, to ensure that the facility is correctly and safely designed and adequate for the demands that will be placed on it (Mike *et al.*,2005).

### **2.2.2 Traffic Survey**

The main reason for undertaking a traffic survey is to provide an objective measure of an existing situation. A survey will provide a measure of conditions at the time that the survey was undertaken. Traffic flow varies by time of day, day of the week and month of the year. In small developments, the only transport issues may be those of appropriate access to/from the highway network and off-highway parking. Requirements for these are normally set out by the local authority in published documents (Mike *et al.*,2005).

### **2.2.3 Traffic Accessibility**

The Guidance then describes the requirement for analyzing accessibility in more detail, as follows:

*A key planning objective is to ensure that jobs, shopping, leisure facilities and services are accessible by public transport, walking and cycling. This is important for all, but especially for those who do not have regular use of a car, and to promote social inclusion. In preparing their development plans, local authorities should give particular emphasis to accessibility in identifying the preferred areas and sites where such land uses should be located, to ensure they will offer realistic, safe and easy access by a range of transport modes, and not exclusively by car.*

### 2.2.3.1 Measurement on the Accessibility of a Location

The accessibility of a location can be measure in two ways which is local and network accessibility:

1. Local accessibility : identifying how accessible a location is to public transport services by measuring walk and waits times.
2. Network accessibility: measuring journey times or costs across the transport network to the location from all other nearby areas separately for each mode (e.g. car, public transport, cycle and walk) (Mike *et al.*,2005)..

### 2.2.4 Traffic Congestion

Congestion is one of the most prevalent transport problems in large urban agglomerations. It is particularly linked with motorization and the diffusion of the automobile, which has increased the demand for transport infrastructures. However, the supply of infrastructures has often not been able to keep up with the growth of mobility. Besides, growing traffic in urban areas is linked with a growing number of accidents and fatalities, especially in developing countries. As traffic increases, people feel less safe to use the streets.

Congestion occurs when transport demand exceeds transport supply in a specific section of the transport system. Under such circumstances, each vehicle impairs the mobility of others. The last decades have seen the extension of roads in rural but particularly in urban areas. Those infrastructures were designed for speed and high capacity, but the growth of urban circulation occurred at a rate higher than often expected.



Investments came from diverse levels of government with a view to provide accessibility to cities and regions. There were strong incentives for the expansion of road transportation by providing high levels of transport supply. This has created a vicious circle of congestion which supports the construction of additional road capacity and automobile dependency.

Urban congestion mainly concerns two domains of circulation, often sharing the same infrastructures:

1. **Passengers** : In many regions of the world incomes have significantly increased to the point that one automobile per household or more is common. Access to an automobile conveys flexibility in terms of the choice of origin, destination and travel time. The automobile is favored at the expense of other modes for most trips, including commuting. For instance, automobiles account for the bulk of commuting trips in the United States.
2. **Freight** : Several industries have shifted their transport needs to trucking, thereby increasing the usage of road infrastructure. Since cities are the main destinations for freight flows (either for consumption or for transfer to other locations) trucking adds to further congestion in urban areas. The "last mile" problem remains particularly prevalent for freight distribution in urban areas. Congestion is commonly linked with a drop in the frequency of deliveries tying additional capacity to insure a similar level of service.

Infrastructure provision was not able to keep up with the growth in the number of vehicles, even more with the total number of vehicles-km. During infrastructure improvement and construction, capacity impairment (fewer available lanes, closed sections, etc.) favors congestion. Important travel delays occur when the capacity limit is reached or exceeded, which is the case of almost all metropolitan areas. In the largest cities such as London, road traffic is actually slower than it was 100 years ago.