PASSE . (PIS) FOR KUANTAN - TANJUNG LUMPUR BUS ROUTE

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ABSTRACT

The main purpose of this study is to provide information about public transportation which is public bus to people living around Tanjung Lumpur area. The dissemination of information about public transportation that is available is very important in order to inform to public bus users about the existence of public transportation thereby can increase the awareness of local residents about the benefits of using public transport. If provided public transportation is not being used and total of passengers is too little, the bus company had to stop the bus operation and this will give problems to low-income residents who still want to use public transport. Public transportation information that need to be considered are bus routes, bus travel time, and location of bus stops. This study used the concept of geographic information system in conducting inventory of existing bus facilities. In addition, the questionnaire surveys and interviews were also conducted to obtain information on bus operations along Kuantan to Tanjung Lumpur bus route. Next, information about public transportation services can be disseminated.

ABSTRAK

Tujuan utama kajian ini adalah untuk memberi informasi atau maklumat tentang pengangkutan awam iaitu bas awam kepada penduduk setempat yang tinggal di Tanjung Lumpur dan kawasan berdekatan. Penyebaran maklumat tentang pengangkutan awam yang disediakan sangat penting untuk memberitahu tentang kewujudan pengangkutan awam tersebut sekali gus dapat meningkatkan kesedaran di kalangan penduduk setempat tentang kelebihan menggunakan pengangkutan awam. Jika pengangkutan awam yang disediakan tidak digunakan dan jumlah penumpang yang menaiki pengangkutan awam terlampau sedikit, pihak syarikat bas terpaksa menghentikan operasi bas dan ini akan menyusahkan penduduk yang berpendapatan rendah yang masih mahu menggunakan pengangkutan awam. Maklumat pengangkutan awam yang perlu diambil kira adalah laluan bas, masa perjalanan bas, dan kedudukan perhentian bas. Kajian ini menggunakan konsep sistem maklumat geografi dalam menjalankan inventori kemudahan bas yang sedia ada. Tambahan lagi, kajian soal selidik dan wawancara turut dijalankan untuk mendapatkan maklumat mengenai operasi bas di sepanjang laluan bas dari Kuantan ke Tanjung Lumpur. Seterusnya, maklumat tentang perkhidmatan pengangkutan awam dapat disebarkan.

TABLE OF CONTENTS

2. LITERATURE REVIEW

3. METHODOLOGY

4. RESULTS AND ANALYSIS

5. CONCLUSION AND RECOMMENDATION

LIST OF FIGURES

LIST OF TABLES

TABLE NO. TITLE PAGE

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Tanjung Lumpur is just a fishing village with small population but now it has experiencing rapid development. So, the population and vehicles in the area will be increasing. From my personal observation, people living in the area do not like to use public transportation services as they prefer to use their own transport. This has lead to lack of adequate stage bus service along the route from Kuantan to Tanjung Lumpur. The issue of lack of stage bus in Kuantan is because the service seems to "die" several years ago when the bus company claimed that they suffered quite a big loss (*Berita Harian, Awang Asrol*). The key to solve this problem is improving public transportation.

Public transport system plays a vital role by providing cost effective and energy saving means of transport. The public bus transport system provides a better and safer environment by reducing congestion, pollution and creating more efficient solution to transport problems. Therefore, it is urgent to promote public transportation informationization to improve service quality and efficiency of bus, subway and other public transportation (*Z. Wen, C. Xiaojie, L. Jianjun, 2010*). From the national application trend, Geographic Information System (GIS) has been the

most effective method to foster public transportation informationization development (*W.Z. Xiao, W. Wang, X.G. Li, 1999*).

This system will be specifically developed for bus transport. In this system, passenger can get information about all buses, routes, timings of buses and all stops along Kuantan to Tanjung Lumpur bus route. This project includes two phases. One is for user and the other for administrator. For the users, they can request for information about all buses, routes, timings of buses and all stops along the route using Wi-Fi or GPRS technology. On the other hand, for the administrator, they can update, delete and insert information about all buses, routes, and helpline numbers for users (*N. Uma, 2011*).

1.2 Problem Statement

Tanjung Lumpur is experiencing poor public transport system, the existing public transport system lacks among other characteristics; passenger trip guidance, bus routes, timings of buses and all stops along Kuantan to Tanjung Lumpur bus route. Passengers do not know the available services provided for them and the advantageof using public transportation and this has lead to low demand for the service. Therefore, there is a need for implementing a geographic database for public transportation information within the area. This will greatly enhance efficiency and facilitate transportation information of the public transportation within the area.

1.3 Objectives of the Study

The objectives of the study are:

i. To conduct inventory the existing bus facilities from Kuantan to Tanjung Lumpur using GIS.
ii. To produce User Publis Transportation Information System (UPTIS) for the study area.

1.4 Scope of Study

Scopes of this study include the following procedures:

i. Collection of information from various sources.
   - Meeting with stakeholders (especially passengers, drivers, bus operators or other commercial operators) and questionnaire surveys to know the needs and priorities of the stakeholders.
ii. Obtain road network map.
   - Capture from Google Earth and geo-referenced to the WGS84 coordinate system
iii. Promotion.
   - The promotion of transport information system helps to raise awareness among the public about the benefit of using public transportation.

1.5 Significance of Study

The study is conducted in order to give information to all users about public bus along Kuantan to Tanjung Lumpur bus route like bus routes, timings of buses, and all stops along the route. Then, the bus operators or public bus companies can distribute information about public transportation to users. The public transportation information system can be given to Majlis Perbandaran Kuantan (MPK) so that they can plan better public transport facilities.

1.6 Study Area

Study area was along Kuantan - Tanjung Lumpur bus route which is from stage bus station at Jalan Stadium to the bus stop at Cherok Paloh. The length of the road is 32 kilometers.

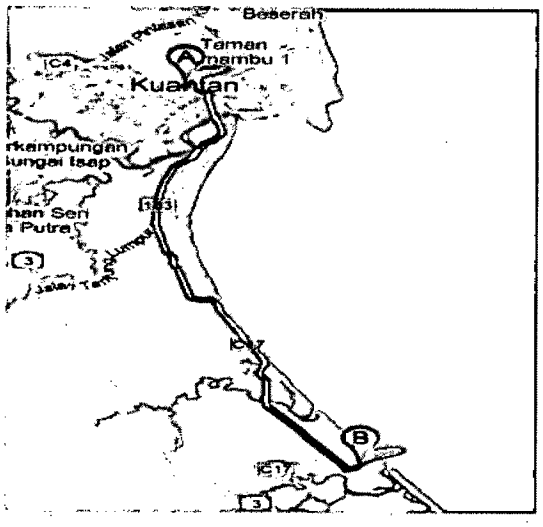

Figure 1: Location of study

1.7 Thesis Layout

The contents of each chapter are summarized below:

1. Introduction: this chapter includes background, problem statement, objectives of the study, scope of study and study area.
2. Literature review: includes analysis background, definition, methods and summary of literature review.
3. Methodology: includes methods from start to end of this project run and methods of using the GIS software.
4. Analysis and Result: presentation of results as database public transportation maps and discussion.
5. Conclusions and recommendations: includes summary of the conclusions and recommendations.
6. References

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In order to successfully conduct this project, it is necessary to have a better understanding and knowledge regarding public transportation inventory and transportation studies. To this, the studies and research in various types of books, articles, case studies, journals and related websites need to carry out.

The process of survey of existing facilities and current behavior or collect the information and resources regarding public transportation is called public transportation inventory. The result of this process can be used in various types of purpose. For example for this project, the data or result will be used as information to the users in the living area.

2.2 Geographical Information System (GIS)

An effective system management is required in planning development in order to achieve the desired goals and objectives, evaluate alternative as well as control development programs that are in line with the current and future prospects.

GIS technology has long been applied in planning activities which essentially include plans formulation as well as development control (Johar et al., 2003). The design of public transportation system operation and networks is complex and can include conflicting objectives. The design may not fulfill the passengers' satisfaction.

GIS can combine pieces of data for every object, put it through the model process, and get back a new piece of information. This allows spatial data to be processed in mass quantities using powerful, complex formulas. GIS not only for mapping, but, it also can analyses, process data and unique. Besides of that, the costing is much cheaper by using GIS (Chang K. T., 2008).

By using GIS in managing the information, the department can provide data that is current and accurate, which can be retrieved at anytime and anywhere. Effective management is very important to eliminate data duplication. The adoption of GIS will lead to a more organized management. Passengers need effective public transport services and to be well regarded, public transport services must follow regular schedules, be safe and rapid, guarantee high service quality, and utilize resources efficiently (Dridi et al., 2005). Public transportation services vitalize economies of nations. These services improve the life of communities by providing safe, efficient, and economic transport and they benefit society by easing traffic congestion, saving money, and creating and sustaining jobs (Tran and Kleiner, 2005).

Public transport managed objects, includes physical entities and data entities. Physical entities refer to the road network, public transport facilities, routes, vehicles, passenger traffic distribution and other objective object. Data entities are mainly public transport daily operation and management data, such as travel schedule, traffic

statistics, sales data, and personal management data. Data entities are generally in the form of database table and every table are correlated by keyword. this project, the data or result will be used as information to the users in the living area.

2.3 Fundamentals of GIS

Fundamentals of GIS are dividing into four parts, which are mapping concepts, features and properties, map characteristics, data automation and the last one is information of digital map.

2.3.1 Mapping Concepts, Features and Properties

A map represents geographic features or others spatial phenomena by graphically conveying information about locations and attributes. Location is described as the position of particular geographic features on the Earth's surface whether the attributes is described as characteristics of the geographic features represented such as name or numbers. The basic objective of mapping is to provide:-

a. Descriptions of geographic phenomenon.
b. Spatial and non spatial data.
c. Map features like point, polygon and line.

2.3.2 Map Characteristics

There are technical characteristics that define map in addition to feature locations or their attributes. Elangovan, 2006, specified the map characterististic includes:-

a. Map scale.

b. Map accuracy.

c. Map extent.

d. Data base extent.

2.3.3 Data Automation

Map features are logically organizes into a set of layers. Map data, regardless of how spatial database will be applied, is collected, automated and updated in a series of adjacent map sheets or aerial photograph. Each sheet is mounted on the digitizer and digitized, one sheet at a time. In order to be able to combine, the coordinates must be transforming into a single common coordinate system. Hence, the attributes will associate with the features (Elangovan, 2006).

2.4 Public Bus Transportation Information

Public bus transportation information include the bus route, bus stops location, and bus operations. All these information are important in order to increase the public awareness about public bus transportation services provided in the study area. Information of public bus transport can be produced by conducting inventory of existing bus facilities along the route using GIS. GIS can be used to emphasize the spatial relationship among the objects being mapped. Data capture putting the public bus information into the system involves identifying the objects on the map, the absolute location of bus stop on the Earth's surface, and their spatial relationships. Software tools that automatically extract features from satellite images are gradually replacing what has traditionally been a time-consuming capture process. Objects are identified in a series of attribute tables the "information" part of GIS. Spatial relationships, such as whether features intersect or whether they are adjacent, are the key to all GIS-based analysis (Elangovan, 2006).

2.4.1 Data Integration

GIS makes it possible to link, or integrate, information that is difficult to associate through any other means. Thus, GIS can use combinations of mapped variables to build and analyze new variables (Elangovan, 2006).

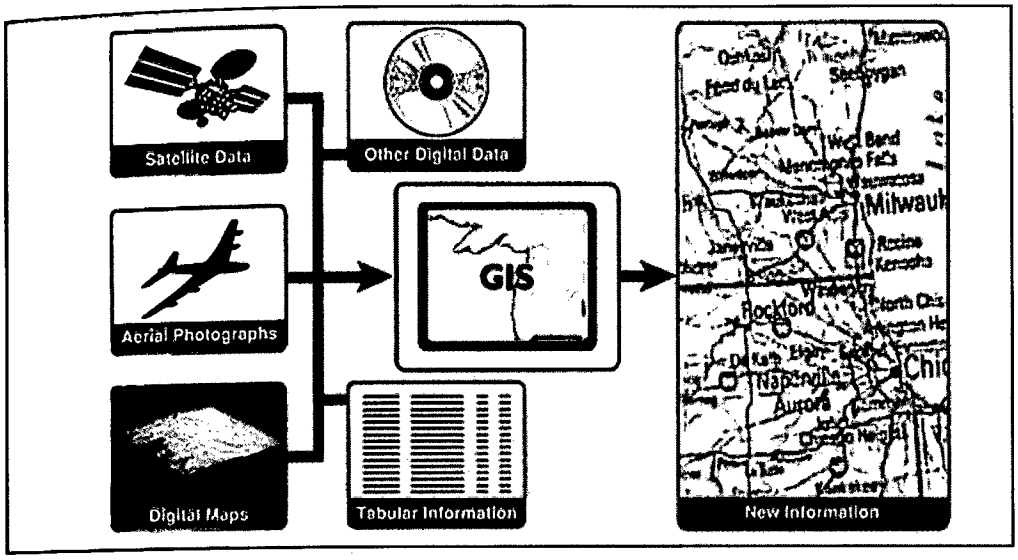

Figure 2.1 : Data integration is the linking of information in different forms through GIS

2.5 Routes

Public bus route is the most important part of transportation which refers to the directed physical path (J. T. Li and J. F. Yang, 2004) of every bus route. In data model, one line is alternatively connected by site and road section.

1) Site: Site is the location for passengers getting on and off the bus. Actually, site is the "projection" of platform of one specific line and its location is according to the corresponding site. In other words, the platform and site has one-to-many relation

2) Road sections: Section is a line segment between adjacent sites which is the basic building blocks unit of bus routes. Specifically, section is the connection of two adjacent sites along the road centerline.

The following diagram visually reflects the relationship between buses related objects:

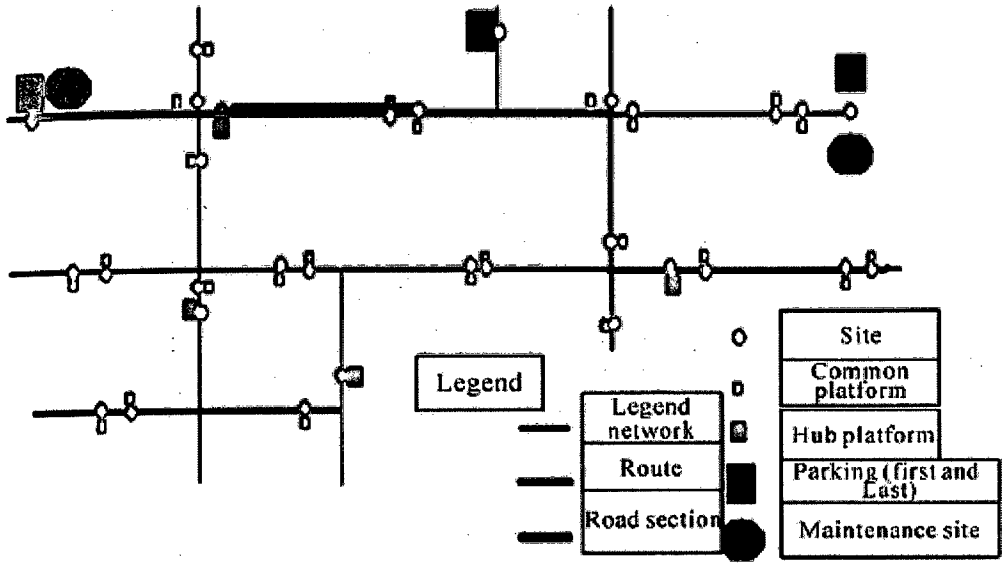

Figure 2.2 : Objects relation of public transportation

2.6 Operation information

Public transport information is bus GIS information which is closely connected with the application business data including the frequency plan, passenger traffic and passenger revenue and other data. It organizes public transportation information. The actual performance of public transport operations is reflected in many aspects, such as vehicle storage and organization, each line transceiver classes, schedules, operating interval, operation mileage management, etc. Related information and route will change accordingly.

2.7 Association of Bus Routes and Bus Stops

Bus routes do not necessarily service all the bus stops that lie on their paths, and many bus stops are serviced by more than one route. Therefore, it is necessary to devise an efficient way and give information by which stops can be specified and associated with their respective (C. S. Papacostas, 1995).

2.8 Materials

In this part, all materials used in this study are presented. The specific material got from MPK and two bus companies that operates along the route which are Rahmat Alam and Bee Huat.

2.8.1 Location of bus stops

In this study, we get location and pictures of bus stops from MPK and transfer to the GIS software to conduct the inventory of existing bus facilities. Example data that could be used is the distance of bus stop from bus terminal at Jalan Pasar, Kuantan.

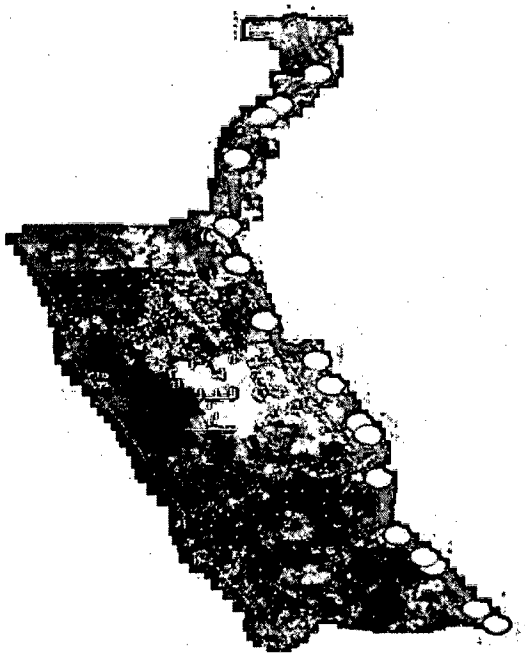

Figure 2.3 : Location of bus stops (image from Google Earth)

2.9 Conclusion of Literature Review

From the literature review, previous researcher already state about how to use GIS, the advantages, functions and also guideline on using GIS software. However, not many people know how to use this intelligent software. The following are some of advantages by using GIS software such as save time and cut cost, high technology, easy to understand, easy to do analysis and GIS can save lots of data. This literature review also played as example for its application in conducting inventory, establishing map, and giving information. The use of GIS can encourage cooperation and communication among the organizations involved in environmental protection, planning, and resource management.

CHAPTER 3

METHODOLOGY

3.1 Introduction

A key component in emerging methods and techniques for better understanding transportation processes is geographical information system (GIS). Researchers have used GIS technology to measure accessibility of public transport, creating public transport routes, identifying optimum routes, optimizing bus stops and spatial analysis of service level, measuring spatial equity and public transport management. Recently, the application of GIS in public transport planning and management has increased. It is an attractive tool for this research because of its query, spatial analysis, and network analysis. Hence, GIS has been used to conduct inventory of existing bus facilities for this study area.

This research has three stages which are the pre-field work stage, field-work stage, and post-field work stage. All methodology and materials used in this research will be discussed in this chapter. In order to achieve the objectives of this research, the general methods followed were literature review, interviews with public bus companies, which are Rahmat Alam and Bee Huat, questionnaire survey for 50 public bus users, data collection from Majlis Perbandaran Kuantan (MPK). In this research, software ArcGIS 9.3 is used.

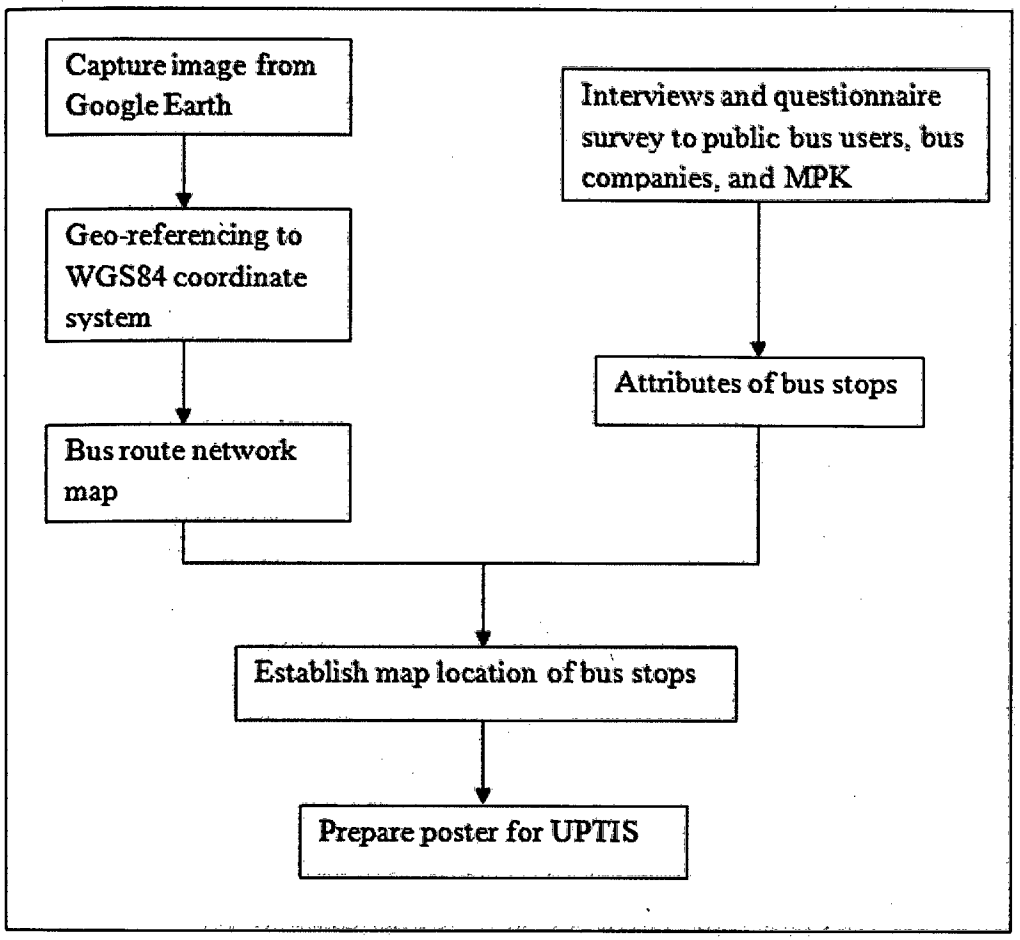

Figure 3.1 : Methodology of research flowchart

3.2 Pre-field Work Study

Firstly, literature review is done to identify the parameters and data required and relevant stakeholders were identified. The required data that have been identified during the pre-field study are road network, bus route, location of bus stops, and bus operations. Then, interview questions and questionnaires were prepared. Interview sessions are done with both Rahmat Alam and Bee Huat bus companies. The questionnaire survey for public bus users was prepared to conduct at bus stops along the bus route. The questionnaires was made as simple as possible so that the required information can be obtained in the waiting time. It has three parts involving