A STUDY ON BUS OPERATING PERFORMANCE AND DEMAND SUSTAINBILITY

(CASE STUDY : KOTA KINABALU, SABAH)

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Thesis submitted in fulfillment of the requirements for award of the degree of B.ENG (HONS.) CIVIL ENGINEERING

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UNIVERSITI MALAYSIA PAHANG

JUNE 2014

ABSTRACT

Public Transport is one of the facilities that facilitate the movement and connecting communities from a place to another place. A good public transport system need to comply with world Bank Standard and other standard or requirement that can prove it their service is can be providing best service to consumer. In Malaysia, The public transport system has always been the government attention to be improved from time to time until 2011 government carried out the plan to improve the urban public transport in Malaysia. This Study On Bus Operating Performance and Demand Sustainability was conduct at Kota Kinabalu City and involved urban public transport City Bus as the main factor to Analysis. The analysis was conduct by observation on site or terminal and also on board observation. The main observation for this study is headway, Travel Distance, Load Factor, Availability and number of passenger. This observation shown that the headway range 26-28minute,Travel Distance Per bus Per day in range 86.40 to 178.70 KM, Availability range 75% to 83.33%. Comparing between the observation result and the standard show that the service by City Bus Kota Kinabalu need to improve their service since many of that indicator or standard observed is far from word Bank standard provided.

ABSTRAK

Pengangkutan awam adalah salah satu kemudahan yang memudahkan pergerakan komuniti yang menghubungkan dari suatu tempat ke tempat yang lain. Sistem pengangkutan awam yang baik perlu memenuhi standard yang telah di tetapkan oleh 'World Bank Standard' atau standard berkaitan perkhidmatan Bas awam. Di Malaysia, Sistem pengangkutan awam sentiasa menjadi perhatian kerajaan untuk diperbaiki dari semasa ke semasa sehingga pada tahun 2011 kerajaan melaksanakan rancangan untuk meningkatkan pengangkutan awam di kawasan bandar di Malaysia. Kajian 'Bus Operating Performance' ini dijalankan di Kota Kinabalu Sabah dan City Bus iaitu penyedia perkhidmatan bas utama akan menjadi analisa. Analisis ini di jalankan dengan melakukan pemerhatian di tapak atau terminal dan juga pemerhatian dalam bas. Analisa utama untuk kajian ini adalah headway, cycle time, Load factor, availability dan travel distance. Hasil daripada kajian ini mendapati bahawa selang masa antara bas (headway) ialah 26-28minute, Jarak Perjalanan Per bas Per untuk keemapt-empat sektor 86.40-178.70 KM,bagi 'Availability' menunjukkan jurang antara 75% ke 83.33%. Membandingkan hasil kajian ini dengan world Bank Standard,ia menunjukkan standard perkhidmatan yang di berikan oleh City Bus Kota Kinabalu perlu ditambah baik kerana hampir kesemua indikator menunjukkan ia jauh dari standard yang di tetapkan oleh world bank standard.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 Introduction

Progress and rapid development taking place in a big city would cause the population in the city increased. This is due to the migration of people from rural areas to the city either to work or follow family living there. Along with the increase in population in the city, increasing the movement of people from one place to another place also will cause public transport services are needed by the user either to work, leisure, entertainment and so on.

Transport is one of the alternative communication systems in the world. It is considered as the heart of movements and income for some people. In Malaysia, the public transport system is the most significant factor in whether a communication system for city and rural communities. As a growing country, the communication system in a State should have the competence and progress in terms of technology and services in use. Therefore, the government has sought to make various changes and new strategies to improve the quality of public transport services in order to attract the people to use public transport.

Good public transport system is a system with quality services that meet the needs of consumers who use the service, whether in terms of security, flexible fares, comfort, quality counter service, a comfortable bus stops and other factors should be taken off. If all these factors are met successfully and well by transport service providers and the government therefore this mode of public transport will be the preferred provider in Malaysia.

1.2 Problem Statement

In transport systems, transport services are good, efficient and effective mode of transportation is covering itself, the available road network and good infrastructure are also good. If these are met by the government, therefore, a good public transport system relies heavily on service providers.

The study of bus services in the city of Kota Kinabalu will involve operators "Citybus". The company that operates services in Kota Kinabalu route. This review covers aspects such as services, the life of the bus, the amenities available to passengers, timeliness of service, system vulnerabilities existing bus services and demand sustainability.

The problems identified in this study are related to transport system, which was provided by the service provider as an uncomfortable bus, awaiting their time is too long and the buses are not enough to accommodate the increasing passenger and not prepared to wait for a good place. The problems identified are derived from his own experience, observations at stops and also complaints from users. Among the problems that arise for different modes of public service providers in the city are:

a) The main problem is the service provider related to the passenger waiting time is too long. Specific intervals not specified and the buses are always changing.

b) Due to use the bus services is increasing, especially in busy routes such as Kota Kinabalu-Sepanggar (also the High demand route). The number of buses available to service this route is not available to meet demand.

c) In the new paper dated July 5 (Daily Express) - The government is committed to the realization of various projects and initiatives to improve and enhance the public transport system in the state. Chief Minister Datuk Seri Musa Aman said the government will continue with respect to redouble efforts to develop the infrastructure and facilities to support public transport to provide comfort to the user.

1.3 Objective

The objective of this study was to obtain information relating to the effectiveness of the existing transportation system, demand sustainability and punctuality of bus service.

The main objective of this study do is as follows:

i) To observed bus operating characteristic

ii) To determine the weakness of the existing system and propose improvement.

1.4 Scope of Work

The scope of this study was to perform a review of bus services in the city of Kota Kinabalu. This study has chosen provider bus Service is applicable in the main city of Kota Kinabalu City Bus to carry out this study. The survey will be conducted to achieve the objectives mentioned earlier. The study will involve observation in the main terminal, sub bustop, passenger on / off and interviewer with a service provider.

1.5 Significance of Study

The results of this study will hopefully help the other authorities, especially service providers in Kota Kinabalu to improve the quality of existing services. This study will provide significances to the following parties:

i) The service provider "CITYBUS"

As a result of this review, the provider will be able to know the weaknesses of the existing system and improve this system in the future in order to increase public transport system users in the city of Kota Kinabalu.

ii) Government

The government will benefit from this research can find out when public expatriates system problems that exist and fix it so that the NKRA in public transportation running.

ii) Public Transport users

The user public transport will benefit from this study when the results of this study will later discover weaknesses and may be repaired by a service provider who in turn will give more comfort to the user "City Bus".

CHAPTER 2

LITERATURE REVIEW

2.1 Public Transportation System

Public transportation refers to public transport vehicles used for transporting passengers who want to move one place to another place who pay a certain cost as a service to travel. Vehicles used in public transport modes can be owned and may take place in private and public bodies such as local government, municipal or private companies either for convenience or for social benefit. Public transport is basically the main transport base in the community as a place closely associated with transportation and community activities and resource availability of goods and services. According Cahyadi (2006) defined as the travelling of community or goods from one place to another for a specific purpose.

Dewi (2007) have stated that the transportation service by a consumer engaged in the transportation services industry is one of the types of services output. Generally, the Service is applicable product features four distinct shapes that policy, may be held, are inseparable from the manufacturer and cannot be saved.

Transport is defined as a process of the transfer, the process of motion, where are the transportation and divert this process cannot be relieved of the need to ensure smooth proponents tool migration process according to the desired time (Dewi, 2007).

2.2 Public transport in Malaysia

National economic growth increases each year have resulted in an increase in the average income of the population in Malaysia. An improvement in the income of the population in Malaysia has allowed all people to have their own vehicles. Still, manypeople, whether in urban or rural areas still require public transport system and caused that in 2011 the government launched a plan to increase the level of public transport services through the government transformation plan (GTP).

For most major cities in Malaysia, for example, Johor Bahru, Penang, Kuala Terengganu, Kota Bharu and the transportation options for residents is limited, and only rely on some type of transportation only and use vehicle Such as private vehicles, especially cars, motorcycles and buses. Other cities in the world such as Japan, the United States, Britain, United Kingdom, etc., have more options public transport exists in their country.

In the development of a city, use public transport and private vehicles are important (Abd Rahim 1999). However, the high dependence on private vehicles such as motorcycles and cars will give negative implications in terms of resource use, such as fossil fuel burned by the engine can come and increase air pollution and thus have a negative impact on the environment. From the studies that have been carried out previously by Syed denial (2004), found that of the 4 million trips a day's singlein Kuala Lumpur, only 30% use the bus. These buses are the 2% of the road capacity. But, transport buses had not attracted the attention of other commuters.

Public transportation is available in larger cities such as Kuala Lumpur, sometimes unable to provide satisfactory service and a maximum score for the user. Quality of service is not satisfactory as inconsistent itinerary, number of passengers too much congestion on the bus and monorail, bus frequency is too long, no air-conditioning (if any equipment is broken and does not work), no "notice board" the bus ride the next table and so on. These conditions are found to have caused serious difficulties for consumers. There are times when a user tries to switch to public transport modes, but the services offered are not satisfactory. As for the continued use of private vehicles turned out to be more difficult when I had to face long traffic jams, fatigue, etc. (Haryati Shafii, 2009)

2.3 Factor of Efficiency Bus Service

For efficiency of the bus, some of the factors that influence the efficiency of a bus system as below:

2.3.1 Vehicle Size And Type

Road vehicles used for mass public transport range from small vehicles carrying about 10 passengers, to bi-articulated buses built for maximum permitted dimensions and weight, which may carry over 270. Each type of vehicle has a role to play, and to some extent all may be complementary to one another as part of the overall public transport system.

2.3.1.1 Vehicle Size

Large buses are appropriate in certain circumstances, and small vehicles with others. It's sometimes difficult to determine whether several small vehicles or one large one would meet the requirements of passengers and operators more efficiently in any given situation.

In broad terms, the appropriate vehicle size is influenced by:

i) The volume of traffic (the number of people traveling between the same two points at the same time).

ii) The characteristics of the road system.

iii) The type of services that passengers are prepared to pay for.

Passenger flows achieved with different vehicle sizes vary considerably. A service operated exclusively by small buses with about 10 seats each can carry up to a maximum of about 3,000 passengers per hour in a single lane in one direction.

2.3.1.2 Size and Operating

The size of a vehicle can affect its operating speed in various ways. A small vehicle, usually has better acceleration and maneuverability in traffic than a larger vehicle. Smaller size also means a smaller number of passengers boarding and alighting at each stop, so dwell times at stops will also be less.

Speed of operation has an effect on system capacity. A vehicle that can achieve a higher average speed will be able to provide more passenger-kilometers than a slower vehicle with the same capacity, although vehicle performance is obviously affected by prevailing

2.3.1.3 Size and Maintenance

Small vehicles are mass produced in greater volume than large buses, and therefore capital costs per seat or passenger-place can be significantly lower. Maintenance costs also, principally the cost of spare parts, are often lower for the same reason. Smaller vehicles are also generally easier to maintain. This makes them attractive to small private sector operators, particularly owner-drivers.

The life of a smaller vehicle is usually shorter than that of a larger vehicle, however, so depreciation costs per passenger may be relatively high. Since each bus requires a driver regardless of its size, labor costs per passenger may be higher for a small bus. But in most developing countries the difference is insignificant since wage rates are generally low. Smaller vehicles require less skill to drive, and therefore recruitment and training of drivers is easier.

2.3.2 Fleet Size

The fleet (all the vehicles owned or licensed in the bus system) should be tracked regularly by the regulatory authority. More importantly, fleet capacity should also be tracked. The effective capacity of the fleet is influenced by the availability and utilization of buses.

Shortage of transport capacity may be due to inadequate fleet size. Often, however, the number of available vehicles would be adequate if they were more effectively utilized. Inefficient operating practices, such as full-vehicle dispatching, may result in inadequate capacity even if there are surplus vehicles.

Surplus vehicles may cause severe traffic congestion in terminals and in the surrounding streets if there is insufficient parking space in the terminals. Surplus vehicles will also result in increased costs and reduced profitability, because the fixed costs of each vehicle must be spread over a smaller number of passengers than would otherwise be possible.

2.3.3 Operating Practice

Operating practices can have a significant impact on operating costs, and hence profitability, fare levels, service capacity, reliability and frequency.

Scheduling procedures are particularly significant. If bus services are operating on schedules, which are designed to ensure that service frequencies are commensurate with demand at different times, services can be operated with a minimum of excess capacity, thus maximizing revenue per kilometer.

Sophisticated scheduling techniques can maximize bus utilization, by deploying a bus on more than one route during the course of the day. In certain circumstances, particularly with routes operating at low frequencies, this can significantly reduce idle time.A major problem with a scheduled operation, however,

is the difficulty in adhering to schedules when there are frequent and significant, but unpredictable, delays caused by traffic conditions.

In many cities, buses are not operating on a schedule. They operate on the full-vehicle-dispatching principle. This means they wait at the terminal until they have a full load of passengers, and then depart. This ensures a good load factor, but results in long periods of waiting, particularly at off-peak times, and reduces capacity along the route.

Full-vehicle dispatching can increase costs by reducing the proportion of running time to idle time. It also usually reduces revenue, since there is insufficient capacity to carry all the passengers wishing to board along the route. Many of these passengers end up walking instead of using the bus.

2.3.4 Vehicle utilization Indicator

This indicator shows the extent to which vehicles are used, and must not be confused with availability. There are various measures of utilization; these include mileage or hours (kilometers per vehicle per period or operational hours/days per vehicle per period); analysis of days or hours of operation as a percentage of the total available time; or the number of vehicles operated in a day as a percentage of the number available.

The most useful indicator is the number of vehicles used for revenue-earning service at a particular time (usually peak periods) as a percentage of the number of buses which are available for service at that time (i.e. Excluding those undergoing maintenance or repair or not available for other reasons). In most city operations the morning peak is more concentrated, and therefore it is normally most useful to use this as the basis for calculation. Where there is no discernible peak, the maximum number of buses in service at any time during the day may be used. Utilization is sometimes expressed as a percentage of the total licensed or owned fleet, but this may give a false impression since a low level of utilization may be because insufficient buses are available, due for example to a large number of vehicles off the road for

repairs, and not because the operations department is unable to find profitable work for the whole fleet.

Utilization normally varies between different times of the day (i.e. Between peak and off-peak periods), different days of the week, and different times of the year. At peak times utilization of urban bus services should normally be between 95% and 100%. A small number of vehicles may be kept as spares in case of breakdown, but some operators schedule all available buses at peak periods, risking the need to cancel some journeys in the event of a breakdown. Poor utilization (as opposed to poor availability) may be due to a surplus of vehicles, inefficient scheduling, shortage of driving and/or conducting staff, or road or weather conditions which prevent the operation of any services.

A high level of utilization does not necessarily mean a high degree of efficiency or profitability. A fleet may be well utilized, but on services for which there is little demand and which consequently lose money. In addition, some buses may be used for very short periods during only one of the peaks, so that their revenue-earning capability is severely limited.

2.3.5 Vehicle Utilization

Bus utilization compares the time spent in revenue-earning service to idle time. It expresses the number of buses in service as a percentage of the buses available for service.

2.3.5.1 Aim for 100% utilization

Bus utilization should be 100% unless there are reasons to keep one or more buses on standby. Reasons to be on stand-by might include surges in demand or to cover for breakdowns. Normally, however, in the event of a breakdown of a low-frequency route, it's possible to divert a bus from a high-frequency route to cover.
Even when a bus is in service, inefficient scheduling may lead to poor utilization. A bus may spend an excessive proportion of its time idle at terminals between journeys, or operating without passengers before commencing, or after completing, a revenue-earning journey.

2.3.5.2 Beware of fixed costs

When a bus is idle, it's incurring fixed costs (depreciation, insurance, license fees, etc.), but not earning revenue to cover them. If it's operating empty between its depot and the route terminus, it's also incurring operating costs, which are not covered by revenue.

Poor utilization will result in low profitability, and may also result in inadequate service capacity unless there is an excessive number of vehicles. Ideally, bus utilization should be maximized, with each vehicle spending as much time in revenue-earning service as possible.

However, a balance must be found between utilization and load factors. There is no point in operating buses on journeys where there is insufficient demand to cover the direct costs of the journey.

2.4 Facilities related to Public Transport

2.4.1 Facilities related to the consumer

ReferringtoTarmizie(2008) states Userswanta comfortableplaceto wait forthe bus and high value of ecstatic. Apart from thatthe user wantspunctuality of the bus is of concernand bus travel from one place to another and Consumersalsowantguaranteed from the management of the bus that the bus are driven safely to user destination. The comfort providedby the service providersmust alsomeet the characteristics ofuser-friendly andnotburdensome.

2.4.2 Facilities related to services

There some service that needs to be focusedon such as that is bus lanes and bus stop.In addition,theoldbuses, frailandoften sufferdamage should bereplacedwithnewbuses(Tarmizie, 2008). So the bus should be repaired and have to maintain every time after they finish their duty.

2.5 Public Transport In Sabah (Kota Kinabalu)

In general, the system of public expatriates in Kota Kinabalu City is still at an unsatisfactory level for the use of buses old and frail and the purpose of its use has not improved. Generally, there are three main types of public transport in the city of Kota Kinabalu, Taxi, Mini Van and also Citybus:

2.5.1 Taxi

Taxi some of the main public transport in Kota Kinabalu. Its use is widespread, if a user wants to go to a place with a convenient, comfortable and fast. But the major problem is related to the taxi fare is quite expensive even at close range. But the major problem is related to the taxi fare is quite expensive even at close range.

2.5.2 Mini Bas

Public transport in the City of Kota Kinabalu mainly pioneered by Mini Bus, because most of the existing service providers to provide a mini bus can only accommodate around 12-15 people at any one time. But most of the buses in use have passed the age of 10 years and above and the path through the minibus will usually be in areas like Penampang, Tuaran, Telipok and rarely through the city of Kota Kinabalu.

2.5.3 City Bus

Citybus has been granted concessions to operate bus services in the city of Kota Kinabalu by the local municipal which is DBKK. After the advent of Citybus, all types of buses, including mini buses can no longer be through the main streets of the City. Citybus has become the preferred route mainly populated Kota Kinabalu-Sepanggar because it was cheap and new bus use.

2.6 Bus Operating Performance

Public transportation (bus) is good to have indicators that should be used as a reference for comparison to the standards set by the World Bank public transport. The bus operating performance indicators commonly used by the researchers are described below:

2.6.1 Load Factor (%)

This indicator, calculated by dividing passenger kilometers by place kilometers, shows the average load on a bus route throughout the day. The higher the load factor, the more profitable the operation, provided that fares are set high enough: if they are too low there can be significant loss even on the very full bus. The theoretical maximum of 100% is never achieved in urban services; buses are rarely full for an entire journey, and usually there are directional imbalances in demand at different times, resulting in buses operating with heavier loads in one direction than in the other.

2.6.2 Cycle Time (minutes)

Cycle time is the time difference between two (2) consecutive appearances in an observation point of the same vehicle in the same direction of movement. Cycle time will be computed at the bus terminal from the time difference between 2 consecutive departures or arrival of the same bus (Arintono et al, 2005). After doing the observation, 10% -15% of layover time is added to the travel time.

2.6.3 Number of Bus (availability, %)

This indicator shows the extent to which the vehicle fleet is available for revenue-earning work, and to a large extent reflects the effectiveness of the maintenance arrangements.

It may be expressed as a percentage of the owned or licensed fleet, which is available over a period; the two definitions are usually different since all vehicles

owned are not necessarily licensed; sometimes vehicles are classified as "owned" if they remain on the company's books, when in fact they have been delinquent for a considerable time and have been cannibalized to the extent that there is virtually nothing left. It is therefore usually more useful to base this ratio on the number of buses licensed rather than owned.

Availability may also be expressed in terms of average days available per year, but this is less usual. Because vehicles spend varying times undergoing maintenance or repair, the number available will tend to vary constantly throughout the day. The most relevant time for calculating vehicle availability is at the time of peak vehicle requirement, and it is appropriate to record the number of vehicles available at this time each day, and to calculate the average over a period, such as a week or a month.

There will rarely be 100% availability except possibly for short periods, since every vehicle requires time out of service for routine maintenance, and there will always be an element of unscheduled maintenance and accident repairs. Some operators regard vehicles as available when they are undergoing scheduled routine maintenance, but this is incorrect, since they are not available for revenue-earning service at these times. If availability is calculated on a daily basis, there may be days on which 100% is achieved: for example, on weekends or public holidays when no routine maintenance is carried out and there are no vehicles out of service for unscheduled repairs or accident damage. Some operators may achieve 100% availability during peaks if routine maintenance can be co-ordinated with operational requirements so that all maintenance is undertaken during the inter-peak periods, although this is unlikely to be achieved on a regular basis.

2.6.4 Time Headway (minutes)

Headway is a consistency or evenness of the interval between successive bus vehicles of missed trips and a number of passing-ups (Amirah, 2010). The time headway is directly computed from the service frequency, i.e if the service frequency is 4 buses per hour, then the time headway is 15 minutes (Sebayang et al, 2005). World Bank standard state that the standard for headway is around 1 to 12 minutes only, but it also needs to consider the day of the survey and the route is chosen.

2.6.5 Number of Trips (Trips/Bus/Day)

Number of trips will be determined by record of bus from the main terminal to the destination. It will be counted as 1 trip and when the bus back to the terminal from its destination, it will be trip number 2. According to Sebayang et al (2005) the purpose to know the number of trips per bus per day to calculate the number of passengers carried and the travel distance per bus per day.

2.6.6 Travel Distance (km/bus/day)

Travel distance will be counted, how long the bus will be use of the day or Kilometer of the bus move on the day. It will be record all the buses on the same road and the uses of determination of bus travel distance is to know the efficiency of the bus. According to world bank standard, the bus has high efficiency will move around 230km to 260km every day.