

Why Public Bus is a Less Attractive Mode of Transport: A Case Study of Putrajaya, Malaysia

Muhamad Nazri Borhan^{1*}, Ahmad Nazrul Hakimi Ibrahim¹,
Deprizon Syamsunur², Riza Atiq Rahmat¹

RESEARCH ARTICLE

Received 24 March 2016; accepted 11 July 2017

Abstract

This paper investigates the constraints that limit the use of public bus by people commuting to work in Putrajaya, Malaysia. Putrajaya was built to replace the city of Kuala Lumpur as the new administrative centre for the government of Malaysia. This research adopted qualitative methods which involved a total of 29 respondents who use car and/or bus to commute to their workplaces. The findings of this study show that several factors, such as reliability, safety, and customer service, play considerable roles in promoting the use of public transportation. The respondents agree that reliability (e.g. frequency, punctuality, and transfer) is an important factor in choosing a particular mode of transport. Safety is one of the major concern amongst the respondents, which need to be improved along with customer satisfaction of the public bus service. The results of this study suggest that a more reliable and accessible service is required to promote public bus as an attractive mode of transport.

Keywords

public bus, car use, service quality, qualitative research

1 Introduction

Antrop (2000) defined urbanisation as a complex process which transform rural landscapes into urban ones, forming star-shaped spatial patterns controlled by the area's physical conditions and accessibility by routes of transportation. The level of urbanisation in the world in the mid-19th century was predicted to range between 4 and 7% compared to the level of urbanisation at around A.D. 1600 and the beginning of 19th century of only 1.6% and 2.2%, respectively. Urbanisation progressed rapidly in the region of Western Europe and North America during the early industrialisation era. According to Antrop (2004), urbanisation is one of the most important factor in European civilisation. In European countries, the percentage of people living in urban area has reached approximately 80%.

As with developed countries, developing countries, such as Indonesia, Thailand, Malaysia, also experienced urbanisation. However, urbanisation in these areas progressed in a different way from that experienced by developed (western) countries. Murakami et al. (2005) highlighted that Jakarta (Indonesia) and Bangkok (Thailand) experienced similar trend of decreasing population density in the city centre, while in the same study found that Manila (Philippines) showed a different trend. During the growing era of urbanisation, accessibility and transportation infrastructure become the most important factor (Lewis and Maund, 1976).

Malaysia too goes through the urbanisation phenomena. This phenomenon has resulted in increased demand for transportation. The demand for transportation is proportional with the rapid migration of people from rural to urban areas. Most urban areas in developing Asian countries such as Malaysia are densely populated and urban transportation in these areas rely on land-based transportation such as cars and motorcycles as well as rail-based transportation, namely commuter trains, light rapid transit (LRT), mass rapid transit (MRT), etc. The expenditure (e.g. fuel and toll costs) incurred for commuting in urban areas takes as much as 5 to 15 percent of household income (Tangphaisankun et al., 2010).

Presently, most Malaysians dependent on private cars to commute from one place to another. This is evident from the fact

¹ Department of Civil and Structural Engineering,
Faculty of Engineering and Built Environment,
Universiti Kebangsaan Malaysia,
43600 Bangi, Selangor, Malaysia

² Faculty of Engineering, USCI University,
56000 Cheras, Kuala Lumpur, Malaysia

* Corresponding author, e-mail: mnazri_borhan@ukm.edu.my

that the percentage of car ownership in Malaysia is constantly increasing every year. As many as 48.5% of all the vehicles registered in Malaysia in 2013 are private cars (Road Transport Department, 2014), which is the highest amongst all types of vehicles. The increasing ownership of cars has not encouraged people to use transport as the main mode of transport. One of the most remarkable findings with regard to the use of public transport in Kuala Lumpur is that it has dropped from 35 percent in 1980 to 16 percent in 2007 (Gakenheimer and Zegras, 2004). The increase in ownership of private cars has ultimately led to traffic congestion and slow commute. Public transportation is also said to contribute to traffic congestion since the speed of traffic on major roads in Kuala Lumpur is only between 10 km/h to 35 km/h during peak hours (Mohamad and Kiggundu, 2007).

Putrajaya, the new federal administrative region of Malaysia, is located 20 km from Kuala Lumpur International Airport (KLIA) and 25 km from Kuala Lumpur City Hall. Putrajaya comprises of 20 Precincts. The city occupies an area of 4,931 hectares and has a population of 67,964 (Borhan et al., 2014). Putrajaya has contributed to the further increase in the ownership of private cars in the city centre. Putrajaya has a unique transport policy which aim to achieve 70% sharing of public transport in its core areas. The public transportations available in Putrajaya are bus, taxi, and KLIA Transit. However, the current modal split between public transport and private transport is 15:85 (Borhan et al., 2014; Nor et al., 2006). Several facilities, such as the 'park and ride' service, have not been successful in attracting commuters to use public transport. The public bus service operating in Putrajaya is not popular due to tardiness and long travel time. The Malaysian government began to shift the administrative centre of the country from Kuala Lumpur to Putrajaya on June 2, 1993. Between 1993 and 2010, a total of 25 ministries and 51 government agencies have been moved entirely to Putrajaya, creating 254,000 employment opportunities (Putrajaya Corporation, 2010). These figures indicate the expected increase in the number of cars in Putrajaya as a result of this migration of work force. With the declaration of a new government administrative centre, the price of properties in Putrajaya have also recorded a sharp increase compared to the price in surrounding regions. This has caused an imbalance in the infrastructure of the Putrajaya city centre which require residences to be built outside the city. With job opportunities being concentrated mostly in the city centre, the commuting patterns of workers have resulted in peak hour congestion on major roads and highways in both directions (in and out of the city). Furthermore, the increased participation of women in industries in response to the increasing demand in the labour market has contributed to the increase in the ownership of private cars.

There are many factors which make private cars more popular and preferred over other mode of transport, such as bus or train. Prior studies (Ellaway et al., 2003; Hiscock et al., 2002) have found that cars are able to provide door-to-door travel

service which reduce travel time and which cannot be achieved when using public transportation. Furthermore, in addition to not being able to cater for individual destinations, buses are also associated with delays and its service may not be available when needed. This has resulted in lack of trust in public transport and discouraged people from using them (Nutley and Thomas, 1995). On the other hand, private cars could meet commuters' demand in terms of travelling as well as providing ample space for baggage; they are also child-friendly. Cars provide safety and privacy to the driver and passenger(s). Having control over their travel gives additional satisfaction to the drivers (Cameron et al., 2004). These factors have ultimately discouraged people from using public transport, especially when it comes to daily commute. Therefore, efforts need to be made to implement measures which reduce the attraction of using private cars (Garling and Schuitema, 2007).

This study presents the findings of a qualitative study involving the opinions of both public transport and private car users in Putrajaya. The research questions addressed in this study are: Why is public transportation not a very popular mode of transport amongst employees? How do employees rate the level of public transport services? To answer these questions, an in-depth interview was conducted with employees who work at the Malaysian government administrative centre of Putrajaya.

The paper begins with a brief discussion of the research methodology adopted in this study, including the respondents and the data collections process. The next section presents the results of the study, followed by discussion in Section 4. The limitations of the study is discussed in Section 5. A conclusion with overall summary of the findings is presented in Section 6.

2 Methodology

Qualitative research refers to an approach which explore human experience, perception, motivation, and behavior (Parahoo, 2006). Quantitative method may present information in numerical form, which involve a variety of statistical methods. There are many options for collection and analysis of data in a qualitative study, such as semi-structured and in-depth interviews; focus groups or group interviews; observational methods; video and audio recording; participative or action research; and documentary analyses, including analysis of visual materials. In addition, a qualitative study investigates the answers to the questions of 'what', 'how' or 'why' which surround a phenomenon rather than the question of 'how many' or 'how much' (Green & Thorogood, 2004). Many qualitative studies aim to understand social situations from the perspective of the people receiving services or the service providers (Britten, 2011). One of the advantages of qualitative research is that it requires smaller sample sizes compared to quantitative research (Patton, 1990). Moreover, qualitative research allows respondents to express their own opinions and experiences regarding the phenomenon being studied, in their own words (Beirao and Cabral, 2007).

Many quantitative methods are used to investigate travel behaviour, such as logistic function to predict the probability of switching from using private vehicles to using public transport through the development of policies. Another form of quantitative study uses structural equation model to predict the use of public transport by creating several forecasters to explain travel behaviour. However, qualitative research is also needed along with quantitative research to explain travel behaviour (Beirao and Cabral, 2007). Quantitative approaches have the advantage of measuring the reactions of many subjects to a limited set of questions, thus allowing the comparison and statistical aggregation of the data. On the other hand, qualitative methods yield a wealth of data on a small number of individuals (Patton, 1990). While qualitative methods offer a great potential for transportation research, they should not be seen as a replacement to quantitative methods; rather it is an extension to help explain the psychological and social factors which influence travel behaviour (Clifton and Handy, 2003).

2.1 Respondent

A total of 29 respondents, 10 male and 19 female, between the age of 21 and 51 years old were selected for the interview (Table 2). All respondents work at the Ministries or government departments and agencies in Putrajaya. Based on their mode of transport, three groups were defined a priori:

- Public transport users: regular users of public transport to commute to work (11 participants).
- Car users: private car users for commuting to work (14 participants).
- Both: private car and occasional public transport users (4 participants).

Table 1 Age range and mode of transport used by respondents.

Age group	Public transport user		Car user		Both		Total
	Male	Female	Male	Female	Male	Female	
20-29	1	6	2	3	1	1	14
30-39	1	3	3	3		1	11
40-49			1			1	2
50-59			1	1			2
Total	2	9	7	7	1	3	29

2.2 Data Collections

The interviews were semi-structured and took an average of 30 minutes to be conducted based on a predefined interview guide. The process and factors influencing the most regular choice of transport are considered in this study. The interviews explored the respondents' attitudes towards a particular mode of transport, as well as how they were attracted to use public transport. The participants' overall perception of public bus service and their evaluation of the different modes of transport

were taken into account. The interviews addressed the use of the bus and private car in particular since they are the two major choices of transport.

3 Results

The results obtained in this study consist of responses from respondents who use public transport or private cars or both to commute to their workplaces in Putrajaya. The results show that several factors should be taken into account to promote the use of public transport, such as increasing the frequency of bus service, decreasing the travel time of buses, providing sufficient information such as bus routes and schedule, safety, and also offering other alternatives such as light rail.

3.1 Travel Time

The long travel time of public buses discouraged the respondents from using public transport. This long travel time causes stress which encouraged the users to switch to using private cars to reduce the extra stress in commuting. A former 24-year old female bus user who switched to driving her own car, explained:

"I feel exhausted when I have to take the bus because there are too many stops and I often spend almost an hour on the bus when returning from work. With a tired body (after work), spending an hour on the bus is very nauseating".

"However, public transportation such as the bus is still useful as an alternative mode, but it needs improvement in reducing the length of travel time that can reduce the passengers' time to get to work".

(Female car user who used to take public bus, 34 years old)

On the other hand, public transport users are those with lower income who often cannot afford to own a car. However, they earnestly hope that bus operators will reduce the travel time of the buses:

"I have no car. I take the bus every day. I hope the bus operators will reduce the bus travel time which takes more than 45 minutes to reach the destination".

(Male bus user, 26 years old)

3.2 Frequency and Punctuality of Buses

Frequency and punctuality are very important factors which influence a user's decision whether or not to use public transport. Bus providers usually set the frequency of buses based on passenger demand. The frequency of a bus is proportional to the demand for the bus. Almost 80% of the car users decided to drive to work because the bus service is not as frequent as needed. Many claimed that they had to wait for the bus for quite a long period.

“Need to provide more buses to each route or make it more frequent to every 10 minutes”.

(Female car user, occasional public transport user, 29 year old)

“Public transport will be better if the bus frequents every 15 minutes”.

(Female car user, 29 years old)

Car users are more concerned with the punctuality of public transport than public transport users. At the time of the study, there were four buses operating in Putrajaya during peak hours (morning and evening). Many car users asserted that they did not take the bus because the service is not available at the time that they needed it and they might be late for work because of this.

“With the car, I can go to work without having to walk to the bus stop and there is no need to wait for the bus”.

(Male car user, 25 years old)

“I had an intention to travel to work by bus. But when I heard complaints from many of my friends about the bus not being on time and the travel time is also usually quite long, I’m quite worried to take the bus, it’s better to drive car to work”.

(Female car user, 32 years old)

“Public transport must be punctual so a user does not have to wait too long and they are late to work as a result”.

(Female car user, 23 years old)

Public transport users are also not satisfied with the arrival time of the buses.

“The bus arrival time should be systematic and frequent so that passengers never have to wait too long to board a bus”.

(Female bus user, 24 years old)

“I hope that the public transport will be more punctual to follow the schedule. I had to wait up to an hour for the bus. The long wait for the bus will waste my time”.

(Female bus user, 28 years old)

3.3 Cost

The general notion is that public transport service is cheaper than owning private cars. All respondents generally agree that public transport will reduce their travel cost. This indicates that although bus travel is economical, it is not significant enough to encourage private car drivers to switch to public transport.

“I know by taking the bus I only need to pay as much as MYR 0.50 (USD 0.15) per trip, but I’m more comfortable driving to work”.

(Female car user, 35 years old)

“Driving car to work is quite expensive and I should spend around MYR 50 (USD 15) for fuel every week”.

(Male car user, 41 years old)

“I agree! Using the bus is cheaper than using the car”.

(Male car user, 32 years old)

However, financially, those who had just begun working may not be able to afford owning a car and therefore consider public transport as an important means of commuting. None of the public transport users complain about the cost of their trip.

“As a person who is just starting a career, using the bus to work certainly saves my budget because I only spend as much as MYR 5 (USD 1.50) to pay for bus fare every week”.

(Female bus user, 21 years old)

3.4 Accessibility to Public Transport

The level of accessibility to transport services is a key factor in planning the facilities for public transport. “Transit accessibility” refers to users’ ability to access transit facilities such as bus stops or train stations. Transit accessibility is influenced by factors such as pedestrian path, bicycle lane, bus-stop condition, and access by people with disability. With regard to accessibility to public transport, bus users show a higher level of concern than car users.

“Bus stops should be provided at both sides of the road”.

(Female bus user, 24 years old)

“Need to provide more bus stops for the convenience of users. If there is no bus stop, where do we wait for the bus?”.

(Male bus user, 26 years old)

3.5 Information

The availability of crucial information, such as bus route and schedule, is important to attract people to use public transport. Several respondents, especially private car users, stressed the importance of bus route and schedule.

“They need to provide bus schedules and routes to facilitate users’ reference. I think it is definitely confusing for the first-time bus user if here is no information available at the bus stop or in the bus”.

(Female car user, 24 years old)

“I’m actually not sure whether the information is provided at the bus stop or in the bus. But it is important for bus operators to provide sufficient information”.

(Male car user, 41 years old)

Some of the respondents who use public transport need online information to manage their travel plan. Respondents complained that they were not updated about change in route, which eventually resulted in a longer travel time.

“There is information at the bus stop as about the bus number, bus routes and bus arrival times. But no information is provided online. Online information will make the travel plan easier for the users”

(Female bus user, 28 years old)

“Bus information is available. But sometimes bus travelling en route is not found in the routing schedule. Very confusing”.

(Male bus user, 26 years old)

3.6 Transfer

As a feeder for the rail service, public bus service plays an important role in ensuring a seamless transfer from one mode of transport to another, thus ensuring an effective public transport system. Users may stop using public transport if they have to wait a long time for the bus-to-train or train-to-bus transfer. Respondents also complained that, when there are no passengers, bus drivers would drive pass by an interchange station without stopping. Public transport users were more concerned than private car users about the transfer service provided by bus operators.

“Each bus must stop at an interchange station for at least one minute to wait for passengers and should not pass by when there are no passengers. It is possible that the passenger could be walking to the bus stop to get the bus at that time”.

(Male bus user, 31 years old)

“The bus at the interchange station should be departing after the train arrives. When I arrived at the interchange station, the bus just departed. So I have to wait for the next bus. This wastes my time”.

(Female bus user, 28 years old)

One former bus user switched to using her car because of the delays she experienced when using public bus.

“Reduce the number of bus exchange to the destination because it will waste a lot of time”.

(Female car user, 34 years old)

3.7 Hours of Service

Hours of service is one of the key factors in promoting public transport. Several respondents, specifically those who use public transport, expressed their dissatisfaction with the hours of service in the evening and on weekends. The lack of service during off-peak hours causes inconvenience to those who have to work overtime.

“Public bus services are quite satisfactory at peak hours (morning and evening) but very poor in the late evening. The bus frequency does not follow the schedule (every 30 minutes) and bus travel does not follow the route in the routing schedule. I have had the experience waiting for the bus over an hour after 6 p.m.”.

(Female bus user, 32 years old)

“On the weekend, the public transport service is not satisfactory and it is troubling for me to do overtime job”.

(Female bus user, 50 years old)

Most private car users are of the opinion that bus service must be provided until late night to facilitate the commute of the public.

“Either after office hours or on the weekend, the bus service should be on schedule”.

(Male car user, 43 years old)

One former bus user echoed a similar opinion with public transport users in terms of hours of service.

“Before using the car, I used the public transport but many problems arise whenever I had to do overtime jobs, especially on weekends. I wasted my time and energy just to wait for the bus”.

(Female car user, 34 years old)

3.8 Safety and Customer Service

Safety is an important factor when choosing a mode of transportation. Several respondents, especially female respondents, are more concerned about their safety when using public transport. One woman reported that on one occasion the bus driver violated traffic rules.

“The bus drivers should be trained well and they should be exposed to the traffic regulations. It is common to see the bus drivers driving quite dangerously over the speed limit”.

(Female bus user, 29 years old)

“The bus driver drives very fast without considering the safety of passengers on board. They also violate traffic signs”.

(Female car user and occasional bus user, 34 years old)

“When I was driving a car to work, a bus had overtaken me. I think I was driving around 60 to 70km/h at that time. The bus was being driven quite fast”.

(Male car user, 27 years old)

Negative incidents, such as tardy service, lack of or incorrect information on bus/train routes and schedule, could mar the reputation of public transport. Unprofessional employees could mean poor quality service.

“Bus transportation in Putrajaya is satisfactory. But some drivers were irreverent and not friendly. Every service provided has its own client charter, so why not practise it?”

(Female bus user, 25 years old)

“I would feel comfortable if the driver can respect me as a bus passenger and follow the traffic rules while driving”.

(Female bus user, 31 years old)

3.9 Reasons for Not Using Public Transport

Private car users and occasional public transport users were asked about the reasons why they are reluctant to use public transport.

“I’m more comfortable driving a car... I do not have to wait for the bus and the bus is also too crowded”.

(Male car user, 27 years old)

“If I take the bus I do not know when I’ll arrive at the office. The bus tends to stop so many times”.

(Female car user, 34 years old)

“I need to take my son to and from the school. School bus facility is not provided. Therefore, it is impossible for me to go to work using the public transportation”.

(Female car user, 32 years old)

“I cannot use the public transport because I need to carry a lot of goods for my part time job. If I had to use the public transportation to bring these items; it is quite difficult”.

(Male car user, 27 years old)

“I prefer to use the car because of the weather factor”.

(Male car user, 50 years old)

4 Discussion

This study describes the perceptions of both public and private transportation users in Putrajaya, Malaysia in the effort to improve public transport service and ridership. There are several factors which clearly encourage people to choose public bus. Firstly, respondents perceived travel time and reliability (e.g. frequency, punctuality, and transfer) as crucial factors when choosing a particular mode of transport. Prior studies (Beirao and Cabral, 2007; Cools et al., 2009; Santoso et al., 2012) found that travel time and reliability play a key role in determining the choice for mode of transport. This study found that some respondents switched to using private cars due to the stressful experience with regard to travel time when using public bus. This indicates that the issues with travel time when using public bus has led people to switch to using private cars. Therefore, it is imperative for bus operators to take measures to reduce travel time which will save users from undue delay

and stress. Reducing travel time for buses by up to fifty percent may increase the number of passengers by up to fifteen percent (Currie and Wallis, 2008).

Furthermore, the time factor is also influenced by the frequency of buses arriving at bus stops. According to Currie and Loader (2009), the characteristics of a typical network of a successful trip when using public transport include high frequency (where the service is provided at a frequency of less than 10 minutes for each bus) and stable routes with fixed stops. A bus frequency of between 10 to 15 minutes could reduce users’ stress because it prevents undue delay in their journey (Balcombe, 2004). This shows that by increasing the frequency of buses, bus operators may be able to meet consumers’ demand, which is a key factor. In addition, buses should adhere to the schedule set to ensure punctuality. Users may not have much to complain about when buses arrive on time. However, the uncertainty in bus schedule creates more troublesome issues (Konig, 2002). Most respondents who use private cars were bothered by the delays due to the erratic bus schedule which caused them to be late for work.

Apart from this, the smoothness and effectiveness in the transfer between public buses and trains are two of the most important factors impacting the quality of public transport. Some respondents stressed that buses at interchange stations should depart several minutes after the arrival of the trains at the stations. This is to ensure seamless and quick transfer of passengers from buses to trains or vice versa. Buses often do not stop at train stations when the drivers do not see any passengers at the bus stop, and because of these passengers who are still walking to the bus stop might miss the bus. According Santoso et al. (2012), the average ideal transfer time proposed by working commuters or students was eight minutes, while for non-working commuters it is nine minutes. In the same study, Santoso et al. pointed out that parents with small children and senior citizens need longer transfer time compared to other commuters. Hence it is necessary to have different transfer times for different groups of commuters. The findings of other studies (e.g. Anable, 2005; Cools et al., 2009; dell’Olio et al., 2011) support this approach. Therefore, bus operators should set sufficient transfer time at the interchange station/stop for each bus.

In terms of cost, most respondents, especially private car users, acknowledged that taking public transport is cheaper than commuting by car. This finding is consistent with the findings of a previous research (Beirao and Cabral, 2007).

The second important factor in the effort to encourage the use of public transport is providing sufficient information about bus routes and schedules. Lack of information on public transport may confuse and frustrate people and it may eventually dissuade them from using public transport. In addition, the information provided must be accurate and clear to avoid confusion. Some bus users expressed their confusion regarding a bus trip that apparently did not follow the route stated in the schedule. One car user mentioned her confusion when

boarding a bus because there was no information available at the bus stop or on the bus. Many researchers (Chorus et al. 2013; Földes and Csiszár 2015) highlighted that the availability of information on public transport (e.g. router planner application based on real time data) could influence the decision regarding which mode of transport to use because, according to Csiszar (2013), user's personal preference is an important factor in the determining the mode of transport. Several studies were conducted recently to assess the decisions made on mode of transport based on the available transportation information. Chorus et al. (2013) investigated the changes in user's choice based on partial and incrementally more complete information. Assessed the effect of some demand management tools on the choice of travel mode. Meanwhile, online information can help users plan and manage their bus trips without spending a lot of time waiting for the bus. Furthermore, live features such as real time bus arrival display can reduce commuter's uncertainty regarding time of arrival and hence increase customer satisfaction. Real-time bus arrival display at the station help to inform commuters of the expected arrival time of the next bus (Dziekán and Kottenhoff, 2007).

Thirdly, the decision to choose public bus for commuting to work is also influenced by the level of accessibility to bus stop/station (Zhao et al., 2003). Easy access to bus stops and personal safety on the route from home to bus stops and vice versa are key issues in ensuring good public transport planning (Hess et al., 2004). It is crucial to ensure that safe and comfortable bus stops and pedestrian walkways are available for the public when they use public transport. Some bus users complained that they had to cross a busy road to get to the bus stop. This is a limitation in the provision bus service, hence the authority should provide adequate facilities such as bus stops and pedestrian walkways to encourage people to use public transport. Fourth, some respondents reported that they faced difficulties due to the lack of bus service in late evenings and on weekends. Hence extending the hours of service of public bus can attract more commuters during these periods. There need to be a reasonable trade-off between bus operators and bus users in terms of the number of buses operating during weekends. Bus frequency can be reduced from four buses per hour for weekdays to three or two buses per hour on weekends, depending on the demand.

Fifth, safety is an important factor in choosing a mode transport. Chen and Gursoy (2001) reported that satisfaction and reliability are affected by two behavioural attitudes, namely perception of safety and comfort during a journey. The interview reveals that many respondents, especially women, were concerned about reckless driving and violation of traffic rules, which give an impression that the safety of passengers are being compromised. In addition, women consider security feature as the main criterion in choosing public transportation (Nurdden et al., 2007). A good customer service provided by an employee

or a bus driver can evoke a good perception about public transportation in general and buses in particular. A number of respondents complained about the attitude of the bus drivers who failed to show regard for users and treat passengers with respect. Overall satisfaction of bus users is directly affected by the negative experience they have when using public transport, such as delay or bad treatment from employees of the bus provider (Friman, 2004; Friman et al., 1998). Therefore, bus operators must seek to enhance customer service in the effort to further enhance customer satisfaction.

Car users cited a number of reasons which discourage them from using bus to commute to work. Some respondents use private cars to drive their children to and from the school due to the lack of school bus services in the residential areas. Other respondents are concern about comfort when the bus is crowded, erratic bus schedule, and long travel time due to frequent stops. All these reasons make using private car a more comfortable and attractive option. Respondents also cited the benefits of private cars over public bus in terms of uncertain whether condition and ease of transporting heavy goods.

The findings of this study are important in the effort to improve public transport services with the objective of attracting more private vehicle users to switch to using public transport. This study is also important in assessing the effectiveness of the policies and measures taken by the government to provide quality public transportation. The findings of this study show that policy makers and transport operators should work together to deal with the limitations of the public transport system in Malaysia.

5 Limitations

While the present study provides useful strategy in choosing a mode of transportation, there are some limitations that should be taken into account. First, this study only used in-depth interview. There are several methods in qualitative study besides in-depth interview method, namely focus group and observation. Future research need to use these methods (triangulation technique) to enhance the credibility and trustworthiness of their results. The second limitation is lack of knowledge of participant's personal background (e.g. job, income, gender, age, required frequency, travel time, and choice for mode of transport) to predict the mode of travel. However, it would be interesting for future studies to investigate the influence of user's characteristics and need in making decisions on mode of transport. Seven factors were assessed in this study, namely travel time, frequency and punctuality, cost, accessibility by the public, information, transfer, hours of service, and safety and customer service. Another limitation of this study is that it did not take into consideration parking condition which might influence the decision on mode of transport. Hence, an assessment of how parking condition impact the decision on the mode of travel is also recommend for future research.

6 Conclusion

The main contribution of this study is in determining the key factors which influence the decision on the mode of transport and in promoting public transportation. The main factors taken into consideration are reliability, safety, and customer service. The results of this study served as a basis for the development of a model to structure the process of choosing a mode of public transportation in Putrajaya. The key findings of this study is that in order to encourage people to commute to and from work by using public bus, a more reliable and accessible service need to be provided. Doing so will enhance customer safety and satisfaction as well as attract potential users.

Furthermore, the choice for mode of transport is profoundly influenced by the availability of information on public transport. Respondents are of the opinion that further improvements need to be made in the public bus service provided, while at the same time providing other alternative mode of transport (such as rail-based transport) to reduce dependency on private cars. Thus, in conclusion, providing more information regarding public transport system and improving its image is one of the key factors in attracting potential users.

Acknowledgement

The project presented in this article is supported by UKM under the Projects GGPM-2014-062 and GUP-2016-019.

References

- Anable, J. (2005). Complacent car addicts or aspiring environmentalists? Identifying travel behavior segments using attitude theory. *Transport Policy*. 12(1), pp. 65–78.
<https://doi.org/10.1016/j.tranpol.2004.11.004>
- Antrop, M. (2000). Changing patterns in the urbanized countryside of Western Europe. *Landscape Ecology*. 15, pp. 257–270.
<https://doi.org/10.1023/A:1008151109252>
- Antrop, M. (2004). Landscape change and the urbanization process in Europe. *Landscape and Urban Planning*. 67, pp. 9–26.
[https://doi.org/10.1016/S0169-2046\(03\)00026-4](https://doi.org/10.1016/S0169-2046(03)00026-4)
- Balcombe, R. (2004). *The demand for public transport: A practical guide*. TRL Report 593. Transport Research Laboratory, Crowthorne.
- Beirao, G., Cabral, J. A. S. (2007). Understanding attitudes towards public transport and private car: A qualitative study. *Transport Policy*. 14, pp. 478–489.
<https://doi.org/10.1016/j.tranpol.2007.04.009>
- Borhan, M. N., Syamsunur, D., Akhir, N. M., Yazid, M. R. M., Ismail, A., Rahmat, R. A. (2014). Predicting the use of public transportation: A case study from Putrajaya, Malaysia. *The Scientific World Journal*. 2014(2014), Article ID 784145, 9 pages.
<https://doi.org/10.1155/2014/784145>
- Britten, N. (2011). Qualitative research on health communication: What can it contribute? *Patient Education and Counseling*. 82, pp. 384–388.
<https://doi.org/10.1016/j.pec.2010.12.021>
- Cameron, I., Lyons, T. J., Kenworthy, J. R. (2004). Trends in vehicle kilometres of travel in world cities, 1960–1990: underlying drivers and policy responses. *Transport Policy*. 11, pp. 287–298.
<https://doi.org/10.1016/j.tranpol.2004.01.002>
- Chen, J., Gursoy, D. (2001). An investigation of tourists' destination loyalty and preferences. *International Journal of Contemporary Hospitality Management*. 13(2), pp. 79–85.
<https://doi.org/10.1108/09596110110381870>
- Chorus, C. G., Walker, J. L., Ben-Akiva, M. (2013). A joint model of travel information acquisition and response to received messages. *Transportation Research Part C: Emerging Technologies*. 26, pp. 61–77.
<https://doi.org/10.1016/j.trc.2012.07.002>
- Clifton, K. J., Handy, S. L. (2003). Qualitative methods in travel behaviour research. In: Stopher, P., Jones, P. (ed.), *Transport Survey Quality and Innovation*. Pergamon, New York.
- Cools, M., Moons, E., Janssens, B., Wets, G. (2009). Shifting towards environment-friendly modes: travellers using Q-methodology. *Transportation*. 36, pp. 437–453.
<https://doi.org/10.1007/s11116-009-9206-z>
- Csiszár, C. (2013). Model of multimodal mobility coordination and guiding system, *International Journal of Engineering and Innovative Technology*. 3(6), pp. 125–132.
- Currie, G., Loader, C. (2009). Exploring bus transfer behaviour in Metropolitan Melbourne. *Proceedings of the 32nd Australasian Transport Research Forum*. [Online]. Available from: http://atrf.info/papers/2009/2009_Currie Loader.pdf [Accessed: 14th April 2015]
- Currie, G., Wallis, I. (2008). Effect ways to grow urban bus markets—a synthesis of evidence. *Journal of Transport Geography*. 16, pp. 419–429.
<https://doi.org/10.1016/j.jtrangeo.2008.04.007>
- dell'Olio, L., Ibeas, A., Cecin, P. (2011). The quality of service desired by public transport users. *Transport Policy*. 18(1), pp. 217–227.
<https://doi.org/10.1016/j.tranpol.2010.08.005>
- Dziewan, K., Kottenhoff, K. (2007). Dynamic at-stop real-time information displays for public transport: effects on customers. *Transportation Research Part A*. 41, pp. 489–501.
<https://doi.org/10.1016/j.tra.2006.11.006>
- Ellaway, A., Macintyre, S., Hiscock, R., Kearns, A. (2003). In the driving seat: psychosocial benefits from private motor vehicle transport compared to public transport. *Transportation Research Part F*. 6, pp. 217–231.
[https://doi.org/10.1016/S1369-8478\(03\)00027-5](https://doi.org/10.1016/S1369-8478(03)00027-5)
- Földes, D., Csiszár, C. (2015). Route plan evaluation method for personalised passenger information service. *Transport*. 30(3), pp. 273–285.
<https://doi.org/10.3846/16484142.2015.1086889>
- Friman, M. (2004). The structure of affective reactions to critical incidents. *Journal of Economic Psychology*. 25, pp. 331–353.
[https://doi.org/10.1016/S0167-4870\(03\)00012-6](https://doi.org/10.1016/S0167-4870(03)00012-6)
- Friman, M., Edvardsson, E., Gärling, T. (1998). Perceived quality of public transport service: inference from complaints and negative critical incidents. *Journal of Public Transportation*. 2, pp. 69–91.
- Gakenheimer, R., Zegras, C. (2004). Drivers of travel demand in cities of the developing world: A synthesis of eight case studies. Geneva, Switzerland: World Business Council for Sustainable Development (WBCSD). [Online]. Available from: <http://www.wbcsd.org/web/publications/mobility/mobility-appendix.pdf> [Accessed: 13th July 2014]
- Garling, T., Schuitema, G. (2007). Travel demand management targeting reduced private car use: effectiveness, public acceptability and political feasibility. *Journal of Social Issues*. 63(1), pp. 139–153.
<https://doi.org/10.1111/j.1540-4560.2007.00500.x>
- Green, J., Thorogood, N. (2004). *Qualitative methods for health research (Introducing qualitative methods series)*. Sage Publications, London.
- Hess, P., Vernez-Moudon, A., Matlick, J. (2004). Pedestrian safety in transit corridors. *Journal of Public Transportation*. 7(2), pp. 73–93.
<https://doi.org/10.5038/2375-0901.7.2.5>

- Hiscock, R., Macintyre, S., Kearns, A., Ellaway, A. (2002). Means of transport and ontological security: Do cars provide psycho-social benefits to their users? *Transportation Research Part D*. 7, pp. 119–135.
[https://doi.org/10.1016/S1361-9209\(01\)00015-3](https://doi.org/10.1016/S1361-9209(01)00015-3)
- Konig, A. (2002). The reliability of the transportation system and its influence on the choice behaviour. *Proceeding of the Swiss Transport Research Conference*. [Online]. Available from: <http://www.strc.ch/conferences/2002/koenig.pdf> [Accessed: 14th January 2015]
- Lewis, G. J., Maund, D. J. (1976). The urbanization of the countryside: a framework for analysis. *Geografiska Annaler*. 58B, pp. 17–27.
<https://doi.org/10.2307/490775>
- Mohamad, J., Kiggundu, A. T. (2007). The rise of the private car in Kuala Lumpur, Malaysia: Assessing the policy options. *IATSS Research*. 31(1), pp. 69-77. [Online]. Available from: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.182.583&rep=rep1&type=pdf> [Accessed: 14th November 2014]
- Murakami, A., Medrial Zain, A., Takeuchi, K., Tsunekawa, A., Yokota, S. (2005). Trends in urbanization and patterns of land use in the Asian mega cities Jakarta, Bangkok, and Metro Manila. *Landscape and Urban Planning*. 70(3-4 SPEC. ISS.), pp. 251–259.
<https://doi.org/10.1016/j.landurbplan.2003.10.021>
- Nor, N. G. M., Nor, A. R. M., Abdullah, A. Z. (2006). Predicting the impact of demand- and supply-side measures on bus ridership in Putrajaya, Malaysia. *Journal of Public Transportation*. 9(5), pp. 57–70.
<https://doi.org/10.5038/2375-0901.9.5.4>
- Nurdden, A., Rahmat, R. A. O. K., Ismail, A. (2007). Effect of transportation policies on modal shift from private car to public transport in Malaysia. *Journal of Applied Sciences*. 7(7), pp. 1014–1018.
<https://doi.org/10.3923/jas.2007.1013.1018>
- Nutley, S., Thomas, C. (1995). Spatial mobility and social-change – the mobile and the immobile. *Sociologia Ruralis*. 35(1), pp. 24–39.
<https://doi.org/10.1111/j.1467-9523.1995.tb00824.x>
- Parahoo, K. (2006). *Nursing research: Principles, process and issues*. Palgrave Macmillan, Basingstoke.
- Patton, M. Q. (1990). *Qualitative evaluation and research methods*. Sage Publications, Newbury Park, CA
- Putrajaya Corporation (2010). Background of Putrajaya. [Online]. Available from: <http://www.ppj.gov.my> [Accessed: 25th June 2015]
- Road Transport Department Malaysia (2014). Driver and Vehicle Statistic. [Online]. Available from: <http://portal.jpj.gov.my/en/statistics> [Accessed: 30th September 2015]
- Santoso, D. S., Yajima, M., Sakamoto, K., Kubota, H. (2012). Opportunities and strategies for increasing bus ridership in rural Japan: A case study of Hidaka City. *Transport Policy*. 24, pp. 320–329.
<https://doi.org/10.1016/j.tranpol.2012.09.005>
- Tangphaisankun, A., Nakamura, F., Okamura, T. (2010). Influences of para-transit as a feeder of mass transit system in developing countries based a commuter satisfaction. *Journal of the Eastern Asia Society for Transportation Studies*. 8, pp. 1341-1356.
- Zhao, F., Chow, L. F., Li, M. T., Ubaka, I., Gan, A. (2003). Forecasting transit walk accessibility: Regression model alternative to buffer method. *Transportation Research Record*. 1835, pp. 34–41.
<https://doi.org/10.3141/1835-05>