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Bus Operation, Quality Service and The Role of Bus Provider and Driver

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Abstract

This paper outlined the important role played by public transport to meet the demand of business and social life. The paper reviewed the type of bus services, quality of service in the bus operation that influences the passenger decision and also the role of bus provider and bus driver. An improved understanding of the bus operation is important for a well managed bus services. Maintaining a high standard of quality in service and performance is of paramount importance to encourage people to make public transport their preferred choice.

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1. Introduction

Across the world, public bus operation play important role to provide transport for commuting passengers. Bus services are provided by different bus agencies with their own specific aims. For instance, in Hampshire, UK, it was reported that 70% of public buses are operated and run by private commercial companies while 30% are funded wholly or partly by the Hampshire County Council or by local district [1]. The commercial bus companies need to make a profit from the bus service. However, the funded bus service may not necessarily be commercially viable but they fulfill a social need of the community.

In some cases, the buses are operated under the management of multiple agencies. One such example is bus services for student and staff (known as Universiti Bus Link or Uni-Link) that are offered by the University of Southampton (UoS) with BlueStar partnership services. Uni-Link is operated by BlueStar bus company. The bus route connects the airport, University campus, General Hospital, railway station and the city centre of Southampton. Uni-Link provide service not only for UoS student and staff but also for the public.

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In Malaysia, most public bus services are managed fully by private companies. However, to ensure the viability of the services, the Government supports the bus companies by providing bus terminal facilities and also subsidy towards the diesel.

2. Bus Operation Services

Bus operation service depends on various factors such as population, culture, environment and economics. In London (UK), buses are by far the most used mode of public transport due to its flexibility, high availability and the accessibility. However, in Kuala Lumpur, Malaysia, public bus service is normally preferred due to its cheaper cost and the better coverage of areas compared to other types of public transport such as trains and air travel.

Types and features of bus operation services are designed according to local needs. With special purpose built technology appropriate to the local climate or passenger needs, such as air conditioning in Asia, or cycle carrier mounts in United Kingdom buses, various types of bus operation service target and become appealing to specific user groups. Some of the examples with its availability across various countries are listed below:

- Bus rapid transit (BRT) – Australia [2], U.S. [3],
- Express bus service - Japan [4], Thailand [5], Australia [6]
- Shuttle bus service – Canada [7], New Zealand [8]
- Internal and private bus service – Malaysia [9], U.S. [10]
- Tour bus service – Indonesia [11], Hong Kong [12]
- School bus service – Greece [13], Russia [14]

2.1 Bus rapid Transit (BRT) Service

BRT is an innovative and flexible bus transit system that is widely used in city areas. The BRT connects passenger travel journey with other types of public transit such as train or tram. It is a fast, efficient, safe, cheap and user friendly bus compared to traditional bus systems. The use of BRT with integrated system and specialised vehicle on dedicated bus lanes can significantly improve city mobility.

BRT was first implemented in Curitiba, Brazil in 1974. It has now become a global application in the twenty-first century. In Europe, BRT is widely used to provide higher quality and performance of transport with effective cost. However, in some Asian countries like Malaysia, the use of BRT system is considered new and growing. Malaysian government established National Key Results Area (NKRA) initiatives to encourage BRT. The NKRA project is aimed to [15]:

- Improve morning peak traffic in Klang valley areas by increasing the modal share and improving public transport in Johor Bahru and Penang by providing a good quality of public transportation system and planning.
- Improve reliability and journey times
- Enhance comfort and convenience
- Improve accessibility and connectivity

Malaysia Land Public Transport Commission participated in Malaysia BRT project and is responsible to [15]:

- Implement a five bus expressway transit service and study bus lanes and BRT network
- Refurbish 634 bus stops and build 306 new covered bus stops
- Integrate “Smart ticketing system”
- Improve bus networks
- Establish performance standards for bus operators

The early achievement of NKRA projects are [15]:

- Around 2.21 million more commuters have taken the LRT in the first 11 months of 2010 than the same period of the previous year.
- Reduced the journey time by about around 30 minutes along the four Bus Expressway Transit routes in the Klang Valley with increased number of riders in all routes
- Integrated Transport Terminal (ITT) in Bandar Tasik Selatan was completed at the end of 2010 and diverts approximately 500 to 600 express buses from the city centre. The ITT will also act as a key transportation hub as it is served by buses, the Light Rail Transit (LRT), Keretapi Tanah Melayu (KTM) Komuter, Express Rail Link and taxis

The implementation of BRT system is complex [16], and require higher costs to provide basic facilities such as running ways, stations and the systems. However, when it operates it can give various advantages to the user through the improvement of bus facilities, bus performance and service.

2.2 Express Bus Service

Express bus service operation is different from BRT service. The services are intended to run faster than normal bus service and is extensively used for long journeys which use the fastest route to reach destination. Express bus services, typically serve trip patterns that have common origins and destinations and in not making as many stops as normal bus services to maintain high travel speeds and level of service. The bus service only stops at dedicated areas. Compared to rail travel for long journey, travel by express bus is much cheaper and provide links not offered by rail networks.

Report by International Road Transport Union [17] indicated that within 1995 and 2002, buses and coaches (express bus) are the second favoured mode of transport in Europe after passenger vehicles. Specifically, in several countries in Europe, express buses are operated on a commercial basis [18]. In Malaysia, express buses are operated by private companies such as *Sani Express*, *Transnasional Express*, and *KKKL express* on a basis of schedule and unscheduled services. Express buses services are popular for personal reasons, holiday travel during big celebration holidays such as Eid and Chinese New Year [19]. Other than that, Malaysian express bus services are also used for business and working purposes. The operation service of express buses in Malaysia is available 24 hours. Some of the bus services, especially for long distance travel the services are operated during wee hours [19].

2.3 Shuttle Bus Service

Shuttle bus service is a service that uses small buses or vans for public mobility. It is used for shorter trips along busy corridors. In Singapore, shuttle bus services are introduced to support the road pricing scheme known as *Area Licensing Scheme (ALS)* [20]. Singaporean government initiated shuttle bus service to encourage public bus commuting in Singapore city areas. Besides that, various cities in different countries such as Hong Kong, Buenos Aires, Calcutta (India), Manila (Filipina), Istanbul (Turkey) and Cairo [21] use a mini bus operation service as city shuttle services. The introduction of minibus services is to cater for short distance with higher frequency service. In Malaysia minibus is the most popular public transport for inter-city travel in Kuala Lumpur and Klang Valey since it was introduced in 1975. With cheaper fares of RM0.60 (£0.12) in 1993, a minibus passenger can use the service for unlimited distance within the coverage route. However, minibus services was terminated in 1998 and today the service has been replaced with a more sophisticated service under new brand of RapidKL.

Free shuttle bus operation services are available in many countries. Airport free shuttle service was provided by *AirExpressBus* company. It is the quickest and most convenient way to travel freely between Eindhoven airports and Airport Weeze to city center of Amsterdam [22]. The University of Edinburgh provides a free shuttle bus service for staff and student who are required to travel between the Central Area, Summerhall and the King's Buildings. The shuttle service interval is between 15 – 30 minutes and take approximately 10 minutes for travel between the Central Area and King's Buildings [23]. One of the free shuttle services operated in Malaysia is *Hop On Free Central Area Transit*. The shuttle service is operated in Penang. It was introduced in 2009 as an initiative of the Penang Island Municipal Council (MPPP) and Rapid Penang for tourist attraction. The service covers a route from Weld Quay to Penang Road and back from 0600hours to 2400hours (midnight).

Shuttle bus services support park and ride schemes and reduces the volume of traffic on the road in Singapore. [24] . Park and Ride scheme was introduced in 1975 in Singapore to complement the use of the Area Licensing Scheme. At first, the scheme involved over 50,000 parking places provided in strategic locations. Shuttle bus was operated to transport park-and-ride user from parking areas to various destinations within the restricted zone.

2.4 Internal and Private Bus Service

Some organisations own and operate a bus for their own needs. Universiti Tun Hussein Onn Malaysia (UTHM), for example, provide a unique on-campus bus for private internal use of its students. The UTHM off-campus bus service is an internal bus service, to transport a student from university residential areas to the main and city campus of UTHM. The operation of the bus is under the management of The Development and Property Management Office of UTHM. The bus operation is free for all students and is available from 0700hours 2300hours daily. The cost of bus operation is partially met from annual student levy.

2.5 Tour Bus Service

The tour bus service is one of the services provided for tourist for sightseeing tours. The marked difference between tour buses with other types of bus service is the design of the bus. Regular buses (coaches) are sometimes used as tour bus. However, open top double decker bus type is now commonly and popularly used as tour buses in big cities such as London,

Amsterdam, Hong Kong, Kuala Lumpur and Melaka. Tour bus service in various countries is to support tourism industries and is normally operated on a commercial basis. *City Sightseeing*, and *Big Bus Tours* are examples of largest operators of tour buses. These operate on a franchised basis all over the world. Services are offered by such bus operators that are normally based within the city sightseeing areas.

Malaysia has a unique tour bus operation service for long distance travel, known as *Executive Bus* operated by *Transnasional Express Sdn. Bhd.* company. The idea of the bus operation was first initiated by Tun Dr. Mahathir Mohammed, a former Malaysian Prime Minister to provide tourism transport services during the campaign of *Visit Malaysia* in 1994 and Commonwealth Games, 1998. Ten buses (Type I and Type II) used for the Executive service were double decker buses (Daewoo BH 120 models) supplied by Daewoo Motor Co. Ltd., Korea. The concept of the bus is it provides a range of as shown in Table 1.

Table 1. Malaysian Executive Bus services criteria [25]

	Type I	Type II
Number of bus operated	2	8
Number of Seats	17 Lounge	24 Telephone
Facilities	Telephone Television	Television Computer
Number of passenger assistants on the bus	Computer 2 drivers 1 hostess	2 drivers 1 hostess

2.6 School Bus Service

The main function of school bus service is to provide students with transport to and from school. In Western Australia, school bus service has been provided by the government to help student with transport to school. Eligible students and students with special needs can freely use the service. School bus services are operated based on contract on the 'orange-bus' [26]. Similarly, School bus service is also reported to be free in Ontario [27]. The service is funded through local property taxes in conjunction with grants from the provincial Ministry of Education. Ministry of Transportation Ontario [28], reported that school bus travel is safe for children to get to school in Ontario. Over 800,000 students are transported daily in school buses that travel 1.9 million kilometres.

Malaysia school bus services are operated by private agencies and are particularly business oriented. Although the service is chargeable, school bus service operation is under control The Land Public Transport Commission (SPAD). SPAD is responsible to issue licence to a company or individual who intends to operate the school bus service and it ensures their safe performance, the tariff, and route coverage requirements.

In Malaysia, school bus is operated to provide student transport in limited areas. During school holidays or festival periods the bus is flexible to be used for other than student transport outside permitted areas. However, permission and licence to operate the service should be obtained from SPAD. The types of school bus operated in Malaysia various from mini bus 8 seating capacity to a maximum 44 seats.

3. Factors Affecting Public Bus Ridership

There are two categories of factors that affect public bus ridership highlighted in the report published by Transportation Research Board [29]. These are internal and external factors. External factors that have direct influence on transit demand and supply. It is the factor that is outside of bus agencies' direct control. For example, increase in population

growth can change public bus transit service demand. In fact, other factors, such as economic condition, fuel price, congestion charges and car parking charges that have been reviewed in the past affects the transit demand. Besides, although, private vehicles are particularly becoming the first choice for mode of travel in most city areas, the public policy and government funding initiatives shown significantly influence in public transit use.

Internal factors that influence public bus ridership are those factors over which bus agencies have some control such as quality of services, and service orientation. Bus operation service quality can be measured based on specific criteria such as its accessibility, availability, and reliability. In addition, fares pricing level is another examples that have been highlighted by previous researchers such as Taylor and Fink [30], and Paulley et al. [31] that have an effect on public ridership. Specifically, Table 2-3 gives a summary of references that suggest various external and internal factors that influences public bus ridership.

3.1 Bus Service Quality

The choice of public transport as a preferred mode of travel by travelers in the city is mainly influenced by quality of bus operation services. Previously, users were satisfied with basic services and the availability of routes and the location of service. However, transit users today are more demanding from the bus providers including fast and reliable service, shorter walking distance to stops, low floor buses, cheaper service and friendly safe drivers. Bus operators are responding to such demands with the aim to increase their customers, and their profile.

Bus quality services may be defined using various attributes that cover items such as service coverage, frequency of services, hours of services, and service reliability. Customer satisfaction survey and expectation surveys in particular are the best methods conducted to measure bus quality service. From the survey, any lack in bus service or performance can be determined and improved. Blue Mountains Bus, a bus company from Australia, for example conducted the first formal passenger for the company satisfaction survey in 2012. The survey undertaken by Australian Department of Transport with aim to measure the current level of bus passenger satisfaction with various bus services. One of the main survey objectives is to know the experience of passengers when travelling with the company bus. Result from the survey is used as part of bus company's focus on continuous improvement. Passenger rating on the Blue Mountain Bus services are summarised in

Fig. 1. Overall, the travelling public have a very high level of satisfaction with drivers. In terms of an operational perspective, the company must consider to improve the aspects relating to frequency of service with relevance to other transport modes. Further to the survey), the bus company had received written comments on drivers, bus shelters, the buses and the timetables and these are being taken into consideration as part of continuous operational improvement. From the satisfaction survey the bus company has planned strategies to increase patronage on the bus [32].

Table 2 Factors that affect public transit

	Factors that affect public transit	Reference
	Population characteristics	[30], [33], [34],
	Economic conditions	[35], [36], [37]
External factors	Cost and availability of alternatives modes	[38], [37]
	Land use / development patterns and policies	[39], [40], [41]
	Travel conditions	[34]
	Public policy / funding initiatives	[20], [30]
	Fares level	[36], [42], [37], [34], [43]
	Route design	[44]
Internal factors	Service schedules and frequency of service	[37], [45]
	Service reliability (perceived and actual)	[36], [46], [37],
	Accessibility features (for person with disabilities)	[47]
	Parking availability (park-and-ride)	[29],

Availability, ease of obtaining, and usefulness of information and customer assistance [44], [43], [34]

Bus passenger satisfaction surveys on bus services across Scotland have been continuously conducted since 2002 to 2005 in Scotland, UK [48]. In the survey, passengers were asked to rate various aspects of bus services and give a reason for not using bus service more often. The survey report indicated that, between 2002 to 2005 most common service complaint was on reliability. This is one of the reasons given by respondents for not using bus more often.

The Land Transport Authority of Singapore (LTA) commissioned the SIM University (UniSIM) to conduct public transport customer satisfaction survey in 2011. The survey is a part of an annual survey measure regular passenger satisfaction on public transport service, namely bus and MRT services [49]. The survey aimed is to determine passenger expectation as well as identify service attributes for improvement. From the survey conducted, The land Transport Authority of Singapore has determined 3 most important service attributes for public bus (as shown in TABLE III). In the survey, passengers also were asked their opinion on whether the public bus system has improved, 70.2 percents of respondent were say 'yes', and this is increased by 2.5% from 2010 [49]. Based on the survey conducted, LTA and Singapore government planned to further enhance public transport service level for commuter benefit. This includes to add 800 buses over the next 5 years [49] which can significantly ramp up bus capacity to improve current bus service level.

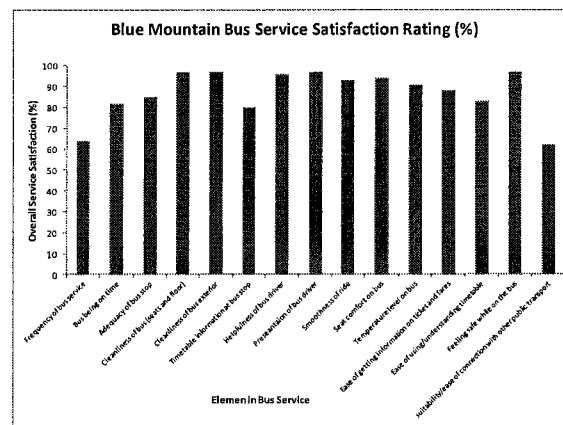


Fig. 1. Overall passenger satisfaction survey on Blue Mountain Bus service [32]

TABLE 3: TOP THREE MOST IMPORTANT SERVICE ATTRIBUTES FROM BUS SERVICE SATISFACTION SURVEY IN SINGAPORE [49]

Most Important Service Attributes					
2010			2011		
1.	Safety	and	1.	Waiting time	
	Security		2.	Travel time	
2.	Travel time		3.	Reliability	
3.	Comfort				

Survey on passenger satisfaction in bus service provides is used widely by various bus agencies to improve or maintain their quality of service. TABLE IV reviews passenger satisfaction survey conducted by various organisations. Specifically, Figure 2 summarises the flow how passenger feedback on bus service is used to improve or upgrade the quality of service. The process starts when bus provider processes customer comments to determine what they expect from the service. At this stage customer input is applied as a guide to set up any action to improve the service. The improvements include driver training, bus maintenances, new or upgraded technology and any related aspects.

The 'Handbook for Measuring Customer Satisfaction and Service Quality' [50] highlights the following as benefits from the bus passenger satisfaction survey

- Increase demand / reduce the cost
- Reduce passenger downturn
- Lower employee turnover
- Enhance agency reputation and public image
- Reduce failure cost

In addition, passenger satisfaction on bus quality service is also beneficial to assess public bus performance in term of economic and the success of services provided [51]. Transportation Research Board (TRB) [50] underlined a specific criteria associated with passenger satisfaction as follows :

- Reliability - Consistency of performance and dependability
- Responsive - Willingness or readiness of employees to provide service. It involves timeline of service
- Competence - Possession of the required skill and knowledge to perform the service
- Access - Approachability and ease of contact
- Courtesy - Politeness, respect, consideration and friendliness of service operator
- Communication - Keeping passengers informed in a language they can understand and listening to them. Bus operator may have good communication skill with different level of bus user.
- Credibility - Trustworthiness, believability and honesty.
- Security - Freedom from danger, risk or doubt
- Understanding / knowing the Passenger - Understand the need of passenger
- Tangibles - Physical environment and representations of the service

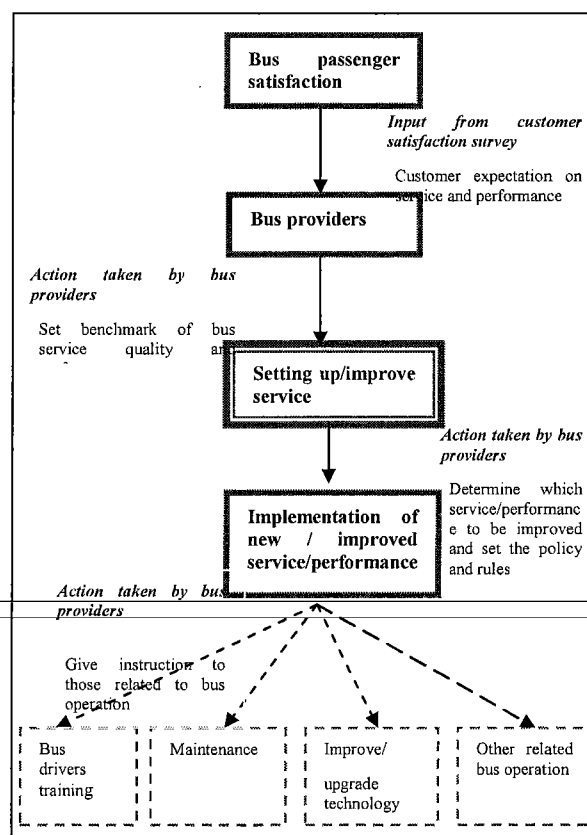
There is evidence that the bus service quality on reliability, safety, communication, comfort and cleanliness are the important criteria considered by passengers. For example, Taylor and Fink [30] review service reliability, particularly service coverage and service frequency as sets of factors influencing public transport ridership. A favourable quality of public bus service tends to attract further bus travellers. This is supported by a study conducted in Kelantan, Malaysia by Suwardo et al. [52] who suggested, the headway changes from 39.66 to 30 minutes causes 2.62% increase in bus service demand. Furthermore researchers have also suggested that the frequency change intends to increase ridership by adding extra number of buses. At the same time the passenger waiting time and overcrowding at bus stop or terminal is improved. Similar, simulation study have been conducted in Putrajaya, Malaysia by Nor et al. [53] who also forecasted that improvement in bus service quality can generate 30 to 40 percent increase in ridership depending on trip purpose

TABLE 4: AIM OF THE SURVEYS

Reference	Bus service type	Survey aims	Service attributes
[54]	School bus	To improve service quality	Driver, facilities,
[55]	Public bus	To improve service quality	Cleanliness, driver, reliability, frequency, information,
[56]	University bus service	To improve service quality	Driver, reliability, frequency,
[57]	Public bus	To determine interest in additional bus service	Interest on new service route
[58]	Public bus	To improve service quality	Accessibility, ticketing, fares,
[59]	Public bus	To improve service quality	Number of seat, fares, drivers, frequency, maps, accessibility, bus stop
[60]	Public bus	To improve service quality and increase number of passenger	Frequency, reliability, driver, cleanliness, value for money, availability of Seat, sufficient space, safety

[61]	Express bus and Public local bus	To compare level of satisfaction between express and public buses in Chicago	Safety, driver, availability of seats, reliability, frequency
[62]	Public bus	To measure passenger satisfaction	Accessibility, reliability, cleanliness, information, comfort, ticketing, safety, convenience

Research studies of Mazzulla and Eboli [44] analysed public transport non-use reasons survey from 176 research respondents who reported reasons why they did not use public transport. The research survey indicated that the main reason why they did not travel by public transport was a low service frequency followed with vehicle overcrowding, slowness of the vehicles and long waits at the stop. Other reasons such as difficulty of carrying loads and fares formed are very small percentage. Contrary with 220 respondents that reported they regularly use public transport, service quality factor that have been significantly influenced their chosen for public bus ridership are inexpensive service, less tiring trip and lower risk of road accidents.



Paulley et al. [31] study on effect of quality service on demand for public transportation service reviewed that, on Sundays and in the evenings, the elasticities for public buses are considerably greater than other period when the bus service levels are generally lower. However, in metropolitan areas, especially in the big cities, where the service levels are higher, the demands on public bus service is more elastic due to competition from other modes of public transport modes.

Therefore, to meet passenger expectation, it is important that all related agencies meet expectation by providing better bus service and access. This should consider several elements such as bus accessible design, better bus stops, drivers relationship, navigating the bus network, route scheduling and network and the most important is a system that support bus access. The management of bus operator is responsible to improve or to maintain the quality service. However bus drivers are the most important participant to carry out the task.

4. The Role of Bus Provider and Bus Driver to Provide Better Bus Service

4.1 Bus Provider's Responsibility

Bus provider plays important roles not only to manage and provide a service, but also being responsible to specific task in such as follows:

1) Handle suggestion and complaints from passenger

Bus providers are responsible to acquire and handle any suggestions and complaints from passengers. Passenger feedback on the bus service is a valuable marketing strategy to identify areas of the service process which the consumer believes must be improved.

2) Specific briefing and training of staff especially bus drivers

Bus providers are not only responsible to manage and provide appropriate job benefit to their staff but also give specific briefing and training to bus drivers. This is to ensure drivers receive recognised training; enabling a driver to meet the challenges of driving a bus whilst being focused to exceed passenger expectations

3) Give reliable and useful information to passenger

One of the advantages of bus information strategy is to increase the passenger for public transport. Bus operators have a responsibility to provide all information such as fares and time of service to the passenger. This information can make the bus service accessible and can improve bus services.

4) Quick response to passenger comments and complaints

Bus providers should respond to the comments and complaints from passenger. Feedback from passenger is valuable to improve operation service and also to develop an image of the bus company. Recorded comments and complaints from bus passengers can be used as research data for decision making to improve service quality.

5) Proposed improvement of service

Plan how to improve bus service is another responsibility of bus provider. The necessary improvement actions will depend on the problems identified and the ability to act. The action should include various components such as operation managements, ticketing and revenue management, passenger orientation, human resource development and operator efficiency.

4.2 Bus Driver's Responsibility

The task of bus driver is physically and mentally demanding because it involves having to cope with conflicting demands. Bus drivers are required to maintain good communications with bus passengers and to be service oriented. However, the need to provide service sometimes conflicts with the requirement to keep a tight handle on the dense traffic and the need to drive safely according to traffic regulations and conditions. There are some overlapping responsibilities between bus driver with bus provider to provide a good bus service as shown in TABLE V. However, as bus drivers are closer to passenger, they play a very important role to operate the bus according to passenger expectation. Some of the bus driver responsibilities are summarised as follows:

6) Safe Driving

The task of being bus driver is to operate the bus safely according to a set daily schedule. This involves facing conflicting demands ensuring that the bus is in good operating condition to pick up or drop off passenger as per timetable. Further, the bus driver must maintain order and security on the bus and at all times obey the law, and regulation to eliminate driving in an unsafe manner that cause a risk to passenger. Bus driver must be alert in order to reduce risk of accident especially during heavy traffic or bad weather

7) Knowledge, Good personality and skill

Bus drivers must have knowledge and skill of handling and manoeuvring the bus he/she drive, the bus route, all regulations, standard and driving procedure and scheduling systems. Knowledge on how to deal with passenger especially for those with special needs is also important to ensure bus passengers have a good experience with the service. Bus driver should have good personal attribute that he/she be able to interact effectively with verbal and listening communication skills. Besides this, honesty, trustworthiness, flexibility, and demonstration of sound work ethics are another relevant personal attributes that bus driver should practice while contributing to the provision of an effective bus service.

TABLE 5: SHARING OF RESPONSIBILITY BETWEEN BUS PROVIDER AND BUS DRIVER

Items in Quality of service	Bus provider	Bus driver
Reliability	X	X
Responsive	X	X
Competence	X	X
Access	X	
Courtesy		X
Communication		X
Credibility	X	X
Security	X	X
Understanding / knowing the Passenger	X	X
Tangibles	X	

5. Conclusion

This paper has discussed the type of bus operation services; and factors that affect public bus ridership. The paper also outlined the role of bus provider and bus driver to provide best quality of service as expected by passenger. The performance of public bus service will be affected largely by quality of service. In areas in which public transport especially buses is highly access, operation performance improvements may be required by improving factor that influence public bus ridership such as bus service reliability, safety, comfort and cleanliness. Improving a such factors will help to encourage people to shift from private to public transport.

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