ASSESSMENT ON LEVEL OF SERVICE OF SUBSIDIZED BUS IN KAJANG, SELANGOR, MALAYSIA

By

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Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Master of Science

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Chair : Zakiah Ponrahono, PhD
Faculty : Forestry and Environment

Subsidized public transportation service is widely offered in many urban societies in order to minimize the use of resources and to alleviate traffic congestion. Selangor, with its proximity to the capital of Malaysia, is known to have massive traffic congestion, especially in Kajang which is in the top four (4) districts with the highest number of Average Daily Traffic (ADT). Thus, a free fare program, subsidized bus was introduced in order to reduce the dependency on private vehicles among people. Specifically in this study, the subsidized buses is used to identify the level of service provided by the local authorities as an initiative in reducing traffic congestion at Kajang. Mixed method approaches will be used in the study's methodology. The researcher employ the Level of Service (LOS) method to measure the operational performance of subsidized buses for qualitative purposes. In the meanwhile, the quantitative method employs a questionnaire-based approach to uncover factors that can influence the quality of subsidized bus service and passenger satisfaction through SERVQUAL dimensions. On the whole, the LOS for subsidized bus service in Kajang achieved LOS D (acceptable standard) based on the assessment from four (4) main aspects that are service frequency, service hours, passenger threshold and bus speed. Additionally, the service quality of subsidized bus was influenced by assurance dimension which had a significant impact in influencing other dimensions on the SERVQUAL too. These findings can be linked to the different types of categories of passengers who involved in this study. Researcher conduct studies that are representative of practically all age groups who used subsidized buses on a daily basis. The level of passenger satisfaction is also considered in the survey, with the result that all passengers rate the subsidized bus service as satisfied. Passengers, local authorities, and bus management must work together to guarantee that this effort is sustained and, as a result, traffic congestion in Kajang is reduced. In addition, this study is also a bonus to the government where they can draw inspiration from this study in the development and improvement of public transportation network in the future. In fact, the use of LOS and SERVQUAL can be used as a benchmark for academia or other body knowledge in studying the quality of services for public transportation. However, there are several constraints that may be encountered, as in this study, such as the on-board

environment during data collection on the bus and peak-hour crash load. Nonetheless, it can be prevented when researcher take some preliminary measures. In short, local authorities and bus management companies should work together in improving the service quality of the subsidized buses in order to maximize the number of ridership in the future. To ensure that the subsidized bus services can operate for a longer period of time, improvements and monitoring must be done on a regular basis.

Abstrak tesis yang dikemukakan kepada *Senat* Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

PENILAIAN TERHADAP TAHAP PERKHIDMATAN BAS SUBSIDI DI KAJANG, SELANGOR, MALAYSIA

Oleh

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Perkhidmatan pengangkutan awam bersubsidi kebanyakannya akan ditawarkan di kalangan masyarakat bandar bagi meminimumkan penggunaan sumber serta untuk mengurangkan kesesakan lalu lintas. Selangor, antara negeri yang terdapat di Malaysia, diketahui mengalami kesesakan lalu lintas yang teruk, terutama di Kajang yang berada di tangga ke-empat (4) daerah teratas dengan jumlah Purata Lalu Lintas Harian (ADT) tertinggi. Oleh itu, sebuah program tambang percuma, bas subsidi diperkenalkan untuk mengurangkan kebergantungan kenderaan persendirian di kalangan orang ramai. Khususnya di dalam kajia ini, bas subsidi digunakan untuk mengenal pasti tahap perkhidmatan yang diberikan oleh pihak berkuasa tempatan di mana ianya merupakan inisiatif dalam mengurangi kesesakan lalu lintas di Kajang. Pendekatan kaedah campuran akan digunakan di dalam metodologi kajian. Pengkaji menggunakan kaedah Level of Service (LOS) untuk mengukur prestasi operasi bas subsidi untuk tujuan kualitatif. Sementara itu, kaedah kuantitatif menggunakan pendekatan berdasarkan soal selidik untuk mengungkapkan faktor-faktor yang kemungkinan mempengaruhi kualiti perkhidmatan bas subsidi dan serta ingin mengenal pasti tahap kepuasan penumpang melalui dimensi SERVQUAL. Secara keseluruhan, LOS untuk perkhidmatan bas subsidi di Kajang mencapai LOS D (standard yang dapat diterima) berdasarkan penilaian dari empat (4) aspek utama iaitu frekuensi perkhidmatan, jangka masa perkhidmatan, kapasiti penumpang dan kelajuan bas. Selain itu, kualiti perkhidmatan bas subsidi dipengaruhi oleh dimensi "assurance" yang memberi kesan signifikan di dalam mempengaruhi dimensi lain pada SERVQUAL juga. Penemuan ini dapat dikaitkan dengan pelbagai jenis kategori penumpang yang terlibat di dalam kajian ini. Penyelidik menjalankan kajian yang mewakili hampir semua kumpulan umur yang menggunakan bas subsidi setiap hari. Tahap kepuasan penumpang juga dipertimbangkan di dalam kajian, dan hasilnya semua penumpang menilai perkhidmatan bas subsidi di tahap berpuas hati. Penumpang, pihak berkuasa tempatan, dan pengurusan bas harus bekerjasama untuk memastikan usaha ini dapat dipertahankan dan, kesannya, kesesakan lalu lintas di Kajang dapat dikurangkan. Di samping itu, kajian ini juga merupakan bonus kepada pentadbir di mana mereka dapat memperoleh inspirasi dari kajian ini di dalam pembangunan dan peningkatan jaringan pengangkutan awam di masa hadapan. Malah, penggunaan LOS

dan SERVQUAL boleh dijadikan sebagai penanda aras bagi ahli akademik atau badan pengetahuan yang lain dalam mengkaji kualiti perkhidmatan untuk pengangkutan awam. Namun, ada beberapa limitasi yang kemungkinan bakal dihadapi, seperti di dalam kajian ini, iaitu situasi on-board ketika pengumpulan data di dalam bus dan kemungkinan beban kemalangan berlaku pada waktu puncak. Namun begitu, ianya dapat dielakkan di mana penyelidik mengambil beberapa langkah awal. Pendek kata, pihak berkuasa tempatan dan syarikat pengurusan bas harus bekerjasama dalam meningkatkan kualiti perkhidmatan bas subsidi bagi memaksimumkan jumlah penumpang di masa hadapan untuk terus menggunakan bas. Bagi memastikan perkhidmatan bas subsidi dapat beroperasi untuk jangka waktu yang lebih lama, penambahbaikan dan pemantauan harus dilakukan secara berkala.

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the Master of Science. The members of the Supervisory Committee were as follows:

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LIST OF ABBREVIATIONS

ADT	Average Daily Traffic
APAD	Agensi Pengangkutan Awam Darat
BNR	Bus Network Revamp
BS	Bus Stop
BTHO	Bandar Tun Hussein Onn
GP	General Practitioner
LOS	Level of Service
MBS	Main Bus Station
MPKj	Kajang Municipal Council Management
PS	Pole Stop
SERVQUAL	Service Quality
SITS	Selangor Transport Intelligent System

CHAPTER 1

INTRODUCTION

1.1 Overview

Chapter 1 explains the background of the study, problem statements, objectives, research questions, limitations on the scope of the study, assumptions and the significance of the study. This study focuses on the service quality performance of subsidized bus services through qualitative and quantitative approaches.

1.2 Background of study

Subsidized public transportation services are widely implemented in many modern cities countries such as China, United States of America as well as India (Pojani & Stead, 2015). The concept of subsidized public transportation is about reducing the allocation of resources and any externalities that influence the performance of public transportation services (Serebrisky et. al, 2009). In other words, subsidization helps in balancing the needs of economic and social sustainability, especially in a city that tries to introduce setting fares for cost recovery (The World Bank, 2014). Additionally, subsidized public transportation is characterized by the economy of scale where the marginal costs should be below the average costs which directly lead to the positive externalities. This will lead to the increase in travel volume of public transportation that will result in high frequency of passengers and lower scheduling costs for the operation of public transportation. Serebrisky et al. (2009) mentioned in their study that subsidizing public transportation also contributes in balancing the competition between other alternative modes in the aspects of society, infrastructure, pollution, congestion, road safety risks and environmental aspects. In fact, the revolution of subsidization on bus services is motivated by several reasons such as "social function" which focuses on vulnerable groups such as low income households (van Goeverden et al., 2006). On top of that, subsidized public transportation has become the top two (2) best instruments in addressing the urban transport problems such as congestion, parking externalities and pollution caused by private vehicles. It can be concluded that private vehicle users are one of the main factors that contributes to congestion as it bring significant impact to the other aspects discussed in previously.

Currently, Malaysia has more than 31.2 million registered vehicles in 2019 (Lim, 2020). This number has posed major challenges and problems such as traffic congestion in this country with more than eight (8) million households (Yeap, 2020). One of the most developed states in Malaysia is Selangor which is known for its heavy traffic congestion in the daily commute. This scenario is caused by the high level of private vehicles on the road, around 410,719 , as shown by the Average Daily Traffic (ADT) in this state (Ministry of Transport Malaysia, 2018). Hence, the Selangor state government has came

up with an initiative to subsidize public transportation by introducing SMART bus, a subsidized bus or free transit program with the aim to encourage people to switch their mode of transportation from private to public transportation. This is one of the programs launched by the state government as part of the SMART Selangor programme. The program, which provides subsidized bus transportation in the Shah Alam, Subang Jaya, and Klang regions, began on July 1, 2015. The state government had provided 100 buses serving 30 routes at the time (Michael, 2017) within towns and districts of Selangor. In fact, the state government of Selangor introduced the 100th SMART bus on September 24, 2017, making it the program with the "Most Number of Free Shuttle Bus Services Provided by a State Government" in the Malaysia Book of Records (Multiangled, 2018). This is in line with the efforts introduced by the government, namely the National Transport Policy 2019 – 2030 and MPKj Local Plan (Addendum) 2035 which focuses on the development of public transportation system in Malaysia. The bus route under this program is determined using the key criteria of the First Last Mile, in which the bus route is connected to bus transportation terminal. As a result, the route implemented can be used to connect the SMART bus transportation route with the commuter station and MRT or LRT. The term "subsidized bus" will be used overall in this study to refer to the SMART bus in Kajang, Selangor. Even though this program covers all the towns and districts of Selangor, for the purpose of this study the researcher will mainly focus on Kajang town that ranked as the top four (4) in the assessment of ADT (46,607) (Ministry of Transport Malaysia, 2017). Subsidized bus officially operated in Kajang in 2016. Presently, there are five (5) main routes operated in Kajang that cover various areas known as KJ01, KJ02, KJ03, KJ04 and KJ05. In detail, the operations of the bus starts from 6 a.m. to 9.40 p.m. daily and can accommodate up to 60 passengers at one time with the facilities for disabled-friendly seating area, CCTV as well as free Wi-Fi to passengers (Michael, 2017).

Due to the extremely severe traffic conditions, especially during peak hours, the subsidized bus programme was implemented. The congestion problem in Kajang is one of the things that the rest of the world also is dealing with. Congestion is a common phenomenon worldwide that could be attributed to modern society's activities. The extensive use of private vehicles in daily life leads to the overuse of roads that directly affects waiting time for cars to move around. According to Thakur & Singh (2017), congestion is caused by several factors; for instance, increase in population, poor infrastructure, lack of alternate routes, no flexible working hours, lack of public transportation and bottleneck network or routes design. Meanwhile, Malaysia was ranked 11th in 2017 as one of the most stressful countries in Asia based on the global rank due to the air pollution, gender inequality and traffic level condition (Delhi, 2017). Traffic congestion is explained based on several classifications such as facilities (roads, bridges, etc.), magnitude (force or course of events) and recurring vs non-recurring (Thakur & Singh, 2017). On average, the road users spend at least an average of 53 minutes in traffic congestion before reaching their destination. Therefore, Almeslati et al. (2011) suggested that to overcome road congestion, the development of efficient public transportation is crucial in reducing the number of private vehicles on the roads. Reliable options with good service quality should be provided by the government to attract the users to switch from private vehicles to public transportation.

It should be highlighted, however, public transportation services must be at the best standard in order to entice people to use it again. A good quality service is the key in the development of economy, lessening impact on the environment and increasing capacity to support the growth of population (Bachok et al., 2014). Therefore, it will be very important to determine the quality of subsidized bus service performance for the improvement in the future. Besides, the excellent quality service would help to portray a good image for the connectivity of the mobility, especially in a busy town such as Kajang (Ponrahono et al., 2016). In addition, the assessment of service quality can ensure that passenger satisfaction is at a good level and the services are at an acceptable Level of Service (LOS) practiced worldwide (Bachok et al., 2014; Wijerathna & Mazzulla, 2015; Weng et al., 2018). The passenger satisfaction level is very important to help in evaluating and improving the service level of public transportation as well as promoting and enhancing the development of the traffic system (Weng et al., 2018). Meanwhile, SEVQUAL was applied specifically to investigate how the service quality of subsidized buses corresponds to the satisfaction of passengers. Under SERVQUAL, the quality of service has been described with the help of five (5) dimensions. There are reliability, assurance, tangibility, empathy responsiveness. Yao et al. (2014) mentioned that SERVQUAL is the most widely used tool for assessing service quality because balancing passenger expectations with the quality of service provided is a very difficult process, thus, the application of SERVQUAL will aid in identifying the quality of subsidized bus services. In other words, the reliable quality of service play an important role in influencing the level of satisfaction among passengers. This is further supported by Shaaban & Khalil (2013) who posited that in order to attract people to use the public transportation system in the city, it is crucial to enhance the quality of service that contributes to the reduction of traffic congestion issue. In many transportation service performance assessments, findings show that high facilities, convenient and effective services will attract more ridership (Ismail et al., 2012). Besides identifying the service quality of subsidized buses, the LOS assessment is also used as one of the indicators in improving public transportation system to become more efficient and effective.

The Level of Service (LOS) introduced by High Capacity Manual is a measure used to assess how well a transportation facility is performing from the perspective of passengers (Etection et al., 2005). According to Chen & Larry (2009) analysis from LOS was recommended in conducting the assessment related to operational performance of the roadway facilities. This assessment would help in planning the city area to become better, especially with regard to the issue of traffic network condition. Six levels of service are typically defined, each with a letter designation ranging from A to F, with LOS A representing the best operating conditions and LOS F representing the worst. LOS helps in highlighting important aspects related to passengers' perception as well as service quality provided by bus service (Das & Pandit, 2013b). Therefore, in this study, in assessing the quality of service of subsidized buses the LOS and SERVQUAL dimensions become the main focus in identifying the current performance of subsidized buses in Kajang, Selangor.

1.3 Problem Statement

Bus service performance is one of the great interests among researchers and organizations in the transportation field. Service performance is indirectly influenced by the satisfaction level among passengers as well as the level of service provided to them. Service quality play a crucial role in reducing traffic congestion by bringing in new passengers to use the public transportation system rather than private vehicle (Guirao et al., 2016). Therefore, it is very important to provide the best quality of service to passengers. However, there are various conflicts experienced by passengers that use public transportation system which impact the performance of the bus service (Brysland & Curry, 2001).

The first issue highlighted is improper bus service delivery performance within the public transportation sector in Malaysia. According to Ponrahono et al. (2016), based on settlement forms, socio-demographic and trip characteristics of the good urbanization process, the present bus system in Malaysia is inappropriate and inadequate to fulfill the needs of passengers. This contributes to the worsening of service in the public transportation system. The gap between expected and perceived quality of service should be captured to identify the problem faced by bus transportation system (Weng et al., 2018) especially in Malaysia. There are various possibilities as to why the gap exists. One such example is poorly trained management who is incapable of meeting the standard of a good quality service, which affects the level of satisfaction of passengers (Weng et al., 2018). Besides, Bellizzi et al. (2020) observed that there is a lack of studies related to the service quality of public transportation. Most of the studies focused on both current and potential users and at the end they had come out with an idea to differentiate between expected and desired quality within the transportation system among current and potential users. However, Hensher (2015) mentioned that even though there were improvement initiatives related to bus service, the ideal of improvement is still poorly understood considering the limited effort being made to passengers for greater improvement in bus service at the end.

The poor performance of public transportation system, especially for bus services hardly makes it the transportation mode of choice. The major issue quoted by passengers when they talk about public transportation is their poor service (E. Zulaika, 2015). This is due to the problem with the circulation of services provided by the bus that directly affect the passengers such as bus stop, punctuality, bus availability and also information on the bus (Dahalan et al., 2017). Furthermore, a survey by Abeid (2015) stated that passengers found that bus service is the most unpleasant service in satisfying the passengers' needs as passengers had high expectations on various aspects such as comfort, cost, safety of the bus, travelling time, bus stop condition, waiting time, safety during trip, bus boarding and others. A study by Wijerathna & Mazzulla (2015) also agreed that the major issues faced by passengers were mainly related to the performance of bus service such as facilities, maintenance of bus stops, cost and ticketing process, cleanliness and also poor road infrastructure.

In Malaysia, the evaluation of service quality among subsidized buses is still underdeveloped. Subsidized buses are one of the local government measures such as in Kajang to limit the use of private vehicles. So, in order to encourage people to use subsidized buses, it is critical to evaluate the level of service of subsidized bus on a regular basis, in accordance with changes in Malaysia's development trajectory. To substantiate this statement, Table 1.1 below summarizes few findings from prior studies conducted in Malaysia and the rest of the world related with public transportation. Therefore, this study was conducted not only to provide a better understanding on important factors that influence the quality of a public transportation services, but also to contribute in the improvement of service performance in the future by considering its ability to fulfil the needs of passengers where can be used as benchmark to compare the quality of public transportation services with similar environmental and economic conditions. Overall, it can be stated that public transportation studies, particularly for subsidized buses, is still in its infancy in Malaysia. In fact, there is no precise reference that the government can used to improve or develop good public transportation. Even though, there have been several studies undertaken in other nations, but need to know that the climate, economic, and cultural aspects in Malaysia are vastly different. As a result, it is expected that this study will aid many parties in improving the quality of public transportation in Malaysia.

Table 1.1 : Summary of Findings Related with Public Transportation

References	Findings	Reseach Gaps
Rahim et al., 2021	Accessibility to the bus terminal is sometimes problematic because bus terminals are typically located near the city's border. Public transportation also suffers from a lack of service quality, such as a lack of safety and comfort for passengers	Higlighted on the surface only without discussing further the main factors and possible recommendations to solve the issues
Faizun et al., 2020	Passengers' perceptions of public transportation in Malaysia are still negative, with bus services becoming the second best alternative	Focuses on the passengers who board the bus and does not overly focus on the facilities provided by the bus management.
Stojic et al., 2020	Public transportation was regarded as unpleasant, and passengers indicated a more unfavourable attitude toward their daily commute than passengers of other means of transportation.	Emphasizes how crucial comfort is for young passengers' satisfaction. But passengers who use public transportation came from diverse ages,thus, the analysis does not represent the total passenger population that using public transportation.

Table 1.1 : Continued

Imre & Çelebi, 2017	Passengers' stress levels are greatly increased by uncertainties in journey durations and traffic jams, according to empirical studies, and as a result, journey times influence passengers' quality of life.	Only analyzes the perception of comfort in public transportation networks. Other factors such as attitude, public transportation schedules, and location of stops are not taken into consideration.
Shen et al., 2016	In-vehicle time considerably affects passenger comfort perception as does passenger load factor, and has a more significant impact on standing passengers than seated one	This research was only about the load factor and in vehicle time only. The variables such as attitude of driver, passengers and also the condition of buses and bus stops are not being explained
Rohani et al., 2013	Factor affecting bus ridership cames from external and internal aspects. External aspects consist of transit demand and supply and for internal aspects from the quality of services and service orientation	Most of the examples such as surveys were from the outside of Malaysia.Thus, lot of research should be done regarding services of bus in Malaysia
Dell'Olio et al., 2011	Waiting time, cleanliness and comfort are the variables that users most valued. As for driver kindness, bus occupancy and journey time are generally given less weight in this study	The modelling had resulted several incorrect sign of the variables due to the users that only consider journey time, waiting time and level of occupancy

The second issue that frequently comes up in studies is low ridership and dissatisfaction with public bus transportation among passengers in Malaysia. Passengers would be satisfied with the service provided when it meets their expectations, either subjective or objective (Wijerathna & Mazzulla, 2015). According to Eboli & Mazzulla (2012) a subjective measure is normally based on the evaluation of passengers' perception. Objective measure, on the other hand, represents any decentralization performance measure made explicit through numerical values that should be compared with fixed standards or past performance. Therefore, it is very important to ensure good service performance, particularly in public transportation, because when service quality falls under passenger expectations, it leads to dissatisfaction among them (Wijerathna & Mazzulla, 2015a; Woldeamanuel & Cyganski, 2011)

According to Haron & Tahir (2018), the recent population growth in Malaysia has brought a huge impact, especially on traffic congestion in major cities such as Kajang. To overcome this issue, the government introduced an inititive called the Bus Network Revamp (BNR) with the aim to split the existing bus corridors into smaller corridors for better improvement in the service efficiency. Kajang was selected as one of the target

towns in this program. This indicates that the authorities have begun to include a reasonable standard of service quality level in public transportation planning and development allocation. Passenger satisfaction becomes the main priority of the improvement program. However, there are some dissatisfaction voiced out generally by the passengers who used the bus as their main mode of transportation at the present (Haron & Tahir, 2018). Thus, an assessment of the service delivery performance and quality are needed. Moreover, there are limited studies being conducted on analyzing the service quality and bus performance within the town of Kajang (Haron & Tahir, 2018).

Gogoi (2019) stated that a good service quality is focused on elements of service efficiency, effectiveness and comprehensive scientific model of passengers' satisfaction level. There are several indicators of passengers' satisfaction that needs to be highlighted and emphasized to ensure continuous improvement on public transportation services such as comfortability, reliability and punctuality. Clearly, it is very important to understand the aspect of satisfaction and dissatisfaction among passengers who choose public transportation as their main mode. Weng et al. (2018) suggested that in order to identify the key factors of the trip process, a questionnaire evaluating the ongoing services must be administered. This would assist in determining the satisfaction level of passengers and improvement on the quality level of public transportation. The delivery of high quality of services is expected by public transportation users in order for them to trust the transportation system and be satisfied with the services. Additionally, the quality of bus service is also influenced by the revenue of transport operation and transport authorities subsidies and programs (Bellizzi et al., 2020).

Oluwaseyi & Olaniyi (2018) mentioned that another important aspect of good service quality is the role of bus drivers during the operation. Even though the frequency of using bus services is different from one passenger to another, their opinions related to service performance can be taken into account because drivers' behavior may lead to the perception of poor quality of services too (Rahman et al., 2015). There are studies on passengers' satisfaction that focus on public transportation services based on daily ridership, and bus was mentioned as the least favorable mode compared to rail services (Fornell et al., 1994; Friman & Fellesson, 2009; van Lierop, Badami, & El-Geneidy, 2018). A study by Tri B. Joewono, Tarigan, & Susilo (2016) found that poor services provided by the operators include bus delay and inadequate information which have led to the negative judgement of passengers while using the bus services. Previous studies such as the ones conducted by Oluwaseyi & Olaniyi (2018) mostly focused on positive expectation and had neglected negative expectation of the passengers. Besides, public institutions, due to the fact that they are non-profit oriented, have also yet to conduct research to assess passenger satisfaction (Abeid, 2015). Another factor that could explain the limited success among local authorities in providing high-performance free bus services is the tendency to expense all efforts in the interest of the operators while ignoring passengers' preferences (Wu et al., 2016).

Transit ridership among passengers is beneficial because it will bring valuable opportunities for modest daily physical activity such as when the passangers walk to the station or take the stairs (Collins & Agarwal, 2015). However, bus ridership in past decades has decreased gradually due to the increasing number of private vehicles on the

road. This situation leads to traffic congestion which directly lengthens bus travel time during the ride, which then contributes to the declining ridership among the passengers (Projects, 2019). This decline is unfortunate because bus services do not only help to transport passengers from low-income families and those with disabilities, but to a certain degree, also address both congestion and pollution in some areas (Projects, 2019).

Hence, an investigation related to the key factors that influence the satisfaction level of passengers should be identified as they are very important in optimizing and maintaining bus service performance. This study also helps in identifying the factors that could influence the pattern of travel behavior among passengers which can then be used to attract new users to use the bus service.

Lastly, the lack of interrelation between passengers and service delivery performance in quality assessment in publc bus transportation sector. Satisfaction level among passengers are directly influenced by the service quality provided. This is because the performance of bus service will be measured based on passenger satisfaction or through the complaints received by the bus management (Berežný & Konečný, 2017). However, according to Haron et al. (2013), in rating service performance past studies mainly focused on the conventional method that looked at bus capacity, frequency of bus and efficiency of bus, but overlook the marketing aspects from the passengers' perspectives that actually plays a vital role in evaluating the quality of service provided by local authorities. Further, many reports and studies, for instance one by Haron & Tahir (2018), only discussed providing the service, but neglected to look at factors or startegies that help in providing good quality service among passengers.

Gogoi (2019) stated that it is very important to provide a very efficient and effective service that fulfils the passengers' needs. Besides, Weng et al. (2018) recommended that future research investigate the relationship between passenger's individual characteristics and service quality perception. This is due to the various studies that only focus on bus passengers and service quality efficiency separately whereas in fact, there is a significant gap in the interrelation between both of these aspects (Yao et al., 2020). Gogoi's (2019) passenger satisfaction parameter could assist in improving the performance of bus service delivery where it will help in the survival of local authorities or corporation that manages bus service. To provide great service local authorities should make a priority to understand passengers' needs and expectations before implementing suitable services (Ok & Hengsadeekul, 2018).

The relationship between these parameters is complex in process because these parameters interconnected with one another where it is very important in the process of quality management (Mahmoud & Hine, 2016). The mechanism between both of these parameters is an important indicator in expanding service quality research related to public transportation performance in Malaysia (Haron et al., 2013).

1.4 Purpose of Study

The main purpose of this study was to determine the Level of Service (LOS) of subsidized bus in Kajang, Selangor using mixed method approaches.

Research Objectives

The specific objectives have been outlined to align with the purpose of this study:

i. To assess the Level of Service (LOS) of subsidized bus service in Kajang, Selangor
ii. To identify the factors of service quality affecting passenger satisfaction of subsidized bus service in Kajang, Selangor
iii. To evaluate the level of passenger satisfaction of subsidized bus service in Kajang, Selangor
iv. To determine the relationship between service quality and level of passenger satisfaction of subsidized bus service in Kajang, Selangor

1.5 Research Questions

i. What is the Level of Service (LOS) of subsidized bus service in Kajang, Selangor?
ii. What are the factors of service quality affecting passenger satisfaction of subsidized bus service in Kajang, Selangor?
iii. What is the level of passenger satisfaction of subsidized bus service in Kajang, Selangor?
iv. What is the relationship between service quality and level of passenger satisfaction of subsidized bus service in Kajang, Selangor?

1.6 Limitation

1.6.1 On board Environment of Subsidized bus

The conditions of bus interior during on board are different during one (1) trip compared to another. Currently, there are five (5) main routes with the total number of twelve (12) buses provided in Kajang but this study only focuses on three (3) routes that are KJ01, KJ02 and KJ03. The different driving techniques or skills of the bus driver for each bus would also influence the on board scenario. Therefore, strategies in reducing this limitation were taken in dealing with the bus management and bus drivers. In addition, the condition of buses and route network for each route were checked. During data collection, a group of enumerators used the same bus and with the same bus drivers to control for the effects relating to the condition of the bus such as speed and driving skills for the bus driver.

1.6.2 Crash load Passenger during Peak Hours

The respondents were chosen based on the convenience sampling technique during the on board survey where the researcher distributed the questionnaire to passengers nearest to them. However, crash load could happen, especially to researchers who do not have any experiences on how to deal with that situation. Commonly, crash load happens during peak hours, especially in the afternoon when there are possibilities that the quality of the answers for the questionnaire would vary. Thus, before data collection the enumerators were briefed on how to approach the passengers and deal with them during peak hours. Besides, each of them was given a set of "cue cards" that will help them elicit from the passengers good quality answers within the shortest time possible.

1.7 Assumptions

1.7.1 Service Quality of Public Transportation

By the end of the study, the data for the current bus service quality level will be utilized as baseline data to improve the operation of subsidized bus services, facilities, route networks and operating system. This would in turn help in the provision of an effective and efficient public transportation system in Malaysia. It is very important for top management to capture the loyalty of passengers by improving their service quality especially in major cities such as Kajang.

1.7.2 Passenger Satisfaction

Besides that, this study also provides baseline data on the passenger satisfaction level that can be beneficial in upgrading the quality of service for subsidized bus in Kajang. All the feedback, comments and complaints obtained throughout this study would help the top management in improving the quality of service in order to attract the existing and new passengers. Bus service improvements would increase passengers' loyalty in choosing the SUBSIDIZED bus as the main mode of transportation for their daily commute.

1.8 Significance of Study

1.8.1 State of Selangor, Regional and Local Authorities

The findings of this study can be used by the authorities in improving the subsidized bus services within the development of an upgrading the functionality and strategic approaches on the subsdized bus. Before formulating policies, it is very important to understand and identify which aspects of the bus transportation services influence satisfaction level and loyalty of passengers in continuing to ride the bus. While understanding user satisfaction based on the specific routes provided, it is recommended for authorities and public transport agencies to focus and work together in increasing loyalty among the passengers. Apart from that, this study also aims to address several goals to establish a comprehensive bus quality system and to develop optimization scenarios for bus services that take into account various categories of passengers.

1.8.2 Academia and Body Knowledge

This study has a significant impact on academics, particularly because the study about subsidized bus services is arguably still lacking in Malaysia compared to other countries. In fact, the methodology used in this study can serve as a model for other academics who want to use Level of Service (LOS) and SERVQUAL to determine the quality of public transportation services. The application of these two methodologies is very suitable to be used in line with the current situation and environment of our country.

1.8.3 Passengers of Subsidized Bus

This study has become one of the platforms for passengers to give feedback, complaints, comments or any objections in improving the operation of the subsidize bus services. From the data and observation gathered during this study it was found that most of the passengers were around 15 years old and above. According to the Department of Statistic Malaysia 2006 - 2011, 6.3% of Malaysian youths, which are 15 to 40 of age still required additional public transportation around the area of their residence and place of work (Dahalan et al., 2017; The Malaysian Institute for Research in Youth Development, 2011). In other words, most of the passengers are residents from the various neighborhoods who commute using the bus service to reach their destinations such as schools, commercial areas, religious centres and also universities. Through this study, the passengers had an opportunity to explain the difficulties that they experience when riding the subsidized bus. They also took the opportunity to come out with suggestions and recommendations on improving its services.

1.8.4 Application of Theory

A significant contribution of this study is it will become one of the sources for future studies that focus on the enhancement in using SERVQUAL (passenger satisfaction) and the Level of Service (LOS). Both of these aspects can be used as a benchmark for public transportation quality indicators. Most of SERVQUAL studies have previously focused on various kinds of service quality activities such as restaurant, tourism and also hospitality. However, SERVQUAL is rarely used in public transportation activities (Mat Shukri & Ponrahono, 2019). As for the LOS, it has the potential to be considered one of the main criteria for local authorities and public transportation agencies to become as an indicator for them to solve the traffic condition which will not only benefit the subsidized bus but other transports as well.

1.9 Operational Definition

There are a few terminologies that will be used frequently during this study. Each terminology has its own operational definition, however, it has been tailored to the actual condition and circumstances of subsidized buses in Kajang, Selangor.

a) Subsidized bus: A free transit program launched by Selangor state government known as SMART bus.

b) Level of Service (LOS): An operational conditions assessment of subsidized buses which cover four (4) main aspects that are fixed-route hours, fixed-route service frequency, passenger threshold and bus speed.

c) SERVQUAL: A measurement for evaluating the quality of subsidized bus services from the perspective of passengers, based on five (5) main dimensions: reliability, assurance, tangibility, empathy and responsiveness.

1.10 Thesis Outline

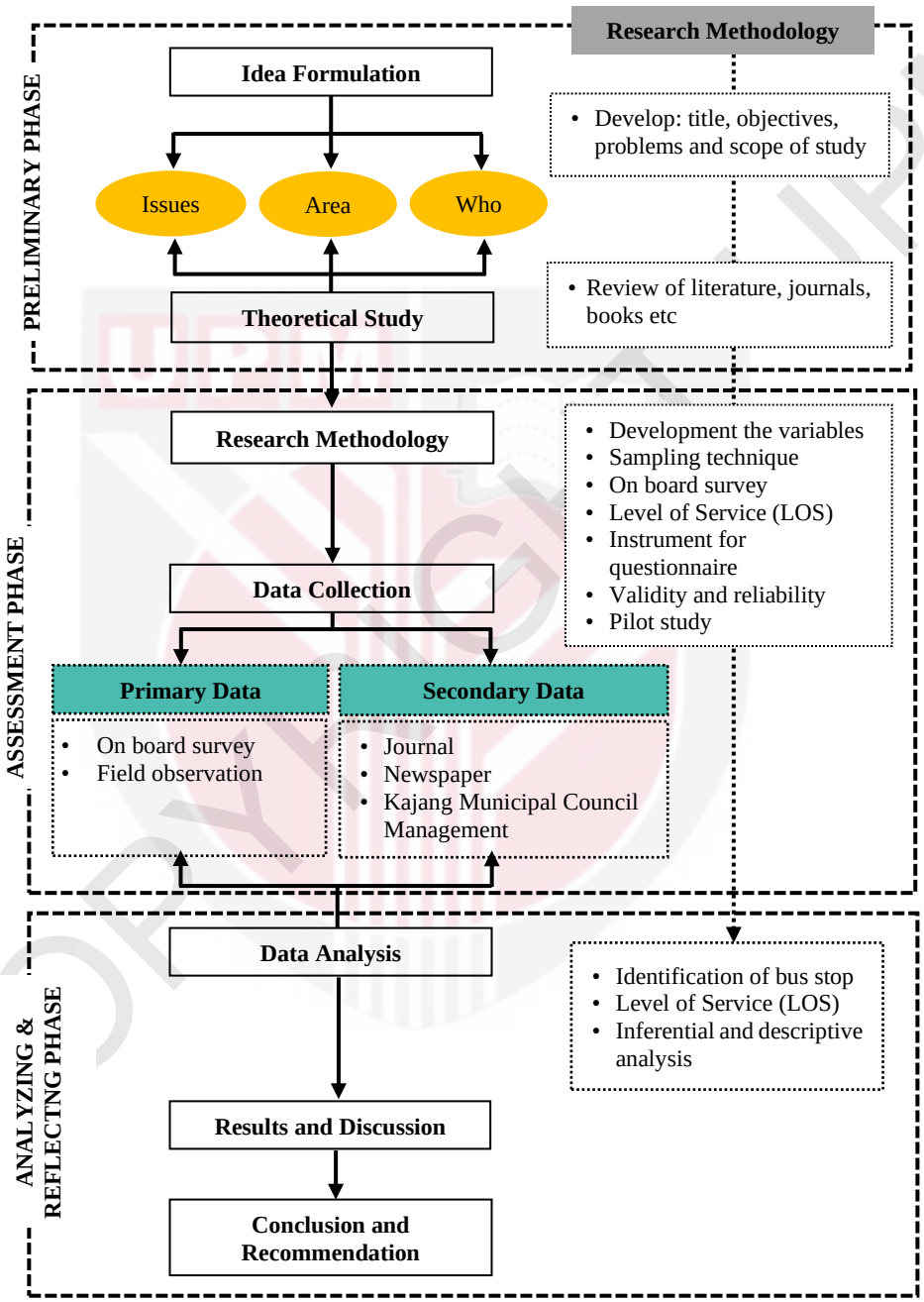

Figure 1.1 : Thesis Outline for Subsidized Bus's Study

1.11 Summary

Concisely, subsidized buses are one of the most effective efforts by the local authorities in improving traffic conditions, particularly for this study in Kajang, while also attracting individuals to switch from their private vehicles to subsidized public transportation. This subsidized buses initiative has brought a huge impact in revolutionizing public transportation where service quality performance is not only based on policies but also comments and feedbacks from the passengers themselves. Despite the introduction of subsidized buses, however, traffic levels remain high. According to the findings of the literature review, some of the most important factors affecting public transportation remain unsatisfactory due to poor bus service delivery performance that interrelate with other factors such as public transportation passengers dissatisfaction and lack of studies focusing on both, service quality of buses with passenger satisfaction. As a contrary, this study will be focused on determining the level of service for subsidized buses in Kajang, Selangor, in order to identify and show the true difficulties that exist by using mixed method approaches. The findings of this study will be useful to various stakeholders, particularly state, regional, and local authorities, in planning the public transportation system network not only in Kajang but throughout Malaysia too. In addition, academia and passengers alike can utilize this study to share their perspectives and use it as a reference for future research. The next chapter will go through this study in greater detail, which will aid in the methodological processes for Chapter 3.

REFERENCES

Abeid, K. I. (2015). Assessment of Customer Satisfaction in Public Transport Services in Zanzibar. *International Journal Advances in Social Science and Humanities*, *3*(11), 41–51.

Advani, M., & Bhandari, K. (2012). *Trip Characteristics and Users' Perception towards Available Public Transport Modes in Delhi*. *July*.

Agensi Pengangkutan Awam Darat. (2016). Land Public Transport Transformation in Malaysia – History, Aspirations and Challenges. In *APAD*.

Al-Mansob, R. (2011). Bus Scheduling Model: A Literature Review. *Regional Engineering Posgraduate Conference (EPC)*, 1–6. https://www.researchgate.net/publication/260034430

Al-Mudhaffar, A., Nissan, A., & Bang, K. L. (2016). Bus Stop and Bus Terminal Capacity. *Transportation Research Procedia*, *14*, 1762–1771. https://doi.org/10.1016/j.trpro.2016.05.142

Alexiev, A. S., Janssen, M., & den Hertog, P. (2018). The Moderating Role of Tangibility in Synchronous Innovation in Services. *Journal of Product Innovation Management*, *35*(5), 682–700. https://doi.org/10.1111/jpim.12459

Almeslati, A. I., Rahmat, R. A. O. K., Jaafar, O., & Abuhamoud, M. A. (2011). The rise of the private car usage in Kajang, Malaysia: role of parking policy on reducing car usage. *Journal of Applied Sciences Research*, *7*(8), 1263–1268. http://www.aensionline.com/jasr/jasr/2011/1263-1268.pdf

Almeslati, A. S. I., Rahmat, R. A. O. K., Jaafar, O., & Abuhamoud, M. A. A. (2011). The Rise of The Private Car Usage in Kajang, Malaysia: Role of Parking Policy on Reducing Car Usage. *Journal of Applied Sciences Research*, *7*(8), 1263–1268.

Aloul, Sahar; Naffa, R. M. M. (2018). *A Perspective of Women Users of Public Transportation*.

Altshuler, A. A. (1969). Transit Subsidies: By Whom, for Whom? *Journal of the American Institute of Planners*, *35*(2), 84–89.

Amin-Naseri, M. R., & Baradaran, V. (2015). Accurate Estimation of Average waiting Time in Public Transportation Systems. *Transportation Science*, *49*(2), 213–222. https://doi.org/10.1287/trsc.2013.0514

Annachira Kushalappa, J., Preethi, B. L., Shwetha, B. M., & Bharathi, C. (2015). A Study on Stress Among Government City Bus Drivers in Hubli. *International Journal of Biomedical Research*, *6*(09), 1–6. https://doi.org/10.7439/ijbr

Association, A. P. T. (2007). *A Profile of Public Transportation Passenger Demographics and Travel Characteristics Reported in On-Board Surveys* (Vol. 20006, Issue May).

Azmi, D. I., Karim, H. A., & Amin, M. Z. M. (2012). Comparing the Walking Behaviour between Urban and Rural Residents. *Procedia - Social and Behavioral Sciences*, *68*, 406–416. https://doi.org/10.1016/j.sbspro.2012.12.237

Bachok, S., Osman, M. M., & Ponrahono, Z. (2014). Passenger's Aspiration Towards Sustainable Public Transportation System: Kerian District, Perak, Malaysia. *Procedia - Social and Behavioral Sciences*, *153*, 553–565. https://doi.org/10.1016/j.sbspro.2014.10.088

Back, C. O. N. (2019). Percent of Workers Who Commute to Work by Public Transportation. *Enviro Atlas*, 1–2.

Bahadur, W., Aziz, S., & Zulfiqar, S. (2018). Effect of Employee Empathy on Customer Satisfaction and Loyalty During Employee–Customer Interactions: The Mediating Role of Customer Affective Commitment and Perceived Service Quality. *Cogent Business and Management*, *5*(1), 1–21. https://doi.org/10.1080/23311975.2018.1491780

Barabino, B., Deiana, E., & Tilocca, P. (2012). Measuring service quality in urban bus transport: A modified SERVQUAL approach. *International Journal of Quality and Service Sciences*, *4*(3), 238–252. https://doi.org/10.1108/17566691211269567

Basso, L. J., Guevara, C. A., Gschwender, A., & Fuster, M. (2011). Congestion pricing, transit subsidies and dedicated bus lanes: Efficient and practical solutions to congestion. *Transport Policy*, *18*(5), 676–684. https://doi.org/10.1016/j.tranpol.2011.01.002

Beckmann, M. J. (1974). Spatial equilibrium in the housing market. *Journal of Urban Economics*, *1*(1), 99–107. https://doi.org/10.1016/0094-1190(74)90025-4

Bellizzi, M. G., Dell'Olio, L., Eboli, L., & Mazzulla, G. (2020). Heterogeneity in Desired Bus Service Quality from Users' and Potential Users' Perspective. *Transportation Research Part A: Policy and Practice*, *132*(November 2018), 365–377. https://doi.org/10.1016/j.tra.2019.11.029

Bempong, A. E. (2019). The Role of Transportation in Logistics Chain. *TEXILA INTERNATIONAL JOURNAL OF MANAGEMENT*. https://doi.org/10.21522/tijmg.2015.05.01.art015

Berawi, M. A., Saroji, G., Iskandar, F. A., Ibrahim, B. E., Miraj, P., & Sari, M. (2020). Optimizing Land Use Allocation of Transit-Oriented Development (TOD) to Generate Maximum Ridership. *Sustainability*, *12*, 1–20.

Berežný, R., & Konečný, V. (2017). The Impact of the Quality of Transport Services on Passenger Demand in the Suburban Bus Transport. *Procedia Engineering*, *192*, 40–45. https://doi.org/10.1016/j.proeng.2017.06.007

Berggren, U., Brundell-Freij, K., Svensson, H., & Wretstrand, A. (2019). Effects From Usage of Pre-trip Information and Passenger Scheduling Strategies on Waiting Times in Public Transport: An Empirical Survey Based on A Dedicated Smartphone Application. *Public Transport*, *0123456789*. https://doi.org/10.1007/s12469-019-00220-1

Bidin, M. O., Mutti, M. A. I., & Mohd Yassin, H. R. (2018). Development of a Bus Stop Design Guideline: Case Study on the Main Campus of Universiti Sains Malaysia (USM). *Advanced in Economics, Business and Management Research (AEBMR)*, *41*(January), 318–326. https://doi.org/10.2991/bcm-17.2018.62

Borgers, N., de Leeuw, E., & Hox, J. (2000). Children as Respondents in Survey Research:Cognitive Development and Response Quality. *BMS Bulletin of Sociological Methodology/ Bulletin de Methodologie Sociologique*, *66*(1), 60–75. https://doi.org/10.1177/075910630006600106

Borhan, M. N., Hakimi Ibrahim, A. N., Syamsunur, D., & Rahmat, R. A. (2019). Why public bus is a less attractive mode of transport: A case study of Putrajaya, Malaysia. *Periodica Polytechnica Transportation Engineering*, *47*(1), 82–90. https://doi.org/10.3311/PPtr.9228

Brysland, A., & Curry, A. (2001). Service Improvements in Public Services Using SERVQUAL. *Managing Service Quality: An International Journal*. https://doi.org/10.1108/09604520110410601

Cats, O., Susilo, Y. O., & Reimal, T. (2017). The Prospects of Fare-Free Public Transport: Evidence from Tallinn. *Transportation*, *44*(5), 1083–1104. https://doi.org/10.1007/s11116-016-9695-5

Ceran, E. B., & Esen, T. E. C. (2018). Service Quality Perception Comparison in Transport Systems within The Context of Users of Instanbul City's Metro and Metrobus Public Transportation Systems. *International Journal of Social Sciences*, *6*(October), 94-1–6.

Chakrabarty, S., Brown, G., & Widing, R. (2012). The Role of Top Management in Developing A Customer-oriented Sales Force. *Journal of Personal Selling and Sales Management*. https://doi.org/10.2753/PSS0885-3134320403

Chang, F., & Gunasekara, Y. (2012). A Study on the Improvement of The Bus Driver's User Interface. In *HUFS Law Review* (Vol. 36, Issue 4). https://doi.org/10.17257/hufslr.2012.36.4.127

Chaudhari, A. (2015). A Study of Facilities Provided by Maharashtra State Road Transport Corporation at Bus Station to Passengers in Maharashtra. *The International Journal of Business & Management*, *3*(4), 42–48.

Chee, W. L., & Fernandez, J. L. (2013). Factors that Influence the Choice of Mode of Transport in Penang: A Preliminary Analysis. *Procedia - Social and Behavioral Sciences*, *91*(225), 120–127. https://doi.org/10.1016/j.sbspro.2013.08.409

Chen, K. ., & Larry, S. . (2009). Determination of Level of Service (LOS) on Different Roads in Kuching Area (A Case study). *UNIMAS E-Journal of Civil Engineering*, *1*(1), 1–6.

Cheng, H. G., & Phillips, M. R. (2014). Secondary Analysis of Existing Data : Opportunities and Implementation. *Shanghai Archives of Psychiatry*, *26*(6), 371–376.

Cheng, J. H., Lai, C. Y., Chen, H. P., & Ou, C. L. (2010). The Service Quality Analysis of Public Transportation System Using PZB Model-Dynamic Bus Information System. *40th International Conference on Computers and Industrial Engineering: Soft Computing Techniques for Advanced Manufacturing and Service Systems, CIE40 2010*, *August 2010*, 1–6. https://doi.org/10.1109/ICCIE.2010.5668302

Chowdhary, N., & Prakash, M. (2007). Prioritizing Service Quality Dimensions. *Managing Service Quality: An International Journal*, *17*(5), 493–509. https://doi.org/10.1108/09604520710817325

Chowdhury, S. (2019). Role of Gender in the Ridership of Public Transport Routes Involving Transfers. *Transportation Research Record*, *2673*(4), 855–863. https://doi.org/10.1177/0361198119837155

Ciesielska, M., & Jemielniak, D. (2017). Qualitative Methodologies in Organization Studies. In *Qualitative Methodologies in Organization Studies* (Vol. 2, Issue December). https://doi.org/10.1007/978-3-319-65442-3

Cochran, W. F. (1977). SamplingTechniques: Third Edition. In *Sampling Techniques*. https://scholar.google.com.tr/scholar?q=sampling+techniques&btnG=&hl=en&as_sdt=0,5#0

Collins, P. A., & Agarwal, A. (2015). Impacts of Public Transit Improvements on Ridership , and Implications for Physical Activity , in A Low Density Canadian City. *Preventinve Medecine Reports*, *2*, 874–879. https://doi.org/10.1016/j.pmedr.2015.10.001

Conn, V. S., Algase, D. L., Rawl, S. M., Zerwic, J. J., & Wyman, J. F. (2010). Publishing Pilot Intervention Work. *Western Journal of Nursing Research*, *32*(8), 994–1010. https://doi.org/10.1177/0193945910367229

Coogan, M., Spitz, G., Adler, T., McGuckin, N., Kuzmyak, R., & Karash, K. (2018). Understanding Changes in Demographics, Preferences, and Markets for Public Transportation. In *Understanding Changes in Demographics, Preferences, and Markets for Public Transportation*. https://doi.org/10.17226/25160

Cortés, C. E., Gibson, J., Gschwender, A., Munizaga, M., & Zúñiga, M. (2011). Commercial Bus Speed Diagnosis Based on GPS-monitored Data. *Transportation Research Part C: Emerging Technologies*, *19*(4), 695–707. https://doi.org/10.1016/j.trc.2010.12.008

Cortina, J. M. (1993). What Is Coefficient Alpha? An Examination of Theory and Applications. *Journal of Applied Psychology*, *78*(1), 98–104. https://doi.org/10.1037/0021-9010.78.1.98

Crabtree, J. L. (2017). The Importance of Public Transportation to Community Mobility and Participation. *AOTA*, *22*(February), 1–8.

Dahalan, D., Silva, J. L. D., Abdullah, H., Ismail, I. A., & Ahmad, N. (2017). Youth Confidence in The Quality of Public Transport Services: The Case of Greater KL, Malaysia. *Geografia - Malaysian Journal of Society and Space*, *11*(9), 12–22.

Daniel, C. N., & Berinyuy, L. P. (2010). Using the SERVQUAL Model to Assess Service Quality and Customer Satisfaction. An Empirical Study of Grocery Stores in Umea. In *Umea School of Business*. http://umu.diva-portal.org/smash/record.jsf?pid=diva2:327600

Daniels, R., & Mulley, C. (2013). Explaining Walking Distance to Public Transport: The Dominance of Public Transport Supply. *Journal of Transport and Land Use*, *6*(2), 5–20. https://doi.org/10.5198/jtlu.v6i2.308

Das, S., & Pandit, D. (2013a). Methodology to Determine Level of Service for Bus Transit in a Developing Country Like India. *CUPUM*, 1–28.

Das, S., & Pandit, D. (2013b). Methodology to Determine Level of Service for Bus Transit in A Developing Country Like India. *Proceedings of CUPUM 2013: 13th International Conference on Computers in Urban Planning and Urban Management - Planning Support Systems for Sustainable Urban Development*, 1–24.

de Leeuw, E. (2011). Improving Data Quality when Surveying Children and Adolescents: Cognitive and Social Development and its Role in Questionnaire Construction and Pretesting. In *Report prepared for the Annual Meeting of the Academy of Finland*.

De Oña, J., & De Oña, R. (2015). Quality of Service in Public Transport Based on Customer Satisfaction Surveys: A Review and Assessment of Methodological Approaches. *Transportation Science*, *49*(3), 605–622. https://doi.org/10.1287/trsc.2014.0544

Delhi, N. E. W. (2017). Asia ' s least and most stressful cities Bangladesh ' s capital Dhaka tops the list of the most stressed cities in Asia whereas Sydney followed by Singapore , Taipei and Osaka are the least stressed cities in Asia , according to the data compiled by the U. *The Nation*.

Dell'Olio, L., Ibeas, A., & Cecin, P. (2011). The Quality of Service Desired by Public Transport Users. *Transport Policy*, *18*(1), 217–227. https://doi.org/10.1016/j.tranpol.2010.08.005

Department of Statistics Malaysia. (2011). *Population Distribution and Basic Demographic Characteristic Report 2010*. https://www.dosm.gov.my/v1/index.php?r=column/ctheme&menu_id=L0pheU43NWJwRWVSZklWdzQ4TlhUUT09&bul_id=MDMxdHZjWTk1SjFzTzNkRXYzcVZjdz09

Department of Statistics Malaysia. (2017). *City Population: Mukim Kajang*. https://www.citypopulation.de/php/malaysia-mukim-admin.php?adm2id=100804

Department of Statistics Malaysia. (2020). *Penemuan Utama 2019*.

Department of Transport, Department of Environment and Conservation, & Department of Health. (2019). *TravelSMART Workplace Fact Sheet Promoting Public Transport*.

Diab, E., Badami, M., & El-Geneidy, A. (2015). Bus Transit Service Reliability and Improvement Strategies : Integrating the Perspectives of Passengers and Transit Agencies In North America Ehab Diab , Madhav Badami , and Ahmed El-Geneidy School of Urban Planning Email : *Transport Reviews*, *23*(3), 1–34.

Doody, O., & Doody, C. M. (2015). Conducting A Pilot Study: Case Study of A Novice Researcher. *British Journal of Nursing*, *24*(21), 1074–1078. https://doi.org/10.12968/bjon.2015.24.21.1074

E. Zulaika. (2015). The Study on Customer Satisfaction of Public Transport in Melaka By Using Service Quality Dimensions : A Case Study of Panorama Melaka. In *Universiti Teknikal Malaysia Melaka*. https://doi.org/10.1172/JCI5504

Eboli, L., & Mazzulla, G. (2012). Performance Indicators for An Objective Measure of Public Transport Service Quality. *European Transport Conference*, *51*, 1–21.

Elgar, I., & Kennedy, C. (2005). Review of Optimal Transit Subsidies: Comparison between Models. *Journal of Urban Planning and Development*, *131*(2), 71–78. https://doi.org/10.1061/(asce)0733-9488(2005)131:2(71)

Etection, C. O. D., Usepa, B. Y., Ingle, M. E. S., & Rocedure, L. A. S. A. L. P. (2005). *Appendix O Level of Service Standard and Measurements* (Issue December).

European Commission. (2013). Attitudes of Europeans towards urban mobility. *Special Eurobarometer 406*.

Factbook, C. W. (2019). *Malaysia Age Structure*. Index Mundi. https://www.indexmundi.com/malaysia/age_structure.html

Faizun, M., Yazid, M., Ali, A. M., Manaf, S. A., Lumpur, U. K., & Lumpur, K. (2020). CUSTOMER SATISFACTION IN PUBLIC TRANSPORT SERVICE. *European Journal of Molecular & Clinical Medicine*, *07*(03), 4108–4127.

Fan, Y., & Das, K. (2015). *Assessing the Impacts of Student Transportation on Public Transit Final Report* (Issue December).

Farida, I. (2018). Public Transport Service Relating to Safety. *IOP Conference Series: Materials Science and Engineering*, *434*(1), 1–4. https://doi.org/10.1088/1757-899X/434/1/012195

Fatima, K., & Moridpour, S. (2019). Measuring Public Transport Accessibility for Elderly. *MATEC Web of Conferences*, *259*, 1–5. https://doi.org/10.1051/matecconf/201925903006

Feng, S., Wu, H., Sun, X., & Li, Z. (2016). Factors of Perceived Waiting Time and Implications on Passengers' Satisfaction with Waiting Time. *Traffic & Transportation*, *28*(2), 155–163.

Filianie Aziz. (2013). *A Study on Service Quality in Relations Towards Customer* (Issue December).

Firew, T., Weckström, C., & Mladenovic, M. (2016). *Analysis of Service Reliability of Public Transportation in the Helsinki Capital Region : The Case of Bus Line 550*.

Fornell, C., Johnson, M. D., Anderson, E. W., Cha, J., & Bryant, B. E. (1994). Index : Nature , Purpose , and Findings. *Journal of Marketing*, *60*, 7–18.

Frankena, M. (1973). Income Distributional Effects of Urban Transit Subsidies. *Journal of Transport Economics and Policy*, *7*(3), 215–230.

Friman, M., & Fellesson, M. (2009). Service Supply and Customer Satisfaction in Public Transportation : The Quality Paradox. *Journal of Public Transportation*, *12*(4), 57–69. https://doi.org/10.5038/2375-0901.12.4.4

Ghotbabadi, A. R., Feiz, S., & Baharun, R. (2015). Service Quality Measurements: A Review. *International Journal of Academic Research in Business and Social Sciences*, *5*(2). https://doi.org/10.6007/ijarbss/v5-i2/1484

Gogoi, L. (2019). Service Delivery and Consumer's Satisfaction Under Assam State Transport Corporation (ASTC). *International Journal of Innovative Technology and Exploring Engineering*, *8*(11), 1845–1850. https://doi.org/10.35940/ijitee.K1797.0981119

Golfashani, N. (2003). Understanding Reliability and Validity in Qualitative Research. *The Qualitative Report*, *8*(4), 597–607. https://nsuworks.nova.edu/tqr/vol8/iss4/6

Goodman, A., Jones, A., Roberts, H., Steinbach, R., & Green, J. (2014). "We Can All Just Get on a Bus and Go": Rethinking Independent Mobility in the Context of the Universal Provision of Free Bus Travel to Young Londoners. *Mobilities*, *9*(2), 275–293. https://doi.org/10.1080/17450101.2013.782848

Gossen, R., & Purvis, C. L. (2004). Activities, Time, and Travel: Changes in Women's Travel Time Expenditures, 1990 - 2000. *Research on Women's Issues in Transportation: Report of a Conference*, *2*(December), 21–29.

Govinder, K. K. (2014). A Theoretical Overview of Public Transport Service Quality: A Focus on Bus and Mini-Bus Taxi Service in South Africa. *Journal of Social Sciences (COES&RJ-JSS)*, *3*(2), 301–316.

Guirao, B., García-pastor, A., & López-lambas, M. E. (2016). The Importance of Service Quality Attributes in Public Transportation : Narrowing The Gap Between Scientific Research and Practitioners' Needs. *Transport Policy*, *49*, 68–77. https://doi.org/10.1016/j.tranpol.2016.04.003

Guo, J. (2016). Literature Review on Transit Bus Maintenance Cost. In *California Air Resources Board* (Issue August). https://www.arb.ca.gov/msprog/bus/maintenance_cost.pdf

Halej, J. (2017). Ethics in primary research (focus groups, interviews and surveys). In *ECU Research and Data Briefing*. https://warwick.ac.uk/fac/cross_fac/ias/activities/accolade/resources/ecu_research_ethics.pdf

Haron, N. F., & Tahir, W. (2018). Assessing Bus Performance Rating in Kajang , Selangor. *IOP Conf. Series: Earth and Environmental Science 140*, 1–9.

Haron, S., Noor, S. M., Farhan, A., & Sadullah, M. (2013). New Dimension of Bus Service Quality Performance Measure. *Proceedings of International Conference on Advances in Computing Advances in Intelligent Systems and Computing*, *174 AISC*(July), 1–23.

Heale, R., & Twycross, A. (2015). Validity and Reliability in Quantitative Studies. *Evidence-Based Nursing*, *18*(3), 66–67. https://doi.org/10.1136/eb-2015-102129

Hensher, D. A. (2015). Customer Service Quality and Benchmarking in Public Transport Contracts. *International Journal of Quality Innovation*, *1*(1), 1–17. https://doi.org/10.1186/s40887-015-0003-9

Higgins, D. L., & Ryan, W. (1980). *Levels of Service Concepts in Transport Planning: Review and Future Prospects*.

Holmgren, J. (2013). An Analysis of The Determinants of Local Public Transport Demand Focusing The Effects of Income Changes. *European Transport Research Review*, *5*(2), 101–107. https://doi.org/10.1007/s12544-013-0094-0

Hu, X., Zhao, L., & Wang, W. (2015). Impact of perceptions of bus service performance on mode choice preference. *Advances in Mechanical Engineering*, *7*(3), 1–11. https://doi.org/10.1177/1687814015573826

Imre, Ş., & Çelebi, D. (2017). Measuring Comfort in Public Transport: A case study for İstanbul. *Transportation Research Procedia*, *25*, 2441–2449. https://doi.org/10.1016/j.trpro.2017.05.261

Islam, R., Chowdhury, M. S., Sarker, M. S., & Ahmed, S. (2014). Measuring Customer's Satisfaction on Bus Transportation. *American Journal of Economics and Business Administration*, *6*(1), 34–41. https://doi.org/10.3844/ajebasp.2014.34.41

Ismail, R., Hafezi, M. H. M., Nor, R. M., Ambak, K., & Tehran, C. (2012). Passengers Preference and Satisfaction of Public Transport in Malaysia. *Australian Journal of Basic and Applied Sciences*, *6*(8), 410–416. http://ukm.pure.elsevier.com/ms/publications/passengers-preference-and-satisfaction-of-public-transport-in-malaysia(cd8afa4d-9115-488b-96ab-f6c8866a816d).html

Ismail, R., Hafezi, M. H., & Nor, R. M. (2013). Passengers Preference and Satisfaction of Public Transport in Malaysia, Part II: A Comparative Analysis of Komuter and LRT Network. *Research Journal of Applied Sciences, Engineering and Technology*, *6*(8), 1450–1456. https://doi.org/10.19026/rjaset.6.3969

Jager, J. De, & Plooy, T. Du. (2007). Measuring tangibility and assurance as determinants of service quality for public health care in South Africa. *Acta Commercii*, 96–111. https://doi.org/10.4102/ac.v7i1.17

Jayaraman K. (2011). Robust Models for The Utilization of Public Bus Transport Services in Malaysia. *African Journal of Business Management*, *5*(26), 10586–10600. https://doi.org/10.5897/ajbm11.510

Joewono, Tri B., Tarigan, A. K. M., & Susilo, Y. O. (2016). Road-based Public Transportation in Urban Areas of Indonesia: What Policies Do Users Expect to Improve The Service Quality? *Transport Policy*, *49*, 114–124. https://doi.org/10.1016/j.tranpol.2016.04.009

Joewono, Tri Basuki, & Kubota, H. (2006). Safety and Security Improvement in Public Transportation based on Public Perception in Developing Countries. *IATSS Research*, *30*(1), 86–100. https://doi.org/10.1016/s0386-1112(14)60159-x

Joewono, Tri Basuki, Santoso, D. S., Adinegoro, L., & Kharisma, A. H. (2017). Characteristics of Travel, Activities, and Action Space of Young Workers Riding Motorcycles in Developing City. *Transportation Research Procedia*, *25*, 5023–5039. https://doi.org/10.1016/j.trpro.2017.05.202

K. Prathibaa, & Dr. K. Gunasekaran. (2016). Planning of Bus Stops for Safe and Effecient Passenger Boarding and Alighting. *International Journal of*

Engineering Research And, *5*(06), 296–304. https://doi.org/10.17577/ijertv5is060474

Kahneman, D., & Deaton, A. (2010). High Income Improves Evaluation of Life but Not Emotional Well-being. *Proceedings of the National Academy of Sciences of the United States of America*, *107*(38), 16489–16493. https://doi.org/10.1073/pnas.1011492107

Kajang Municipal Council Management. (2018). *Taklimat Rancangan Tempatan Majlis Perbandaran Kajang, Selangor 2035 (Penggantian 4)* (Vol. 2035).

Kamaruddin, R., Osman, I., & Pei, C. A. C. (2012). Public Transport Services in Klang Valley: Customer Expectations and Its Relationship Using SEM. *Procedia - Social and Behavioral Sciences*, *36*, 431–438. https://doi.org/10.1016/j.sbspro.2012.03.047

Kawulich, B. B. (2005). Participant observation as a data collection method. *Forum Qualitative Sozialforschung*, *6*(2). https://doi.org/10.17169/fqs-6.2.466

Kementerian Dalam Negeri. (2019). *Statistik Pekerja Asing Aktif Terkini Mengikut Negeri dan Sektor Sehingga 30 Jun 2019*. Data.Gov.My.

Kittelson & Associates. (1999). Transit Capacity and Quality of Service Manual 1st Edition. In *Transportation Research Board* (Issue 5).

Krejcie, R. V, & Morgan, D. (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement*, *30*, 607–610.

Krizek, K., & El-Geneidy, A. (2007). Segmenting Preferences and Habits of Transit Users and Non-Users. *Journal of Public Transportation*, *10*(3), 71–94. https://doi.org/10.5038/2375-0901.10.3.5

Kujala, R., Weckström, C., & Mladenovi, M. N. (2018). *Computers , Environment and Urban Systems Travel times and transfers in public transport : Comprehensive accessibility analysis based on Pareto-optimal journeys*. *67*, 41–54. https://doi.org/10.1016/j.compenvurbsys.2017.08.012

Kumar, D. (2012). Service Quality and Satisfaction: Study on International Students in universities of North Malaysia. *International Journal of Research in Management*, *3*(2), 116–133.

Kumar, R. (2012). Research Methodology A Step by Step Guide for Beginners. In *SAGE* (Third Edit).

Lee, B. M., Schuele, C. M., & Salkind, N. J. (2020). Demographics. In *Research Design* (p. 347).

Lee, S., Comer, L. B., Dubinsky, A. J., & Schafer, K. (2011). The Role of Emotion in The Relationship Between Customers and Automobile Salespeople. *Journal of Managerial Issues*.

Li, Z., & Hensher, D. A. (2013). Crowding in Public Transport: A Review of Objective and Subjective Measures. *Journal of Public Transportation*, *16*(2), 107–134. https://doi.org/10.5038/2375-0901.16.2.6

Liang, R., Chang, C., & Wang, T. (2011). The Effect of Service Responsiveness and Social Emotions on Service Outcomes: An Empirical Investigation of Service Firms. *African Journal of Business Management*, *5*(8), 3155–3167. https://doi.org/10.5897/AJBM10.634

Lim, A. (2020). Vehicles Registrations in Malaysia – 31.2 mil as of 2019. *Paultan.Org*.

Lissitz, R. W., & Green, S. B. (1975). Effect of The Number of Scale Points on Reliability: A Monte Carlo Approach. *Journal of Applied Psychology*, *60*(1), 10–13. https://doi.org/10.1037/h0076268

Liu, Y., Wang, W., Ding, C., Guo, H., Guo, W., Yao, L., Xiong, H., & Tan, H. (2012). Metropolis Parking Problems and Management Planning Solutions for Traffic Operation Effectiveness. *Mathematical Problems in Engineering*, *2012*, 1–6. https://doi.org/10.1155/2012/678952

Lochan Dhar, P. R. (2008). Quality of Work Life: A Study of Municipal Corporation Bus Drivers. *The Journal of International Social Research*, *1/5*, 251–273.

Luo, Y., & Qian, D. (2018). Research on the Impact Scope of Bus Stations Based on the Application of Bus Lanes. *Journal of Advanced Transportation*, *2018*, 1–10. https://doi.org/10.1155/2018/3935852

Magnusson, J., Sundin, E., & Gustafsson, K. E. (2005). *Service Tangibility and Customer Loyalty: Is there a relationship?*

Mah, S., & Mitra, R. (2017). The Effects of A Free Bus Program on Older Adults Travel Behaviour: A Case Study of A Canadian Suburban Municipality. *Case Studies on Transport Policy*, *5*(3), 460–466. https://doi.org/10.1016/j.cstp.2017.05.003

Mahmoud, M., & Hine, J. (2016). Measuring The Influence of Bus Service Quality on The Perception of Users. *Transportation Planning and Technology*, *39*(3), 284–299. https://doi.org/10.1080/03081060.2016.1142224

Majlis Perbandaran Kajang. (2020). *Rancangan Tempatan Majlis Perbandaran Kajang Selangor 2035 (Penggantian): Jilid I (Strategi Pembangunan)*.

Marcelo, C., Idal, L., Bolis, I., & Abrahao, J. (2015). The Work of Bus Drivers and Their Contribution to Excellence in Public Transportation. *Production*, *25*(2), 323–335.

Marie K. Larsen. (2010). *Analysis of the Danish Travel Survey data on private and public transportation*. 1–16.

Martins, F. S., Cunha, J. A. C. da, & Serra, F. A. R. (2018). Secondary Data in Research – Uses and Opportunities. *Revista Ibero-Americana de Estratégia*, *17*(04), 01–04. https://doi.org/10.5585/ijsm.v17i4.2723

Mat Shukri, N. S., & Ponrahono, Z. (2019). Conceptualising The Free Bus Service Quality Performance Assessment. *The European Proceedings of Multdisciplinary Sciences*, *15*, 825–833.

Mathew, T. V., & Rao, K. V. K. (2007). Capacity and Level of service. In *Introduction to Transportation Engineering* (pp. 1–6). https://nptel.ac.in/courses/105101087/downloads/Lec-35.pdf

Mei Yi, L., Siew Wan, T., Haldorai, K., Rahman, A., Haque, R., Haibin, P., & Shengnan, Y. (2018). Structure Equation Analysis on Customer Satisfaction of Public Transport: An Empirical Study in Klang Valley Malaysia. *International Journal of Engineering & Technology*, *7*(4.38), 778. https://doi.org/10.14419/ijet.v7i4.38.27544

Meyer, C., & Kan, R. (2017). Determination of Bus Occupancy , Routes and Stop Locations from Mobile Device Reports. *Defensive Publication Series Art.*, *473*, 2–10.

Michael, S. (2017). Selangor's Free Bus Service to Use Electric Vehicles Next Year. *The Star Online*, 1–2. http://jjbs.hu.edu.jo/files/v6n4/Paper Number 3m.pdf

Mikhaylov, A., Gumenyuk, I., & Mikhaylova, A. (2015). The SERVQUAL Model in Measuring Service Quality of Public Transportation : Evidence from Russia. *Quality, Access to Success*, *16*(144), 78–83.

Mikhaylov, A. S., & Mikhaylova, A. A. (2014). The Public Transportation of Russia and Sweden. A Comparative Analysis of Service Quality from Customer Perspective. *Journal of Applied Economic Sciences*, *9*(3), 422–432.

Ministry of Transport Malaysia. (2017). Statistik Pengangkutan Malaysia. In *Statistik Pengangkutan Malaysia 2017*. http://www.mot.gov.my/my/Statistik Tahunan Pengangkutan/Statistik Pengangkutan Malaysia 2017.pdf

Ministry of Transport Malaysia. (2018). *Statistik Pengangkutan Malaysia*.

Ministry of Transport Malaysia. (2019). National Transport Policy. In *Ministry of Transport* (Issue February). https://s3.amazonaws.com/ndpc-static/pubication/Transport+Policy_Dec2008.pdf

Mohd Faizun, M. Y., Aeshah, M. A., & Sanusi, A. M. (2020). Customer Satisfaction In Public Transport Service. *European Journal of Molecular & Clinical Medicine*, *7*(3), 4108–4127.

Muhammad Adib Bin Mahmud. (2010). *Studies on Bus Services and Passenger Demand Sustainability* (Issue December).

Mulalic, I., Pilegaard, N., & Rouwendal, J. (2015). Evidence from The Copenhagen Metropolitan Area. In *Tinbergen Institute Discussion Paper: Vol. VII* (Issue 139). http://www.tinbergen.nl

Multiangled. (2018). Introduce bus cards to replace free bus services. *Malaysia Kini*. https://www.malaysiakini.com/letters/418024

Muthupandian, K. S., & Vijayakumar, C. (2012). *Measurement of Passengers Service Quality in Public Transportation: SERVQUAL Analysis* (Vol. 1, Issue 5). https://doi.org/10.5897/JAERD12.088

Nanaki, E. A., Koroneos, C. J., Roset, J., Susca, T., Christensen, T. H., De Gregorio Hurtado, S., Rybka, A., Kopitovic, J., Heidrich, O., & López-Jiménez, P. A. (2017). Environmental assessment of 9 European public bus transportation systems. *Sustainable Cities and Society*, *28*, 42–52. https://doi.org/10.1016/j.scs.2016.08.025

Napiah, M., Kamaruddin, I., & Suwardo. (2011). Punctuality index and expected average waiting time of stage buses in mixed traffic. *WIT Transactions on the Built Environment*, *116*(September 2014), 215–226. https://doi.org/10.2495/UT110191

Newman, P., & Kenworthy, J. (1999). *Sustainability and Citires: Overcoming Automobile Dependence*. Island Press. https://books.google.com.my/books?id=X-p0Nw7XbzIC&printsec=copyright&redir_esc=y#v=onepage&q&f=false

Ng, W.-S., & Acker, A. (2018). Understanding Urban Travel Behaviour by Gender for Efficient and Equitable Transport Policies. *International Transport Forum*, *2018–01*, 1–19. https://doi.org/10.1016/j.physio.2013.08.007

Noor, H. M., Nasrudin, N., & Foo, J. (2014). Determinants of Customer Satisfaction of Service Quality: City Bus Service in Kota Kinabalu, Malaysia. *Procedia - Social and Behavioral Sciences*, *153*, 595–605. https://doi.org/10.1016/j.sbspro.2014.10.092

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), 1013–1018. https://doi.org/10.3923/jas.2007.1013.1018

Ok, S., & Hengsadeekul, T. (2018). Customer Satisfaction on Service Quality of Bus Transport: A Survey of Passengers from Phnom Penh to Poipet in Cambodia. *Journal of Social Science Studies*, *5*(2), 114. https://doi.org/10.5296/jsss.v5i2.13020

Oluwaseyi, S., & Olaniyi, A. (2018). *Assessment of Passengers ' Satisfaction of Public Transport System in Akure-Owo Axis , Nigeria*. *4*(1), 1–16. https://doi.org/10.54655/aijmsr.v4n1p1

Orth, H., Dorbritz, R., & Weidmann, U. (2011). Public Transport Capacity and Quality – Development of an LOS-Based Evaluation Scheme. *11th Swiss Transport Research Conference*, 2–16.

Pakurár, M., Haddad, H., Nagy, J., Popp, J., & Oláh, J. (2019). The service quality dimensions that affect customer satisfaction in the Jordanian banking sector. *Sustainability (Switzerland)*, *11*(4), 1–24. https://doi.org/10.3390/su11041113

Parasuraman, A., Zeithaml, V., Berry, L. (1988). SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality. *Jorunal of Retailing*, *64*(1), 12–40.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (2009). A Conceptual Model of Service Quality and iIts Implications for Future Research. *The Journal of Marketing*, *49*(4), 41–50.

Parry, I. W. H., & Small, K. A. (2009). Shoud Urban Transit Subsidies Be Reduced? *The American Economic Review*, *99*(3), 700–724. https://doi.org/10.1257/aer.99.3.700

Percetakan Nasional Malaysia Berhad. (2007). Undang-Undang Malaysia, Akta 668. In *Akta Pertubuhan Belia dan Pembangunan Belia 2007*.

Perone, J. S. (2002). Advantages and Disadvantages of Fare-Free Transport Policy. In *Center for Urban Transport Research National Center for Transportation Research University of South Florida*. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.504.198&rep=rep1&type=pdf

Piaw, C. Y. (2014). *Kaedah Penyelidikan (Buku 1)*.

Planners M Consult. (2020). *Rancangan Tempat Majlis Perbandaran Kajang, Selangor 2035 (Penggantian)*.

Pojani, D., & Stead, D. (2015). Sustainable Urban Transport in The Developing World: Beyond Megacities. *Sustainability (Switzerland)*, *7*(6), 7784–7805. https://doi.org/10.3390/su7067784

Ponrahono, Z., Bachok, S., Ibrahim, M., & Osman, M. M. (2016). Assessing Passengers' Satisfaction Level on Bus Services in Selected Urban and Rural Centres of Peninsular Malaysia. *Procedia - Social and Behavioral Sciences*, *222*, 837–844. https://doi.org/10.1016/j.sbspro.2016.05.183

Ponrahono, Z., Bachok, S., Osman, M. M., Ibrahim, M., Abdullah, M. F., & Abdullah, A. (2015). Assessing The Urban and Rural Stage Bus Services Disparities in Peninsula Malaysia. *Journal of Malaysian Institute of Planners*, *XIII*, 65–84. https://doi.org/10.21837/pmjournal.v13.i5.140

Ponrahono, Z., Isa, N. M., Aris, A. Z., & Harun, R. (2019). The traffic volume and level of service (los) of universiti putra Malaysia (upm) serdang campus main access.

Planning Malaysia, *17*(2), 50–61. https://doi.org/10.21837/pmjournal.v17.i10.628

Projects, C. (2019). *Declining bus ridership : Improving the efficiency of transit networks*. *July*.

Putriani, O., & Fauzi, I. (2018). A comparative study of Transit Oriented Development (TOD) at Yogyakarta Railway Station. *MATEC Web of Conferences*, *181*, 1–11. https://doi.org/10.1051/matecconf/201818102001

Qatra, R. (2016). *Analysis of Transit Accessibility for People with Disabilities*. http://scholarworks.wmich.edu/masters_theses/742/

Rahim, M. N. A., Aziz, Z. A., Hassan, A. A. M., Yazid, M. F. A., Razik, M. A., Miskam, Z., & Mustapha, N. (2021). Factors Influencing Passengers' Preference towards Public Bus Transportation from Kelantan to Northern Region. *Turkish Journal of Computer and Mathematics Education (TURCOMAT)*, *12*(3), 2572–2583. https://doi.org/10.17762/turcomat.v12i3.1257

Rahman, F., Chowdhury, T. D., Haque, M. M. T., Rahman, M. R., & Islam, M. A. (2015). Analyzing Customer Satisfaction of Bus Service In Dhaka City. *International Conference on Recent Innovation in Civil Engineering for Sustainable Development, October*, 829–835.

Ramos, S., Vicente, P., Passos, A. M., Costa, P., & Reis, E. (2019). Perceptions of the public transport service as a barrier to the adoption of public transport: A qualitative study. *Social Sciences*, *8*(5). https://doi.org/10.3390/socsci8050150

Rida Khurshid, Naeem, H., Ejaz, S., Faiza Mukhtar, & Batool, T. (2012). Service Quality and Customer Satisfaction in Public Transport Sector of Pakistan: An Empirical Study. *International Journal of Economics and Management Sciences*, *1*(9), 24–30.

Riphahn, R. T., & Serfling, O. (2005). Item non-response on income and wealth questions. *Empirical Economics*, *30*(2), 521–538. https://doi.org/10.1007/s00181-005-0247-7

Road Service Transportation Unit. (2005). *Bus Stop Design Guide*. https://www.planningni.gov.uk/downloads/busstop-designguide.pdf

Rodrigues, I. B., Adachi, J. D., Beattie, K. A., & MacDermid, J. C. (2017). Development and validation of a new tool to measure the facilitators, barriers and preferences to exercise in people with osteoporosis. *BMC Musculoskeletal Disorders*, *18*(1), 1–9. https://doi.org/10.1186/s12891-017-1914-5

Rohani, M. M., Wijeyesekera, D. C., & Karim, A. T. A. (2013). Bus Operation, Quality Service and The Role of Bus Provider and Driver. *Procedia Engineering*, *53*, 167–178. https://doi.org/10.1016/j.proeng.2013.02.022

Roopa, S., & Rani, M. (2012). Questionnaire Designing for a Survey. *Journal of Indian Orthodontic Society*, *46*(4_suppl1), 273–277. https://doi.org/10.1177/0974909820120509s

Saif, M. A., Zefreh, M. M., & Torok, A. (2019a). Public transport accessibility: A literature review. *Periodica Polytechnica Transportation Engineering*, *47*(1), 36–43. https://doi.org/10.3311/PPtr.12072

Saif, M. A., Zefreh, M. M., & Torok, A. (2019b). Public Transport Accessibility: A Literature Review. *Periodica Polytechnica Transportation Engineering*, *47*(1), 36–43. https://doi.org/10.3311/PPtr.12072

Sam, E. F., Hamidu, O., & Daniels, S. (2018). SERVQUAL Analysis of Public Bus Transport Services in Kumasi Metropolis, Ghana: Core User Perspectives. *Case Studies on Transport Policy*, *6*(1), 25–31. https://doi.org/10.1016/j.cstp.2017.12.004

Satiennam, T., Fukuda, A., & Oshima, R. (2006). A Study on The Introduction of Bus Rapid Transit System in Asian Developing Cities. *IATSS Research*, *30*(2), 59–69. https://doi.org/10.1016/s0386-1112(14)60170-9

Serebrisky, T., Gómez-Lobo, A., Estupiñán, N., & Muñoz-Raskin, R. (2009). Affordability and Subsidies in Public Urban Transport: What Do We Mean, What Can Be Done? *Transport Reviews*, *29*(6), 715–739. https://doi.org/10.1080/01441640902786415

Shaaban, K., & Khalil, R. F. (2013). Investigating the Customer Satisfaction of the Bus Service in Qatar. *Procedia - Social and Behavioral Sciences*, *104*(1), 865–874. https://doi.org/10.1016/j.sbspro.2013.11.181

Shen, X., Feng, S., Li, Z., & Hu, B. (2016). Analysis of bus passenger comfort perception based on passenger load factor and in-vehicle time. *SpringerPlus*, *5*(1), 1–10. https://doi.org/10.1186/s40064-016-1694-7

Singh, A., Arkatkar, S., Subramaniam, U., Sarkar, A., & Kanuganti, S. (2013). Quantification of Level-of-Service Index for Bus Routes in Developing Countries: A Case Study in India. *Journal of the Eastern Asia Society for Transportation Studies*, *10*, 1347–1366. https://doi.org/10.11175/easts.10.1347

Singh, S. (2017). Assessment of Passenger Satisfaction with Public Bus Transport Services: A Case Study of Lucknow City (India). *Studies in Business and Economics*, *11*(3), 107–128. https://doi.org/10.1515/sbe-2016-0039

Sinha, S., Sadhukhan, S., & Priye, S. (2017). The Role of Quality Assessment for Development of Sustainable Bus Service in Mid-sized Cities of India: A Case Study of Patna. *Procedia Engineering*, *198*(September 2016), 926–934. https://doi.org/10.1016/j.proeng.2017.07.138

Sisiopiku, V. P., Byrd, J., & Chittoor, A. (2007). Application of Level-of-Service Methods for Evaluation of Operations at Pedestrian Facilities. *Transportation*

Research Record: Journal of the Transportation Research Board, *2002*(1), 117–124. https://doi.org/10.3141/2002-15

Solah, M. S., Ariffin, A. H., Mohd Isa, M. H., Mohd Jawi, Z., Paiman, N. F., Azhar, H., & Abu Kassim, K. A. (2013). Assessment of Bus Interior Design in Malaysia. *Advanced Engineering Forum*, *10*(December), 367–372. https://doi.org/10.4028/www.scientific.net/aef.10.367

Soltani, S. H. K., Sham, M., Awang, M., & Yaman, R. (2012). Accessibility for Disabled in Public Transportation Terminal. *Procedia - Social and Behavioral Sciences*, *35*(December), 89–96. https://doi.org/10.1016/j.sbspro.2012.02.066

Stanley, R. (1995). Transit Ridership Initiative. *Transit Cooperative Research Program*, *4*, 46. http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rrd_04.pdf

State of Florida Department of Transportation. (2013). 2013 Quality / Level of Service Handbook. In *Report*.

Stewart, F. (2003). Income Distribution and Development. In *In Trade and Development: Directions for the 21st Century* (pp. 185–217). https://doi.org/10.4337/9781843767473.00014

Stjernborg, V., & Mattisson, O. (2016). The role of public transport in society-A case study of general policy documents in Sweden. *Sustainability (Switzerland)*, *8*(11), 1–16. https://doi.org/10.3390/su8111120

Stojic, D., Ciric, Z., Sedlak, O., & Horvat, A. M. (2020). Students' views on public transport: Satisfaction and emission. *Sustainability (Switzerland)*, *12*(20), 1–16. https://doi.org/10.3390/su12208470

Sukor, N. S. A., & Fisal, S. F. M. (2018). Factors Influencing The Willingness to Walk to The Bus Stops in Penang Island. *Journal of Malaysian Institute of Planners*, *16*(1), 193–204. https://doi.org/10.21837/pmjournal.v16.i5.423

Sun, D. J., Xu, Y., & Peng, Z. R. (2015). Timetable Optimization for Single Bus Line Based on Hybrid Vehicle Size Model. *Journal of Traffic and Transportation Engineering (English Edition)*, *2*(3), 179–186. https://doi.org/10.1016/j.jtte.2015.03.006

Suruhanjaya Pengangkutan Awam Darat. (2018). *Rancangan Induk Pengangkutan Awam Darat Negara*.

Susilawati, M., & Nilakusmawati, D. P. E. (2017). Study on The Factors Affecting The Quality of Public Bus Transportation Service in Bali Province Using Factor Analysis. *Journal of Physics: Conference Series*, *855*(1), 1–7. https://doi.org/10.1088/1742-6596/855/1/012051

Syam, A., Khan, A., & Reeves, D. (2012). Demographics Do Matter: An Analysis of People's Travel Behaviour of Different Ethnic Groups in Auckland. *WIT*

Transactions on the Built Environment, *128*(XVIII), 513–525. https://doi.org/10.2495/UT120441

Systems, I., Clay, I. N., & Soil, L. (2014). Application of SERVQUAL in Campus Shuttle Service. *Ge-International Journal of Engineering Research*, *2*(5), 66–81.

Taherdoost, H. (2018a). Sampling Methods in Research Methodology; How to Choose a Sampling Technique for Research. *SSRN Electronic Journal*, *January 2016*. https://doi.org/10.2139/ssrn.3205035

Taherdoost, H. (2018b). Validity and Reliability of The Research Instrument: How to Test the Validation of A Questionnaire/Survey in A Research. *SSRN Electronic Journal*, *September*. https://doi.org/10.2139/ssrn.3205040

Tavakol, M., & Dennick, R. (2011). Making Sense of Cronbach's alpha. *International Journal of Medical Education*, *2*, 53–55. https://doi.org/10.5116/ijme.4dfb.8dfd

Thakur, S., & Singh, R. (2017). A Review of Traffic Congestion Problem and Various Automated Traffic Measurement Sensors and Techniques. *Indian Journal of Science and Technology*, *9*(47), 1–16. https://doi.org/10.17485/ijst/2015/v8i1/106902

The Malaysian Institute for Research in Youth Development. (2011). *Necessity of Life That is Much Needed by Current Youth Generation*.

The World Bank. (2014). *Targeted subsidies in public transport : combining affordability with financial sustainability*. http://siteresources.worldbank.org/INTURBANTRANSPORT/Resources/340136-1152550025185/Targeted-Subsidies-Public-Transport-Note-04-23-2014.pdf

Transportation Research Board. (2000). *Highway Capacity Manual*.

Transportation Research Board. (2013a). Part 2 Bus Transit Capacity. In *Transit Capacity and Quality of Service Manual Third Edition*. http://www.trb.org/main/blurbs/169437.aspx

Transportation Research Board. (2013b). Transit Capacity and Quality of Service Manual, Third Edition. In *Transit Capacity and Quality of Service Manual, Third Edition*. https://doi.org/10.17226/24766

Tubis, A., & Werbińska-Wojciechowska, S. (2014). Safety Measure Issues in Passenger Transportation System Performance: Case Study. *Safety, Reliability and Risk Analysis: Beyond the Horizon - Proceedings of the European Safety and Reliability Conference, ESREL 2013*, *July 2015*, 1309–1316. https://doi.org/10.1201/b15938-195

van Goeverden, C., Rietveld, P., Koelemeijer, J., & Peeters, P. (2006). *Subsidies in public transport*. *32*, 5–25.

van Hagen, M., Galetzka, M., & Pruyn, A. (2007). Perception and Evaluation of Waiting Time at Stations of Netherlands Railways (NS). *European Transport Conference*, 1–18.

van Lierop, D., Badami, M. G., & El-Geneidy, A. M. (2018). What Influences Satisfaction and Loyalty in Public ransport? A Review of The Literature. *Transport Reviews*, *38*(1), 52–72. https://doi.org/10.1080/01441647.2017.1298683

van Lierop, D., & El-Geneidy, A. (2016). Enjoying loyalty: The relationship between service quality, customer satisfaction, and behavioral intentions in public transit. *Research in Transportation Economics*, *59*, 50–59. https://doi.org/10.1016/j.retrec.2016.04.001

van Teijlingen, E., & Hundley, V. (2002). The Importance of Pilot Studies. *Nursing Standard (Royal College of Nursing (Great Britain) : 1987)*, *16*(40), 33–36. https://doi.org/10.7748/ns2002.06.16.40.33.c3214

Weisbrod, G., Street, O., & Reno, A. (2009). *ECONOMIC IMPACT OF PUBLIC Prepared for : American Public Transportation Association Prepared by :* (Issue October).

Weng, J., Di, X., Wang, C., Wang, J., & Mao, L. (2018). A bus service evaluation method from passenger's perspective based on satisfaction surveys: A case study of Beijing, China. *Sustainability (Switzerland)*, *10*(8), 1–15. https://doi.org/10.3390/su10082723

Weng, J., Wang, C., Huang, H., Wang, Y., & Zhang, L. (2016). Real-time Bus Travel Speed Estimation Model Based on Bus GPS Data. *Advances in Mechanical Engineering*, *8*(11), 1–10. https://doi.org/10.1177/1687814016678162

Wetzel, E., Böhnke, J. R., Brown, A., Wetzel, E., Böhnke, J. R., & Brown, A. (2016). Response Biases. *The ITC International Handbook of Testing and Assessment*, *April*, 349–363. https://doi.org/10.1093/med:psych/9780199356942.003.0024

Wijerathna, I. D. C., & Mazzulla, G. (2015a). *Service Quality Factors Affecting Passenger Satisfaction in Public Bus Transportation : a case study of Kegalle District Passenger Bus Transportation Service Sector reforms for Economic Development*. 232–236. https://doi.org/http://dx.doi.org/10.1016/j.mrfmmm.2012.06.001

Wijerathna, I. D. C., & Mazzulla, G. (2015b). Service Quality Factors Affecting Passenger Satisfaction in Public Bus Transportation : a case study of Kegalle District Passenger Bus Transportation Service Sector reforms for Economic Development. *Telecommunication, Transportation and Policy*, 232–236. https://doi.org/http://dx.doi.org/10.1016/j.mrfmmm.2012.06.001

Wirasinghe, S. C., Kattan, L., Rahman, M. M., Hubbell, J., Thilakaratne, R., & Anowar, S. (2013). Bus Rapid Transit - A Review. In *International Journal of Urban*

Sciences (Vol. 17, Issue 1, pp. 1–31). https://doi.org/10.1080/12265934.2013.777514

Woldeamanuel, M. G., & Cyganski, R. (2011). Factors Affecting Travellers' Satisfaction With Accessibility To Public Transportation. *In Proceedings European Transport Conference.*, *May*, 1–19.

Worldbank. (2011). *Transit Bus Operational and Maintenance Practices to Maximize Fuel Economy* (Issue 63116).

Wu, J., Yang, M., Rasouli, S., & Xu, C. (2016). Exploring passenger assessments of bus service quality using bayesian networks. *Journal of Public Transportation*, *19*(3), 36–54. https://doi.org/10.5038/2375-0901.19.3.3

Yaakub, N., & Napiah, M. (2011). Public Bus Passenger Demographic and Travel Characteristics A Study of Public Bus Passenger Profile in Kota Bharu, Kelantan. *2011 National Postgraduate Conference - Energy and Sustainability: Exploring the Innovative Minds, NPC 2011*, 1–6. https://doi.org/10.1109/NatPC.2011.6136379

Yaliniz, P., Bilgic, S., Vitosoglu, Y., & Turan, C. (2011). Evaluation of Urban Public Transportation Efficiency in Kutahya, Turkey. *Procedia - Social and Behavioral Sciences*, *20*(April 2015), 885–895. https://doi.org/10.1016/j.sbspro.2011.08.097

Yamane, T. (1967). Statistics An Introductory Analysis: 2nd Edition. In *Scottish Journal of Arts, Social Sciences and Scientific Studies*.

Yankees, R. S. (2011). Cross Tabulation Analysis. *Qualtrics*, *Ico*, *1*, 1–4.

Yao, D., Xu, L., & Li, J. (2020). Does technical efficiency play a mediating role between bus facility scale and ridership attraction? Evidence from bus practices in China. *Transportation Research Part A: Policy and Practice*, *132*(1954), 77–96. https://doi.org/10.1016/j.tra.2019.11.002

Yao, L., Siali, F., Ridzuan, M., Darun, B., & Ismail, M. F. (2014). Service Quality and Customer Satisfaction : Rapid Kuantan in Kuantan Route , Malaysia. *Proceedings of SOCIOINT14- International Conference on Social Sciences and Humanities*, *September*, 6–12.

Yeap, C. (2020). Special Report: Gleaning Insights from the 2019 Household Income Survey. In *The Edge Malaysia*.

Yeboah, G., Cottrill, C. D., Nelson, J. D., Corsar, D., Markovic, M., & Edwards, P. (2019). Understanding Factors Influencing Public Transport Passengers' Pre-travel Information-Seeking Behaviour. *Public Transport*, *11*(1), 135–158. https://doi.org/10.1007/s12469-019-00198-w

Yudhistira, G., Firdaus, M. I., & Agushinta, L. (2017). Transportation System In Japan: A Literature Study. *Jurnal Manajemen Transportasi Dan Logistik*, *2*(3), 333. https://doi.org/10.25292/j.mtl.v2i3.108

Zhang, J., Li, Z., Zhang, F., Qi, Y., Zhou, W., Wang, Y., Zhao, D., & Wang, W. (2018). Evaluating the Impacts of Bus Stop Design and Bus Dwelling on Operations of Multitype Road Users. *Journal of Advanced Transportation*, 1–10. https://doi.org/10.1155/2018/4702517

Zhang, Z., Zhang, X., Ji, N., Lin, S., Wang, K., Ma, T., & Zhu, W. (2019). A Study on The Differences in Driving Skills of Chinese Bus and Taxi Drivers. *Journal of Advanced Transportation*, *Volume 201*, 1–9. https://doi.org/10.1155/2019/8675318

Ziolkowski, R. (2018). The Role of The Bus Rapid Transit in Public Transport. *Transportation Overview*, *June*, 34–43. https://doi.org/10.35117/A

Zulkefly, N. S., & Hamsa, A. A. K. (2018). Evaluating Travel Time and Passenger Ridership of University Shuttle Bus Service. *Planning Malaysia*, *16*(3), 233–247. https://doi.org/10.21837/pmjournal.v16.i7.514