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ENHANCING PASSENGER SATISFACTION IN KEDAH PUBLIC BUS SERVICES: A COMPREHENSIVE ANALYSIS OF SERVICE QUALITY DIMENSIONS AND ACCESSIBILITY

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APRIL 2024

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A Research Paper Submitted to the
College of Business Universiti Utara Malaysia
in Partial Fulfillment of the Requirement for the Master of Science
(Transportation And Logistics Management)

Kolej Perniagaan
(College of Business)
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Program Pengajian *(Programme of Study)*	:	**Master of Science (Transportation & Logistics Management)**
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ABSTRACT

The purpose of this study was to investigate the current state of public bus transportation in Kedah, focusing on the factors influencing customer satisfaction and the decline in demand for bus services. The problem statement revolves around the decrease in demand for public bus has caused low demand for public bus service in Kedah and traffic congestion. The service quality (SERVQUAL) model theory and the Concept of Access are used as the main variables, namely reliability, assurance, tangibles, empathy, responsiveness, accessibility, and customer satisfaction in the context of public bus transportation in Kedah. This research paper utilizes a quantitative research design with hypotheses testing to explore the relationships between predetermined variables. Data collection involves closed-ended questionnaires administered to a sample size of 388 passengers selected through multi-stage sampling, incorporating both cluster and convenience sampling techniques to ensure geographic representation and route-specific diversity. The analysis conducted using PLS-SEM managed to answer the research objectives and questions of this research paper in which it revealed strong positive relationships between reliability, responsiveness, accessibility, and customer satisfaction, indicating that improvements in these areas can lead to higher levels of satisfaction among passengers. However, assurance, tangibles, and empathy did not show significant effects on customer satisfaction. Despite limitations, the research paper provides theoretical contributions and practical implications for bus operators and government authorities. In conclusion, improvements in transportation sector need to be taken so that public bus transport operations become more efficient and satisfaction among users will also increase.

Keywords: Public bus transportation, service quality, accessibility, customer satisfaction, Kedah

ABSTRAK

Tujuan kajian ini dijalankan untuk mengkaji penggunaan semasa pengangkutan bas awam di Kedah. Masalah tercetus apabila berlaku kemerosotan permintaan terhadap perkhidmatan bas awam yang menjadi punca kenaikan kesesakan lalu lintas apabila masyarakat di Kedah lebih memilih menaik kenderaan persendirian. Teori model kualiti servis dan konsep akses digunakan sebagai pembolehubah utama iaitu kebolehpercayaan, jaminan, peralatan kemudahan, empati, tanggungjawab, kebolehcapaian, dan kepuasan pelanggan dalam konteks pengangkutan bas awam. Kaedah penyelidikan kuantitatif dengan ujian hipotesis untuk menganalisis hubungan antara pembolehubah tersebut. Pengumpulan data telah dijalankan melalui soal selidik tertutup, 388 orang responden telah dipilih melalui pensampelan berbilang peringkat yang supaya dapat meliputi perwakilan geografi dan kepelbagaian khusus laluan. Kaedah *PLS-SEM* digunakan untuk menganalisis hubungan positif antara pemboleh ubah tersebut. Analisis yang dijalankan berjaya menjawab objektif dan persoalan kertas penyelidikan ini di mana ia mendedahkan hubungan positif yang kuat antara kebolehpercayaan, responsif, kebolehcapaian dan kepuasan pelanggan, menunjukkan bahawa penambahbaikan dalam bidang ini boleh membawa kepada tahap kepuasan yang lebih tinggi di kalangan penumpang. Namun, jaminan, peralatan kemudahan dan empati tidak menunjukkan kesan yang ketara ke atas kepuasan pelanggan. Melalui kajian ini, pengkaji dapat memberikan sumbangan teori dan implikasi praktikal untuk pengendali bas dan pihak berkuasa kerajaan. Kesimpulannya, penambahbaikan dalam sektor ini perlu dipandang serius agar operasi pengangkutan bas awam ini menjadi lebih efisen.

Kata kunci: Pengangkutan bas awam, kualiti perkhidmatan, kebolehcapaian, kepuasan pelanggan, Kedah

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DECLARATION

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; and any editorial work, paid or unpaid, carried out by a third party is acknowledged.

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ACKNOWLEDGEMENT

In the name of Allah S.W.T, the Most Gracious and the Most Merciful, I thank You for the strength You have given me in order to complete this thesis and my master's degree study.

First and foremost, I would like to express my sincere gratitude to all those who contributed to the completion of this research paper, "Enhancing Passenger Satisfaction in Kedah Public Bus Services: A Comprehensive Analysis of Service Quality Dimensions and Accessibility". The highest heartfelt appreciation goes to the Universiti Utara Malaysia for the opportunity I get while completing this research paper and obtained useful research skills for my future endeavours.

Special thanks are due to my beloved supervisor Prof. Madya Dr. Suhaila Binti Abdul Hanan for her invaluable guidance, encouragement, and constructive feedback. Her valuable experience and expertise have been instrumental in shaping the direction and quality of this research paper. Next, I would like to extend the grateful thanks to the passengers, bus operators and workers in Kedah's public bus transportation for their support and cooperation throughout the research process. I acknowledge the supports given by participants who generously shared their insights and experiences through the completion of the questionnaires, without those participants this research paper would not have been possible.

In addition, I wish to express my profound gratitude to my parents, Rosiah Binti Ramli and Muhayadin Bin Mahamud, whose unwavering support has been instrumental in the completion of this study. Their encouragement and understanding have provided the foundation upon which this research was built. Additionally, I extend my heartfelt thanks to my family and friends for their continual encouragement and assistance throughout this academic endeavour.

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LIST OF ABBREVIATIONS

AC	Accessibility
AS	Assurance
AVE	Average Variance Extracted
BCI	Bootstrap Confidence Interval
BRT	Bus Rapid Transit
CAGR	Cumulative Annual Growth Rate
COVID-19	Coronavirus Disease 2019
CR	Composite Reliability
CS	Customer Satisfaction
DP	Demographic Profile
DV	Dependent Variable
EM	Empathy
H	Hypothesis
HTMT	Heterotrait-Monotrait
IV	Independent Variable
LL	Lower Limit
NTP	National Transport Policy
PLS – SEM	Partial Least Squares Structural Equation Modelling
PPP	Public-Private Partnership
Q2	Predictive Relevance
RE	Reliability
RS	Responsiveness
SA	Strongly Agree
SD	Strongly Disagree
SDGs	Sustainable Development Goals
SE	Standard Errors
SERVQUAL	Service Quality
SPSS	Statistical Package for The Social Sciences
TA	Tangibles
UL	Upper Limit
UUM	Universiti Utara Malaysia
VIF	Variance Inflation Factor

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CHAPTER ONE:

INTRODUCTION

1.0 INTRODUCTION

Chapter 1 comprised background of the study, the problem statement, research questions and objectives, significance of research, scope of research which targeting on the passenger of public bus transportation, and definitions of key terms.

1.1 BACKGROUND OF THE STUDY

Public bus transportation refers to a mode of shared transport operated by government or private entities that usually has lengthy over 20 feet (ft) that offered service to facilitate mobility for individuals from one point to another with fixed designated route access as schedule (Perez, et al., 2021). Promoting the usage of public bus is important for urban mobility which will positively increase individual physical activities and also to reduce the usage of private vehicles to head towards sustainability transportation to reduce traffic congestion, noise and air pollution (Tuan, Van Truong, Tetsuo, & Ngoc An, 2022). The risen in public bus transportation demand will reduce price springiness considering increasing the number of passengers can lower operating expenses and increase profitability. Besides, public bus transportation makes a substantial contribution to social fairness by giving underprivileged travellers the chance to travel especially the elderly, disabled, and those who do not possess a vehicle. Thus, bus service providers' attempts on cultivating their service quality to fulfil the customer satisfaction.

The global average recommended age of public bus is for 6.9 years only. Saeidizand (2019) stated that China, Rusia and Brazil emphasizing the public bus

quality had hugely contribute in this average age significantly. Indonesia, Mexico and Republic of Korea also start to adapt the usage of new bus to promote their service quality. To make public bus to be user friendly to all individual especially underprivileged travellers, almost 90 percent of research on public bus have started the awareness towards underprivileged travellers when 18 out of 46 countries are wheelchair-accessible areas, making the service more accessible to all citizens (Saeidizand, 2019). Figure 1.1 have shown the percentage of implementation of additional infrastructure to ease the underprivileged traveller's movement while using public bus.

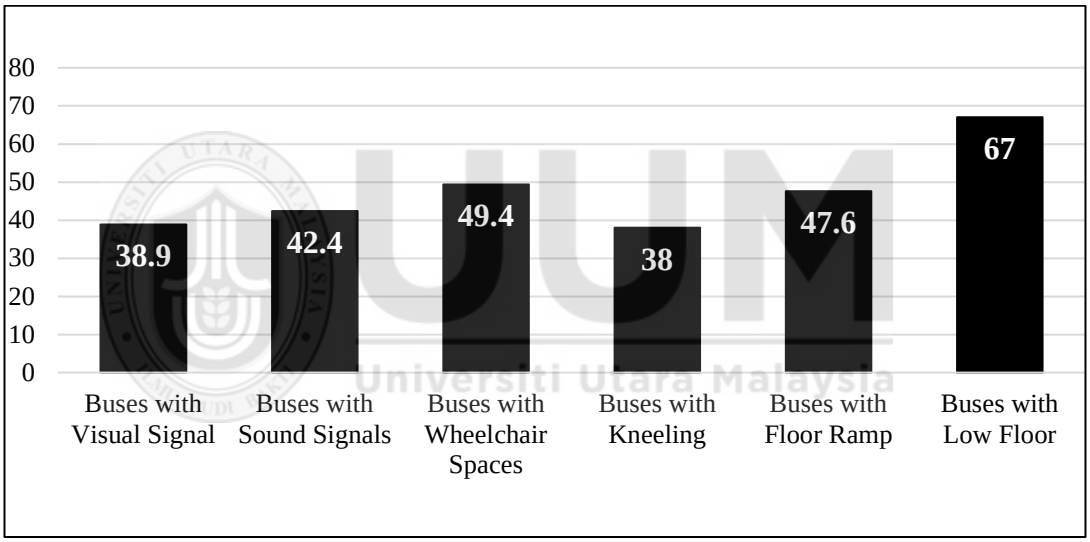

Figure 1.1
Accessibility Equipment of Buses (in percent)
Source: Saeidizand, (2019)

The largest and most successful Bus Rapid Transit (BRT) systems which are from Bogotá, Columbia is TransMilenio with the highest number of 20 785 206 passengers in Latin America. TransMilenio, Bogotá's BRT system, serves as a global best practice in public bus transportation, addressing urban challenges through a successful Public-Private Partnership (PPP) model. Launched in 1999 to alleviate congestion and improve air quality, TransMilenio demonstrated key strengths from the PPP structure involved private operators owning buses, ensuring efficiency and

innovation (Hidalgo, Giesen, & Muñoz, 2024). Infrastructure development received USD 213 million in investments from local taxes, grants, and World Bank credits. With 114.4-kilometer coverage, TransMilenio reduced travel times by 32 percent, increased property values, and improved air quality. Stakeholder engagement, leadership, and knowledge exchange were crucial for success, making TransMilenio a global model in sustainable, effective, and transformative public bus transportation.

Meanwhile, figure 1.2, show the modes of transportation that older individuals in Malaysia utilize with those in other nations. In Malaysia, 62.5 percent of senior citizens opt to utilize their personal vehicles for everyday activities and well-being, like purchasing groceries, attending medical schedules, and spending time with close ones. In contrast, a mere 15.1 percent express a preference for public transportation, indicating a substantial disparity in the choices made between these two modes of transportation (Noor, et al., 2022). When compared to countries like Japan, Singapore, Thailand, and Korea, a noteworthy trend emerges – a majority of older individuals in these nations exhibit a preference for public transportation over private cars. This is in stark contrast to Malaysia's scenario, where a significant proportion of seniors opt for private vehicles. However, Malaysia still surpasses Australia and the Netherlands in the preference of using public transportation. Public bus transportation is a key player for Malaysia's land public transport that consist six types of bus which are stage bus, express bus, tour bus, chartered bus, school bus and employee bus (MOT, 2024). However, the trend of transportation in Malaysia where most Malaysian have personal vehicle ownership likes cars and motorcycles making the use of bus transportation especially in Kedah is likely to be negatively impacted by this trend as well (Norhisham, et al., 2021). In response to this, the study restricts its attention to the Kedah population in order to streamline the data collection process.

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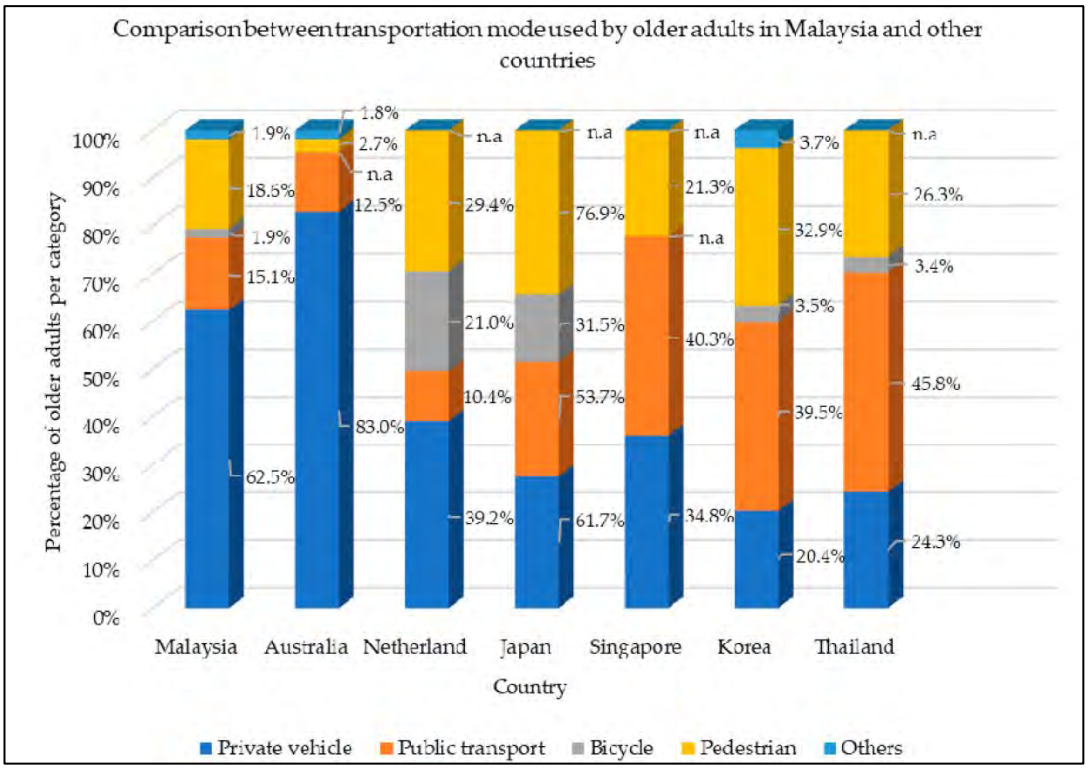

Figure 1.2

Modes of Transport That Older Individuals in Malaysia and Other Nations Utilize (in percent)

Source: Noor et al. (2022)

In Kedah, there are three public stage bus operators which are My Bas, HBR Group, and Mara Liner. According to Table 1.1, the bus goes through the route of Ayer Hitam, Jitra, UUM, Kuala Kedah, Kuala Nerang, Baling, Yan Langgar, Tokai, Sungai Tiang, Bukit Raya, Sik, Kuala Ketil, Sungai Petani and Kulim. In the past few years, the Kedah government has been working to upgrade the infrastructure and services of public bus transportation. These services have a significant impact on facilitating the movement of residents and visitors within the state. The Kedah public bus system is intended to offer a practical and easily accessible means of transportation for people commuting for a variety of reasons, such as employment, education, or leisure (Norhisham, et al., 2021). Major transportation hubs, important destinations, and towns and cities are all frequently connected by routes in Kedah's public bus network. Various factors, such as reliability, safety, cleanliness, and

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accessibility, contribute to the overall quality of public bus services in Kedah (Norhisham, et al., 2021). Thus, comprehending and tackling these variables is important in maximizing the efficiency of public transport and guaranteeing a satisfactory journey for commuters depending on the state's bus network.

Table 1.1
The Route Taken by The Bus

Route	First Trip	Last Trip	Hours of Services	LOS	Operator
Kangar (Ayer Hitam)	6.15 AM	8.15 PM	14.00	C	My Bas
Kangar (Jitra)	6.00 AM	7.45 PM	13.45	C	My Bas
UUM	6.30 AM	7.00 PM	12.30	D	My Bas
K.Kedah	6.30 AM	7.30 PM	13.00	D	HBR Group
K. Nerang	6.15 AM	8.00 PM	13.45	C	HBR Group
Baling	6.00 AM	5.15 PM	11.15	E	Mara Liner
Yan/ Sg. Petani	6.30 AM	5.30 PM	11.00	E	Mara Liner
K. Nerang	6.30 AM	7.00 PM	12.30	D	Mara Liner
Langgar /Sg. Tiang	6.30 AM	5.15 AM	10.45	E	Mara Liner
Tokai / Sg. Tiang	7.45 AM	4.45 PM	9.00	E	Mara Liner
Bkt Raya/ Sik	6.30 AM	5.00 PM	10.30	E	Mara Liner
K.Ketil/ Kulim	7.30 AM	5.00 PM	9.30	E	Mara Liner
Sg. Petani	6.30 AM	7.30 PM	13.00	D	Red Bus
			Average	**D**	

Source: Norhisham, et al. (2021)

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In a nutshell, it is strongly advised to advertise the public bus services in Kedah, a state with inadequate public transportation to promote transportation sustainability. This study focuses on public bus transportation to study the current trend of movement of the population in Kedah. Public bus was selected as the vehicle to advocate for sustainable transportation that helps preserve money on petrol and protect the environment by dispersing toxic gases and emissions. Also, according to the forecast, the bus-based public transport industry would experience a rising demand globally of the Cumulative Annual Growth Rate (CAGR) of 8.30 percent from 2022 to 2029 (DBMR, 2022). However, Luke and Heyns (2020) claimed that public bus transportation is frequently regarded as being of poor quality in fulfil the customer satisfaction. Besides, due to Malaysia's subpar of public bus service quality,

this condition has led to a drop in the demand proportion of passengers of public transport (Brohi, Pillai, Asirvatham, Ludlow, & Bushell, 2018). Hence, the focus of this study will be accessing the relationship of five traits service quality (SERVQUAL) (which are reliability, assurance, tangibles, empathy and responsiveness) and accessibility towards the customer satisfaction.

1.2 PROBLEM STATEMENT

Table 1.2
Number of Active Stage Bus by Year, 2015 – 2021

Year	2015	2016	2017	2018	2019	2020	2021
Number of Active Bus	4 150	4 136	4 118	4 088	3 975	3 740	3 260

Source: MOT (2021)

Despite growing recognition of the pivotal role that public bus transportation plays in shaping a sustainable future, a significant challenge persists in the form of declining global demand for these services. As outlined by Gaskin, Zare, and Delarmente (2021), the onset of the coronavirus disease 2019 (COVID-19) pandemic in 2019 had a profound impact on people's mobility choices worldwide, leading to a decline in bus service utilization due to reduced bus availability and shifts in individual travel preferences. This alteration prompted bus operators to adjust their daily operations in compliance with government-imposed travel restrictions (Gaskin, Zare, & Delarmente , 2021). Consequently, the decrease in bus frequency rendered buses less convenient, prompting individuals to opt for private vehicles instead (Abdullah, Dias, Muley, & Shahin, 2020). This shift in preference towards private vehicle usage post-pandemic also has been hugely shift the trend of dependability on

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public bus in South Korea and China, where over 60 percent of the population have transitioned accordingly (Zhang, Hayashi, & Frank, 2021).

In present-day Malaysia, there is a growing recognition of the importance of public transportation in promoting environmental sustainability through the reduction of air pollution stemming from excessive gas emissions (Norhisham, et al., 2021). An urgent requirement for assessment arises to ensure the efficacy and productivity of current bus services. As per statistics from Table 1.2, there has been a noticeable decline in the number of operational buses over the years—from 4,150 in 2015 to 3,260 in 2017 (MOT, 2021). This trend has raised concerns regarding the significance of bus utilization in the daily routines of Malaysians. The diminishing reliance on buses could potentially have adverse effects on the transportation industry in Malaysia (Borhan, Ibrahim, Syamsunur, & Rahmat, 2017).

In Kedah, public bus services play a pivotal role in connecting urban and rural areas, facilitating daily commuting, and supporting economic development (Norhisham, et al., 2021). However, despite urbanization and developmental progress, a significant challenge has emerged due to the population's reluctance to use public transportation. This reluctance stems from perceived low customer satisfaction with service quality, leading to a decline in demand for public bus services over the years and have been major contribution to traffic congestion in Kedah especially in Alor Setar (Norhisham, et al., 2021). The primary objective of this research paper is to promote sustainable public bus transportation that caters to the mobility needs and satisfaction of a growing population. Thus, there is an urgent need for an evaluation of Kedah's public bus service quality through a comparative study.

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Based on above arguments, a research gap exists in the absence of a detailed exploration of reliable data regarding the decrease in demand and its relationship with service quality and customer satisfaction (Norhisham, et al., 2021). According to Norhisham et al. (2021), there is a lack of reliable data explicitly stating the extent of reduced demand in public bus transportation. Secondly, limited research that cover about social justice for disability individual and those highlighted the important to provide service for individual with limited mobility (Best, et al., 2022). While existing literature touches on the consequences of low service quality based on the SERVQUAL model, questions remain regarding the intricate interplay of accessibility, especially for individuals with disabilities (Akaateba, Adumpo, & Yakubu, 2023). Another research gap could be the limited exploration of the socio-economic impacts of the decline in public bus transportation demand, particularly on marginalized communities and low-income individuals (Kar, Carrel, Miller, & Le, 2022). Understanding how reductions in bus services affect access to essential services, employment opportunities, and overall quality of life for disadvantaged groups can provide valuable insights for policymakers and urban planners (Rasca & Saeed, 2022). Hence, this research seeks to explore the relationship between reliability, assurance, tangibility, empathy, responsiveness, and accessibility of Kedah's public bus service with customer satisfaction.

1.3 RESEARCH QUESTIONS

These research questions are addressed in accordance with the issues that have been discussed in the problem statement:

1. What is the relationship between the reliability of Kedah's public bus service and the customer satisfaction?

2. What is the relationship between the assurance of Kedah's public bus service and the customer satisfaction?
3. What is the relationship between the tangibles of Kedah's public bus service and the customer satisfaction?
4. What is the relationship between the empathy of Kedah's public bus service and the customer satisfaction?
5. What is the relationship between the responsiveness of Kedah's public bus service and the customer satisfaction?
6. What is the relationship between the accessibility of Kedah's public bus service and the customer satisfaction?

1.4 RESEARCH OBJECTIVES

Examining the link between each independent variable (IV) and the dependent variable (DV) is the aim of this study. The following are the precise objectives:

1. To identify the relationship between the reliability of Kedah's public bus service and the customer satisfaction.
2. To identify the relationship between the assurance of Kedah's public bus service and the customer satisfaction.
3. To identify the relationship between the tangibles of Kedah's public bus service and the customer satisfaction.
4. To identify the relationship between the empathy of Kedah's public bus service and the customer satisfaction.
5. To identify the relationship between the responsiveness of Kedah's public bus service and the customer satisfaction.

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6. To identify the relationship between the accessibility of Kedah's public bus service and the customer satisfaction.

1.5 SIGNIFICANCE OF RESEARCH

This study is important to provide awareness of the condition of service quality in the perspective of passengers' public bus in Kedah to meet the customer satisfaction. The primary finding will reveal the relationship between the model that affect the customer satisfaction in Kedah's public bus service. This research addresses the service quality and accessibility of public transportation services, a critical aspect of building sustainable cities and communities. By comprehending the elements that influence service quality and customer satisfaction, the study can contribute to create more efficient, affordable, and accessible public transportation systems in Kedah. This line up with the aims to promote sustainable urbanization and reducing the environmental impact of transportation (Gabrielli, 2023).

Secondly, to promote community physical well-being and accessibility. This research will contribute to the identification and resolution of accessibility issues, improving the availability of public bus services aimed at senior citizens, people with disabilities and boost individual physical movement to be healthier. This aligns with the goal of promoting Sustainable Development Goals (SDGs) 3 which is decent welfare and well-being for all individuals, including commuters (Nations, 2023). The deficiencies within the public transportation infrastructure formed the backdrop of their daily travel encounters when the considerable distances they had to cover to access transit points, the insufficient frequency of services, and the prolonged travel durations all acted as constraints on their utilization of public transport (Noor, et al., 2022). This situation also contributed to the elevated prevalence of private vehicle

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ownership in Malaysia. By investigating the relationship between the models, the research can promote the usage of public bus in Kedah.

1.6 SCOPE OF RESEARCH

It focused on the passengers of buses in the Kedah region as the target respondents. The research aims to gather reliable and trustworthy data by surveying individuals who have first-hand experience using the bus transportation services in Kedah. By limiting the study to bus passengers in this specific geographical area. The urban area consists of Kulim, Sungai Petani, and Alor Setar. While suburban area will be Changlun, Pokok Sena and Pendang. The research seeks to gain insights into their perceptions, experiences, and opinions regarding the variables of reliability, assurance, tangibles, empathy, responsiveness and accessibility.

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1.7 DEFINITION OF KEY TERMS

Below are the main definitions of some commonly used terms in this research:

1.7.1 PUBLIC BUS TRANSPORTATION

It is a mode of public transportation that involves the provision of scheduled bus services on predetermined routes to transport passengers from one location to another that are available for use by the general public (Rohani, Chitral Wijeyesekera, & Tarmizi, 2013).

1.7.2 CUSTOMER SATISFACTION

It discussed the notch to which a customer's rating, following the purchase of products or services, matches their expectations (Razak, Nirwanto, & Triatmanto, 2016).

1.7.3 SERVICE QUALITY (SERVQUAL)

Introduced in the 1980s by Parasuraman, Zeithaml, and Berry, the SERVQUAL model posits that the quality of service is influenced by the disparity between customer expectations and their perceptions of the service provided. The model is segmented into reliability, assurance, tangibles, empathy, and responsiveness.

1.7.3.1 RELIABILITY

Reliability entails delivering the pledged service promptly, precisely, and to the satisfaction of the customer (Nyabundi, Aliata, & Odondo, 2021). Reliability was evaluated by verifying if each bus route delivered the specified number of completed trips as guaranteed (Chawuthai, Sumalee, & Threepak, 2023).

1.7.3.2 ASSURANCE

Assurance refers to the combination of factors that comprises confidence, trust, and a sense of safety security in users of public transportation services (Efthymiou & Antoniou, 2017).

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1.7.3.3 TANGIBLES

Tangibles cover the aspect of facilities and other items that are displayed to customers personnel-based communication channels (Parasuraman, Zeithaml, & Berry, 1988). Tangibles also encompass the quality of communication materials, such as brochures, signage, and digital displays that will contributes to achieve customer satisfaction (Rane, 2023).

1.7.3.4 EMPATHY

Empathy involves the presence of a warm and compassionate demeanour exhibited by employees towards customers (Aquino, Souza, Silva, & Jerônimo, 2018). This extends beyond merely being friendly; it encompasses the ability to understand and relate to the needs, feelings, and experiences of customers.

1.7.3.5 RESPONSIVENESS

Responsiveness is the openness of service providers to help customers receive exceptional and prompt service immediately (Parasuraman, Zeithaml, & Berry, 1988). Responsiveness refers to the eagerness and readiness of bus operator to assist customers and deliver service promptly (Nyabundi, Aliata, & Odondo, 2021).

1.7.3.6 ACCESSIBILITY

Transportation accessibility refers to users' capability to reach transit accommodations such as transportation hubs or train stations (Borhan, Ibrahim, Syamsunur, & Rahmat, 2017).

1.8 ORGANIZATION OF CHAPTER

Chapter One

Chapter one discussed about the overall introduction of the research, begins with background of the study which is public bus and followed by problem statement. This chapter also cover the research questions, supporting by the research objectives, significance and scope of research, definition of key terms used in this research, organization of chapter and the summary of the chapter.

Chapter Two

Chapter two comprised the literature review of the model used in this research. It highlights the important of public bus transportation, definition or concept of variables, and the six developments of hypotheses in this research.

Chapter Three

Chapter three present the research methodology that have been used in steering the research, starting with research framework, and research design. Next, the explanation of data collection by consuming population, sample size using technique of Krejcie & Morgan (1970), sampling technique and questionnaire design. After that, the data analysis that conducted in this chapter using SPSS and PLS.

Chapter Four

In chapter 4, well-presented of result and discussion based on data collection. The chapter provides comprehensive outcomes in the format of figures, tables, or textual content, ensuring that essential information is emphasized and clearly presented.

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Chapter Five

Chapter 5 provide conclusion and recommendation. The key discoveries are condensed based on the research objectives, emphasizing the importance of the findings and their implications in terms of theory, practicality, and policy. This chapter also provide incorporate suggestions for potential research endeavours.

1.9 SUMMARY

Chapter One instigates with a background of the study, outlining the importance of public bus services for urban mobility and sustainability. It highlights the global context of public bus transportation, emphasizing successful models like

TransMilenio in Bogotá. The focus then shifts to Malaysia, specifically Kedah, where public bus services play a vital role in land public transport. The problem statement identifies a decline in public bus demand, aggravated by issues such as the COVID-19 pandemic and perceived low service quality. The research questions and objectives are established to explore the relationships between reliability, assurance, tangibles, empathy, responsiveness, accessibility and customer satisfaction. The significance of the research is emphasized by its contribution to SDGs and national agendas, addressing urbanization challenges. The scope centers on bus passengers in Kedah, and key terms used in this research paper are defined. Lastly, it presents the organization of subsequent chapters, providing a roadmap for the rest of the study.

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CHAPTER TWO:

LITERATURE REVIEW

2.0 INTRODUCTION

Chapter 2 elaborated the literature review support by definition of variables that extracted from the theories and development of hypotheses statement.

2.1 PUBLIC BUS TRANSPORTATION

Research on public transport involved studying various aspects of transportation systems that are accessible to the general public. This multidisciplinary field explores the efficiency, accessibility, sustainability, and user satisfaction of public bus transportation. Past paper had investigated factors influencing utilization of public transportation, infrastructure development, and the impact on urban development.

Public bus is very important as a metropolitan area develops, its urban layout may shift from a fixed to a continuously evolving state, and the project for cities may become multicentered (Sun & Quan, 2022). The problem brought up by increased growth and urbanization was traffic congestion (Norhisham, et al., 2021). Government should encourage the usage of public bus to achieve sustainability of urban mobility as the seating capacity could be from 30 to 40 passenger. This might contribute to a decrease in the quantity of vehicles on the road, easing traffic congestion, and reduced stress for commuters (Hidalgo, Giesen, & Muñoz, 2024).

Regrettably, buses, the most common form of public transportation, have drawn criticism for their bad service quality such as being ineffective and unreliable, especially in large cities where bus bunching is an issue (Wang, Jiang, Jiang, Gao , & Liu, 2024). The phenomenon of "bus bunching" occurs when successive buses

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operating on the same route depart drastically from the headways that were planned. In some areas, public bus transport infrastructure was not well-developed, leading people to opt for private vehicles due to challenges in accessing public transport (Nafiu, Hassan, & Alogwuja, 2018). Issues on public bus transport were disabilities people run across issues with dysfunctional elevators, unstable boarding surfaces, gaps between platforms, and inappropriate bus-stop (Twardzik, et al., 2024).

2.2 DEFINITION/CONCEPT OF VARIABLES

There are six variable that have been extracted from the theory to classify the linking between the homogenous of independent variables and customer satisfaction.

2.2.1 CUSTOMER SATISFACTION

Customer satisfaction on public transportation is influenced by service quality, which serves as a barometer for the extent to which an organization comprehends and fulfils the needs of its customers (Khadka & David, 2023). Zul et al. (2022) and Zhang (2022), also emphasized the important of service quality in order to draw in and meet customer satisfaction for promoting the usage of public transport included cleaner buses, helpful crew, on-time bus service, comfortable seating, and clear communication. Moreover, it seems that a dissatisfaction with service quality has led to a significant portion of the population in Kedah depending more on their private vehicles rather than using public buses. (Norhisham, et al., 2021). Furthermore, numerous customers have expressed dissatisfaction with the service quality over the last decade, specifically concerning issues such as drivers' attitudes, punctuality, inadequate attention to customer safety, and a lacked of supervision from management operators (Norhisham, et al., 2021).

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2.2.2 SERVICE QUALITY (SERVQUAL) MODEL

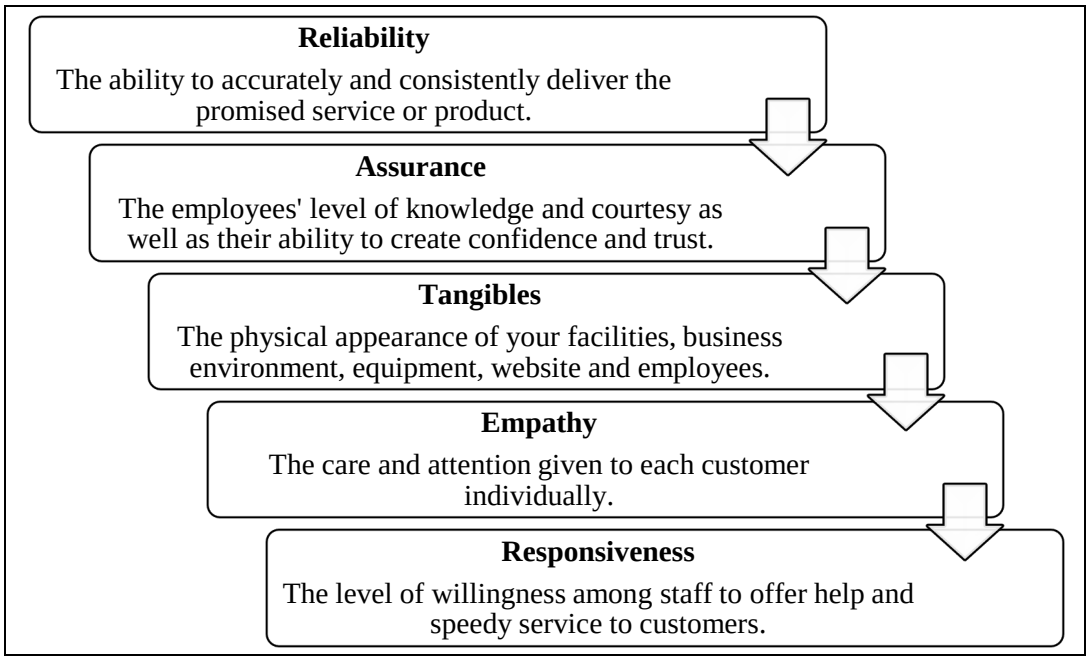

Figure 2.1
SERVQUAL Model
Source: Bhasin (2023)

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The SERVQUAL model is an extensively recognized and commonly utilized for gauging and assessing service quality across various industries, including public transportation (Parasuraman, Zeithaml, & Berry, 1988). Therefore, in order to enhance comprehension of the dependent variable, which is customer satisfaction, the SERVQUAL model was employed. Developed in the 1980s by Parasuraman, Zeithaml, and Berry, the SERVQUAL model posits that the quality of service is influenced by the disparity between customer outlooks and their insights of the service provided. Zul et al. (2022) stated that the 22 attributes that make up the SERVQUAL scale are divided into 5 categories as shown in figure above: reliability, assurance, tangibles, empathy and responsiveness. Bhasin (2023) found that preserving and continually enhancing service quality can not only attract new users, but can also impact the customer satisfaction to settle on a better service sector. In short, SERVQUAL influenced customer satisfaction with products and services.

2.2.2.1 RELIABILITY

Reliability denoted to the dependable delivery of services over time (Bhasin, 2023). It involved the capability of a service provider to encounter promises, commitments, and prospects with a high degree of accuracy and dependability (Zul, Azman, Nadzri, Ismail, & Azizan, 2022). In the realm of public transport, reliability encompasses factors such as adherence to schedules, timely service delivery, and the consistency of the transportation system (Parasuraman, Zeithaml, & Berry, 1988).

Previous research on reliability in public transportation indicated that a dependable and efficient service enhances the inclusive service quality and contributes to curbing the rise in reliance on personal vehicles (Oort, 2016). Additionally, it serves as an inspiration for the younger generation to responsibly adopt the use of public transportation. Based on SERVQUAL model, reliability concept is when public transport has to show up when it is supposed to and must be able to live up to passengers' expectations (Zul, Azman, Nadzri, Ismail, & Azizan, 2022). A bus's frequency is inversely correlated with its demand. Due to poor reliability, above 60 percent of population in South Korea and China start using cars post pandemic due to inconsistent of bus operation (Zhang, Hayashi, & Frank, 2021). A significant number of individuals who owned vehicles mentioned that they refrained from utilizing the bus service due to its unavailability during their preferred timings, and extended waiting periods, causing them to arrive late at their workplaces (Borhan, Ibrahim, Syamsunur, & Rahmat, 2017). Poor reliability was attributed to a number of problems, including an ageing bus fleet, insufficient maintenance procedures, and poor route design. The study emphasized how frequent failures, delays, and erratic timetables result in unhappy passengers and lower passenger numbers (Andrew, Kitali, Sando, & Musagasa, 2022).

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In a nutshell, an important factor that impacts customer satisfaction in public bus transportation is reliability. Transportation authorities can put into place practical steps to boost the dependability, improve the passenger experience, and maximize the overall performance of public bus transportation systems by taking lessons from both successful and unsuccessful cases. To such a degree, this research was conducted to assess the reliability of public bus services in terms of adherence to schedules, waiting times, and service interruptions.

2.2.2.2 ASSURANCE

Assurance refers to the combination of factors of confidence, trust, and a sense of safety security in users of public transportation services (Efthymiou & Antoniou, 2017). Assurance assures passengers that they are in capable and trustworthy hands throughout their journey and it is important factors in convincing public to use public transportation (Abenoza, Cats, & Susilo, 2017). Measures such as well-maintained vehicles, competent drivers, surveillance systems, and adequate security personnel enhance passenger safety and contribute to assurance.

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In Malaysia, the concern for safety assurance has become significant for individuals opting for private transportation owing to the notably high proportion of street lawbreaking. As indicated by a survey led by Rohana, Ismah, and Che Pei (2017), residents in the Klang Valley prioritize safety assurance, leading them to avoid relying on public transportation services. Additionally, a survey found that only 2.7 percent of respondents in Petaling Jaya agreed that public transit in their area is safe making they choose to use it as mode of transportation (Brohi, Pillai, Asirvatham, Ludlow, & Bushell, 2018). Research showed that in order to eliminate crime from Malaysian streets, government authorities must raise the bar for security (Şimşekoğlu, Nordfjærn, & Rundmo, 2015). As the major assurance issues in public

bus mobility, factors including theft, sexual assault of female passengers, and pickpockets were mentioned. Utilizing the public bus will continue to be difficult due to inadequate assurance. Other than that, employees that lack professionalism may provide subpar service (Borhan, Ibrahim, Syamsunur, & Rahmat, 2017). The disorderly behaviour of drivers, identified by Nafiu, Hassan, and Alogwuja (2018), stands out as a powerful factor influencing the assurance of public transportation service fulfilment. On top of that, public transport drivers operate their vehicles carelessly in an effort to keep to schedule make the passenger lack of trust to the bus driver because they felt insecure while using bus (Nafiu, Hassan, & Alogwuja, 2018).

According to studies on travel safety perceptions, some user groups alter their travel habits to steer clear of situations alleged as unsafe and posing a hazard to individual safety (Friman, Lättman, & Olsson, 2020). More susceptible demographics, including women, the elderly, and children, are more inclined than men to take into account perceptions of travel safety assurance. By understanding this aspect, will aid to examine the assurance measures implemented in Kedah's public bus services that will enhance the customer satisfaction.

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2.2.2.3 TANGIBLES

Tangibles cover the aspect of facilities and other items that are displayed to customers personnel-based communication channels include the visual and aesthetic aspects of the physical facilities (Bhasin, 2023). This covers cleanliness, layout, and overall maintenance of the facilities (Tuan, Van Truong, Tetsuo, & Ngoc An, 2022). Tangibles also encompass the quality of communication materials, such as brochures, signage, and digital displays to achieve customer satisfaction (Rane, 2023).

Nafiu, Hassan, & Alogwuja (2018) stated implementation of service quality is very important to achieve customer satisfaction. To achieve the tangible, well-maintained, clean, and pleasing physical facilities contribute completely to the service experience. It highly advised for the bus operator to improved their facilities such as walkway with roof, proper bus-stop or terminal, easy to be access for people with disability and the bus-stop also should be established at both sides of the road (Borhan, Ibrahim, Syamsunur, & Rahmat, 2017). It also important to provide clear information to avoid confusion to for the new passenger and updated the system used to make all data available online to make easier for user to track their desire bus route (Rane, 2023). Meanwhile, poor fleet management, ageing infrastructure, and a lack of technological investment are some of the causes of poor tangible (Chandrayan, 2016). If facilities are poorly maintained, outdated, or unclean, it creates a negative impression on the overall customer experience (Zhang H. , 2022). Peeling paint, broken equipment, or an unkempt environment can signal a lack of attention to detail and may undermine the perceived quality of the service. Furthermore, in Kogi State, most passenger need to deal with rude drivers when the drivers frequently cause delays for passengers before departing for their respective locations (Nafiu, Hassan, & Alogwuja, 2018). Besides, public buses in Malaysia face challenges related to cleanliness, with complaints about dirty interiors and inadequate maintenance leading to discomfort for passengers (Borhan, Ibrahim, Syamsunur, & Rahmat, 2017).

In order to draw and satisfy passengers, public transportation systems must fulfill certain requirements, such providing comfortable services, are considered successful. This means that passengers utilizing transportation services ought to be at ease. This was a reference to the establishment that offers a range of facilities to make its users feel comfortable.

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2.2.2.4 EMPATHY

The capacity to perceive or comprehend an individual's circumstances, viewpoints, and emotions by firsthand experience with highest level of care and devotion is known as empathy (Zul, Azman, Nadzri, Ismail, & Azizan, 2022). When a passenger is experiencing difficulties, the service provider needs to be able to identify those difficulties and find solutions (Nafiu, Hassan, & Alogwuja, 2018).

Most passenger concern for comfortable and safe transportation that could take good care of their carry goods and luggage (Nafiu, Hassan, & Alogwuja, 2018). A bus operator that could serve high-quality of empathy is crucial when most passenger desire for smooth travel experience with pleasant bus environment that provide comfortable seats, the right bus temperature and enjoyable travel experience (Njeru, Cheruiyot, & Maru, 2019). The capability of a driver includes his or her driving skills, and familiarity with routes will make customer feel at ease as the driver could guarantee their safety and comfort, and pain free neither physical nor mental strain (Etuk, Anyadighibe, James, & Mbaka, 2021). Besides, clean and sweet scenting interior fragrance of bus environment really important to offer empathy by eliminating and reducing bad smell inside the bus that might cause customer dissatisfaction (Etuk, Anyadighibe, James, & Mbaka, 2021). Moreover, public bus fares are affordable and the location of bus-stop that easy to access also important to provide greater empathy to ease the passenger's movement (Friman, Lättman, & Olsson, 2020). One notable case as stated by Mahari (2023) is the implementation of priority seating for individuals with disabilities, pregnant women, and the elderly. This initiative shows empathy by acknowledging the needs of vulnerable passengers and providing them with dedicated seating to ensure their comfort and safety during their journey (Mahari, 2023).

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Empathy is a pivotal factor in ensuring customer satisfaction and loyalty in public bus transportation. A bus operator's high-quality empathy, offering a pleasant environment and skilled drivers, contributes to a smooth and enjoyable travel experience. Clean, well-scented interiors, affordable fares, and accessible bus stops enhance the overall service, addressing passengers' needs for a stress-free journey.

2.2.2.5 RESPONSIVENESS

Responsiveness is the openness of service providers to help customers receive exceptional and prompt service immediately (Parasuraman, Zeithaml, & Berry, 1988). In line with Ubaidillah et al. (2022), responsiveness is characterized by rapid execution, timely replies to user inquiries about services, and short waiting times. In the context of public bus transportation, responsiveness becomes a critical factor in shaping passengers' perceptions of the service (Ubaidillah, et al., 2022).

Public bus services that exhibit responsiveness adhere to published schedules, minimizing waiting times for passengers (Ngeoywijit, et al., 2022). Prompt and reliable service contributes to passenger satisfaction. Ngeoywijit, et al. (2022) stated the function of latest innovation could enhance responsiveness by using smartphone to access the location of bus and buying ticket are more practical. One real case that highlights by Nafiu, Hassan and Alogwuja (2018) the importance of responsiveness in the public bus sector in Malaysia is the issue of bus punctuality when many passengers have complained about buses frequently running late or not adhering to their schedules. This lack of responsiveness to the needs of passengers can lead to frustration and dissatisfaction among commuters (Nafiu, Hassan, & Alogwuja, 2018). For example, if a bus is delayed without any communication or explanation from the bus operator, passengers may feel ignored and inconvenienced. Public bus services

that efficiently address passenger concerns or complaints demonstrate responsiveness with quick and effective resolution contributes to customer satisfaction (Borhan, Ibrahim, Syamsunur, & Rahmat, 2017). As stated by Etuk, Anyadighibe, James, and Mbaka (2021), drivers who are respectful, accommodating, and quick to respond to inquiries from passengers enhance the perception of their responsiveness because driver-passenger relations have a big impact on the passengers' entire experience. As noted by Ustadi & Shopi (2015), a courteous and helpful attitude from the ticket collector and information counter contributes to optimistic responsiveness, as passengers feel that their needs and concerns are acknowledged and addressed with a customer-centric approach.

Hence, responsiveness in public bus services is crucial for passenger satisfaction. Timely loyalty to schedules, tied with innovative solutions like access for location tracking and ticket purchasing, boosts service efficiency. Communication is key, executing technologies helps to boost responsiveness.

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2.2.3 THE CONCEPT OF ACCESS

Penchansky and Thomas (1981) proposed a conceptual framework for understanding accessibility theory in their article titled "The Concept of Access: Definition and Relationship to Consumer Satisfaction" comprises five dimensions of accessibility, known as the "Five A's", encompassing Availability, Accessibility, Accommodation, Affordability, and Acceptability. However, only one dimension that will be focus which is accessibility. Accessibility examines the ease with which passengers can physically reach and use transportation services, considering factors like proximity, connectivity, and the availability of accessible infrastructure (Reoch & Thomson, 2018). This dimension involves ensuring that individuals have equal

access to legal resources and services, promoting fairness and equity within the legal system (Penchansky & Thomas, 1981). It also will assess the extent to which the services are flexible and responsive to the diverse passengers demands of the population, including considerations for individuals with disabilities, cultural differences, and linguistic preferences (Penchansky & Thomas, 1981). Therefore, this variable has been used to analyze the customer satisfaction.

2.2.3.1 ACCESSIBILITY

Accessibility eliminate barrier while ensuring equitable and inclusive mobility for all individuals, including those with disabilities, older adults, and individuals with limited mobility (Friman, Lättman, & Olsson, 2020). The idea is connected to social repercussions including social inclusion, transport disadvantage, and transport justice through documenting individual experiences (Schwanen, et al., 2015).

When designing the infrastructure for public transport, the term "accessibility" describes how easily users can get to transit facilities like bus stops and railway stations (Borhan, Ibrahim, Syamsunur, & Rahmat, 2017). Transit accessibility is affected by things like the state of bus stops, bicycle lanes, pedestrian paths, and accessibility for those with disabilities. A study highlighted the importance of physical accessibility features, such as low-floor buses, ramps, and priority seating, in facilitating independent boarding and disembarking for passengers with mobility impairments (Smith, et al., 2020). These features enhance convenience and promote inclusivity. According to past research, universal design principles emphasize the significance of developing transportation systems that are available to everyone, regardless of their age or level of proficiency (Borhan, Ibrahim, Syamsunur, & Rahmat, 2017). The accessibility experience is improved by including elements like clear signs, audio-visual announcements, and contrasting colours for enhanced

visibility. Nevertheless, the lack of direct connections had minimized the accessibility between some train stations and bus terminals via amenities like air-conditioned bridges raises serious connectivity issues (Brohi, Pillai, Asirvatham, Ludlow, & Bushell, 2018). Other than that, accessibility can be severely hampered by inadequate infrastructure, such as poorly constructed bus stops or no accessible routes to such stops (Zhu, et al., 2023). According to Zhu et al. (2023), older people and people with mobility issues are disproportionately affected by transportation hubs without adequate seating or shelters. Moreover, bus drivers and other staff personnel are essential in making sure that services are accessible. However, it can result in bad experiences if they are not properly trained in helping passengers with disabilities. Insufficient staff training led to drivers failing to offer the required help or using accessibility elements improperly (Etuk, Anyadighibe, James, & Mbaka, 2021).

Accessibility in public transport is crucial for inclusive mobility, especially for individuals with disabilities and older adults. Infrastructure design impacts transit accessibility, involving features like low-floor buses and ramps. Universal design principles emphasize inclusive transportation systems. However, challenges include poor connectivity, inadequacies in infrastructure, and the need for staff training to ensure proper assistance for passengers with disabilities, preventing negative experiences. In consequence, to assess the accessibility of public bus services in Kedah, considering factors of coverage, frequency, and proximity to residential areas, educational institutions, and commercial centers.

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2.3 HYPOTHESES DEVELOPMENT

Research hypotheses are detailed declarations that propose a relationship or difference between two or more variables (Khan, Raman, Sambamoorthy, & Prashanth, 2023). In the setting of this research, relationship hypothesis of explanatory hypotheses will be formulated to test various aspects of the transit system. Hence, in order to analyze the relationship, the hypotheses' testing results development has been developed in one of the following formats, outlined below:

2.3.1 RELIABILITY AND CUSTOMER SATISFACTION

Zul et al. (2022) stated that customer satisfaction of service quality will improve when public bus transit is more reliable, as evidenced by timetable adherence, few service interruptions, consistent performance includes elements like comfort, safety, cleanliness, professionalism, and accessibility (Zhang H. , 2022). There is a positive relationship between reliability and customer satisfaction in public bus transportation (Nafiu, Hassan, & Alogwuja, 2018; Wang, Zhang, Zhu, & Wang, 2020). When the customer pleased with the reliability of public bus service, it improves the quality of the service by offering a reliable and predictable passenger experience (Zul, Azman, Nadzri, Ismail, & Azizan, 2022).

H1: *There is a positive relationship between reliability and customer satisfaction.*

2.3.2 ASSURANCE AND CUSTOMER SATISFACTION

Customer satisfaction will improve if there are higher levels of assurance in public bus transportation, which include elements like dependability, safety, information and communication, comfort, accessibility, and professionalism (Zul, Azman, Nadzri, Ismail, & Azizan, 2022). Higher service quality ensures that

passengers have a positive and satisfactory experience throughout their journey (Fu, Zhang, & Chan, 2018). There is a positive relationship between assurance and service quality in public bus transportation (Friman, Lättman, & Olsson, 2020; Zul, Azman, Nadzri, Ismail, & Azizan, 2022). A high level of service quality, on the other hand, regularly provides a satisfying travel experience that matches or exceeds passenger expectations, reinforcing assurance (Börjesson & Rubensson, 2019).

H2: *There is a positive relationship between assurance and customer satisfaction.*

2.3.3 TANGIBLES AND CUSTOMER SATISFACTION

A positive relationship between tangibles aspects and customer satisfaction in public bus transportation suggests that the physical and visual elements of the service significantly contribute to passengers' overall satisfaction levels. Tangibles elements typically encompass the interior, cleanliness, and functionality of the physical appearance and amenities associated with public bus services (Nafiu, Hassan, & Alogwuja, 2018). In the context of public bus transportation, tangibles factors might include the condition of bus stops, the cleanliness and maintenance of buses, the comfort of seating, and the availability of clear signage and information (Ustadi & Shopi, 2015). When passengers perceive these tangibles elements positively, it tends to enhance their overall satisfaction with the service (Ngeoywijit, et al., 2022).

H3: *There is a positive relationship between tangibles and customer satisfaction.*

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2.3.4 EMPATHY AND CUSTOMER SATISFACTION

The positive relationship between empathy and customer satisfaction in public bus transportation is evident in the attentive and caring approach adopted by service providers. As highlighted by Zul et al. (2022), empathy involves understanding passengers' circumstances and emotions through firsthand experiences. This empathetic duty of bus operators, as defined by the authors, contributes to customer satisfaction by making passengers feel valued, special, and fostering loyalty (Zul, Azman, Nadzri, Ismail, & Azizan, 2022). The significance of empathy extends to various aspects, including the provision of a comfortable and safe travel environment, careful handling of passengers' belongings, and the competence of drivers, as emphasized by Nafiu et al. (2018), Njeru et al. (2019), and Etuk et al. (2021). Additionally, considerations such as clean and pleasant bus interiors, affordable fares, and accessible bus stops further enhance the empathetic service, ensuring passengers experience a stress-free and enjoyable journey (Friman et al., 2020). This collective focus on empathy ultimately strengthens the positive connection between empathetic practices and heightened customer satisfaction in the realm of public bus transportation.

H4: *There is a positive relationship between empathy and customer satisfaction.*

2.3.5 RESPONSIVENESS AND CUSTOMER SATISFACTION

Based on previous research, there is positive relationship between responsiveness and customer satisfaction in public bus services. Responsiveness plays a vital role in determining passengers' perceptions of the service quality (Parasuraman, Zeithaml, & Berry, 1988). Studies highlight that adhering to published

schedules and minimizing delays enhances passenger satisfaction (Ngeoywijit, et al., 2022). The incorporation of innovative solutions, such as using smartphones for location tracking and ticket purchasing, further improves service efficiency that provide high responsiveness. Additionally, positive interactions between drivers, ticket collectors, and Information Kiosk staff further enhance the customer experience (Ustadi & Shopi, 2015). In conclusion, a well-executed of responsiveness public bus service is associated with increased customer satisfaction, emphasizing the positive correlation between these two factors.

H5: *There is a positive relationship between responsiveness and customer satisfaction.*

2.3.6 ACCESSIBILITY AND CUSTOMER SATISFACTION

Customer satisfaction towards service quality will improve if public transport is more accessible, including features like well-designed bus stops, ramps or lifts for people with impairments, and convenient routes (Friman, Lättman, & Olsson, 2020). The service is more inclusive and user-friendly thanks to improved accessibility measures, which also improve passengers' overall travel experiences (Akaateba, Adumpo, & Yakubu, 2023). Accessibility in public bus transportation plays a vital role in ensuring equitable and inclusive mobility for all individuals, including those with disabilities, older adults, and individuals with limited mobility (Friman, Lättman, & Olsson, 2020). This was mentioned by Borhan et al. (2019), who discovered that providing correct and current information to travelers with impairments had a positive impact to service quality. There is a positive relationship between accessibility and service quality in public bus transportation (Friman, Lättman, & Olsson, 2020; Borhan, Ibrahim, Syamsunur, & Rahmat, 2017).

H6: *There is a positive relationship between accessibility and customer satisfaction.*

2.4 SUMMARY

Chapter 2 of the research delves into the literature review, defining variables extracted from theories and developing hypotheses. Public bus transportation research spans efficiency, accessibility, sustainability, and user satisfaction. Six variables, are analyzed through the SERVQUAL model and Concept of Access. Hypotheses propose positive relationships between Reliability, Assurance, Tangibles, Empathy, Responsiveness, Accessibility, and Customer Satisfaction. The review culminates in hypotheses aimed at examining the intricate relationships between service quality proportions and customer satisfaction in the context of public bus transportation in Kedah.

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CHAPTER THREE:

METHODOLOGY

3.0 INTRODUCTION

In chapter 3, there is a research framework that illustrate about the variables. This chapter also consisted a complete research design. By using the appropriate method to discover data collection which include population, sampling technique, sample size and questionnaire design. This chapter also explained the method that used for data analysis.

3.1 RESEARCH FRAMEWORK

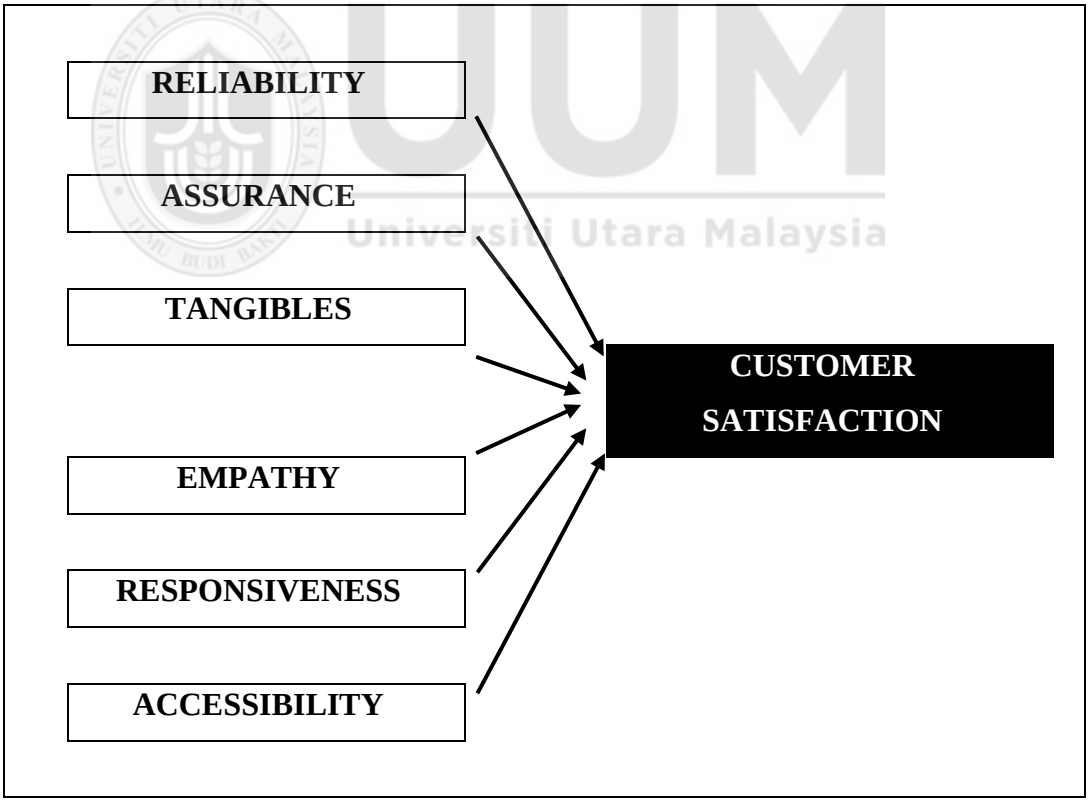

Figure 3.1
The Research Framework

The variables used in this research were extracted from the SERVQUAL model and the Concept of Access. Five dimensions from SERVQUAL model have been use

which are reliability, assurance, tangibles, empathy, and responsiveness (Parasuraman, Zeithaml, & Berry, 1988). In addition to complete the coverage of this research in order to meet the customer satisfaction, dimension of accessibility from the Concept of Access have been used to highlight the important of accessibility in order to remove any barrier and ensuring equitable and inclusive mobility for all individuals, including those with disabilities, older adults, and individuals with limited mobility to travel without limit (Penchansky & Thomas, 1981). Thus, the purpose of this research will study the relationship between reliability, assurance, tangibles, empathy, responsiveness, accessibility and customer satisfaction. As shown in the figure below the dependent variable for this research is service quality and the independent variable for this research are reliability, assurance, tangibles, empathy, responsiveness, and accessibility.

3.2 RESEARCH DESIGN

This research employed the quantitative research design with hypotheses testing to describe a phenomenon in the context of contingent assertions of the relationship between the predetermine variables such as reliability, assurance, tangibles, empathy, responsiveness, accessibility and customer satisfaction (Khan, Raman, Sambamoorthy, & Prashanth, 2023). The type of investigation used in this research was correlational. Correlational research is a type of investigation in research design that scrutinizes the statistical relationship between two or more variables without manipulating them (Khan, Raman, Sambamoorthy, & Prashanth, 2023). The goal of correlational studies is to determine the relationship exists between variables, as well as to predict or explain changes in one variable based on the observed changes in another. The extent of research interference was minimal and the study setting

employed non-contrived settings. Khan et al. (2023) stated non-contrived settings refers to a natural and authentic environment that is not artificially manipulated or controlled for research purposes. While the unit of analysis targeted on the group of passengers of public bus in Kedah. The time horizon employed single cross-sectional. This type of research design provides a snapshot of the characteristics, behaviors, or conditions of the subjects under investigation. Single cross-sectional studies are commonly used to describe the prevalence of a phenomenon or to explore associations between variables (Khan, Raman, Sambamoorthy, & Prashanth, 2023).

3.3 DATA COLLECTION

Data collection encompasses gathering information from various sources to fulfill research objectives or respond to specific research inquiries (Sekaran & Bougie, 2013). The data for this research is obtained via a questionnaire that is completed by the participant. This strategy is simple, has a high return rate, is less expensive, and any doubts may be cleared up. Questionnaires are a set of open-ended or closed-ended questions to which respondents respond (Kabir, 2016). However, for the data collection, this research will only be focusing on closed-ended questions.

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3.3.1 POPULATION

Population is an integrated collection of items (people or objects) who share a particular trait resolute by the researcher's test group parameters (Sekaran & Bougie, 2013). The population is the precise group on which a researcher selected to draw conclusions based on a generated sample (Khan, Raman, Sambamoorthy, & Prashanth, 2023). According to City Population, the total of entire population in Kedah for the year 2023 was 2 187 500 (Kedah, 2023). The research population would be focusing on the passenger of public bus services in Kedah.

3.3.2 SAMPLE SIZE

A sample is a subgroup of the entire population (Khan, Raman, Sambamoorthy, & Prashanth, 2023). The passenger from Kedah were targeted for participation in this research study. The sample size would be from the population in Kedah which 2 187 500 (Kedah, 2023). Krejcie and Morgan (1970) made the size decision and helped in providing a decision for the sample size in a given population. Thus, for the population that is more than 1 000 000, the sample size would be 384 number of respondents that need to be collected in this research (Krejcie & Morgan, 1970). However, this study aimed to gather data of 400 participants to ensure that the dataset remained above the minimum threshold of 384 respondents, which is necessary for balanced data analysis (Ramayah, Cheah, Chuah, & Ting, 2018). Consequently, the final dataset comprised responses from a total of 388 participants after 12 datasets have been rejected. Therefore, this study utilized a sample size of 388 respondents, as recommended by Ramayah et al. (2018), who emphasized that a larger sample size yields more robust results.

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3.3.3 SAMPLING TECHNIQUE

This research used multi-stage sampling to reach the passenger of public bus services to identify the factors that affecting the customer satisfaction. Multi-stage sampling for public bus research involves selecting samples in stages, considering various levels or stages within the transportation system.

In stage 1, the sampling technique employed cluster by analyzing through the area sampling based on the geographic (Khan, Raman, Sambamoorthy, & Prashanth, 2023). It began by selecting the specific cities where public bus operated involving choosing urban and suburban areas with different characteristics. The urban area

consists of Kulim, Sungai Petani, and Alor Setar. While suburban area will be Changlun, Pokok Sena and Pendang. Based on this method, further descriptive analysis on the passenger's background could be identified.

Next, in stage 2, the convenience sampling has been used. Convenience sampling is a non-probability sampling method in which the sample is chosen for its convenience or accessibility and availability to the researcher (Khan, Raman, Sambamoorthy, & Prashanth, 2023). In the context of public bus passengers, convenience sampling might involve selecting individuals who are readily available and accessible for data collection. Within each selected cities as stated in Stage 1, convenience sampling will be used by choosing a specific bus route. For instance, the researcher chooses My Bus to join the full trip of the bus route from UUM Sintok to Terminal Shahab Perdana and use Mara Liner to join the trip from Terminal Shahab Perdana to Sungai Petani. This will target respondent that ride the bus on that particular day.

This multi-stage approach allows researchers to capture a diverse and representative sample of public bus services. It considers geographical variations, route-specific characteristics, and passenger demographics. Each stage introduces a layer of sampling, helping ensure that the final sample is comprehensive and reflective of the broader public bus system. The choice of probability or non-probability sampling methods at each stage depends on factors such as available resources, research goals, and the desired level of representativeness.

3.3.4 QUESTIONNAIRE DESIGN

The questionnaire used for this research was split into two (2) main sections. Section A: Demographic Profile of respondent and Section B: A Comprehensive

Analysis of SERVQUAL Dimensions and Accessibility. The SERVQUAL model that developed by Parasuraman, Zeithaml, and Berry in the 1980s is a model that based on the principle of service quality is determined by the gap between customer outlooks and their insights of the service delivered. This theory consists of five primary attributes of reliability, assurance, tangibles, empathy and responsiveness. However, this attributes solely do not have full coverage to fulfil the demand of accessibility for all kind of individual especially for disability people to increase awareness about social justice. So, the variable of accessibility has been included in this research and was extracted from Concept of Access by Penchansky & Thomas (1981). This theory involves ensuring that individuals have equal access to legal resources and services, promoting fairness and equity within the legal system. Therefore, the following Section B will offer a comprehensive review of the instruments based on primary attributes of SERVQUAL (service quality, reliability, assurance, tangibles, empathy and responsiveness) and additional variable which is accessibility. All the question below were derived from previous study.

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SECTION A: DEMOGRAPHIC PROFILE

	ITEM	RESPONSES	ADAPTED FROM
DP1	Gender	Male	Akaateba, Adumpo, & Yakubu, 2023; Kadali, Ingole, Iyer, & Subbarao, 2021; Nafiu, Hassan, & Alogwuja, 2018; Wang, et al., 2020; Yue, Feng, Shao, Huang, & Ruan,
		Female	
DP2	Age	Below 25 years	
		26 – 35 years	
		36 – 50 years	
		Above 50 years	
DP3	Marital status	Single	
		Married	
		Divorced	
DP4	The area where you live	Village	
		Urban	
DP5	What is your occupation?	Student	
		Employee	
		Self-employed	
		Unemployed	

DP6	What is your monthly income range?	Below RM1 000	2024; Zhu, et al., 2023
		RM 1 000 – RM1 999	
		RM 2 000 – RM 2 999	
		Above RM 3 000	
DP7	Which mode of transportation you prefer to travel in Kedah?	Own Vehicle	
		Bus	
		Train	
DP8	Do you have any mobility challenges or physical barriers?	Yes	
		No	
DP9	How many years have you been using public transport?	Below 1 year	
		1 – 2 years	
		3 – 4 years	
		Above 4 years	
DP10	What is your main purpose for using public bus transportation?	Go to school or university	
		Official business/ Work	
		Social activity	
DP11	How frequently do you use public bus transportation in a month?	Not more than 1 time	
		Approximately 2 – 3 times	
		Approximately 4 – 5 times	
		More than 5 times	

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SECTION B: A COMPREHENSIVE ANALYSIS OF SERVQUAL DIMENSIONS AND ACCESSIBILITY

The fixed alternative questions of Likert Scale are used in developing this questionnaire which will be easier for the passenger to answer (Hair J. J., Hult, Ringle, & Sarstedt, 2022). Please choose the number in the box to specify how far you strongly agree or disagree with each statement by using the following scale:

Strongly Disagree (SD)				**Strongly Agree (SA)**
1	2	3	4	5

1	**CUSTOMER SATISFACTION (CS)**	**ADAPTED FROM**
CS1	I am satisfied with the safety compliance provided	Koc & Kaya, 2021; Neto, et

CS2	I am satisfied with the driver's driving skills.	al., 2020; Wang, et al., 2020; Yue, Feng, Shao, Huang, & Ruan, 2024
CS3	I am satisfied with the bus operator's prompt response during the incident.	
CS4	I am satisfied with the payment method used.	

2	**RELIABILITY (RE)**	**ADAPTED FROM**
RE1	I am satisfied with the navigation of the bus routes.	Friman, Lättman, & Olsson, 2020; Ngeoywijit, et al., 2022
RE2	I am satisfied with the ease to move with kids.	
RE3	I am satisfied with the accurate arrival time of bus.	
RE4	I am satisfied with the accurate information of the traveling route.	

3	**ASSURANCE (AS)**	**ADAPTED FROM**
AS1	I am satisfied that there is always a seat when riding the bus.	Friman, Lättman, & Olsson, 2020; Neto, et al., 2020
AS2	I am satisfied with the condition of bus throughout the journey.	
AS3	I am satisfied with the smooth traveling movement offered.	
AS4	I am satisfied with the brake system of the bus.	

4	**TANGIBLES (TA)**	**ADAPTED FROM**
TA1	I am satisfied with the number of seats provided at the bus stop.	Borhan, Ibrahim, Syamsunur, & Rahmat, 2017; Nafiu, Hassan, & Alogwuja, 2018; Ustadi & Shopi, 2015
TA2	I am satisfied with the distance to the nearest bus stop.	
TA3	I am satisfied with the availability of pedestrian access to bus stops.	

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TA4	I am satisfied with the cleanliness of the bus.	

5	EMPATHY (EM)	ADAPTED FROM
EM1	I am satisfied with the behaviour of bus driver.	Nafiu, Hassan, & Alogwuja, 2018; Ngeoywijit, et al., 2022; Ustadi & Shopi, 2015
EM2	I am satisfied with the temperature of air-conditioned inside the bus.	
EM3	I am satisfied with the pleasant environment at the bus stop.	
EM4	I am satisfied with the availability restrooms at bus terminals.	

6	RESPONSIVENESS (RS)	ADAPTED FROM
RS1	I am satisfied with the number of buses operate daily.	Friman, Lättman, & Olsson, 2020; Ngeoywijit, et al., 2022; Ustadi & Shopi, 2015
RS2	I am satisfied with the guidance provided at the Information Kiosk.	
RS3	I am satisfied with the behaviour of attendance bus before boarding bus.	
RS4	I am satisfied with the fast announcement for any changes occurs.	

7	ACCESSIBILITY (AC)	ADAPTED FROM
AC1	I am satisfied with the availability restrooms at bus terminals.	Akaateba, Adumpo, & Yakubu, 2023; Koc & Kaya, 2021; Minser & Webb, 2010; Unsworth & Timmer, 2023
AC2	I am satisfied with the wide bus aisles to accommodate mobility aids such as crutches.	
AC3	I am satisfied with the availability of ramps for individual with mobility challenges.	
AC4	I am satisfied with the lower bus floor height that ease the movement.	

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3.4 DATA ANALYSIS

Data analysis is to extract evocative information from the data and exploit it for decision-making purposes (Johnson, 2023). In this study, three methods of data analysis, namely data screening, descriptive analysis and statistical analysis, are employed to confirm the hypotheses development. Data screening is employed to guarantee that the accuracy of data and the descriptive analysis to analyze the demographic profile of the respondents. Both of these was analyze using SPSS Statistics 27 software. Statistical analysis was carried out using PLS-SEM.

3.4.1 DATA SCREENING

In this section, data analysis was conducted using the data collection's result by screening the data in three ways such as missing value, outliers and normality.

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3.4.1.1 MISSING VALUES

Missing values typically happen when survey respondents leave out portions of the questions (Khan, Raman, Sambamoorthy, & Prashanth, 2023). Nonetheless, a careful deletion technique could be used to handle the missing information (Adnan, Nordin, Amini, & Langove, 2018). The online questionnaire for the present research was distributed to respondents via Google Forms, with each element requiring a response. There was no possibility of questionnaires being unanswered because respondents were unable to disregard any inquiries or parts in the questionnaire form starting at the outset.

3.4.1.2 OUTLIERS

Khan et al. (2023) stated that outlier is a value that deviates from the typical data range which could lead to error and measurement uncertainty. It is a data point that deviates noticeably from other values and is positioned irregularly. Eliminating anomalies has the potential to improve study estimating accuracy. Using the z-score methodology suggested by Mowbray, Fox-Wasylyshyn, & El-Masri (2018), the outliers can be found; a z-score value of within - 3.29 to 3.29 shows the presence of outliers that need to be abolished during data screening.

3.4.1.3 NORMALITY TESTS

A statistical method to determine whether data follows a normal distribution is called normality. The data's normality could be checked using skewness and kurtosis (Khan, Raman, Sambamoorthy, & Prashanth, 2023). Kurtosis quantifies the degree to which the distribution's tails differ from those of the normal distribution, whereas skewness gauges the degree to which the distribution's overall shape deviates from that of the normal distribution. Whereas skewness concentrates on the overall structure, kurtosis concentrates on the shape of the tail. The study's data should be in normal ranges and normally distributed if the values of skewness and kurtosis are within the proper range of -1 to +1 (Hair J. F., Hult, Ringle, & Starstedt, 2017).

3.4.2 DESCRIPTIVE ANALYSIS

In this study, descriptive analysis has been used to analyze the result in the Section A of the Demographic Profile. The data obtained have been analyzed using IBM SPSS Statistics 27. Descriptive statistics using SPSS can provide a detailed outline of the characteristics of public bus users in Kedah based on the variables

mentioned. The descriptive analysis of public bus users in Kedah provides valuable insights into the demographic composition, preferences, and behaviours of the surveyed population (Trochim, 2021). The study revealed a diverse representation in terms of gender, age, and marital status, contributing to a comprehensive understanding of the passenger profile (Rawat, 2021). Residents from various areas participated, reflecting a broad geographical coverage. The educational and occupational diversity further highlighted the heterogeneous nature of public bus commuters. Monthly income range data showcased the economic diversity among users. Preferences for mode of transportation indicated the relevance of public buses within the travel choices available in Kedah shed light on additional mobility factors. Understanding mobility challenges and years of public transport use provided context to the transportation needs of the population. The analysis also unveiled the primary purposes for utilizing public bus services and the frequency of usage per month, offering key insights for improving service quality and addressing specific passenger needs in the region.

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3.4.3 STATISTICAL ANALYSIS

Statistical analysis employed the Partial Least Squares Structural Equation Modelling (PLS-SEM) which is a powerful statistical technique used to analyze complex relationships among variables in a structural model. In the context of this research model involving reliability, assurance, tangibles, empathy, responsiveness, accessibility, and customer satisfaction, PLS-SEM offers a robust method to examine these intricate connections. The PLS-SEM analysis begins with the development of a measurement model, assessing the reliability and validity of the observed indicators for each latent construct (Dash & Paul , 2021). After establishing the measurement

model, the focus shifts to the structural model, which examines the relationships between latent constructs by understanding how reliability, assurance, tangibles, empathy, responsiveness, and accessibility collectively influence customer satisfaction in the context of public bus transportation in Kedah. In the PLS-SEM analysis, the software calculates path coefficients, indicating the strength and direction of the relationships between constructs (Dash & Paul , 2021). Additionally, the analysis provides insights into the overall model fit and the significance of the relationships, helping the understand the relative impact of each latent variable on customer satisfaction. In summary, PLS-SEM provides a comprehensive approach to analyze the intricate connections in the research model. By evaluating the measurement and structural models, this research will gain valuable insights into how reliability, assurance, tangibles, empathy, responsiveness, and accessibility collectively contribute to shaping customer satisfaction in the context of public bus transportation in Kedah.

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3.5 PILOT TEST

A pilot study was conducted before the real survey was conducted to guarantee that all the items in the questionnaire are valid and consistent to be used as data collection tools (Khan, Raman, Sambamoorthy, & Prashanth, 2023). Thirty-two questionnaires were pre-tested by distributing the questionnaires to the targeted respondent. Based on the feedback, six out of the thirty-two have problem in understanding the questionnaire however changes have been made to ensure the credibility of the questionnaire. The data obtained from the pilot study was analyzed using the scale of reliability test in SPSS. The outcome from the study was measured by using the Internal Consistency Method which stated that if the Cronbach's Alpha

value range from 0.703 to 0.911 its indicate that the result was satisfactory for the research (Hair J. F., Hult, Ringle, & Starstedt, 2017). Thus, based on the result below, all the items are reliable to be used in the study.

Table 3.1
Result of Reliability Test of Pilot Study

Variable	No. of items	Cronbach's Alpha
Customer Satisfaction	4	0.911
Reliability	4	0.837
Assurance	4	0.703
Tangibles	4	0.729
Empathy	4	0.754
Responsiveness	4	0.853
Accessibility	4	0.752

3.6 SUMMARY

Chapter 3 begins with an introduction outlining the research framework, which includes variables from the SERVQUAL model and the Concept of Access. The research design employs causal research method and correlational investigation to explore the relationship between predetermined variables such as reliability, assurance, tangibles, empathy, responsiveness, accessibility, and customer satisfaction. Data collection involves a questionnaire with closed-ended questions, targeting public bus passengers in Kedah. The population size is determined, and a sample size of 384 respondents is chosen using multi-stage sampling. The questionnaire design includes two sections: demographic profile and Likert scale for variables. Data analysis utilizes descriptive analysis and PLS-SEM. Additionally, a pilot study was conducted to ensure the reliability of the questionnaire.

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CHAPTER FOUR:

DATA ANALYSIS AND FINDINGS

4.0 INTRODUCTION

In this chapter, the data collection analysis result is discussed. Firstly, the result of data screening is done using the IBM SPSS Statistics 27 software. Secondly, this chapter discussed on the respondents' demographic profile using descriptive analysis. Thirdly, statistical analysis is done using PLS-SEM to study complex relationships among variables in a structural model as the aims to analyze the correlation between various factors—such as reliability, assurance, tangibility, empathy, responsiveness, and accessibility—of Kedah's public bus service and customer satisfaction.

4.1 DATA CODING AND ENTERING

The questionnaire items were coded using easily recognizable codes. This was achieved by independently coding the variables based on the two-letter and number items from the questionnaire. For instance, a question for section A of Demographic Profile was coded as DP and followed number 1 until 11 for each question. In section B, the variable was label as Customer Satisfaction (CS), Reliability (RE), Assurance (AS), Tangibles (TA), Empathy (EM), Responsiveness (RS), Accessibility (AC) and the number label started from 1 to 4 as per each variable consist of four questions only. By using data coding, errors are prevented and the questionnaire is easily retrieved.

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4.2 DATA SCREENING

Following the data collection process via Google Form, rigorous screening procedures were implemented to uphold data quality standards. Initially, the Google Form yielded responses from a total of 400 participants. Adhering to the recommendation by Krejcie and Morgan (1970), the study targeted a sample size of 384. Nevertheless, this study aimed to gather data from 400 participants to ensure that the dataset remained above the minimum threshold of 384 respondents as, which is necessary for balanced data analysis (Ramayah, Cheah, Chuah, & Ting, 2018). Besides, subsequent screening revealed that 12 questionnaires exhibited unusable data due to unbalanced outliers. Consequently, 388 questionnaires remained suitable for further analysis. The exclusion of these 12 questionnaires was necessary as they contained unbalanced outliers, which could potentially distort the dataset and compromise the reliability and validity of the analysis (Hair J. F., Hult, Ringle, & Starstedt, 2017). Thus, to maintain the accuracy and integrity of the results, these questionnaires were omitted from the dataset.

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4.2.1 MISSING VALUES

Missing values can ensue due to countless reasons such as non-response, data entry errors, or data corruption. Disregarding missing values can lead to biased estimates, reduced statistical power, and incorrect conclusions (Khan, Raman, Sambamoorthy, & Prashanth, 2023). Addressing missing values appropriately ensures that the analysis is based on complete information, minimizing the risk of bias and allowing for more accurate inferences about the population being studied. As shown below, the total number of respondents are 388 and there no missing values

were found. Since all of the sections and questions in the Google Form were intended to be completed by respondents.

Table 4.1
The Output from SPSS

Statistics												
		DP1	**DP2**	**DP3**	**DP4**	**DP5**	**DP6**	**DP7**	**DP8**	**DP9**	**DP10**	**DP11**
N	**Valid**	388	388	388	388	388	388	388	388	388	388	388
	Missing	0	0	0	0	0	0	0	0	0	0	0

4.2.2 OUTLIERS

Outliers are data points that suggestively differ from the rest of the dataset. They can occur due to measurement errors, natural variability, or extreme observations. Identifying and addressing outliers helps in understanding the data distribution better and ensures that statistical analyses are not unduly influenced by extreme observations (Khan, Raman, Sambamoorthy, & Prashanth, 2023). This promotes the robustness and accuracy of the findings by providing a more representative picture of the underlying population. Using SPSS software, the current study investigates outliers with standardized scores (z-scores). Prior research has also employed this method to find outliers when screening data. Scholars state that any z-score value that is above 3.29 or lower -3.29 is an outlier (Mowbray, Fox-Wasylyshyn, & El-Masri, 2018). Based on the summary below, there are no outliers were found among the item, indicates that all data are valid.

Table 4.2
Summary of Z-Score Values

Variables	**Item**	**Standardised Value (Z-Score)**	
		Lower Value	**Upper Value**
Customer Satisfaction	CS1	- 2.53499	1.71678
	CS2	- 2.51641	1.69812
	CS3	- 2.54433	1.70474
	CS4	- 2.50367	1.68953

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Reliability	RE1	- 2.74614	1.68730
	RE2	- 2.46162	1.65523
	RE3	- 1.82354	1.32572
	RE4	- 1.92465	1.76763
Assurance	AS1	- 1.71511	1.72101
	AS2	- 1.84245	1.81106
	AS3	- 2.68832	1.33897
	AS4	- 2.21398	1.30661
Tangibles	TA1	- 2.76204	1.83084
	TA2	- 2.63740	1.70479
	TA3	- 2.11338	1.50689
	TA4	- 2.66284	1.37303
Empathy	EM1	- 2.75555	1.68691
	EM2	- 2.13717	1.99516
	EM3	- 2.76932	2.03289
	EM4	- 2.06538	1.98193
Responsiveness	RS1	- 2.95849	1.30877
	RS2	- 2.60857	1.72911
	RS3	- 2.28306	1.36608
	RS4	- 2.78767	1.34063
Accessibility	AC1	- 2.65911	1.47196
	AC2	- 2.61128	1.42528
	AC3	- 2.72429	1.48277
	AC4	- 2.74992	1.42200

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4.2.3 NORMALITY TEST

Assessing normality allows researchers to determine whether parametric assumptions are met and to select appropriate statistical methods accordingly (Hair J. F., Hult, Ringle, & Starstedt, 2017). Deviations from normality can affect the uniformity of these tests and lead to inaccurate conclusions. Thus, normality test was conducted. The table below displayed the result for normality test that have been conduct in the SPSS software to study the skewness and kurtosis. Hair et al. (2017) state that the appropriate range for the result should be within ± 1. Based on the result below, it shown that the data's normally distributed.

Table 4.3
The Result of Skewness and Kurtosis from SPSS

Item	Skewness		Kurtosis	
	Statistic	**Standard Error**	**Statistic**	**Standard Error**
CS1	- 0.430	0.124	0.284	0.247
CS2	- 0.451	0.124	0.295	0.247
CS3	- 0.442	0.124	0.309	0.247
CS4	- 0.436	0.124	0.254	0.247
RE1	- 0.424	0.124	0.467	0.247
RE2	- 0.466	0.124	0.249	0.247
RE3	- 0.318	0.124	- 0.808	0.247
RE4	- 0.207	0.124	- 0.639	0.247
AS1	0.277	0.124	- 0.675	0.247
AS2	0.240	0.124	- 0.533	0.247
AS3	- 0.541	0.124	- 0.185	0.247
AS4	- 0.411	0.124	- 0.436	0.247
TA1	- 0.448	0.124	0.549	0.247
TA2	- 0.317	0.124	0.166	0.247
TA3	- 0.091	0.124	- 0.923	0.247
TA4	- 0.233	0.124	- 0.493	0.247
EM1	- 0.432	0.124	0.495	0.247
EM2	- 0.425	0.124	- 0.152	0.247
EM3	- 0.545	0.124	- 0.021	0.247
EM4	- 0.375	0.124	- 0.239	0.247
RS1	- 0.593	0.124	- 0.129	0.247
RS2	- 0.285	0.124	0.101	0.247
RS3	- 0.575	0.124	- 0.080	0.247
RS4	- 0.519	0.124	- 0.252	0.247
AC1	- 0.624	0.124	0.211	0.247
AC2	- 0.653	0.124	0.219	0.247
AC3	- 0.696	0.124	0.401	0.247
AC4	- 0.668	0.124	0.346	0.247

4.3 DESCRIPTIVE ANALYSIS OF DEMOGRAPHIC PROFILE

By utilizing the SPSS 27, the descriptive analysis was generated on the respondents' demographic profile which the result could be refer at Appendix D. The summary of respondents' demographic profiles could be referred at Table 4.4.

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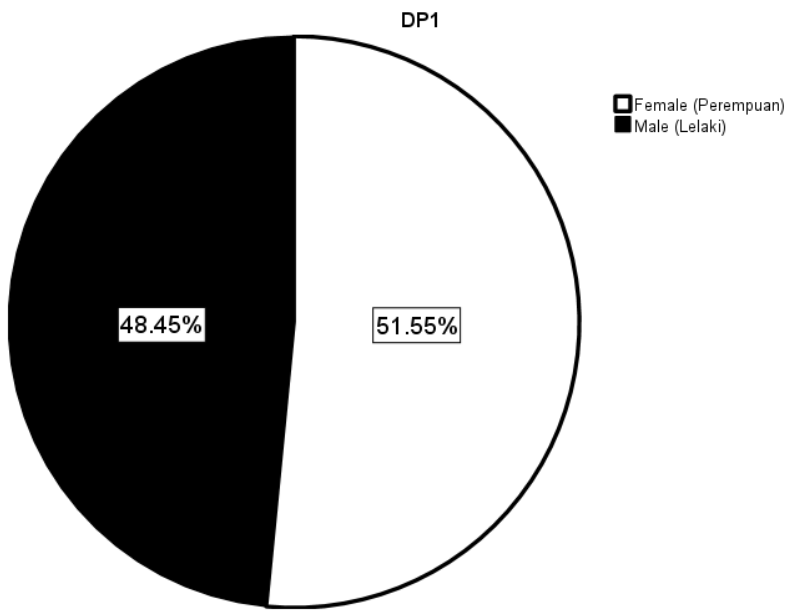
4.3.1 DP1 – GENDER



	Frequency	Percent
Female (Perempuan)	200	51.5
Male (Lelaki)	188	48.5
Total	388	100.0

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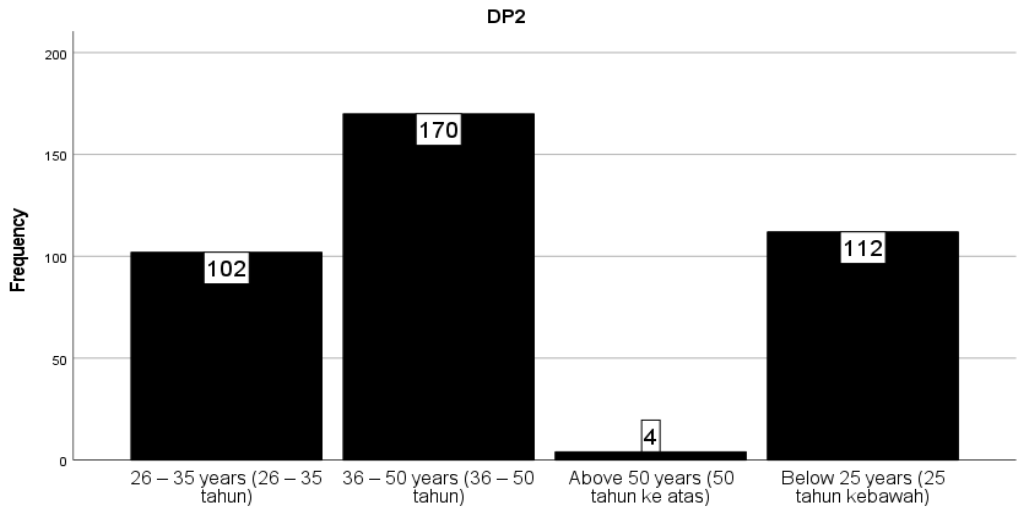
Figure 4.1
The Pie Chart of DP1

Based on the data collected from Figure 4.1, the entire of 388 respondents partaken in the study. Among these respondents, 200 were female, comprising 51.5 percent of the whole sample, while 188 were male, also representing 48.5 percent of the whole sample. This gender distribution indicates a comparatively balanced representation of both male and female respondents in the dataset, allowing for a comprehensive analysis of gender-related factors in the study.

4.3.2 DP2 – AGE



	Frequency	Percent
26 – 35 years (26 – 35 tahun)	102	26.3
36 – 50 years (36 – 50 tahun)	170	43.8
Above 50 years (50 tahun ke atas)	4	1.0
Below 25 years (25 tahun kebawah)	112	28.9
Total	388	100.0

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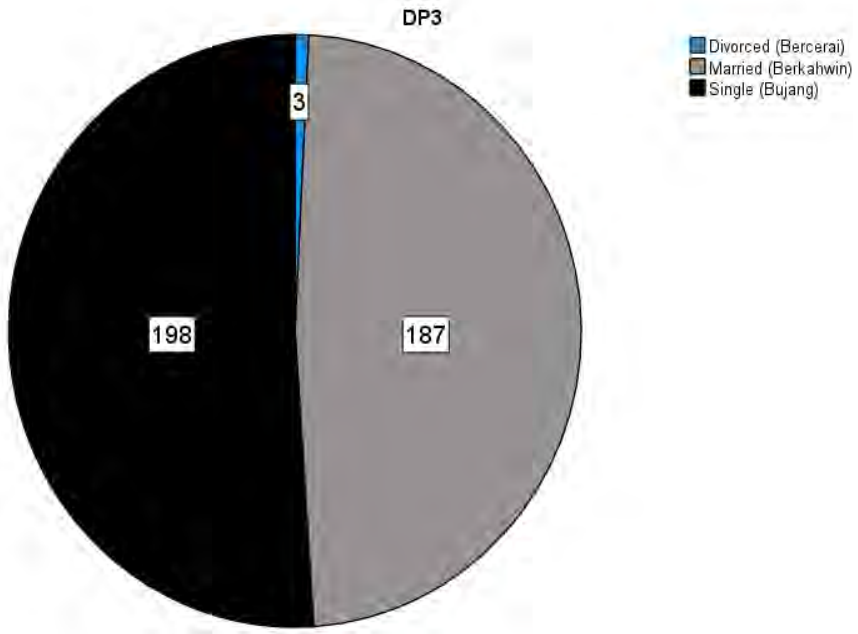
Figure 4.2
The Bar Chart of Respondents' Age

Figure 4.3 presents the demographic data regarding respondents' age (DP2). The majority of respondents, comprising 170 individuals or 43.8 percent of the total sample, fall within the age range of 36 to 50 years. Following this group, 112 respondents (28.9 percent) are below 25 years old, while 102 respondents (26.3 percent) are between 26 and 35 years old. Only a small proportion of respondents, totalling 4 individuals (1 percent), are aged above 50 years. This distribution allows for a detailed examination of age-related patterns and preferences within the dataset, facilitating nuanced analysis of age demographics in relation to other variables under investigation.

4.3.3 DP3 – MARITAL STATUS



	Frequency	Percent
Divorced (Bercerai)	3	.8
Married (Berkahwin)	187	48.2
Single (Bujang)	198	51.0
Total	388	100.0

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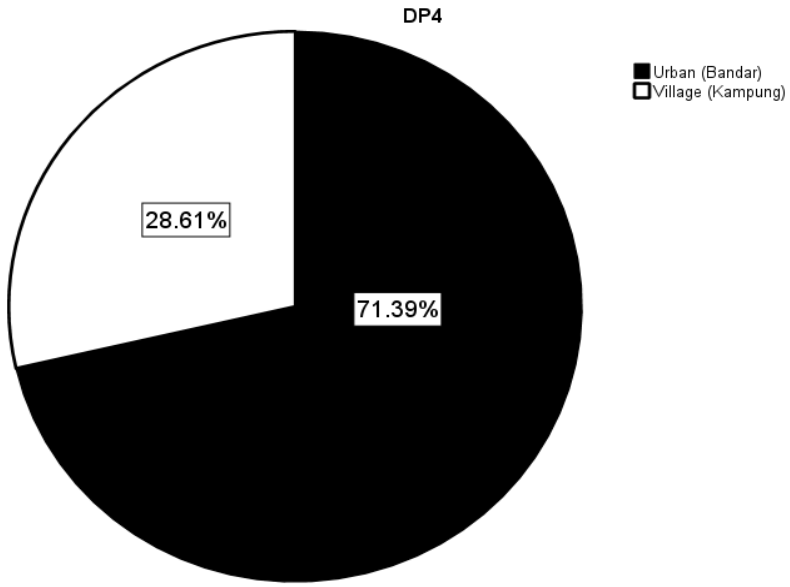
Figure 4.3
The Pie Chart of DP3

Figure 4.3 presents the distribution of respondents' marital status (DP3) in a pie chart format. The data reveals that the majority of respondents, accounting for 198 individuals or 51 percent of the total sample, are single. Following this group, 187 respondents (48.2 percent) are married, while only a small fraction, comprising 3 individuals (0.8 percent), are divorced. This clear visual representation allows for easy comparison of marital status categories.

4.3.4 DP4 – THE ORIGIN OF RESPONDENT

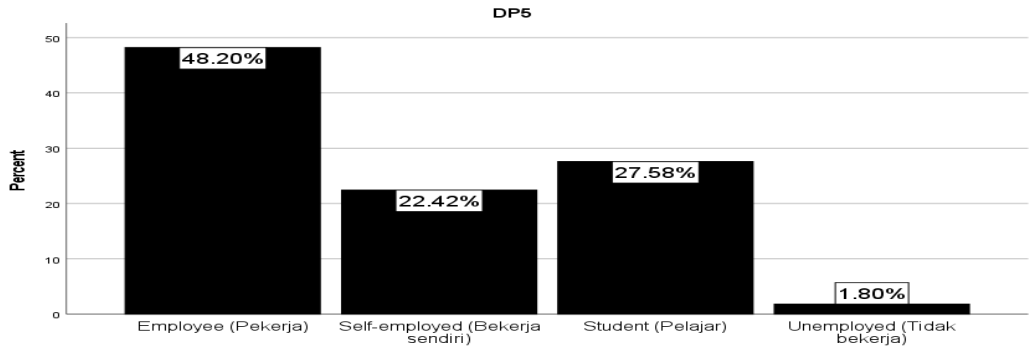


	Frequency	Percent
Urban (Bandar)	277	71.4
Village (Kampung)	111	28.6
Total	388	100.0

Figure 4.4
The Origins of The Respondent

DP4 provides insights into the origins of the respondents, categorizing them into urban and village areas. The data reveals that a significant majority of respondents, comprising 71.4 percent, are from urban areas, while 28.6 percent are from villages. Understanding the geographical distribution of respondents is crucial for several reasons in data analysis. Firstly, it helps assess the representativeness of the sample, ensuring that responses are not skewed towards one particular location. Secondly, it allows for the examination of potential differences in perceptions, behaviours, and experiences between urban and rural residents, which may influence the study outcomes (Berg & Ihlström, 2019).

4.3.5 DP5 – RESPONDENTS' OCCUPATION

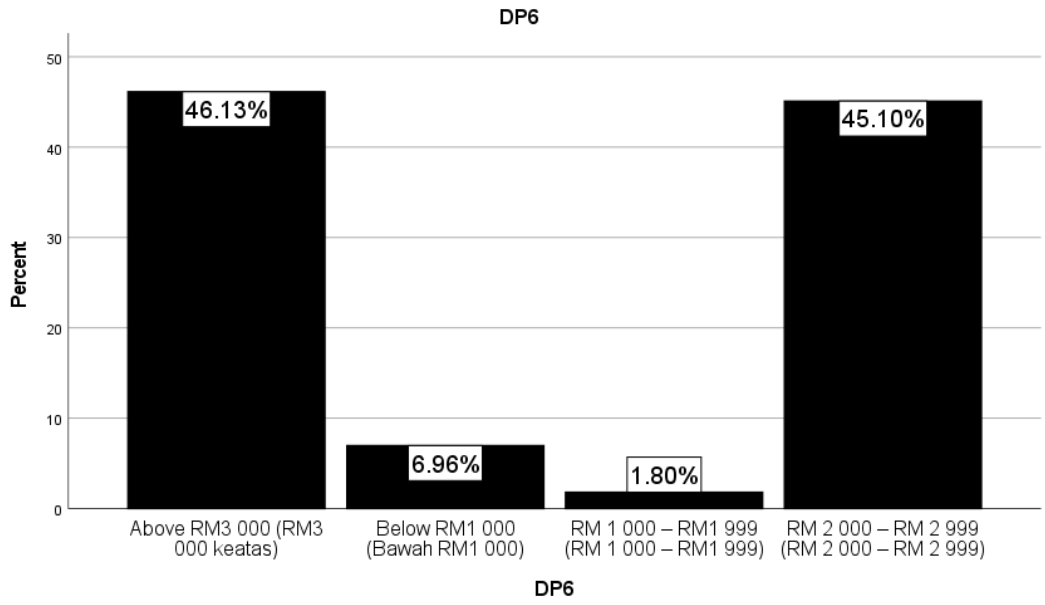


	Frequency	Percent
Employee (Pekerja)	187	48.2
Self-employed (Bekerja sendiri)	87	22.4
Student (Pelajar)	107	27.6
Unemployed (Tidak bekerja)	7	1.8
Total	388	100.0

Figure 4.5
Respondents' Occupation

DP5 provides an impression of the occupational status of the respondents. The data reveals that a significant portion of respondents, constituting 48.2 percent, are employees, followed by 27.6 percent who are students, 22.4 percent self-employed, and 1.8 percent unemployed. Analyzing respondents' occupational status is crucial for understanding how their employment situation may influence their perceptions, behaviors, and preferences related to public bus transportation (Berg & Ihlström, 2019). For example, employees may prioritize factors such as reliability and convenience for their daily commute, while students may focus on affordability and accessibility (Borhan, Ibrahim, Syamsunur, & Rahmat, 2017; Friman, Lättman, & Olsson, 2020). Self-employed individuals may have flexibility in their travel schedules, impacting their usage patterns differently (Shin, 2019). By considering occupational status in data analysis, researchers can tailor interventions and strategies to better meet the diverse needs of various occupational groups.

4.3.6 DP6 – MONTHLY INCOME



	Frequency	Percent
Above RM3 000 (RM3 000 keatas)	179	46.1
Below RM1 000 (Bawah RM1 000)	27	7.0
RM 1 000 – RM1 999 (RM 1 000 – RM1 999)	7	1.8
RM 2 000 – RM 2 999 (RM 2 000 – RM 2 999)	175	45.1
Total	388	100.0

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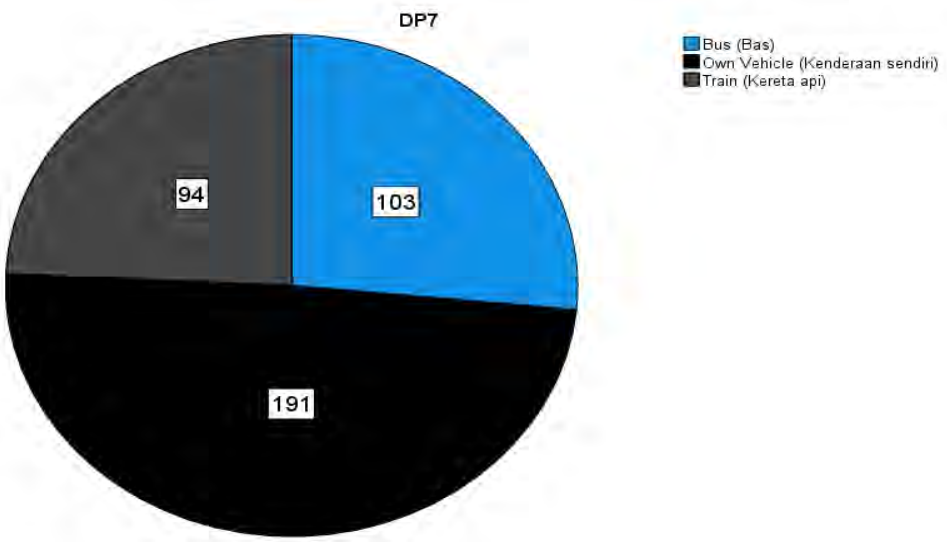
Figure 4.6
Respondents' Monthly Income Range

Following in data of Figure 4.6, monthly income range data (DP6) showcased the economic diversity among users. The highest frequency of 179 respondents with 46.13 percent represented income range of above RM3 000 and closely followed by income range of RM2 000 – RM2 999 with 175 respondents with 45.1 percent. The remaining are below RM1 000 and RM1 000 – RM1 999 with 27 samples (6.96 percent and 7 samples (1.8 percent) respectively.

4.3.7 DP7 – MODE OF TRANSPORTATION



	Frequency	Percent
Bus (Bas)	103	26.5
Own Vehicle (Kenderaan sendiri)	191	49.2
Train (Kereta api)	94	24.3
Total	388	100.0

Figure 4.7
Preferences for Mode of Transportation in Kedah (DP7)

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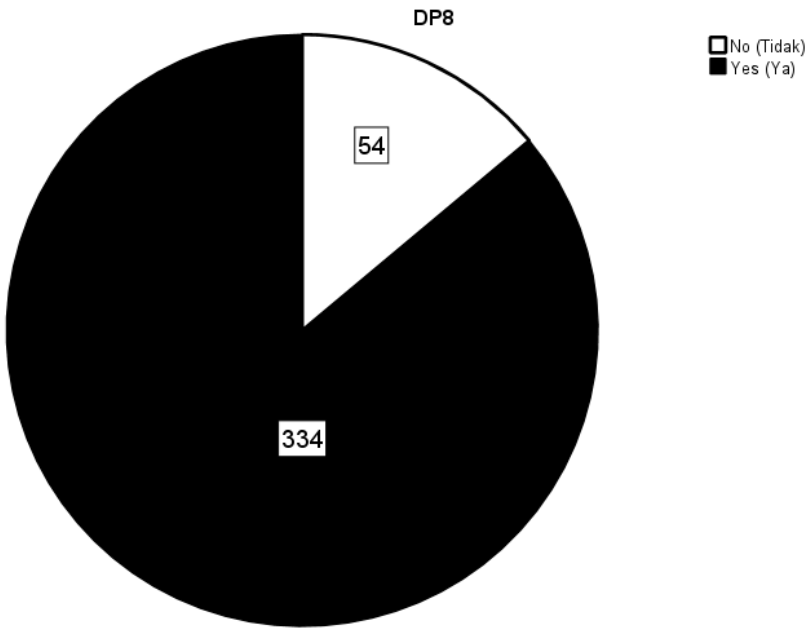
Analyzing preferences for modes of transportation, as depicted in DP7, offers valuable insights into travel behaviors and choices among the population in Kedah. 26.5 percent of respondent prefer to travel using bus and 24.3 percent of respondents choose train as their preference transportation. The data reveals a clear preference for personal vehicles, with 49.2 percent of respondents opting to use their own vehicles for transportation. This preference is supplementary consistent with the findings of previous studies by Nafiu, Hassan, and Alogwuja (2018) and Norhisham et al. (2021), indicating a prevalent inclination towards private vehicles over public transport. Understanding these preferences is essential for policymakers and transportation authorities to design interventions and initiatives aimed at promoting the use of public transportation.

4.3.8 DP8 – MOBILITY CHALLENGES



	Frequency	Percent
No (Tidak)	54	13.9
Yes (Ya)	334	86.1
Total	388	100.0

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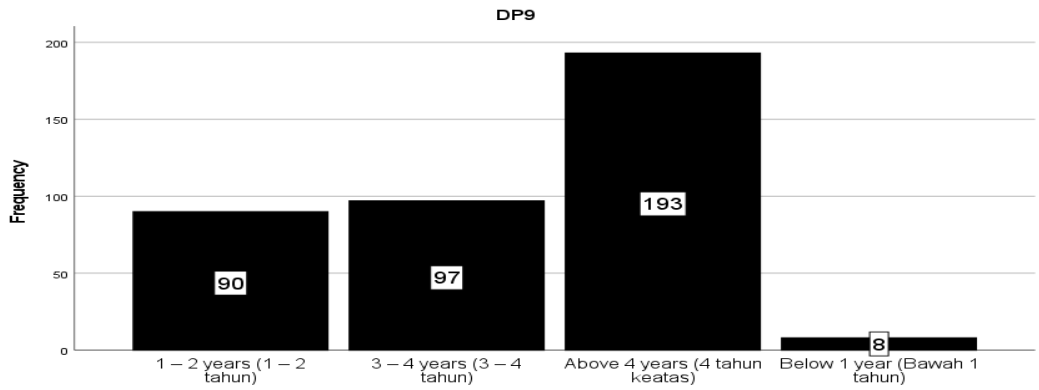
Figure 4.8
Mobility Challenges

The investigation into DP8 aimed to ascertain the prevalence of mobility challenges among respondents. Figure 4.8 reveals that a significant majority, totalling 334 individuals, acknowledged facing mobility challenges or physical barriers, whereas only 54 respondents reported not encountering such obstacles. This highlights the standing of manageable and inclusive public transportation choices to cater to the desires of individuals facing mobility challenges. By recognizing and addressing these challenges, public transportation providers can better tailor their services to meet the diverse needs of the population, thereby potentially increasing demand for public bus services (Schwanen, et al., 2015).

4.3.9 DP9 – RESPONDENTS' EXPERIENCES



	Frequency	Percent
1 – 2 years (1 – 2 tahun)	90	23.2
3 – 4 years (3 – 4 tahun)	97	25.0
Above 4 years (4 tahun keatas)	193	49.7
Below 1 year (Bawah 1 tahun)	8	2.1
Total	388	100.0

Figure 4.9
Respondents' Experiences

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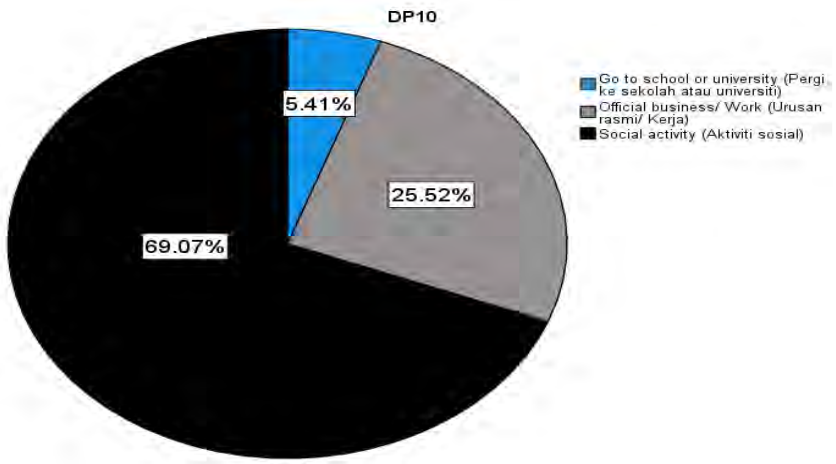
DP9 provides insights into respondents' experiences with using public buses. Among the respondents, 193 individuals reported having more than 4 years of experience, followed by 97 respondents who have been using buses for 3 to 4 years. Additionally, 90 respondents reported having 1 to 2 years of experience, while only 8 respondents conveyed having less than 1 year of experience. The significant number of respondents with years of bus usage experience signifies a sustained demand for public bus services. This suggests the vital role these services play in meeting community transportation needs. Also, the presence of respondents with shorter usage durations indicates opportunities for attracting new users (Franklin, 2024). Targeted initiatives aimed at improving service quality could further enhance bus services, capturing existing trends, and fostering potential areas for growth.

4.3.10 DP10 – PURPOSE OF USAGE



	Frequency	Percent
Go to school or university (Pergi ke sekolah atau universiti)	21	5.4
Official business/ Work (Urusan rasmi/ Kerja)	99	25.5
Social activity (Aktiviti sosial)	268	69.1
Total	388	100.0

Figure 4.10
Purpose of Usage

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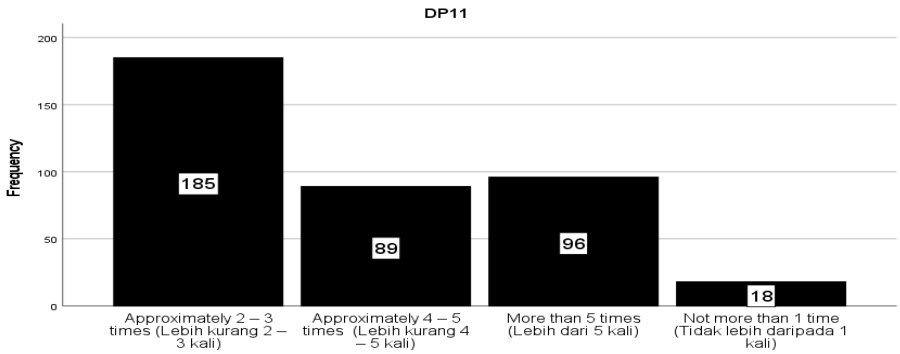
The data presented reveals that the primary purposes for utilizing the public stage bus service in Kedah are social activities, official business or work, and commuting to school or university. With 69.07 percent of respondents indicating social activity as their main reason for bus usage, followed by 25.52 percent for official business or work, and 5.41 percent for education purposes, it becomes evident that the majority of passengers utilize the bus service for non-essential activities. Understanding these usage patterns is crucial for enhancing the demand for public buses. By recognizing that a significant portion of passengers utilize the bus service for social activities, transportation authorities and bus operators can tailor their services to cater to these needs (Berg & Ihlström, 2019). For example, they could introduce promotional campaigns targeting leisure travellers, offer discounted fares during off-peak hours, or improve route connectivity to popular social destinations.

4.3.11 DP11 – THE FREQUENCY OF USAGE



	Frequency	Percent
Approximately 2 – 3 times (Lebih kurang 2 – 3 kali)	185	47.7
Approximately 4 – 5 times (Lebih kurang 4 – 5 kali)	89	22.9
More than 5 times (Lebih dari 5 kali)	96	24.7
Not more than 1 time (Tidak lebih daripada 1 kali)	18	4.6
Total	388	100.0

Figure 4.11
The Frequency of Usage

DP11 studied about the frequency of respondents using the bus. Figure 4.11 shown 4.6 percent of the respondents using the bus not more than one per month, 47.7 percent of the respondents often using the bus 2 until 3 times per month, 22.9 percent of them travel use the bus 4 to 5 times per month and 24.7 percent of the population have used the bus more than 5 times. The distribution of respondents across different frequency categories provides a nuanced understanding of the usage patterns and preferences among bus passengers. The fact that nearly half of the respondents use the bus 2 to 3 times per month indicates a moderate level of reliance on this mode of transportation for regular travel needs. The substantial proportion of respondents using the bus more than 5 times per month highlights a significant demand for public bus services among frequent users. Understanding the data aids policymakers and transportation authorities in tailoring services to meet the diverse needs of bus passengers effectively.

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Table 4.4
The Summary of Respondents' Demographic Profiles

Demographic Profile	Variable	Frequency	Percentage (%)
DP1. Gender	Female	200	51.5
	Male	188	48.5
DP2. Age	26 – 35 years	102	26.3
	36 – 50 years	170	43.8
	Above 50 years	4	1.0
	Below 25 years	112	28.9
DP3. Marital status	Divorced	3	0.8
	Married	187	48.2
	Single	198	51.0
DP4. The area where you live	Urban	277	71.4
	Village	111	28.6
DP5. What is your occupation?	Employee	187	48.2
	Self-employed	87	22.4
	Student	107	27.6
	Unemployed	7	1.8
DP6. What is your monthly income range?	Above RM3 000	179	46.1
	Below RM1 000	27	7.0
	RM 1 000 – RM1 999	7	1.8
	RM 2 000 – RM 2 999	175	45.1
DP7. Which mode of transportation you prefer to travel in Kedah?	Bus	103	26.5
	Own Vehicle	191	49.2
	Train	94	24.2
DP8. Do you have any mobility challenges or physical barriers?	No	54	13.9
	Yes	334	86.1
DP9. How many years have you been using public transport?	1 – 2 years	90	23.2
	3 – 4 years	97	25.0
	Above 4 years	193	49.7
	Below 1 year	8	2.1
DP10. What is your main purpose for using public bus transportation?	Go to school or university	21	5.4
	Official business/ Work	99	25.5
	Social activity	268	69.1
DP11. How frequently do you use public bus transportation in a month?	Approximately 2 – 3 times	185	47.7
	Approximately 4 – 5 times	89	22.9
	More than 5 times	96	24.7
	Not more than 1 time	18	4.6

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4.4 STATISTICAL ANALYSIS USING PLS – SEM

Statistical analysis is done using PLS-SEM to study complex relationships among variables in a structural model as it is suitable and dept at handling complex relationships among variables, making it well-suited for analyzing the correlation between various factors affecting customer satisfaction with public bus services in Kedah. It also allows for both measurement and structural model assessments, making it useful for predicting customer satisfaction based on factors like reliability, assurance, tangibility, empathy, responsiveness, and accessibility. Furthermore, given that the research aims to explore the factors contributing to the demand for public bus services and whether certain factors influence this demand, PLS-SEM's flexibility and suitability for exploratory research make it an ideal choice. Subsequent, on the data screening, the accuracy of data has been proven. Next, this study examined the measurement and structural model utilizing Partial Least Squares Structural Equation Modelling (PLS-SEM) with the SmartPLS 4 version (Ringle, Wende, & Becker, 2022). Following the recommendations of Hair et al. (2022) and Ramayah et al. (2018), the measurement model start examined the measurement model to ensure the legitimacy and consistency of the instruments employed. Afterward, ran the structural model to verify the premise.

4.4.1 MEASUREMENT MODEL

Measurement model involved evaluating the loadings, composite reliability (CR), average variance extracted (AVE), HTMT discriminant validity, collinearity issues and R square.

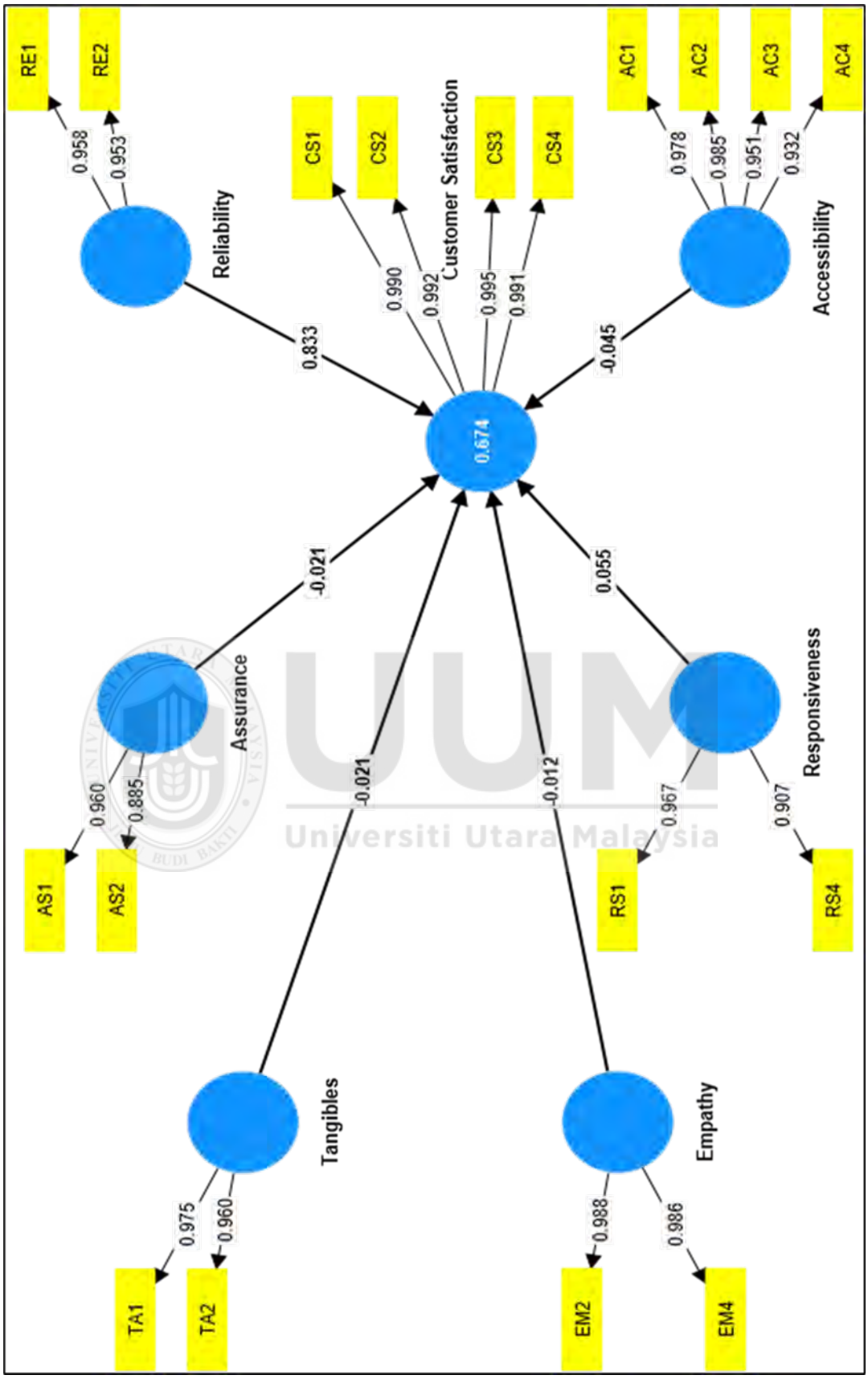

Figure 4.12
The Measurement Model of PLS-SEM Algorithm

4.4.1.1 INDICATOR RELIABILITY OUTER LOADINGS

Indicator reliability is determined by the loading of each indicator in a construct which the value should be within greater or equal to 0.7 for each indicator (Hair J. F., Hult, Ringle, & Starstedt, 2017). It suggests that the indicator has a good degree of reliability as the constructs account for more than 50 percent of the variance of the indicators. The data in Appendix E, number 2 shown some of the outer loading's result did not fulfil the criterion and it have been deleted to ensure that the data met the lowest acceptable level value. Following the PLS algorithm's execution, data in Figure 4.12 shown every item loading—which ranged from 0.907 to 0.995—met the minimal threshold value.

Table 4.5
The Measurement Model of PLS-SEM Algorithm

Constructs	Indicators	Indicator Reliability Outer Loadings (≥0.7)	Internal Consistency Reliability Composite Reliability (>0.7)	Convergent Validity, AVE (>5)
CS	CS1	0.990	0.996	0.984
	CS2	0.992		
	CS3	0.995		
	CS4	0.991		
RE	RE1	0.958	0.955	0.913
	RE2	0.953		
AS	AS1	0.960	0.921	0.853
	AS2	0.885		
TA	TA1	0.975	0.967	0.936
	TA2	0.960		
EM	EM2	0.988	0.987	0.974
	EM4	0.986		
RS	RS1	0.967	0.936	0.879
	RS4	0.907		
AC	AC1	0.978	0.980	0.925
	AC2	0.985		
	AC3	0.951		
	AC4	0.923		

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4.4.1.2 COMPOSITE RELIABILITY

As suggested by Hair et al. (2017), composite reliability (CR) was used in this study to examine the internal consistency reliability. The cutoff value for this composite reliability should be ≥ 0.7. The data of CR was extracted from composite reliability (rho_c) as shown in Appendix F. All seven construct values in this study exceed the minimum threshold value of 0.7, according to the PLS algorithm's smart PLS results. Table 4.5 displays the constructs values, which Hair et al. (2017) determined to be a reasonable range, ranging from 0.921 to 0.996.

4.4.1.3 CONVERGENT VALIDITY (AVE)

The notch to which two or more measurements of constructs that theoretically ought to be connected to one another really are related is known as convergent validity. This might be evaluated by applying the Hair et al., (2022) criterion to the average variance extracted (AVE), where an AVE of 0.5 or higher indicates a substantial statistical significance of the convergent validity. The results of the PLS method in this study showed that all seven constructs' AVE values—which range from 0.853 to 0.984—exceed the 0.5 threshold value (Table 4.5). These findings imply that there is adequate convergent validity in the measuring model.

4.4.1.4 HTMT DISCRIMINANT VALIDITY

Henseler, M. Ringle, and Sarstedt, (2015) recommended to verify using the method of the discriminant validity using the Heterotrait-Monotrait (HTMT) criterion. HTMT discriminant validity is the degree to which two or more measurements of constructs that, in theory, ought to be unrelated to one another actually are unconnected. HTMT was used in the current study to assess the discriminant validity of the components. Any constructs with values 0.90 or more

than, show a lack of discriminant validity (Henseler, M. Ringle, & Sarstedt, 2015). Subsequently, the PLS algorithm results demonstrate that every one of the seven constructs' HTMT values in this study is less than 0.90, suggesting that discriminant validity was demonstrated in this investigation (table 4.6). Stated in distinct ways, all seven notions in the current investigation are conceptually unique if their HTMT values are less than 0.90. However, the HTMT result of 0.861 between Reliability and Customer Satisfaction indicates almost a relatively high correlation between these constructs compared to their correlations with themselves. This could suggest that there is a substantial shared variance between Reliability and Customer Satisfaction, which may need to be further investigated.

Table 4.6
The Matrix of HTMT Discriminant Validity

	AC	AS	CS	EM	RE	RS	TA
Accessibility							
Assurance	0.068						
Customer Satisfaction	0.13	0.1					
Empathy	0.06	0.695	0.091				
Reliability	0.113	0.177	**0.861**	0.15			
Responsiveness	0.017	0.08	0.08	0.035	0.182		
Tangibles	0.067	0.178	0.254	0.188	0.357	0.091	

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4.4.1.5 COLLINEARITY ISSUES

Before analyze the result of data, evaluation of collinearity issues has been made. Collinearity among predictor constructs can be quantified using the variance inflation factor (VIF), with values greater than 5 suggesting collinearity (Hair J. F., Hult, Ringle, & Starstedt, 2017). However, in accordance with Kock (2015) and Lynn (2012)'s recommendations. All the variables in this method will be regressed against a common variable, and the single source data will not be biased if the collinearity statistics (VIF) is less than 3.3. By testing the complete collinearity, the constructs'

VIF values ranged from 1.015 to 1.678 after testing the results in smart PLS, suggesting that there is no collinearity among the constructs in this study and single source bias is not a significant problem for our data. The outcomes of VIF depending on constructs are displayed in Table 4.7.

Table 4.7
Collinearity Statistics (VIF) – Inner Model Matrix

Collinearity statistics (VIF) - Inner model - Matrix

	Accessibility	Assurance	Customer Satisfaction	Empathy	Reliability	Responsiveness	Tangibles
Accessibility			1.015				
Assurance			1.675				
Customer Satisfaction							
Empathy			1.678				
Reliability			1.171				
Responsiveness			1.031				
Tangibles			1.149				

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4.4.1.6 THE COEFFICIENT OF DETERMINATION (R^2)

The coefficient of determination, R^2 is a measure of the amount of an endogenous construct's variance that is explained by its predictor constructs to assess the goodness of fit of a regression model (Hair J. F., Hult, Ringle, & Starstedt, 2017). Furthermore, scholars have noted that R^2 values of 0.26, 0.13, or 0.02 for endogenous latent variables in the structural model can be classified as substantial, moderate, or weak, respectively (Cheah, Memon, Chuah, Ting, & Ramayah, 2018). In this study, the endogenous variables of customer satisfaction have R^2 values of 0.674 indicate the value is substantial (shown in figure 4.12). Generally, an R^2 value of 0.674 indicates that approximately 67.4 percent of the variance in the dependent variable is explained by the independent variables in the model.

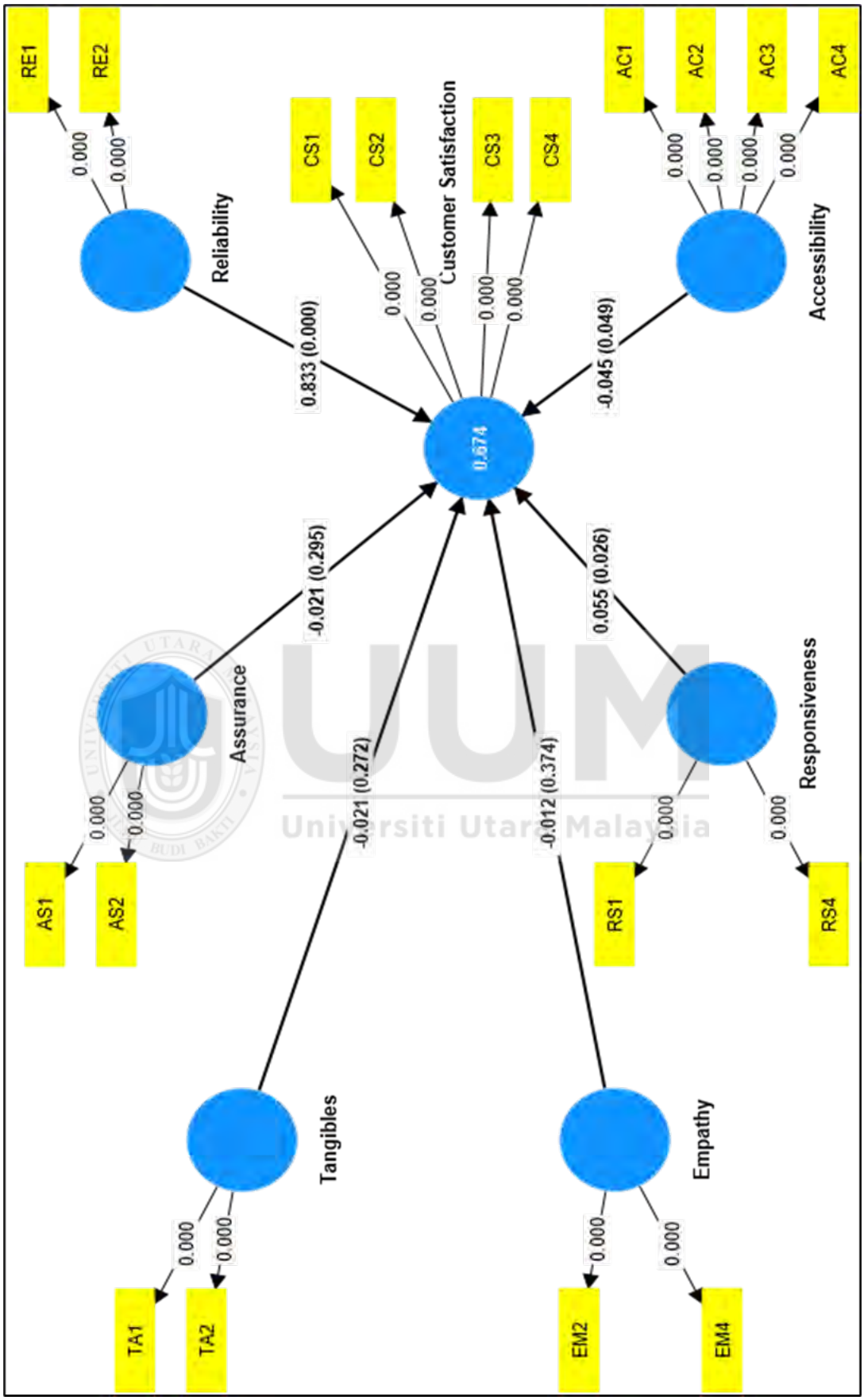

Figure 4.13
The Measurement Model of Bootstrapping

4.4.2 STRUCTURAL MODEL

In PLS-SEM, bootstrapping is commonly used for estimating standard errors, constructing confidence intervals, and conducting hypothesis testing. While bootstrapping provides valuable information about the reliability and robustness of parameter estimates, it also was used to ran the structural model to verify the significant. In step 2, the structural model was ran using a subsample of 10,000-bootstrapping sample procedure, a complete amount of result with setting of percentile bootstraps of one tailed test type at significance level of 0.05 and used fixed seed (Ramayah, Cheah, Chuah, & Ting, 2018). In accordance with Becker et al.'s (2023) recommendations', structural model should analyze the path coefficients, standard errors, t-values, and p-values. However, Hahn and Ang (2017) had stated the important of effect sizes, confidence intervals, and p-values should all be used in combination when evaluating the significance of a hypothesis. Thus, the structural model has analyze in two method the path coefficient including standard errors, t-values and p values. Secondly, the confidence interval by analyze the effect sizes (f square), Bootstrap Confidence Interval (BCI): Lower Limit (LL) and Upper Limit (UL). Figure 4.13 show the result of bootstrapping with the inner model indicate value for path coefficients and p-value.

4.4.2.1 PATH COEFFICIENT

In PLS-SEM, the path coefficient (β) is a measure that indicates the strength and direction of the relationship between two latent variables in the model. It represents the effect of one variable on another. Along with the path coefficient, standard errors, t-values, and p-values, and CI are used to assess the strength, significance, and reliability of relationships between latent variables in the PLS-SEM model.

T-values are derived by dividing the path coefficient by its standard error, providing a standardized measure of the coefficient's significance. In accordance to researcher, the hypothesis (H) would be accepted if the t-value is more than 1.645 for one tailed analysis (Ramayah, Cheah, Chuah, & Ting, 2018).

P-values associated with the t-values indicate the probability of obtaining the observed result if the null hypothesis of no relationship between variables is true. Lower p-values suggest stronger evidence against the null hypothesis, indicating a statistically significant relationship between variables. Hair J. F., Hult, Ringle, and Starstedt (2017) suggest that p-values from bootstrapping in PLS-SEM can be interpreted similarly to traditional hypothesis testing, where smaller p-values indicate stronger evidence against the null hypothesis. A commonly used threshold for significance is 0.05, meaning that p-values less than 0.05 are considered statistically significant and hypothesis accepted.

Subsequently, the bootstrap confidence interval (BCI) also enables the examination of whether a path coefficient differs significantly from zero. If a confidence interval for an estimated path coefficient excludes zero, we reject the hypothesis that the path coefficient equals zero (Hair J. F., Hult, Ringle, & Starstedt, 2017). Instead, we infer a significant effect, indicating that there is evidence of a meaningful relationship between the variables involved. In simpler terms, if both the lower limit (LL) and upper limit (UL) of the confidence interval have the same direction, either both negative or both positive, we conclude that there is a positive relationship between the variables.

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Table 4.8
Path Coefficient Result

Relationship	Path (β)	SE	t- values	p- values	BCI LL (5%)	BCI UL (95%)	R
H1: RE→CS	0.833	0.027	30.299	0.000	0.786	0.875	√
H2: AS→CS	- 0.021	0.040	**0.538**	**0.295**	**- 0.083**	**0.048**	×
H3: TA→CS	- 0.021	0.035	**0.607**	**0.272**	**- 0.079**	**0.036**	×
H4: EM→CS	- 0.012	0.038	**0.322**	**0.374**	**- 0.078**	**0.046**	×
H5: RS→CS	0.055	0.028	1.939	0.026	0.007	0.098	√
H6: AC→CS	- 0.045	0.027	1.658	0.049	- 0.092	- 0.002	√

Note: Bootstrap Samples = 10000, significance level at 0.05% (one-tailed test).
Note: Standard Errors = SE, R = Result, √ = Accepted, × = Rejected

The path coefficient analysis presented in the table above reveals distinct levels of significance and directionality in the relationships among the latent variables under investigation. Firstly, the path coefficient (β) between Reliability (RE) and Customer Satisfaction (CS) is 0.833 with a standard error (SE) of 0.027. The calculated t-value (30.299) significantly exceeds the threshold of 1.645, indicating strong support for the hypothesis (Ramayah, Cheah, Chuah, & Ting, 2018). Additionally, the p-value (0.000) is substantially below the common threshold of 0.05, further confirming the statistical significance of the relationship (Hair J. F., Hult, Ringle, & Starstedt, 2017). Moreover, the bootstrap confidence interval (0.786 - 0.875) does not include zero, indicating a meaningful positive relationship between RE and CS. Thus, H1 is accepted.

Secondly, the relationship between Assurance (AS) and Customer Satisfaction (CS), the β is -0.021 with a SE of 0.040. The associated t-value (0.538) falls below the critical threshold of 1.645, suggesting insufficient evidence to support the hypothesis. Furthermore, the p-value (0.295) exceeds the conventional significance level of 0.05, indicating a lack of statistical significance. The bootstrap confidence interval (-0.083 to 0.048) encompasses zero, indicating no significant relationship between AS and CS. Hence, H2 is not supported.

Thirdly, the β between Tangibles (TA) and Customer Satisfaction (CS) is -0.021, with a SE of 0.035. The calculated t-value (0.607) does not surpass the critical threshold of 1.645, and the p-value (0.272) exceeds the common significance level of 0.05. Moreover, the bootstrap confidence interval (-0.079 to 0.036) contains zero, indicating no significant effect of TA on CS. Thus, H3 is not accepted.

Fourthly, the relationship between Empathy (EM) and Customer Satisfaction (CS), the path coefficient (β) is -0.012, with a standard error (SE) of 0.038. The corresponding t-value (0.322) is below the critical threshold, and the p-value (0.374) exceeds 0.05, indicating no statistical significance. Additionally, the bootstrap confidence interval (-0.078 to 0.046) includes zero, suggesting no meaningful relationship between EM and CS. Therefore, H4 is not supported.

Fifthly, the path coefficient (β) between Responsiveness (RS) and Customer Satisfaction (CS) is 0.055, with a standard error (SE) of 0.028. The calculated t-value (1.939) surpasses the critical threshold, and the associated p-value (0.026) is less than 0.05, indicating statistical significance. Moreover, the bootstrap confidence interval (0.007 to 0.098) does not contain zero, confirming a positive and significant relationship between RS and CS. Hence, H5 is accepted.

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Next, for the relationship of H6 between Accessibility (AC) and Customer Satisfaction (CS), the path coefficient (β) is -0.045, with a standard error (SE) of 0.027. The computed t-value (1.658) exceeds the threshold, and the associated p-value (0.049) is less than 0.05, indicating statistical significance. Furthermore, the bootstrap confidence interval (-0.092 to -0.002) does not include zero, suggesting a negative and significant relationship between AC and CS. Therefore, H6 is accepted.

In summary, the findings emphasized the positive impact of reliability, responsiveness, and accessibility on customer satisfaction within the model, while assurance, tangibles, and empathy do not exert significant effects.

4.4.2.2 PREDICTIVE RELEVANCE, Q^2

According to Hair et al. (2017), Q2 is a crucial metric for assessing the predictive relevance of constructs in a SEM model. If Q2 exceeds zero, it signifies that the model possesses predictive relevance, whereas if Q2 is below zero, the model lacks such relevance (Hair J. F., Hult, Ringle, & Starstedt, 2017). In the present study, the Q2 value for the model, focusing on the endogenous construct of customer satisfaction, is determined to be 0.662, indicating that the model indeed exhibits predictive relevance.

Table 4.9
Predictive Relevance of Q^2

LV prediction summary - PLS-SEM			
	Q^2predict	RMSE	MAE
Customer Satisfaction	0.662	0.585	0.343

4.4.2.3 PLS PREDICT ASSESSMENT

Shmueli et al. (2016) introduced PLSpredict, a methodology that employs a holdout sample-based approach to generate case-level predictions within PLS-SEM models. By utilizing PLS-Predict along with a 10-fold procedure, this technique assesses predictive relevance on an item or construct level. The authors proposed that if the item differences (PLS-LM) are consistently lower, it indicates strong predictive power (Shmueli, Ray, Estrada, & Chatla, 2016). Conversely, if they are consistently higher, predictive relevance is not confirmed. In cases where the majority of item differences are lower, moderate predictive power is inferred, whereas if the minority are lower, it suggests low predictive power.

Table 4.10
PLS Predict Model

	Q^2predict	**PLS-SEM_RMSE**	**LM_RMSE**	**PLS-LM**
CS1	0.646	0.42	0.421	- 0.001
CS2	0.635	0.431	0.433	- 0.002
CS3	0.667	0.408	0.408	0.000
CS4	0.655	0.421	0.422	- 0.001

Referring to Table 4.10, the overall results suggest that the PLS Predict Model, based on PLS-SEM, demonstrates strong predictive power. The Q^2predict values for all constructs (CS1, CS2, CS3, and CS4) are relatively lower, indicating that a significant proportion of the variance in customer satisfaction is explained by the model. Additionally, the PLS-LM values, which represent the differences between the PLS-SEM and LM models, are consistently negative or close to zero across all constructs. Negative values suggest that the PLS-SEM model tends to outperform the LM model in terms of predictive accuracy. This indicates that the PLS-SEM model provides more accurate predictions compared to the LM model, further supporting its strong predictive power. Therefore, based on the PLS-LM values, the overall result

suggests that the PLS Predict Model is effective in generating accurate case-level predictions within PLS-SEM models.

4.5 SUMMARY

In Chapter 4, the data analysis and findings section cover a comprehensive examination of the collected data. The analysis involves using IBM SPSS Statistics 27 for data screening, descriptive analysis and PLS-SEM for statistical analysis. The findings shed light on the relationships between reliability, assurance, tangibles, empathy, responsiveness, accessibility and customer satisfaction, providing valuable insights for the research objectives. In summary, Hypothesis(H)1, H5, and H6 are supported, indicating positive relationships between reliability, responsiveness, and accessibility, respectively, with customer satisfaction. Conversely, H2, H3, and H4 are not supported, suggesting no meaningful relationships between assurance, tangibles, empathy, and customer satisfaction. The f^2 indicate large effects for H2, H3, and H4, indicating substantial impact, while moderate effects are observed for H5 and H6. The Q^2 values suggest predictive relevance for the model overall. Additionally, the PLSpredict assessment indicates strong predictive power for the model.

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CHAPTER 5:

DISCUSSION & CONCLUSION

5.0 INTRODUCTION

This chapter presents the outcomes of the research and the decisions drawn from them. It is structured into six primary segments. Firstly, this chapter explained the recapitulation of study. Subsequently, the results of the investigation were discussed. Following that, the contribution and limitations of the study was explained in detail. Lastly, the study's recommendations and final conclusions was emphasized.

5.1 RECAPITULATION OF STUDY

This study consisted six independent variables. Five out of six were extracted from SERVQUAL by Parasuraman, Zeithaml, and Berry in the 1980s – reliability, assurance, tangibles, empathy, and responsiveness. The remaining one, accessibility was extracted from Concept of Access by Penchansky & Thomas (1981). This research seeks to examine the existing demand for public bus services and determine whether certain factors contribute to a decline in this demand. It aims to analyze the correlation between various factors—such as reliability, assurance, tangibility, empathy, responsiveness, and accessibility—of Kedah's public bus service and customer satisfaction. The sampling frame was targeting the passenger of public bus in Kedah. Table 5.1 are the precise six research objectives and research questions of this study.

The data collection conducted using Google Form and obtained 400 respondents. However, the data analysis procedure using 388 of filtered sample of respondent after conducting the data screening using SPSS to and developing the

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descriptive analysis. After thar, SmartPLS4 was used to address the research questions, six hypotheses have been formulated. The result demonstrated that Hypotheses 1, 5, and 6 are supported, indicating positive relationships between reliability, responsiveness, and accessibility, respectively, with customer satisfaction. Conversely, Hypotheses 2, 3, and 4 are not supported, suggesting no meaningful relationships between assurance, tangibles, empathy, and customer satisfaction.

Table 5.1
Research Objectives and Questions

Research Questions	**Research Objectives**
1. What is the relationship between the reliability of Kedah's public bus service and the customer satisfaction?	1. To identify the relationship between the reliability of Kedah's public bus service and the customer satisfaction.
2. What is the relationship between the assurance of Kedah's public bus service and the customer satisfaction?	2. To identify the relationship between the assurance of Kedah's public bus service and the customer satisfaction.
3. What is the relationship between the tangibles of Kedah's public bus service and the customer satisfaction?	3. To identify the relationship between the tangibles of Kedah's public bus service and the customer satisfaction.
4. What is the relationship between the empathy of Kedah's public bus service and the customer satisfaction?	4. To identify the relationship between the empathy of Kedah's public bus service and the customer satisfaction.
5. What is the relationship between the responsiveness of Kedah's public bus service and the customer satisfaction?	5. To identify the relationship between the responsiveness of Kedah's public bus service and the customer satisfaction.
6. What is the relationship between the accessibility of Kedah's public bus service and the customer satisfaction?	6. To identify the relationship between the accessibility of Kedah's public bus service and the customer satisfaction.

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5.2 DISCUSSIONS OF THE FINDINGS

This segment will offer a discussion on the research questions, including empirical analyses and the findings concerning the relationships between the six independent variables and customer satisfaction. The study has introduced six hypotheses to address these research inquiries and the result as stated in table 5.2. The thorough examination and analytical assessment of the findings will be elaborated upon in subsequent sections.

5.2.1 RELATIONSHIP BETWEEN RELIABILITY AND CUSTOMER SATISFACTION

The first research question aimed to explore the connection between the reliability of Kedah's public bus service and customer satisfaction, “What is the relationship between the reliability of Kedah's public bus service and the customer satisfaction?”. Scholars such as Nafiu, Hassan, & Alogwuja (2018), Wang, Zhang, Zhu, & Wang (2020), Zhang H. (2022), and Zul, Azman, Nadzri, Ismail, & Azizan (2022) have previously highlighted that meeting reliability expectations in public bus services can enhance customer satisfaction. Hence, hypothesis 1 (H1) was formulated: “There is a positive relationship between reliability and customer satisfaction”. This hypothesis was designed to align with the notion that when the reliability of public bus services is met, it tends to lead to higher levels of customer satisfaction. Upon analysis of the results presented in Table 4.8, it becomes evident that there is indeed a positive relationship between reliability and customer satisfaction. The path coefficient ($\beta = 0.833$, t-value of 30.299 >1.645, p-value 0.000 < 0.05, CI = same direction both positive (LL = 0.786, UL = 0.875) is statistically significant, suggesting a strong positive relationship between the variables.

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This has confirmed that the finding in line with the previous research by the study by Aruho and Kansiime (2021), they found a notable positive correlation between the dependability of customer service and customer satisfaction ($r = 0.442$, $p = < 0.1$). This suggests that when the reliability of customer service improves, customer satisfaction also tends to increase (Aruho & Kansiime, 2021). In summary, the research findings suggest that ensuring reliability in Kedah's public bus service is essential for fostering higher levels of customer satisfaction, a conclusion supported by existing scholarly literature and empirical evidence presented in the study. Hence, the research question 1 and research objective 1 of "To identify the relationship between the reliability of Kedah's public bus service and the customer satisfaction" had been answered. In conclusion, hypotheses 1 accepted.

5.2.2 RELATIONSHIP BETWEEN ASSURANCE AND CUSTOMER SATISFACTION

The research question two was, "What is the relationship between the assurance of Kedah's public bus service and the customer satisfaction?". The following research question aimed to explore the relationship between the assurance provided by Kedah's public bus service and customer satisfaction. This question was particularly pertinent in the context of Malaysia, where safety assurance is a significant concern, as highlighted by Rohana, Ismah, and Che Pei (2017). In which residence prioritize assurance that can influence their willingness to rely on public transportation services. Henceforth, hypothesis 2 was developed, "***H2:*** *There is a positive relationship between assurance and customer satisfaction"*. This hypothesis was based on the assumption that when Kedah's public bus service provides assurance regarding safety and reliability, it would lead to higher levels of customer satisfaction (Abenoza, Cats, & Susilo, 2017; Efthymiou & Antoniou, 2017).

However, upon analyzing the coefficient results, it was found that there is a negative relationship between assurance and customer satisfaction. The path coefficient (β = -0.021, t-value of 0.538 < 1.645, p-value 0.295 > 0.05, CI = different direction (LL = - 0.083, UL = 0.048), suggesting a negative relationship between the variables.

The p-value results exceeded the significance level of less than 0.05, indicating that this relationship is statistically negative (Hair J. F., Hult, Ringle, & Starstedt, 2017). Nevertheless, this unexpected result is in line with the study by Fan, Shao, and Dong (2022) suggests that there is a significant negative association between assurance (β = 0.124, P < 0.01) and customer satisfaction. According to the study, if a company invests disproportionately in assurance measures without addressing fundamental aspects of the product or service that contribute to customer satisfaction, it may lead to a disconnect between customer expectations and actual experience (Fan, Shao, & Dong, 2022). Subsequent by Masrurul (2019), when assurance is not significant with customer satisfaction, as indicated by the value of 0.077 with a p-value of 0.538, it suggests that there is no statistically significant relationship between assurance and customer satisfaction in the context of the study or analysis being conducted. Consequently, businesses are strongly advised to enhance their levels of customer satisfaction by improving their "assurance dimensions" (Masrurul, 2019). Thus, further research may be needed to explore the underlying reasons for this finding and its implications for improving customer satisfaction in public transportation services. To sum up, even though the H2 had been rejected, the study managed to answered the research question 2 as mentioned before and research objective 2 of “To identify the relationship between the assurance of Kedah's public bus service and the customer satisfaction”.

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5.2.3 RELATIONSHIP BETWEEN TANGIBLES AND CUSTOMER SATISFACTION

The third research question was, “What is the relationship between the tangibles of Kedah's public bus service and the customer satisfaction?”. It aimed to explore the relationship between the tangibles associated with Kedah's public bus service and customer satisfaction. Tangibles typically mention to the physical facilities and amenities associated with the service, including appearance, cleanliness, and functionality. Hypothesis 3 (H3) was formulated to support this question: “There is a positive relationship between tangibles and customer satisfaction”. This hypothesis was based on existing literature, such as studies by Nafiu, Hassan, & Alogwuja (2018) and Ustadi & Shopi (2015), which indicated that elements such as the condition of bus stops, cleanliness and maintenance of buses, comfort of seating, and availability of clear signage and information can significantly impact passenger satisfaction. The results presented by Masrurul (2019) also support this assertion, indicating a notable correlation between tangibles and customer satisfaction, with a β coefficient of 0.191 and a significance level of $p > 0.039$. However, upon analyzing the path coefficient results of this study ($\beta = -0.021$, t-value of $0.607 < 1.645$, p-value $0.272 > 0.05$), it was found that the hypothesis was rejected. The confidence interval between the lower and upper limits contained zero (CI = different direction (LL = -0.079, UL = 0.036), indicating that there is no statistically significant relationship between tangibles and customer satisfaction.

The outcomes of this research stand in stark contrast to the findings of Nyabundi, Aliata, and Odondo (2021), wherein they observed a significant correlation between tangibility and customer satisfaction through correlation analysis ($r = 0.631$, $p < 0.05$). Their study indicated that 63.1 percent of the variance in customer satisfaction could be attributed to tangibility (Nyabundi, Aliata, & Odondo, 2021). Moreover,

past studies led by Nafiu, Hassan, & Alogwuja (2018) and Ustadi & Shopi (2015) have proposed a positive correlation between tangibles and customer satisfaction within public transportation services, the results of this current study present a different perspective, particularly within the context of Kedah's public bus service. This highlights the significance of taking into account factors specific to the context and conducting empirical investigations to confirm assumptions and hypotheses. To sum up, the hypotheses 3 was rejected. However, the research question 3 as mentioned before and the research objective 3 of "To identify the relationship between the tangibles of Kedah's public bus service and the customer satisfaction" has been answer, which was there is a negative relationship between tangibles and customer satisfaction.

5.2.4 RELATIONSHIP BETWEEN EMPATHY AND CUSTOMER SATISFACTION

The research question four of the study was, "What is the relationship between the empathy of Kedah's public bus service and the customer satisfaction?". While the research objective 4 was, "To identify the relationship between the empathy of Kedah's public bus service and the customer satisfaction". Scholars such as Zul et al. (2022) have highlighted empathy as a crucial aspect of bus operators' duties, involving understanding passengers' circumstances and emotions to make them feel valued and foster loyalty. This empathetic service contributes to customer satisfaction by creating a comfortable and safe travel environment, careful handling of passengers' belongings, and competent drivers, as emphasized by Nafiu et al. (2018), Njeru et al. (2019), and Etuk et al. (2021). Accordingly, the fourth research question aimed to investigate the relationship between the empathy demonstrated by Kedah's public bus service and customer satisfaction. Hypothesis 4 (H4) was formulated to

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support this question: “There is a positive relationship between empathy and customer satisfaction”. However, upon analyzing the results presented in Chapter 4, it was found that the hypothesis was rejected. The p-values and confidence intervals did not meet the criteria for data evaluation ($\beta = -0.012$, t-value of $0.322 < 1.645$, p-value $0.374 > 0.05$, CI = different direction (LL = - 0.078, UL = 0.046), indicating that there is no statistically significant relationship between empathy and customer.

This unexpected result suggests that factors other than empathy may have a more significant influence on customer satisfaction in this particular context. This is totally contradicted with the study by Masrurul (2019) that stated there is positive relationship between empathy and customer satisfaction as the p-value meet the significance level of less than 0.05 ($\beta = 0.287$, $p < 0.026$). Hence, further research may be needed to understand the underlying reasons for this finding and to explore alternative strategies for enhancing customer satisfaction. In summary, while previous literature by Nafiu et al. (2018), Njeru et al. (2019), Etuk et al. (2021) and Zul et al. (2022) has highlighted the importance of empathy in fostering customer satisfaction in public transportation services, the findings of this study suggest otherwise in the specific context of Kedah's public bus service. This highlights the complexity of factors influencing customer satisfaction and the need for empirical research to validate assumptions and hypotheses in different contexts. Based on the findings, the research question and objective have been answered which there is a negative relationship between empathy and customer satisfaction. As a result, the H4 have been rejected.

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5.2.5 RELATIONSHIP BETWEEN RESPONSIVENESS AND CUSTOMER SATISFACTION

The study' fifth research question was, "What is the relationship between the responsiveness of Kedah's public bus service and the customer satisfaction?". The fifth research question aimed to investigate the relationship between the responsiveness of Kedah's public bus service and customer satisfaction. Previous scholars such as Ngeoywijit et al. (2022) and Ustadi & Shopi (2015) have suggested that there exists a significant relationship between responsiveness and customer satisfaction. Consequently, hypothesis 5 (H5) was formulated based on this assertion: "There is a positive relationship between responsiveness and customer satisfaction". This hypothesis posits that when Kedah's public bus service demonstrates responsiveness to customer needs and inquiries, it will lead to higher levels of customer satisfaction. While the research objective 5 was, "To identify the relationship between the responsiveness of Kedah's public bus service and the customer satisfaction". Upon conducting data analysis, the study found support for hypothesis 5 as the p-value below the significance level 0.05 with value 0.026 and the CI in the same direction with 0.007 for lower limit and 0.098 for upper limit.

This specifies that there is indeed a positive relationship between responsiveness and customer satisfaction in the context of Kedah's public bus service. This in line with result from Masrurul (2019) stated there is positive relationship between responsiveness and customer satisfaction when the p value less than 0.05 ($\beta = 0.211$, $p < 0.025$). Thus, authors decided to accepted their hypothesis. In other words, when the bus service is prompt and attentive in addressing customer concerns, it tends to enhance overall satisfaction among passengers. Briefly stated, the study's findings suggest that responsiveness plays a crucial role in influencing customer satisfaction in Kedah's public bus service. This conclusion is consistent with previous research

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by Borhan, Ibrahim, Syamsunur, & Rahmat (2017), Etuk, Anyadighibe, James, and Mbaka (2021), Nafiu, Hassan, & Alogwuja (2018), Ngeoywijit, et al. (2022) and Ustadi & Shopi (2015) that highlights the importance of timely and effective responsiveness in meeting customer needs and fostering positive perceptions of service quality. Consequently, the positive relationship between responsiveness and customer satisfaction have answered the research objective and question, and the outcome was to accepted H5.

5.2.6 RELATIONSHIP BETWEEN ACCESIBILITY AND CUSTOMER SATISFACTION

The research question six of "What is the relationship between the accessibility of Kedah's public bus service and the customer satisfaction?". The sixth research question aimed to explore the relationship between the accessibility of Kedah's public bus service and customer satisfaction. Scholars such as Friman, Lättman, and Olsson (2020) have suggested that accessibility features, such as well-designed bus stops, ramps or lifts for people with impairments, and convenient routes, can enhance customer satisfaction. Based on this premise, hypothesis 6 (H6) was formulated: "There is a positive relationship between accessibility and customer satisfaction". Based on path coefficient result at Table 4.8, the p – value is 0.049 less than significance level at 0.05 and the CI in the same direct 0f – 0.092 (LL) and – 0.002 (UL). Thus, the present study revealed consistent with hypothesis 6.

This indicates that indeed, there is a positive relationship between accessibility and customer satisfaction in the context of Kedah's public bus service. In line as finding by Jannnang and Abdullah (2016), there is significant relationship between accessibility and customer satisfaction when the Cronbach Alpha result is 0.736 and AVE is 0.729 which meet the requirement for significant level (Jannang & Abdullah,

2016). In other words, the research objective six - To identify the relationship between the accessibility of Kedah's public bus service and the customer satisfaction, have been answered. To conclude, the study's findings suggest that accessibility features play a significant role in influencing customer satisfaction in Kedah's public bus service. This conclusion is supported by previous research and emphasized the importance of providing inclusive and convenient transportation options to meet the needs of all passengers, thereby enhancing their overall satisfaction with the service.

Table 5.2
The Hypotheses Result

Hypothesis Relationship	R
H1: *There is a positive relationship between reliability and customer satisfaction.*	√
H2: *There is a positive relationship between assurance and customer satisfaction.*	×
H3: *There is a positive relationship between tangibles and customer satisfaction.*	×
H4: *There is a positive relationship between empathy and customer satisfaction.*	×
H5: *There is a positive relationship between responsiveness and customer satisfaction.*	√
H6: *There is a positive relationship between accessibility and customer satisfaction.*	√

Note: R = Result, √ = Accepted, × = Rejected.

5.3 CONTRIBUTION OF THE STUDY

This study may contribute to the public transport service in Kedah by enhancing customer satisfaction within the public transportation system. The study's contributions are examined in the subsequent subsections.

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5.3.1 THEORETICAL CONTRIBUTIONS

This research donates to theoretical distributions in several ways.

5.3.1.1 ENRICHES THE EXISTING KNOWLEDGE

Previous studies in the context of public transportation have predominantly focused on trains, with limited research dedicated to buses (Briggs & Hau Kian, 2020). Moreover, there is a scarcity of research specifically fixated on public bus services in the northern region of Malaysia, particularly in Kedah. This scarcity of literature presents challenges in conducting a comprehensive literature review on public bus transportation in Kedah. As such, this study fills a gap in the literature by focusing on Kedah as a representative case for the northern region. By examining the factors contributing to customer satisfaction within the public bus transportation system in Kedah, this research enriches the existing body of knowledge on public transportation services, particularly in areas where research is lacking. Furthermore, given the prevailing trend of transportation in Malaysia, where personal vehicle ownership, such as cars and motorcycles, is common, the use of public bus transportation, especially in Kedah, may be negatively impacted. This trend has been observed in studies such as Norhisham et al. (2021). In light of this, the study's attention is restricted to the population of Kedah with the aim of promoting the usage of sustainable transportation options, including public buses.

5.3.1.2 SERVQUAL TO FULFILL SOCIAL JUSTICE

This research contributes to understanding the current transportation demand and preferences in Kedah, aiming to boost customer satisfaction. While the SERVQUAL model, developed by Parasuraman, Zeithaml, and Berry in the 1980s, provides a comprehensive framework for assessing service quality, it primarily

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focuses on attributes such as reliability, assurance, tangibles, empathy, and responsiveness. However, these attributes may not fully address the accessibility needs of all individuals, particularly those with disabilities, thereby highlighting the importance of including the variable of accessibility in this study. Drawing from the Concept of Access proposed by Penchansky & Thomas (1981), which emphasizes the importance of ensuring equal access to resources and services for all individuals, including those with disabilities, this research aims to increase awareness about social justice and promote fairness and equity within the transportation system. By incorporating the accessibility variable into the analysis, the study expands the scope of service quality assessment to encompass the needs of diverse populations, ultimately contributing to a more inclusive and equitable transportation environment in Kedah.

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5.3.2 MANAGERIAL IMPLICATIONS

In terms of managerial implications, both bus operators and government authorities could enhance:

5.3.2.1 EXISTING GUIDELINES AND REGULATIONS

Managerial could enhance existing guidelines and regulations governing public bus transportation. This study offers valuable insights into transportation preferences in Kedah, where personal vehicle ownership is prevalent, potentially negatively impacting the utilization of public bus services. This trend, as evidenced by studies such as Norhisham et al. (2021), indicates a preference for private vehicles over public transport. The demographic profiling of question 7 conducted in this research further corroborates this trend, with nearly half of the respondents (49.2 percent) expressing a preference for personal vehicles, compared to 26.5 percent

opting for bus travel and 24.2 percent choosing trains. In light of these findings, bus operators and government authorities can refer this information to revise and modify their policies, focusing on initiatives that address barriers to public transportation usage and promote its attractiveness as a viable alternative to private vehicles. Such efforts may include improving service reliability, enhancing accessibility, and implementing measures to address concerns related to comfort, convenience, and affordability, ultimately fostering a shift towards more sustainable transportation options.

5.3.2.2 INCREASE DEMAND

The study highlights the reputation of reliability, responsiveness, and accessibility in driving customer satisfaction within the public bus transportation system. The positive correlations observed among these variables highlight their significance in influencing overall satisfaction levels. Hence, it is essential for bus operators to prioritize efforts to enhance these aspects to meet customer expectations effectively. By focusing on improving reliability, responsiveness, and accessibility, including accommodating individuals with disabilities, bus operators can address key factors driving customer satisfaction. These improvements are expected to lead to a surge in demand for public bus transportation services in Kedah. Enhancing these variables not only elevates the service quality but also fosters a more positive perception of public transportation among passengers. Consequently, bus operators can anticipate increased patronage and enhanced customer loyalty, ultimately contributing to the sustainability and success of the public transportation system in Kedah.

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5.3.2.3 SERVICE QUALITY ENHANCEMENT

The findings of this study offer significant managerial implication, particularly in enhancing the service quality of Mara Liner in Kedah, a prominent bus operator. By distributing the results of the data analysis to Mara Liner, they can leverage research insights for service quality enhancement at Mara Liner and gain valuable insights into the factors influencing customer satisfaction and demand for their services. Armed with this knowledge, Mara Liner can strategically focus on areas identified for improvement, such as reliability, responsiveness, and accessibility. To illustrate, the analysis reveals that customers perceive Mara Liner's buses by prioritizing accessibility features for individuals with disabilities, Mara Liner can demonstrate a commitment to inclusivity and social responsibility, potentially attracting a broader customer base. Overall, the dissemination of research findings to Mara Liner enables them to make informed decisions and strategic investments aimed at improving service quality, ultimately leading to increased demand and customer satisfaction.

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5.4 LIMITATIONS OF THE STUDY

The limitations of a study refer to its deficiencies or inadequacies, which may arise due to various factors such as:

5.4.1 SAMPLE SIZE AND REPRESENTATIVENESS

The limitation regarding sample size and representativeness of the study is evident when examining the demographic profile of respondents. While efforts were made to gather data from a diverse range of participants, certain demographic groups may have been underrepresented in the sample. For instance, the majority of respondents were from urban areas (71.4 percent), which might not fully capture the

perspectives of individuals residing in rural or remote areas. Also, the sample predominantly comprised individuals aged 26-50 years (70.1 percent), potentially overlooking the experiences and preferences of younger or older demographics. In addition, the high proportion of respondents with mobility challenges or physical barriers (86.1 percent) might skew perceptions and experiences regarding accessibility and satisfaction with public bus transportation. Besides, the preference for using personal vehicles (49.2 percent) over public buses could indicate a bias towards respondents who already have a favourable opinion of private transportation, potentially impacting their assessments of bus service quality. Hence, while the study provides valuable insights, thoughtfulness should be drilled in generalizing findings to the broader population of public bus users in Kedah, as certain demographic biases may influence the understanding and experiences captured within the sample.

5.4.2 DATA COLLECTION METHOD

When utilizing a data collection method such as Google Forms with Likert scale responses ranging from "strongly disagree" to "strongly agree," there are specific considerations regarding potential biases. Despite the convenience and accessibility of online surveys, respondents may still be susceptible to response biases. For instance, social desirability bias could manifest wherein participants may tend to provide answers that they have faith in align with societal norms or prospects, rather than their honest sentiments or experiences. This bias might influence respondents to select responses they perceive as more socially acceptable, particularly when responding to Likert scale questions. Additionally, there may be a tendency for participants to exhibit acquiescence bias, where they consistently select the same response option (e.g., "agree" or "strongly agree") regardless of the question's content. Therefore, while Google Forms and Likert scales offer an efficient

means of data collection, researchers should remain mindful of these potential prejudices and employ approaches to lessen their impact, such as including reverse-scored items or utilizing diverse question formats.

5.5 RECOMMENDATIONS FOR FUTURE RESEARCH

Recommendations for future research in the field of public bus transportation in Kedah include:

5.5.1 SUSTAINABLE PROMOTION AND ADOPTION

It is critical to spread the word throughout society about the National Transport Policy (NTP), which aims to incentivize individuals by decreasing the value of money and promoting the economical and sustainable use of resources (NTP, 2019). Despite that, the government may employ more social media or advertising to publicize the new policy and encourage more Malaysians to take public transportation instead of driving their own vehicles (Khan R. , 2023). In addition, the government may erect billboards encouraging the use of public transit. It is a very clever strategy to persuade automobile owners to switch to public transportation because it is more affordable, efficient, and may even boost productivity—especially since they will be stranded in traffic. Higher usage of private vehicles can cause a lot of air pollution to the atmosphere. It is recommended that Malaysians get rid of the belief that those who cannot afford a car should only use public transportation (Teh, 2019). In the process of cutting down on travel time and traffic accidents, efficient public transportation systems also boost disposable income by lowering productivity losses and negative environmental effects, which in turn open up jobs for both urban and rural residents. Thus, it highly recommended for future research on sustainable

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transportation promotion and adoption to change Malaysian's mindset regarding public transportation.

5.5.2 RESEARCH ON EXPLORING FUTURE INNOVATION

Future research in the turf of public bus transportation should prioritize investigating the impact of technological innovations on customer satisfaction and usage patterns. Specifically, researchers should delve into the effectiveness of real-time tracking systems, mobile applications, and smart ticketing solutions in enhancing various aspects of the passenger experience (Sonawane, Gogri, Bhanushali, & Khaimar, 2020). By conducting empirical studies, researchers can assess how these technological advancements contribute to convenience, reliability, and overall satisfaction among bus passengers. Additionally, exploring the adoption rates and user perceptions of such technologies can provide valuable insights into their potential to revolutionize public transportation systems (Ngeoywijit, et al., 2022). This research agenda aims to shed light on the role of technology in shaping the future of public bus transportation, guiding policymakers and stakeholders in implementing effective strategies to improve service quality and enhance passenger experiences.

5.6 CONCLUSION

In conclusion, this study has provided valuable insights into the factors influencing customer satisfaction within Kedah's public bus transportation system. While the research confirmed positive relationships between reliability, responsiveness, and accessibility with customer satisfaction, unexpected findings emerged regarding assurance, tangibles, and empathy. These results emphasized the

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complexity of factors impacting passenger perceptions and highlight the need for context-specific analysis in the field of transportation. Despite limitations in sample size and data collection methods, the study offers theoretical contributions by addressing gaps in existing literature and providing practical implications for bus operators and government authorities. Moving forward, future research should focus on promoting sustainable transportation adoption and exploring the potential of technological innovations to enhance service quality and passenger experiences, ultimately contributing to the development of more efficient and inclusive public transportation systems in Kedah and beyond.

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APPENDIX A – QUESTIONNAIRE

QUESTIONNAIRE FORM

KAJIAN KEPUASAN PENGGUNAAN BAS AWAM DI KEDAH

Dear Respondent,

I am Nur Amirah, student from the School of Technology Management and Logistics, College of Business at Universiti Utara Malaysia (UUM), and currently conducting a study on **"Redesigning Public Transit: Assessing the Service Quality and Accessibility of Kedah's Bus Service"**. This study is a requirement for the Research Paper (BPMZ69912) subject. I believe that your participation in this study will provide a representative on this present study. All information given is confidential and will be used only for this study. If you have any questions about this study, please do not hesitate to contact me. I also would like to thank you in advance, for your time and response which will contribute a lot towards this study. It is a great assistance to me and highly appreciated. All information provided will be kept strictly **CONFIDENTIAL.**

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Responden yang dihormati,

*Saya Nur Amirah, pelajar dari Pusat Pengajian Pengurusan Teknologi dan Logistik, Kolej Perniagaan di Universiti Utara Malaysia (UUM), dan sedang menjalankan kajian mengenai "**Meningkatkan Kepuasan Pelanggan dalam Perkhidmatan Bas Awam Kedah: Analisis Komprehensif Terhadap Dimensi Kualiti Servis dan Kebolehcapaian"**. Kajian ini adalah keperluan untuk mata pelajaran Kertas Penyelidikan (BPMZ69912). Saya percaya bahawa penyertaan anda dalam kajian ini akan memberikan wakil kepada kajian ini. Segala maklumat yang diberikan adalah sulit dan akan digunakan untuk kajian ini sahaja. Jika anda mempunyai sebarang pertanyaan tentang kajian ini, sila beritahu saya. Saya juga ingin mengucapkan terima kasih terlebih dahulu, atas masa dan maklum balas anda yang akan banyak menyumbang ke arah kajian ini. Ia adalah bantuan yang besar kepada saya dan amat dihargai. Semua maklumat yang diberikan akan **dirahsiakan** sama sekali.*

SECTION A: DEMOGRAPHIC PROFILE *(BAHAGIAN A: PROFIL DEMOGRAFI)*

Please tick (/) in the box for your answer.

(Sila tandakan (/) di dalam kotak untuk jawapan anda.)

DP1. Gender
(Jantina)

☐ Male *(Lelaki)*
☐ Female *(Perempuan)*

DP2. Age
(Umur)

☐ Below 25 years *(25 tahun kebawah)*
☐ 26 – 35 years *(26 – 35 tahun)*
☐ 36 – 50 years *(36 – 50 tahun)*
☐ Above 50 years *(50 tahun ke atas)*

DP3. Marital status
(Status perkahwinan)

☐ Single *(Bujang)*
☐ Married *(Berkahwin)*
☐ Divorced *(Bercerai)*

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DP4. The area where you live
(Kawasan tempat tinggal anda)

☐ Village *(Kampung)*
☐ Urban *(Bandar)*

DP5. What is your occupation?
(Apakah pekerjaan anda?)

☐ Student *(Pelajar)*
☐ Employee *(Pekerja)*
☐ Self-employed *(Bekerja sendiri)*
☐ Unemployed *(Tidak bekerja)*

DP6. What is your monthly income range?
(Apakah kadar pendapatan bulanan anda?)

☐ Below RM1 000 *(Bawah RM1 000)*
☐ RM 2 000 – RM 2 999 *(RM 2 000 – RM 2 999)*
☐ RM 1 000 – RM1 999
☐ Above RM3 000

(RM 1 000 – RM1 999) *(RM3 000 keatas)*

DP7. Which mode of transportation you prefer to travel in Kedah?
(Mod pengangkutan yang manakah anda lebih suka untuk bergerak di Kedah?)

- ☐ Own Vehicle *(Kenderaan sendiri)*
- ☐ Bus *(Bas)*
- ☐ Train *(Kereta api)*

DP8. Do you have any mobility challenges or physical barriers?
(Adakah anda mempunyai sebarang cabaran mobiliti atau halangan fizikal?)

- ☐ Yes *(Ya)*
- ☐ No *(Tidak)*

DP9. How many years have you been using public transport?
(Sudah berapa tahun anda menggunakan pengangkutan awam?)

- ☐ Below 1 year *(Bawah 1 tahun)*
- ☐ 3 – 4 years *(3 – 4 tahun)*
- ☐ 1 – 2 years *(1 – 2 tahun)*
- ☐ Above 4 years *(4 tahun keatas)*

DP10. What is your main purpose for using public bus transportation?
(Apakah tujuan utama anda menggunakan pengangkutan bas awam?)

- ☐ Go to school or university *(Pergi ke sekolah atau universiti)*
- ☐ Official business/ Work *(Urusan rasmi/ Kerja*
- ☐ Social activity *(Aktiviti sosial)*

DP11. How frequently do you use public bus in a month?
(Berapa kerapkah anda menggunakan bas awam dalam sebulan?)

- ☐ Not more than 1 time *(Tidak lebih daripada 1 kali)*
- ☐ Approximately 4 – 5 times *(Lebih kurang 4 – 5 kali)*
- ☐ Approximately 2 – 3 times *(Lebih kurang 2 – 3 kali)*
- ☐ More than 5 times *(Lebih dari 5 kali)*

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SECTION B: ASSESSING THE SERVICE QUALITY (SERVQUAL) AND ACCESSIBILITY OF KEDAH'S BUS SERVICE

(BAHAGIAN B: ANALISIS KOMPREHENSIF TERHADAP DIMENSI KUALITI SERVIS DAN KEBOLEHCAPAIAN)

Please choose the number in the box to indicate how far you strongly agree or disagree with each statement by using the following scale:

(Sila pilih nombor dalam kotak untuk menunjukkan sejauh mana anda sangat bersetuju atau tidak bersetuju dengan setiap pernyataan dengan menggunakan skala berikut:)

Strongly Disagree (SD)				**Strongly Agree (SA)**
1	2	3	4	5

CUSTOMER SATISFACTION *(KEPUASAN PELANGGAN)*		1	2	3	4	5
CS1	**I am satisfied with the safety compliance provided.** ***(Saya berpuas hati dengan pematuhan keselamatan yang disediakan.)***					
CS2	**I am satisfied with the driver's driving skills.** ***(Saya berpuas hati dengan kemahiran pemanduan pemandu.)***					
CS3	**I am satisfied with the bus operator's prompt response during the incident.** ***(Saya berpuas hati dengan maklum balas segera pengendali bas semasa kejadian.)***					
CS4	**I am satisfied with the payment method used.** ***(Saya berpuas hati dengan kaedah pembayaran yang digunakan.)***					

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RELIABILITY *(KEBOLEHPERCAYAAN)*		1	2	3	4	5
RE1	**I am satisfied with the navigation of the bus routes.** ***(Saya berpuas hati dengan navigasi laluan bas.)***					
RE2	**I am satisfied with the ease to move with kids.** ***(Saya berpuas hati dengan kemudahan untuk melakukan perjalanan dengan kanak-kanak.)***					
RE3	**I am satisfied with the accurate arrival time of bus.** ***(Saya berpuas hati dengan masa ketibaan bas yang tepat.)***					
RE4	**I am satisfied with the accurate information of the traveling route.** ***(Saya berpuas hati dengan maklumat tepat tentang laluan perjalanan.)***					

ASSURANCE *(JAMINAN)*		1	2	3	4	5
AS1	**I am satisfied that there is always a seat when riding the bus.** ***(Saya berpuas hati kerana sentiasa ada tempat duduk semasa menaiki bas.)***					
AS2	**I am satisfied with the condition of bus throughout the journey.** ***(Saya berpuas hati dengan keadaan bas sepanjang perjalanan.)***					
AS3	**I am satisfied with the smooth traveling movement offered.**					

	(Saya berpuas hati dengan pergerakan lancar yang ditawarkan.)					
AS4	**I am satisfied with the brake system of the bus.** *(Saya berpuas hati dengan sistem brek bas.)*					

TANGIBLES ***(PERALATAN KEMUDAHAN)***		1	2	3	4	5
TA1	**I am satisfied with the number of seats provided at the bus stop.** *(Saya berpuas hati dengan jumlah tempat duduk yang disediakan di perhentian bas.)*					
TA2	**I am satisfied with the distance to the nearest bus stop.** *(Saya berpuas hati dengan jarak ke perhentian bas terdekat.)*					
TA3	**I am satisfied with the availability of pedestrian access to bus stops.** *(Saya berpuas hati dengan ketersediaan akses pejalan kaki ke perhentian bas.*					
TA4	**I am satisfied with the cleanliness of the bus.** *(Saya berpuas hati dengan kebersihan bas.)*					

EMPATHY ***(EMPATI)***		1	2	3	4	5
EM1	**I am satisfied with the behaviour of bus driver.** *(Saya berpuas hati dengan sikap pemandu bas.)*					
EM2	**I am satisfied with the temperature of air-conditioned inside the bus.** *(Saya berpuas hati dengan suhu penghawa dingin di dalam bas.)*					
EM3	**I am satisfied with the pleasant environment at the bus stop.** *(Saya berpuas hati dengan persekitaran yang menyenangkan di perhentian bas.)*					
EM4	**I am satisfied with the availability restrooms at bus terminals.** *(Saya berpuas hati dengan ketersediaan tandas di terminal bas.)*					

RESPONSIVENESS ***(TANGGUNGJAWAB)***		1	2	3	4	5
RS1	**I am satisfied with the number of buses operate daily.** *(Saya berpuas hati dengan bilangan bas yang beroperasi setiap hari.)*					
RS2	**I am satisfied with the guidance provided at the Information Kiosk.** *(Saya berpuas hati dengan panduan yang diberikan di Kiosk Maklumat.)*					
RS3	**I am satisfied with the behaviour of attendance bus before boarding bas.** *(Saya berpuas hati dengan sikap pemeriksa tiket sebelum menaiki bas.)*					
RS4	**I am satisfied with the fast announcement for any changes.** *(Saya berpuas hati dengan makluman yang pantas untuk sebarang penukaran.)*					

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ACCESSIBILITY *(KEBOLEHCAPAIAN)*		1	2	3	4	5
AC1	**I am satisfied with the availability restrooms at terminals.** ***(Saya berpuas hati dengan ketersediaan tandas di terminal bas.)***					
AC2	**I am satisfied with the wide bus aisles to accommodate mobility aids such as crutches.** ***(Saya berpuas hati dengan lorong bas yang luas untuk menampung alat bantu pergerakan seperti tongkat.)***					
AC3	**I am satisfied with the availability of ramps for individuals with mobility challenges.** ***(Saya berpuas hati dengan ketersediaan laluan OKU di untuk individu yang mempunyai masalah mobiliti.)***					
AC4	**I am satisfied with the lower bus floor height that ease the movement.** ***(Saya berpuas hati dengan lantai bas yang lebih rendah yang memudahkan pergerakan.)***					

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APPENDIX B – PILOT TEST RESULT

1. Customer Satisfaction

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.911	.913	4

Item Statistics

	Mean	Std. Deviation	N
CS1	4.06	.948	32
CS2	3.84	1.139	32
CS3	4.22	.906	32
CS4	4.00	.950	32

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
CS1	12.06	7.351	.801	.693	.883
CS2	12.28	6.338	.826	.726	.879
CS3	11.91	7.572	.797	.681	.886
CS4	12.13	7.403	.786	.666	.888

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2. Reliability

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.837	.842	4

Item Statistics

	Mean	Std. Deviation	N
RE1	4.16	.884	32
RE2	3.69	1.256	32
RE3	3.50	1.244	32
RE4	4.09	.893	32

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
RE1	11.28	8.467	.660	.458	.805
RE2	11.75	6.387	.737	.601	.766
RE3	11.94	6.383	.749	.593	.759
RE4	11.34	8.749	.586	.381	.830

3. Assurance

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.703	.710	4

Item Statistics

	Mean	Std. Deviation	N
AS1	4.16	.847	32
AS2	4.00	.880	32
AS3	4.16	.767	32
AS4	3.88	1.008	32

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
AS1	12.03	4.160	.483	.408	.643
AS2	12.19	4.996	.197	.163	.803
AS3	12.03	3.773	.733	.544	.503
AS4	12.31	3.254	.625	.478	.542

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4. Tangibles

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.729	.736	4

Item Statistics

	Mean	Std. Deviation	N
TA1	4.16	.677	32
TA2	4.25	.762	32
TA3	4.00	1.016	32
TA4	4.03	.822	32

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
TA1	12.28	4.402	.422	.471	.720
TA2	12.19	3.899	.525	.492	.666
TA3	12.44	3.157	.518	.554	.685
TA4	12.41	3.410	.650	.571	.589

5. Empathy

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.754	.755	4

Item Statistics

	Mean	Std. Deviation	N
EM1	3.94	.948	32
EM2	4.13	.942	32
EM3	4.31	.859	32
EM4	3.94	.982	32

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
EM1	12.38	4.565	.633	.402	.649
EM2	12.19	4.802	.567	.341	.688
EM3	12.00	5.226	.526	.292	.711
EM4	12.38	4.952	.484	.255	.735

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6. Responsiveness

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.853	.865	4

Item Statistics

	Mean	Std. Deviation	N
RS1	3.72	1.224	32
RS2	4.06	.840	32
RS3	3.97	.999	32
RS4	3.97	.933	32

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
RS1	12.00	5.935	.649	.502	.849
RS2	11.66	7.265	.736	.578	.805
RS3	11.75	6.839	.663	.529	.826
RS4	11.75	6.645	.788	.627	.777

7. Accessibility

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.752	.768	4

Item Statistics

	Mean	Std. Deviation	N
AC1	3.81	1.061	32
AC2	3.69	1.061	32
AC3	3.34	1.335	32
AC4	3.97	.967	32

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
AC1	11.00	7.548	.465	.602	.737
AC2	11.13	6.629	.664	.492	.631
AC3	11.47	6.580	.441	.451	.774
AC4	10.84	6.975	.680	.641	.633

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APPENDIX C – DATA SCREENING (NORMALITY TEST)

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
CS1	388	2	5	3.79	.706	-.430	.124	.284	.247
CS2	388	2	5	4.05	.728	-.451	.124	.295	.247
CS3	388	2	5	3.79	.712	-.442	.124	.309	.247
CS4	388	3	5	4.53	.515	-.436	.124	.254	.247
RE1	388	2	5	3.86	.677	-.424	.124	.467	.247
RE2	388	2	5	3.79	.729	-.466	.124	.249	.247
RE3	388	2	5	4.20	.908	-.318	.124	-.808	.247
RE4	388	1	5	3.09	1.083	-.207	.124	-.639	.247
AS1	388	2	5	3.50	.873	.277	.124	-.675	.247
AS2	388	2	5	3.51	.821	.240	.124	-.533	.247
AS3	388	2	5	3.80	.706	-.541	.124	-.185	.247
AS4	388	2	5	3.79	.667	-.411	.124	-.436	.247
TA1	388	2	5	3.80	.653	-.448	.124	.549	.247
TA2	388	2	5	3.82	.691	-.317	.124	.166	.247
TA3	388	1	5	3.34	1.105	-.091	.124	-.923	.247
TA4	388	2	5	3.98	.743	-.233	.124	-.493	.247
EM1	388	2	5	3.86	.675	-.432	.124	.495	.247
EM2	388	2	5	4.27	.828	-.425	.124	-.152	.247
EM3	388	2	5	3.55	.726	-.545	.124	-.021	.247
EM4	388	2	5	3.53	.741	-.375	.124	-.239	.247
RS1	388	1	5	3.57	.968	-.593	.124	-.129	.247
RS2	388	1	5	3.59	.991	-.285	.124	.101	.247
RS3	388	1	5	3.59	.951	-.575	.124	-.080	.247
RS4	388	1	5	3.64	.959	-.519	.124	-.252	.247
AC1	388	1	5	3.77	.937	-.624	.124	.211	.247
AC2	388	1	5	3.70	.969	-.653	.124	.219	.247
AC3	388	1	5	3.59	.951	-.696	.124	.401	.247
AC4	388	1	5	3.64	.959	-.668	.124	.346	.247
Valid N (listwise)	388								

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APPENDIX D – DESCRIPTIVE ANALYSIS (DEMOGRAPHIC PROFILE)

DP1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female (Perempuan)	200	51.5	51.5	51.5
	Male (Lelaki)	188	48.5	48.5	100.0
	Total	388	100.0	100.0	

DP2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	26 – 35 years (26 – 35 tahun)	102	26.3	26.3	26.3
	36 – 50 years (36 – 50 tahun)	170	43.8	43.8	70.1
	Above 50 years (50 tahun ke atas)	4	1.0	1.0	71.1
	Below 25 years (25 tahun kebawah)	112	28.9	28.9	100.0
	Total	388	100.0	100.0	

DP3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Divorced (Bercerai)	3	.8	.8	.8
	Married (Berkahwin)	187	48.2	48.2	49.0
	Single (Bujang)	198	51.0	51.0	100.0
	Total	388	100.0	100.0	

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DP4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Urban (Bandar)	277	71.4	71.4	71.4
	Village (Kampung)	111	28.6	28.6	100.0
	Total	388	100.0	100.0	

DP5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Employee (Pekerja)	187	48.2	48.2	48.2
	Self-employed (Bekerja sendiri)	87	22.4	22.4	70.6
	Student (Pelajar)	107	27.6	27.6	98.2
	Unemployed (Tidak bekerja)	7	1.8	1.8	100.0
	Total	388	100.0	100.0	

DP6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Above RM3 000 (RM3 000 keatas)	179	46.1	46.1	46.1
	Below RM1 000 (Bawah RM1 000)	27	7.0	7.0	53.1
	RM 1 000 – RM1 999	7	1.8	1.8	54.9
	RM 2 000 – RM 2 999	175	45.1	45.1	100.0
	Total	388	100.0	100.0	

DP7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bus (Bas)	103	26.5	26.5	26.5
	Own Vehicle (Kenderaan sendiri)	191	49.2	49.2	75.8
	Train (Kereta api)	94	24.2	24.2	100.0
	Total	388	100.0	100.0	

DP8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No (Tidak)	54	13.9	13.9	13.9
	Yes (Ya)	334	86.1	86.1	100.0
	Total	388	100.0	100.0	

DP9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 – 2 years (1 – 2 tahun)	90	23.2	23.2	23.2
	3 – 4 years (3 – 4 tahun)	97	25.0	25.0	48.2
	Above 4 years (4 tahun keatas)	193	49.7	49.7	97.9
	Below 1 year (Bawah 1 tahun)	8	2.1	2.1	100.0
	Total	388	100.0	100.0	

DP10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Go to school or university (Pergi ke sekolah atau universiti)	21	5.4	5.4	5.4
	Official business/ Work (Urusan rasmi/ Kerja)	99	25.5	25.5	30.9
	Social activity (Aktiviti sosial)	268	69.1	69.1	100.0
	Total	388	100.0	100.0	

DP11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Approximately 2 – 3 times (Lebih kurang 2 – 3 kali)	185	47.7	47.7	47.7
	Approximately 4 – 5 times (Lebih kurang 4 – 5 kali)	89	22.9	22.9	70.6
	More than 5 times (Lebih dari 5 kali)	96	24.7	24.7	95.4
	Not more than 1 time (Tidak lebih daripada 1 kali)	18	4.6	4.6	100.0
	Total	388	100.0	100.0	

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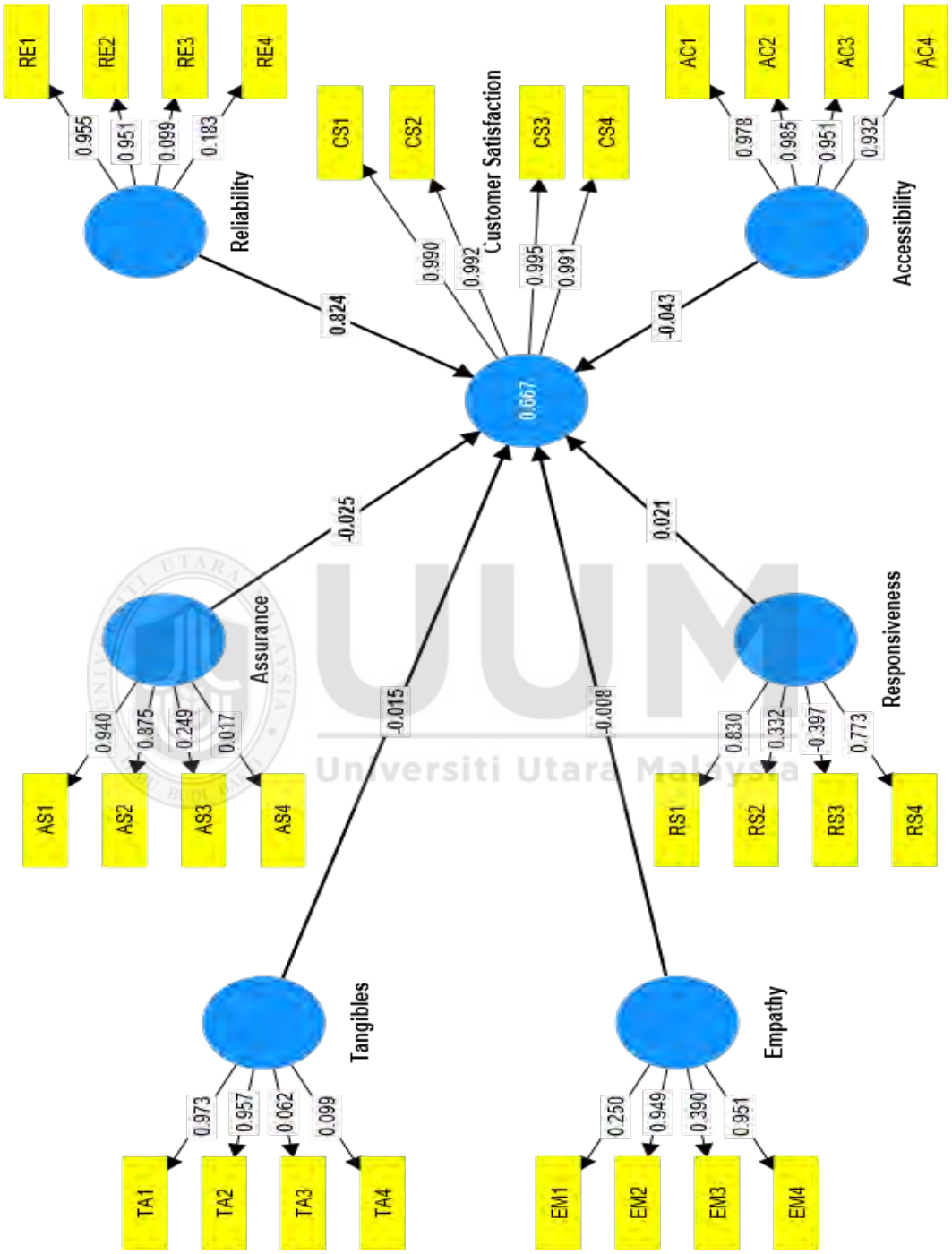
APPENDIX E – OUTPUT OF SMART PLS 4

1. The Graphical Output of Indicator Reliability Outer Loadings (Before)



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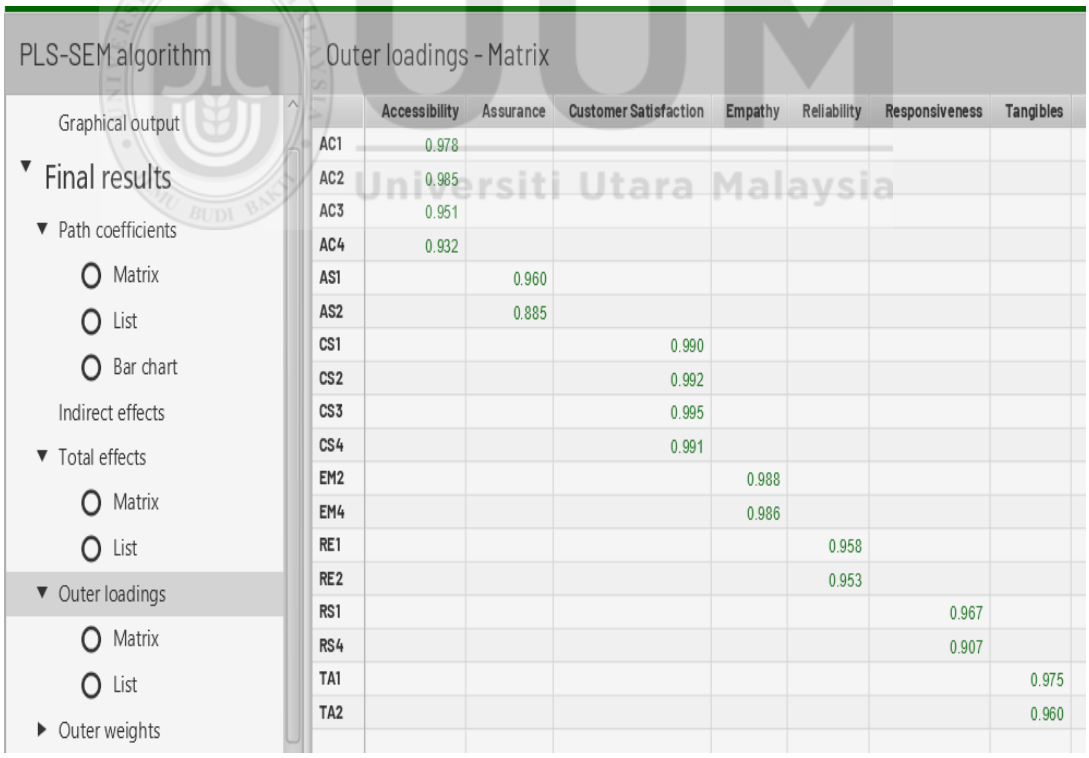
2. Outer Loadings – Matrix (Before)

	Accessibility	Assurance	Customer Satisfaction	Empathy	Reliability	Responsiveness	Tangibles
AC1	0.978						
AC2	0.985						
AC3	0.951						
AC4	0.932						
AS1		0.940					
AS2		0.875					
AS3		0.249					
AS4		0.017					
CS1			0.990				
CS2			0.992				
CS3			0.995				
CS4			0.991				
EM1				0.250			
EM2				0.949			
EM3				0.390			
EM4				0.951			
RE1					0.955		
RE2					0.951		
RE3					0.099		
RE4					0.183		
RS1						0.830	
RS2						0.332	
RS3						-0.397	
RS4						0.773	
TA1							0.973
TA2							0.957
TA3							0.062
TA4							0.099

3. Outer Loadings – Matrix (After)



	Accessibility	Assurance	Customer Satisfaction	Empathy	Reliability	Responsiveness	Tangibles
AC1	0.978						
AC2	0.985						
AC3	0.951						
AC4	0.932						
AS1		0.960					
AS2		0.885					
CS1			0.990				
CS2			0.992				
CS3			0.995				
CS4			0.991				
EM2				0.988			
EM4				0.986			
RE1					0.958		
RE2					0.953		
RS1						0.967	
RS4						0.907	
TA1							0.975
TA2							0.960

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4. Reliability and Validity

PLS-SEM algorithm

- Matrix
- List
- Bar chart
- ▼ Construct reliability and validity
  - Overview
  - Cronbach's alpha - Bar

Construct reliability and validity - Overview

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Accessibility	0.973	1.024	0.980	0.925
Assurance	0.838	1.000	0.921	0.853
Customer Satisfaction	0.994	0.995	0.996	0.984
Empathy	0.973	0.976	0.987	0.974
Reliability	0.905	0.906	0.955	0.913
Responsiveness	0.870	1.037	0.936	0.879
Tangibles	0.932	0.969	0.967	0.936

5. R-Square

R-square - Overview

	R-square	R-square adjusted
Customer Satisfaction	0.674	0.669

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6. Path Coefficients

Bootstrapping

- ▼ Graphical
  - Graphical output
- ▼ Final results
  - ▼ Path coefficients
    - Mean, STDEV, T values,

Path coefficients - Mean, STDEV, T values, p values

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Accessibility -> Customer Satisfaction	-0.045	-0.046	0.027	1.658	0.049
Assurance -> Customer Satisfaction	-0.021	-0.018	0.040	0.538	0.295
Empathy -> Customer Satisfaction	-0.012	-0.014	0.038	0.322	0.374
Reliability -> Customer Satisfaction	0.833	0.833	0.027	30.299	0.000
Responsiveness -> Customer Satisfaction	0.055	0.051	0.028	1.939	0.026
Tangibles -> Customer Satisfaction	-0.021	-0.022	0.035	0.607	0.272

7. f – square

f-square - Matrix

	Accessibility	Assurance	Customer Satisfaction	Empathy	Reliability	Responsiveness	Tangibles
Accessibility			0.006				
Assurance			0.001				
Customer Satisfaction							
Empathy			0.000				
Reliability			1.818				
Responsiveness			0.009				
Tangibles			0.001				

8. PLS Predictive Model

PLSpredict / CVPAT

- Final results
  - MV prediction summary
    - Overview
    - PLS-SEM prediction erro
    - PLS-SEM predictions (d

MV prediction summary - Overview

	Q^2predict	PLS-SEM_RMSE	PLS-SEM_MAE	LM_RMSE	LM_MAE
CS1	0.646	0.420	0.249	0.421	0.253
CS2	0.635	0.431	0.247	0.433	0.254
CS3	0.667	0.408	0.238	0.408	0.239
CS4	0.655	0.421	0.242	0.422	0.247

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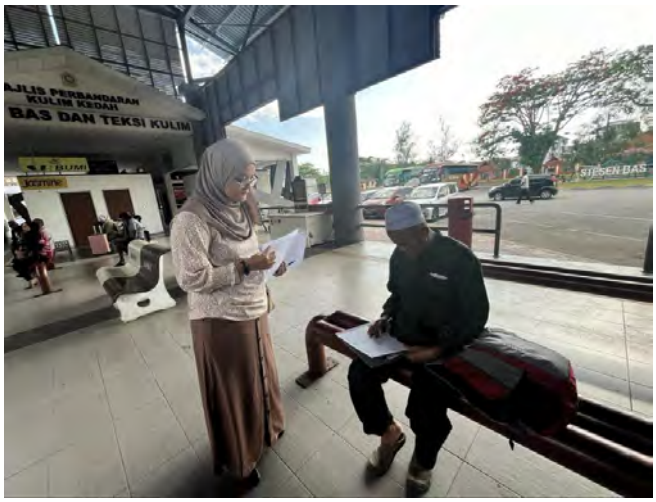
APPENDIX F – EVIDENT OF DATA COLLECTION PROCESS



Source: Muhayadin, N.A., (2024)

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