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Assessing and Enhancing Service Quality in the Transport Sector: Case of Addis Ababa City Bus Service Company (AACBSC)

By

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Addis Ababa, Ethiopia

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A Master's Proposal/Thesis Submitted to School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for Degree of Masters of Science in Mechanical and Industrial Engineering (Industrial Engineering Stream)

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ABSTRACT

Service quality in the transport industry sector is crucial in one's country socio, economic and political aspects evaluated to ascertain the level of service provided to customers. This study focuses on determining the impact of service quality dimensions on customer satisfaction and loyalty within this sector. The research was conducted in Addis Ababa, under the four terminals: Addis Ketema (Mercato), Leghar, Piassa (Menelik), and Megenagna. The study involved 138 participants who were surveyed using SERVPERF and Kano model questionnaires to assess service performance and prioritize customer needs. Descriptive analysis was carried out using Statistical Package for Social Sciences (SPSS) software to evaluate service performance. The findings revealed a low performance across all service quality dimensions, with reliability being identified as the most severe compared to others. This indicates that customers perceive a significant gap in the consistency and dependability of the service provided. The Kano model analysis further categorized service attributes, where five attributes fell under the "Must be" category. These attributes were critical to customers and were deemed essential for their basic satisfaction. These findings were then utilized as inputs for the House of Quality (HOQ) framework to translate customer requirements into actionable service improvements. The HOQ methodology, through its relation and correlation matrices, was employed to establish proposed solutions aimed at enhancing the identified service quality dimensions. The proposed solutions focused on improving shortcomings dimensions prioritizing reliability and other critical service attributes to meet customer expectations and improve overall service quality. This paper contributes to the ongoing efforts to understand and enhance service quality in the transport industry, providing a comprehensive analysis and practical recommendations for service improvement.

Key Words: SERVPERF, Kano model, HOQ, QFD

Table of Contents

`List of Tables

List of Figures

List of Diagrams

CHAPTER ONE

1. INTRODUCTION

According to (Joseph Enimola et al., 2022), customer satisfaction elements are considered significant regarding public transportation service quality aspects as Customer satisfaction and quality assurance are crucial for the success of a company (James, 2024). This is because the availability of transportation has a direct influence and contribution to rising family income and commercial activity, which in turn contributes to economic and industrial expansion. Buses remain the most prevalent means of transportation, among others.

"Addis Ababa is tremendously growing" (Gudesa, 2021). As cities grow, additional mobility difficulties arise as a result of urbanization, with the urban shape of the city being the primary driver driving mobility growth and transportation initiatives. Addis Abeba was divided into two cities in October 2022. The categorization was formed within the previous Addis Abeba city, and the newly constituted Shegar city consists of six settlements embedded in Addis (Kassahun, 2023). About 11 sub-cities, including a new one called "Lemi Kura" with 116 woredas and a total covering area of 540 square meters.

As a result, urban growth has been closely monitored in recent years, necessitating the provision of suitable public transportation services (Breno et al. 2011). Population growth and economic development are said to be influencing Addis Ababa City's fast urbanization and expansion. Population expansion was driven by both significant rural-urban migration and very high natural growth, which led to an an increase in demand for housing, infrastructure, and services (Ayenachew & Abebe, 2024).

Encompassing quick, secure, regular, and trustworthy service attributes, as well as fair, economical, and acceptable prices that cater to the average of society. In Addis, the majority of transportation services are provided by Anbessa City Bus, Sheger City Bus, Alliance City Bus, Public Bus (PSETSE), Higher Buses, and Minibuses (taxis). Despite the widespread use of SERVQUAL, there is a gap in integrating performance-based measures like SERVPERF with advanced tools such as the Kano model and HOQ to provide a comprehensive assessment of service quality. The Kano model helps identify attributes that can enhance customer satisfaction, while HOQ translates these attributes into specific service improvements. By combining these

methodologies, this study aims to fill the gap by providing a more robust framework for assessing and improving service quality. This approach not only helps in identifying key service attributes but also guides businesses in prioritizing improvements that have the most significant impact on customer satisfaction and loyalty.

Recently in this year 2015 E.C it has been integrated with Anbessa bus under the administration of the city. According to the Decree No. 74/2014 issued to establish executive bodies of Addis Ababa city administration. AACBSC headquarters located at Yeka incorporating three depots located in Yeka east of the city, Shegole in northwest, and a newly opened Mekanisa depot at within the south. The buses serve 124 routes having four bus terminals for controlling the route network that are located in Addis Ketema, Leghar, Menelik Square and Megenagna. They are mainly in charge of adjusting the services required by balancing the late arrivals, lost trips, and re-allocate vehicles done by the terminal controllers entertaining the priority.

In practice Serving the public interest simultaneously and gaining profit are the primary objective of transport service. Unlike the aim of the two benefits there appears an argument when coming to practicability where the primary is related to the flow and the second refers to the relation that appears with in the customers and the flow (Covic, F, S, 2019.) In Addis, public transport holds about 40% of the demand and the private provides the rest 60% which are the taxis (Luke R., 2020).

It is vital to evaluate public bus service performance from the perspective of users in order to discover service operators' strengths and weaknesses. Less satisfied with timeliness-related attributes (0.50) and security-related fee As a result, service operators and other concerned stakeholders should prioritize features like as punctuality and security in order to improve user satisfaction with the city's bus service (Mendiate et al., 2024).

In this study, the focus is on evaluating service quality using the SERVPERF model, incorporating elements of the Kano model and House of Quality (HOQ) to enhance the assessment of customer satisfaction and loyalty. Service quality is a critical determinant of customer satisfaction, and understanding the factors that influence it is essential for businesses aiming to improve their service offerings. Previous research has extensively utilized the SERVQUAL model, which measures service quality by comparing customer expectations and perceptions. However, the SERVPERF model, which focuses solely on performance perceptions,

is argued to provide a more accurate reflection of service quality by eliminating the subjective nature of expectations.

1.2. PROBLEM STATMENT

According to a recent statistic, Addis Ababa City Bus Service Company (AACBSC) alone feeds 300,000 passengers daily. Implying there is an intense need for public transport. Vehicle shortages and long lines at stations are prevalent in Addis .The city with over 3.2 million citizens rely on public transportation. The buses, together with more than 10,000 additional vehicles, convey 2.5 million people every day. The current public transportation, is affected by a variety of causes, including rising population and mobility as a result of economic expansion (Monitor, 2022). This is shown commonly looking at massive peoples lining that is becoming more common and adapted scenario in Addis Ababa extensively than other cities of the country. It is observed that there appears to be a wastage of time, as a consequence of this constraint (Seid Endrie.et.,al, 2021).The service quality being delivered also contributes its own impact on the above mentioned problems.in which the service quality measures how well the service is being provided and delivered with respect to customer expectation and perception.

Delivering quality service that confirms the customer expectations is vital for ensuring the survival and competitiveness with in the market (Allen et al., 2021). The findings of (Girma, Woldetensae, 2022) revealed that 58.1% of the attributes are to be found under concentrate here and low priority quadrant implying users were not satisfied with the service being delivered while evaluating user's satisfaction in public transit service. Among the variety of criteria that determines quality of bus transit service includes regular travel time and consistency, transit waiting time, financial charges, ride comfort, information, and personal protection(Cascetta & Cartenì, 2014).

This effect impacts highly on passengers' or customers satisfaction using the service. This issue influences highly to the extent customers can turn their back on the service at any time. (Gebremeskel et al., 2022).Waiting longer time for transportation severity is shown by large number of people in queuing while only 44.8% serve the public out of 62.5% of total vehicles are found in the city of them (Gudesa, 2021). Delaying of arrival time in work place is among the key constraints in respect to economic, social and political aspects Though 63.8% of middle income groups experience a total travel time of more than 2 hours and 52.3% of low-income

groups but only 36.3% of high-income groups devote a total travel time above 2 hours in terms of travel time (Gebremeskel et al., 2022).

This condition also facilitates susceptibility to thefts, losing of mobile phones, bags and other private properties.as a consequence warnings, salary deductions and dismissing of jobs are commonly experienced through employed persons, in relation there existed a loss of economic profit with that of self-employed.

The service being delivered is usually observed to be biased based on the individual perception of the workers. Among the characters driver's behavior has a wide-ranging impact on public transportation capacity (Farjana et al., 2024). Some drivers might choose to start work early and return home late in order to serve the community for a longer period of time, whereas other may prefer the reverse. A majority of drivers spend most of their time enjoying tea and lunch breaks, in contrast, some of manage their time efficiently in order to maximize their working hours and serve their customers sincerely (Seid Endrie.et.,al, 2021).

The mentioned realities indicates that there exists to be obstacles in delivering quality service to the customers and emphasizes on the service quality can be improved by prioritizing the critical dimensions for improvement. As quality is achieved through the involvement of all stake holders and customers satisfying service desires (Barabino et al., 2022).

1.3. RESEARCH QUESTIONS

Based upon the problems stated previously, this paper answers the following research questions:

i. At what level of quality the service is being delivered in AACBSC?
ii. What is the relationship between service quality dimensions and customer satisfaction and loyalty in AACBSC?
iii. What kind of service strategy should be designed to improve the service quality?

1.4. OBJECTIVES

1.4.1. General Objective

The general objective of this paper is to assess and enhance the service quality in the transport sector particularly in Addis Ababa City Bus Service Company (AACBSC) through a mixed research approach by employing the SERVPERF model along with the Kano Model and

studying the relationships among service dimensions, customer's satisfaction and loyalty. Effective enhancement solutions are developed through a quality deployment function tool called the House of Quality (HOQ).

Specific Objective

- To measure the performance and level of the service being provided to the customers.
- To measure the relationships between service quality dimensions and customer satisfaction and loyalty in AACBSC.
- To develop quality improvement strategies through establishing HOQ.

1.5. SIGNIFICANCE

The practical significance of this research is to depicting on how service quality dimensions alters customer's satisfaction and loyalty. Furthermore employing the SERVPERF model for investigating the perceived service currently and taking it as an input for constructing proposed enhancement measures using QFD. This study besides encourages and supports in providing:

- An insight to service sector peculiarly in public transportation service along with the impacts of service quality dimensions in maintaining, sustaining and improving the service quality.
- Relevant information and details that can be taken as an input for other companies delivering equivalent services as the case company
- Researchers to realize and employ SERVPERF and Kano models with QFD to enhance service quality.
- Basis for constructing customer-based service strategies based on customers' voices or demands to trigger corrective action for satisfying customers and keep their loyalty using QFD.

1.6. SCOPE AND LIMITATIONS

The scope this study comprehends taking only AACBSC (Addis Ababa City Bus Service Company) transport providing company. This paper focuses on quality of the service delivered to the customers in relation with the way it is delivered considering the five service quality dimensions using SERVPERF model. External contributing factors such as lack of infrastructure,

road congestion, population growth, urbanization, economic factors and related causes were not taken into account.

The data of the sample size and the study was taken after the integration of Anbessa City Bus Service Enterprise (ACBSE) and Sheger City Bus under Addis Ababa City Bus Service Company (AACBSC). The limitations of this study was only configuring the service quality in Addis Ababa City Bus Service Company.in which it does not incorporate other transport service providers that are privately owned or shared companies such as Public buses, Alliance city bus, Higher buses and Mini bus (taxis).Additionally not addressing other terminals and stations can also be considered.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Service

Service refers to an ongoing process of interactions between customers and service providers that include a variety of intangible activities provided as premium solutions to customers' problems as well as the physical and financial resources and any other useful system elements involved in providing these services (Grönroos, 2004). According (Moeller, 2010, R & Joseph, 2013) it can be further defined as an act or activity that one person or an organization performs for another person or organization.it is mainly characterized by 1.intangibilty 2.involvment 3.inseparabilty 4.inconsistency and 5 inventory (Moeller, 2010).

2.2. Service Quality

Within a service organization Quality refers to a measure of the extent that the service delivered meets the customer's expectations.(Ghobadian et al., 1994). This researchers further discuss that Perceived quality represents the customer's feeling towards the service offered as well determines the extent to which customers are satisfied. The three key possible outcomes are:

1. Satisfactory quality, the state in which customer's expectations (CE) are exactly me, PCE = PQ
2. Ideal quality, when perceived quality is higher than customer's expectations, PQ > PCE;
3. Unacceptable quality, where perceived quality is lower than customer's expectations, PQ < PCE.

Service quality acknowledged internationally as a sign of an organization's competitiveness. Addressing the potential components of quality service is essential in enhancing customer performance in many ways. Among most industries, service quality is considered as a tactical tool to achieve customer's satisfaction. By arguing that there appears to be a direct and positive correlation between the integrity of the service delivered and level of customer satisfaction, based up on the literatures reviewed by (Ismail et al., 2023).

2.3. Service Quality Models

There are different service quality models that measures service quality being delivered to customers. Among those the commonly utilized are SERVQUAL model, SERVPERF model, Kano model, Grönroos Model, and GAP model which are discussed as follows.

2.3.1. SERVQUAL Model

This model was primarily developed by Parasuraman et al. in1988. Among the commonly used tools in measuring service quality it's dominant and frequently used tool. Determines the level of service by computing the difference between customers' expectations and perceptions using SERVEQUAL Gaps scores.

The SERVQUAL approach has been utilized successfully in many service quality studies among others some scholars argue that as the SERVQUAL Model with in data collection task the lengthy manner of questionnaire being required to collect data about consumers' expectations and perceptions of a firm's performance on each of the 22 service quality scale attributes leads to misinterpretations of the expectation question by respondents (Jain & Gupta, 2004). Brady & Cronin, (2001a) and Seth et al. (2005), also consolidate that this model has limitations in measuring gaps at different levels and observed to be not brief as being expected. Though most of scholars suggests and prefer this model as it exhibits good stability in measuring service quality within its five dimensions (Dianawati et al., 2019a).

Strength

Good to measure service quality on experienced customers

Drawback (Limitation)

It focuses on customer perception – customer expectation. Lack of the option like "Don't know" and the number of values (to those are inexperienced customers in that service) which leads to misinterpretations

2.3.2. SERVPERF Model

Unlike the SERVQUAL model, SERVPERF Model measures performance (perceived service) using the same characteristics as reliability, responsiveness, assurance, tangibles, and empathy for service quality measurement (Rodrigues et al., 2011). They stated that the SERVPERF model

is a performance only measure of service quality which is based on a customer's attitude giving more accurate measure of service quality than the SERVQUAL model.

The work of (Elarifi, 2021) this model better fits in performance based while measuring the service quality in logistics with in cargo measures a who show that elements influencing service quality are better thought of as antecedents rather than components, and that customer satisfaction greatly mediates the impact of service quality on behavioral intentions. As well it enables Clients' service quality to be measured using 22 factors on the SERVPERF scale.

Generally, the SERVPERF Model is more preferable as it provides detailed information about customer perception of service, performance levels as perceived by the customer, customer comments, suggestions, and impressions from employees concerning customer expectations and satisfaction. Moreover, the scale appears to be an adequate tool for analyzing the quality and performance of the activities involved in delivering services (Gonzaga et al., 2024).

This study utilizes SERVPERF model for assessing the service quality delivered to the customers. Basically SERVPERF was chosen as it focuses on the performance of service dimension and directly linking with customer's satisfaction and loyalty. It's prefer ability over Servqual is that direct measurement of service performance, empirical robustness, simplicity, and relevance to real-time service quality assessment can be executed. This makes it a suitable tool for evaluating and enhancing the service quality of the case company. Additionally ,using Servperf aligns well with the focus of the study on understanding and improving actual service delivery by concentrating on the performance metrics, the study can more effective to identify and prioritize the specific service attributes that impact customer satisfaction and loyalty than other models.

2.3.3. Kano Model

It is model was developed by Dr. Noriaki Kano of Tokyo from Rika University In 1984.This tool is used mainly to assess how well the service or the product can satisfy the customer's desire., identifies the needs that determines the customers satisfaction and tries to correlate the requirements with the customer pleasure. There are 6 attributes in Kano Model

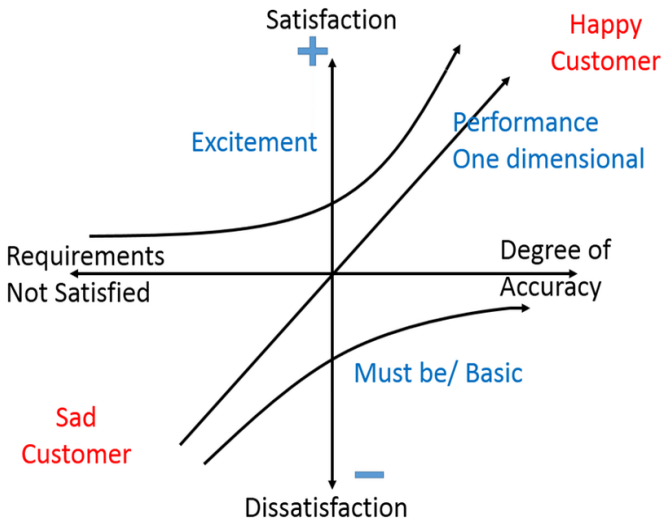
These are Must be /Basic needs where customers will be dissatisfied, when it is low, One dimensional /Performance need in case of customer satisfaction is linear attribute to the

performance of the attribute. Attractive /Excitement need where customers' satisfaction increases super linearly with an increased attribute Performance. Indifferent requirements an attribute in which its presence or absence doesn't have that impact the customers. Reverse requirements results if customers doesn't request for that attribute while reverse of it is being expected and Questionable Requirements refers to the conditions that could happen due to illogical response given such as the question is incorrectly phrased and Misunderstood of equation with in customers (Dianawati et al., 2019b).

Kano consists of Functional questions and Dysfunctional questions. Functional questions refers to positive interrogation and Dysfunctional questions refers to negative interrogative questions about the service. This model also gives customers alternatives that customers can answer in 5 different ways I like it that way ,It must be like that way ,I am neutral ,I can live with it that way and I dislike it that way.

Customer satisfaction (CS):- determines the Kano category for each attribute indicates Satisfaction Index (SI):- $\left[\frac{A+O}{A+O+M+I}\right]$,

Dissatisfaction Index (DI):- $\left[\frac{M+O}{A+O+M+I}\right]$



Graph 2.1.Kano Model graphical representation

Source :(Solanki & Desai, 2018)

Service /product influences customer's satisfaction and dissatisfaction. It ranges from 0 to 1,-ve. SI & DI are plotted in the above graph that consisting 4 quadrants. Kano model to yields better outcomes in fulfilling the requirements of customers when being blended with QFD(Quality Function Deployment) measure service quality(Adusei & Tweneboah-Koduah, 2019).

DrawBack/limitations/ of Kano is mainly rely on the ability not to quantify in numerical /qualitative performance, the absence of explaining what drives customer perceptions
and what the customer's behavioral intentions are, and why the particular attributes are important to the customers (Dianawati et al., 2019a)

2.3.4. Grönroos Model

The approach states that service quality is determined by comparing expected and perceived service levels. The author evaluates the model on a sample of service industry executives and claims that it could potentially guide service marketing and management by specifying how customers perceive service quality.

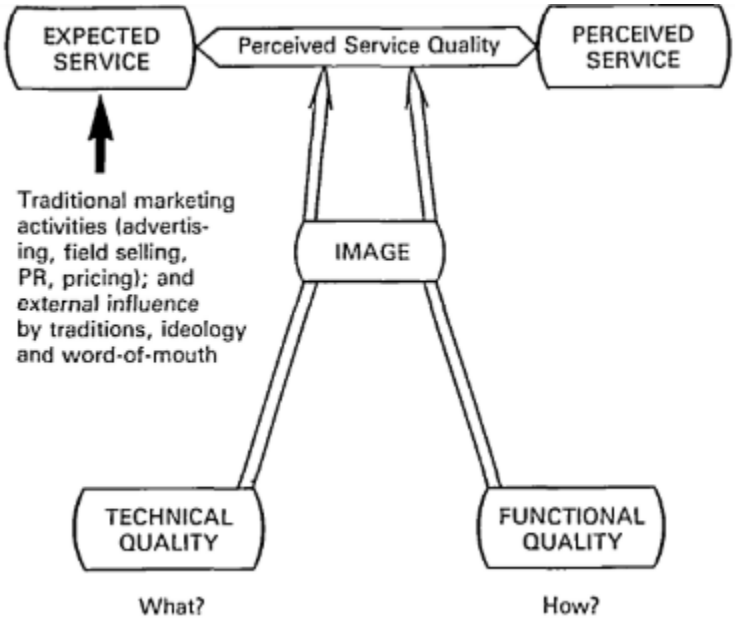


Diagram 2.1.Grönroos Model

Source: (Grönroos, 1984)

The article of (Grönroos, 1984) states that the service perceived is the summation of technical and functional quality. Technical quality meanly dealt with what is served to the customers and

functional quality focuses on the way how the service is provided or delivered. Functional quality is measured subjectively incorporating customers' perception about the service and their insights in a brand wise way. Measuring the quality as it doesn't set a direction is known to be the limitation of the model.

2.3.5. GAP Model of Service Quality

The Gap model of service quality was established based on measuring the differences that exists between expectation and performance of the service through the service quality dimensions. This model consists to 5 gaps as shown in the below figure .The first Gap one represents the difference that exists between the Managements perception of customers and customers expectation of the service. This would happen as there is no follow up and also miscommunication. Gap 2 exists as a result of difference between service quality specification and perceptions of the customer's expectation with the management. They are mainly established when there is lack of quality standards, lack of training and lack of commitment. Gap 3 arises from the deviation between the service delivered and service quality specifications. Absence of commitment between the management and the employees are the main causes facilitating this and of gap. The fourth gap in the model is initiated due to the limitations of customers not knowing the services being delivered as well the promises about the service are being kept well. The reasons behind this are the difference in the service expected and perceived though it is vary based on the customers desire about the way the service is to be delivered.

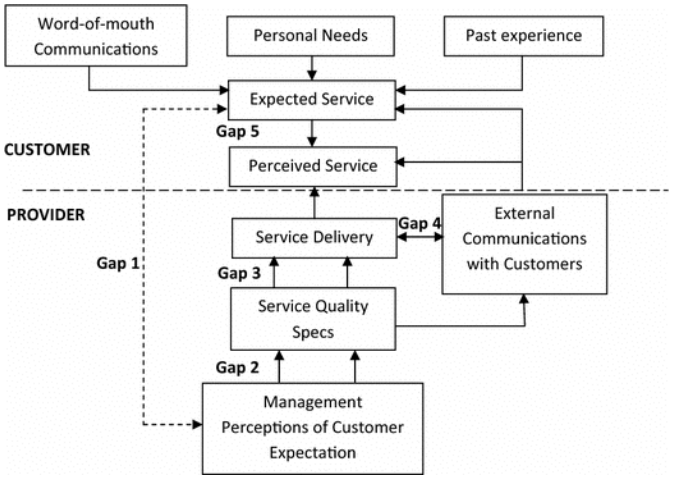


Diagram 2.2.Gap Model

Source :(Kansal et al., 2017)

Having an insight among the mentioned service quality models the SERVPERF and Kano Model were selected in relation to the study's objective and aim. SERVPERF Model was chosen for its ability to track the current performance of the case company as well fulfilling the gap on the Kano model as it only categorizes without quantifying. Both methods when blended are helpful for better magnification of the desired effect.

This synergy was manifested as to (Kelilba & Chaib, 2024) aimed to enhance quality, attractiveness, and competition of bus services in Constantine city using this two methodologies in which they achieve an improved quality. Additionally taking online banking service (Chung et al., 2024) had assessed the service performance delivered for customers through Kano model and gave an improvement measures depending on importance performance analysis that attracts more clients for the service. It can be concluded as both methodologies were useful for depicting strategic goals and recommended methodologies for quality improvement and customer satisfaction that perfectly aligns to the study's objective.

2.4.Total Quality Management

Total Quality Management (TQM) a frame work of management in which is primarily focuses on achieving continuous improvement by enhancing services or product. According to (Permana et al., 2021)TQM differs from other quality management systems as it dwells in continuous improvement and customer satisfaction, following a holistic approach through integrating the quality aspects from strategic planning to daily operations. It is applicability feature to all functional areas and levels of the system in an organization are the main character that made it to be favorable.

TQM has eight principles in general such as customer focus ,Employee involvement ,focus on process ,integrated business system ,strategic and systematic approach ,continuous improvement ,focus on data and communication. There are also different methods that are performed while maintaining TQM system. These are FMEA analysis, SPC analysis, RCA analysis and QFD analysis are discussed below.

2.4.1. Quality Function Deployment (QFD)

QFD is one of the most widely used tool was developed by Yoji Akao in 1972.mainly involves Translating customers requirement into an appropriate technical requirements at every stage of a product life cycle, from product conception to sales to service.it also identifies the customer need

that will enable companies to enhance their service quality by designing the technical requirements (Moradi and Raissi 2015).

House of Quality refers to a matrix used in first step of Quality Function Development (QFD) processes that is formed from seven parts. The elements consisted are Correlation Matrix, Technical Requirements (How's), Customer Requirements (What's), Relationship Matrix, Customer Priority Level, Competitive Assessment and Target Values (Dianawati et al., 2019a).

The House of Quality (HOQ) is a methodical approach among QFD tools and techniques .as it is mainly used in product and service development this study will employ it for identifying, prioritizing, and transforming customers' requirements into technical features for a better enhancement of the service.

The paper of (Sahay, 2023a) claims that House of Quality matrix is used in the QFD process. Customer needs are integrated into the product's design, production, and marketing phases through a customer-driven planning process that aims to create a product that both meets and surpasses consumer expectations. The Japanese created this strategy in order to satisfy their customers' demands.

The QFD (Quality Function Deployment) technique meets customer needs while enhancing service quality. The method of creating QFD involves numerous steps. Finding out what customers want is the first step, therefore in order to enhance service quality, brainstorm with a number of customers to obtain a Voice of the Customer (VOC) or technical response. Table 8 summarizes the client feedback gathered during the brainstorming session.(Vazry et al., 2024)
With the Quality Function Flow (QFD) technique, the "what" becomes the "how" and the design is based on quality is done. In other words, the method converts consumer expectations into the technical needs of the organization for each step of design. House of Quality is the name of the QFD implementation tool (HOQ). This article uses the QFD approach to explore the design of GIS functionalities in the sales and customer support fields and presents process improvement ideas. The QFD approach and its HOQ tool in order to design GIS functionality in sales and other areas, the constraint of time and other resources in creating and operationalizing all 10 technical requirements, as well as the necessity of converting "requirements" into "technical dimensions" customer service procedures and figuring out how important each technological parameter is in absolute terms were both utilized. (Yousefi et al., 2024)

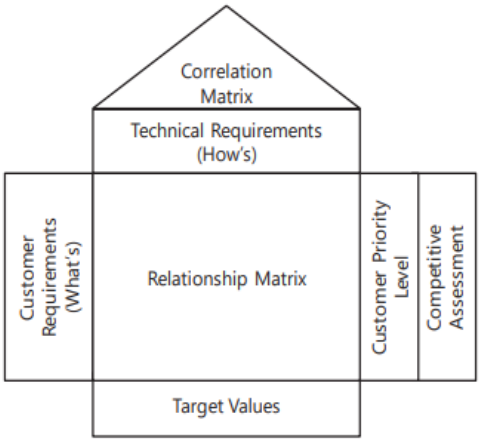


Diagram 2.3.House of Quality (HOQ)

Source :(Pawitra and Tan, 2001)

2.4.2. Failure Mode and Effects Analysis (FMEA)

Failure mode and effects analysis is one of the most commonly used TQM technique. The methodology mainly analysis failure of product, process or service. This is done through identifying risk and mitigating risk which leads to enhancement of reliability and safety. Additionally, the paper of (Zuniawan, 2020) tells that it assures the customers satisfaction by meeting the customers' expectation as the nature of FMEA attains proactive problem solving, reducing defects, saving cost of reworks or recalls and mitigating hazards.

2.4.3. Statistical Process Control (SPC)

This type of TQM tool mainly deals in monitoring, controlling and ensuring the quality of product or service. Statistical methods are commonly employed for analysis such asC_p, C_{pk},p_p and p_{pk}. Taking this as an input in SPC software it liberates analysis in streamlining the process of the service along with the quality dimensions. This tool was executed by (Isniah & Purba, 2021) liberating a better enhancement and improvement. These aims in early detection of variability, reduced costs, consistency and reliability of the product or service being assessed for continuous improvement and better performance.

2.4.4. Root Cause Analysis (RCA)

Among the commonly used tools and techniques used in TQM Root cause analysis is the dominate.it deals on identifying the root causes of shortcomings, problems and defects. This is done through using fishbone diagrams, 5why's and Pareto analysis. The paper of (Maryanti et al., 2020) mainly demonstrates it can be used indifferent ways for an improvement The 5 why's approach plays a major role in the analysis of RCA by which it identifies the root causes ,eliminate symptoms through incorporating critical thinking as a result it reduces wastes and errors by assuring optimized ,enhanced and efficient service or product.

Along the listed TQM techniques QFD or HOQ was elected for the ability it possess quality of transforming qualitative customer requirements to qualitative parameters through maintaining service quality. Furthermore its integrity with Kano Model is helpful as it enable to identify and categorizes customer's demand (Apornak, A. 2017). The study of (Chandra and Rashed, 2007) also consolidates that associating QFD and Kano model was used for analyzing the customer satisfaction level. In the meanwhile , (Hsu et al.,2007) integrated Kano model and HOQ for improving and prioritizing by identifying nonlinear linkages.

In conclusion, SERVPERF and Kano models are utilized as service quality measurement models and HOQ of QFD is executed for proposing solution and as an enhancement strategy upon the outcomes obtained.

2.5.Service quality in public transport

Effective public bus transit services are a crucial component contributing to the well-being of developing metropolitan regions (Tabi & Adams, 2016). The quality of service provided by public transit systems directly affects customer satisfaction and has significant implications for financial performance. According to Teklay et al. (2022), low service quality negatively impacts both customer satisfaction and financial outcomes. However, they also found that the impact of customer satisfaction on financial performance varies across different types of airlines, being significant in full-service airlines but not in low-cost airlines. Interestingly, their study suggested no direct relationship between transportation quality and financial performance.

In the context of Addis Ababa, the present transportation systems are often inadequate and time-consuming, affecting both public and private transport sectors. These inadequacies lead to various service quality issues, including longer waiting times, passenger discomfort due to

overcrowding, high costs of intercity mobility, and frequent bus failures. Such factors directly influence the level of service quality delivered. Longer waiting times, in particular, are a significant problem, as noted by Millonig et al. (2012), who highlighted that waiting for public transport services is one of the most irritating factors for customers. Their research lists the top quality characteristics that demand urgent attention from all involved transport stakeholders.

The Addis Ababa City Bus Service Enterprise (AACBSE) is a key provider of public transport services in the city. Abbelti (2018) identified long passenger waiting times as a primary indicator of poor public transit service quality in AACBSE. The study underscores the need for management, decision-makers, and stakeholders to monitor service performance and implement quick action plans to address these critical issues. This includes progress upgrading programs to improve the overall service quality.

In improving service quality, public service transport providers must focus on performance and expectations. The integration of various service quality models, such as SERVPERF, SERVQUAL, and the Kano model, provides a comprehensive approach to evaluating and enhancing service quality. Rodrigues et al. (2011) found that combining SERVPERF and SERVQUAL models reveals weaknesses in empathy and assurance dimensions. SERVPERF measures service quality based on customer perceptions, while SERVQUAL assesses service quality by comparing perceptions with expectations. This dual approach helps identify satisfaction levels and areas needing improvement, despite SERVQUAL's lengthy questionnaire being a potential drawback.

For strategic improvements in service quality, integrating SERVQUAL with the Kano model, as done by Dianawati et al. (2019), prioritizes essential service attributes. Chen et al. (2021) argued that the Kano model effectively classifies service needs and provides insights into customer perceptions. Combining these models with the House of Quality (HOQ) framework, which is a part of Quality Function Deployment (QFD), allows for translating customer requirements into specific service enhancements. Studies by I. et al. (2009) and Bilişik et al. (2019) have shown that QFD is effective in improving service quality, particularly in transportation, by linking passenger requirements with technical specifications using methodologies like Fuzzy QFD.

The SERVPERF model is valued for its simplicity and cost-effectiveness in assessing service quality, incorporating importance and perception aspects (Rasyida et al., 2016). It has been

effectively used in various contexts, such as environmental planning venues (Zhijun et al., 2022), by modifying traditional characteristics to evaluate service quality comprehensively.

In conclusion, this study will blend SERVPERF, Kano, and QFD models to leverage their synergistic capabilities, providing a robust framework for assessing and improving service quality in Addis Ababa's transport sector. The SERVPERF model will be utilized for performance evaluation, the Kano model for prioritizing existing attributes, and QFD for formulating strategies to enhance the quality of service delivered by AACBSE. This integrated approach aims to address the critical service quality issues identified and propose actionable solutions for improvement.

2.6 Integration of the SERVPERF, Kano and QFD models in Evaluating and Enhancing Transport Service

Service quality in the transport industry is a critical area of study, frequently evaluated to understand the level of service provided to customers. Various researchers have focused on determining the impact of service quality dimensions on customer satisfaction and loyalty. These dimensions, as identified by Parasuraman, Zeithaml, and Berry (1988), include tangibility, reliability, responsiveness, assurance, and empathy. The SERVPERF and Kano models have been widely adopted as effective tools for assessing service performance and prioritizing customer needs. As the main aim of any research is to synergize different tools and grasp the best optimal solution for a given problem or phenomenon, this study combines three tools—SERVPERF, Kano model, and House of Quality (HOQ)—to ensure service quality. Combining these tools leverages their synergistic ability to provide a comprehensive approach to understanding and improving service quality.

Rodrigues et al. (2011), in their study combining the SERVPERF and SERVQUAL models, concluded that empathy and assurance were their weaker dimensions. SERVPERF focuses on measuring service quality based on customer perceptions, while SERVQUAL measures service quality by subtracting expectations from perceptions. The positive values in SERVQUAL indicate satisfaction, whereas negative values indicate dissatisfaction. SERVQUAL has a higher diagnostic power and is used to identify shortfalls in managerial interventions, although its lengthy questionnaire can be a drawback.

In developing a commuter line train strategy for improving service quality, Dianawati et al. (2019) integrated SERVQUAL with the Kano model to prioritize attributes that need focus. They identified a gap in the Kano model's ability to quantify and explain the drivers of customer perception. Despite this limitation, Chen et al. (2021) discussed that the Kano model encourages the classification of service needs into categories and provides insights into how customers perceive the service. Furthermore, they blended HOQ with SERVQUAL and the Kano model to develop a strategy that addresses the gaps of one model with the strengths of another. For example, gap scores from SERVQUAL were used in HOQ as important rate attributes, and the improvement ratio was integrated with the Kano model and HOQ.

HOQ, a key tool in Quality Function Deployment (QFD), is widely used to enhance service and product quality in various sectors. Among different scholars, I. et al. (2009) proved that QFD is effective in improving service quality, especially in transportation. Bilişik et al. (2019) employed QFD to link passenger requirements with technical requirements using Fuzzy QFD and the Passengers Satisfaction for Public Transportation Requirements (PSPTR) methodology, which effectively describes passenger requirements in practical applications.

The SERVPERF model is known for its convergent and discriminant validity in explaining service quality constructs (Jain & Gupta, 2004). These researchers suggest that SERVPERF is best for assessing overall service quality compared to other models, although it has lower diagnostic power than SERVQUAL as it focuses only on perceived performance (Elarifi, 2021). Rasyida et al. (2016) argue that SERVPERF is a simple and inexpensive means to assess service quality, incorporating both importance and perception aspects. Furthermore, Zhijun et al. (2022) highlight that SERVPERF effectively ranks service quality evaluation for environmental planning venues. They modified the 22 characteristics of tourism to classify 26 quality evaluation indexes integrated with VIKOR and Fuzzy AHP, yielding better outcomes in investigating and improving service quality.

This study blends SERVPERF, Kano, and QFD models, leveraging their integration to yield better outcomes. The SERVPERF model evaluates performance, the Kano model prioritizes existing attributes, and QFD formulates strategies to enhance the quality of service delivered by the case company. This integrated approach provides a robust framework for understanding and improving service quality in the transport industry.

No	Author	Title	Objective	Methodology	Finding
1	(Teklay et al., 2022)	Transportation Quality, Customer Satisfaction and Financial Performance	-To examine relationship between simultaneous & asynchronous effect of transportation service quality on financial performance and customers satisfaction	-Structural equation modelling using partial least square approach	-Low service quality has adverse effect on customer satisfaction &financial performance. -Impact of customer satisfaction on financial performance is mixed. -Impact of customer satisfaction on financial performance is significant in full service airlines though not observed in low cost airlines. -No direct relationship between transportation quality and financial performance
2	**(*Abbelti*, 2018)**	Analysis and Optimization of Passenger Waiting Time: In Case Anbessa City Bus	-To develop demand-oriented mathematical modeling bus transportation service	-Mixed integer linear programming with LINGO software	-Minimizing the total passengers waiting time is important to increase the transportation service quality & satisfy the passenger demand.
3	(Rasyida et al., 2016)	Assessing Service Quality: A Combination of SERVPERF and Importance Performance Analysis	-To assess the service quality of the service firms - To identify dimensions to be prioritized to attain customer satisfaction	-SERVPERF model as first objective -Importance performance analysis(IPA) as second objective	-SERVPERF was demonstrated identified the attributes important for the customers and its performance. - Assists relatively simple and inexpensive way to assess the service quality. -IPA used to understand the customer satisfaction ,prioritize areas of improvement & guidance to strategic development
4	(Zhijun et al., 2022)	Sustainable Tourism Supply Chain Assessment Using Hybrid Decision-Making Methods under	-To assess the design, development and construction of environmental	-SERVPERF model -Fuzzy-AHP & -VIKOR method	-SERVPERF:-to modify 22 multi item & -To conform the characteristics of service

		Fuzzy Uncertainty	system - To investigate the service quality		quality of tourist -classify the 26 service quality evaluation indexes -VIKOR method is used for service quality evaluation
5	(Rodrigues et al., 2011)	Comparison of SERVQUAL and SERVPERF metrics: an empirical study	-Empirical investigation of SERVQUAL and SERVPERF metrics for service quality. - To examine how their outcome differ and concur each other	-Qualitative approach (meta-analysis of literature in service quality) -Quantitative approach (standard statistical procedures) for testing hypothesis.	-Tangibles & reliability are dimensions of higher quality satisfaction -Empathy & Assurance are dimensions of least satisfaction in higher education sector
6	(Bilişik et al., 2019)	Passenger Satisfaction Evaluation of Public Transportation in Istanbul by Using Fuzzy Quality Function Deployment Methodology	-To increase service quality -Passenger satisfaction by listening voice of passengers -Determining their requirements,	-Fuzzy QFD -PSPTR(Passengers Satisfaction for Public Transportation Requirements) methodology	-QFD : links PRs(passengers requirements) and TRs(Technical requirements) to magnify the customers voice -Fuzzy QFD: to express the PRs in practical way with real world application
7	(I. et al., 2009)	Application of Quality Function Deployment on an Alternative Transportation System (Paratransit System)	-To apply QFD methodology in planning alternative transportation system (paratransit)	- Employing QFD	-QFD can enhance quality successfully for a new or improved service /product
8	(Dianawati et al., 2019b)	Strategy of Service Quality Improvement for Commuter Line Jabodetabek Train Using Integration Methods of SERVQUAL and Kano Model into House of Quality	-To improve service quality -To increasing the number of Commuter Line Jabodetabek passenger.	-SERVQUAL method -Kano Model -House of Quality(HOQ)	-SERVQUAL shows service quality attributes with negative & positive SERVQUAL gap -Kano Model shows that attributes are translated into technical requirements -House of Quality (HOQ) obtain the appropriate service quality improvement strategies

9	(Chen et al., 2021)	Applying the Kano model to investigate the quality of transportation services at mega events	-To evaluate passengers satisfaction with each service elements in mega event - To rank service elements requiring enhancement.	-Kano model -SERVQUAL method -Customer satisfaction coefficient using quality improvement index	Kano determines - Most valued requirements of user satisfaction. -Overcomes the misconception of linearity b/n service quality attributes and customer satisfaction.
10	(Jain & Gupta, 2004)	Measuring Service Quality: SERVQUAL vs. SERVPERF Scales	-To assess the diagnostic level and ability of SERVQUAL &SERVPERF model -To analyze their methodological soundness & validity	-Correlation coefficients -Regression using ANOVA technique	-SERVPERF :-yields more convergent & discriminant valid explanation of the service -Limitation on diagnostic power. -SERVQUAL:-better than SERVPERF by pinpointing areas of managerial interventions for service quality shortfalls.

Table 2.1.List of Reviewed Literatures

2.7. Literature Gap

In spite of extensive research exists on service quality in the transportation sector, this study specifically fulfills the gaps that remained underexplored by providing a comprehensive evaluation of all five dimensions of service quality. Taking AACBSE this paper offers valuable insights into the specific areas where it fall short of customer satisfaction and loyalty contributing to the broader body of knowledge by highlighting the unique challenges faced in this setting. The findings provide a nuanced understanding of customer dissatisfaction and identify critical areas for improvement, thereby informing strategies aimed at enhancing service quality in public transportation systems in similar urban environments. Additionally, previous research often addresses service quality dimensions in isolation rather than providing a holistic analysis encompassing service quality dimensions with Kano and QFD tools collectively for a better service.

CHAPTER THREE

3. METHODOLOGY

The study's methodology includes data collection, data analysis and interpretation. The research design will be included in this section. Both qualitative and quantitative approaches will be executed from the data's being obtained from primary and secondary data sources. The procedures that are undertaken with in the methodology classified under three main stages incorporating collection of data, analyzing the results being obtained and identifying the responsible factors for the gap with in the service are related to service quality, customer satisfaction, and customer loyalty.

3.1. Research Design

The general main steps that are included with the research design are listed sequential consists observation ,defining the main sources of long waiting times outlining the variables, distributing fulfilling SERVPERF and Kano questionnaires ,deploying QFD and finally developing strategy based on House of Quality(HOQ) findings.

3.2. Research Methods

The study will employ both primary and secondary data's. The primary data's are obtained through questionnaires and interview. The questionnaires developed will be SERVPERF question.

3.3. Population of the Study

The areas taken for sampling were the four major terminals that are found in Addis Ababa. Terminals are defined as the places passengers or freight originates or terminates (*Transport Terminals*, 2019).These are Addis Ketema (Mercato) terminal, Leghar terminal, Piassa (Menelik) terminal and Megenagna terminal. The locations were selected as they are main terminals available currently entertaining wide and variety range of passengers. The number of commuters each terminals accommodates were to be 199,136 in Megenagna terminal, 184,023 passengers in Piassa, 77,805 commuters in Addis Ketema and 72,765 at Leghar terminal. Taking this data the following sample size calculations were made.

3.4. Sampling and Sample Size Calculation

The sampling techniques used is simplified random sampling techniques along with the terminal. The total sample size attain 138 participants. While dividing the participants with respect to the stations it will become 51, 48, 20 and 19 participants in Megenagna, Piassa, Addis Ketema and Leghar terminals.

Sampling Size Calculation

There appears to be several methods applied for determining sample sizes (Hamdan et al. 2023). The methods can be applied for known or unknown populations. The commonly used methods of sample size determination used are Yamane's Method, Krejcie and Morgan Method ,Cochran method and G*Power Software (Kharuddin et al., 2020). This study utilized Finite population Correction Factor (FPC) formula to determine the appropriate sample size taking the confidence level 90%.The sample size computed to be 138 passengers.

The formula used is for finite population:

$$sample\ size(n) = \frac{\frac{z^2P(1-P)}{e^2}}{1+\left(\frac{z^2P(1-P)}{e^2 \times N}\right)} = \frac{\frac{(1.645)^2 \times 0.50 \times (1-0.5)}{(0.05)^2}}{1+\frac{(1.645)^2 \times 0.50 \times (1-0.5)}{(0.05)^2 \times 533{,}729}} = 138\ participants$$

n = required sample size.

z^2= z-score value, taking 1.645 for 90% confidence level

N= the population size

P = the standard deviation assumed to be 0.50

e^2 = margin of error, to be 0.07

Depending on the total sample size for the study obtained earlier sample size for each terminal are computed taking data's from AACBSE the number of passengers entertained daily on each terminals are 199,136 in Megenagna ,184,023 in Piassa ,77,805 in Addis ketema and 72,765 in Leghar terminal. From the data's the number of participants have been determined as below.

i) $n_M = \frac{Nm \times n}{N} = \frac{199136 \times 138}{533729} = 51.48 \approx 51$passengers,

ii) $n_P = \frac{Np \times n}{N} = \frac{184023 \times 138}{533729} = 47.58 \approx 48$ passengers,

iii) $n_A = \frac{NA \times n}{N} = \frac{77805 \times 138}{533729} = 20.11 \approx 20$ passengers,

iv) $n_L = \frac{NL \times n}{N} = \frac{72765 \times 138}{533729} = 18.81 \approx 19$passengers,

n_M-no of passengers that will be participating at Megenagna terminal.

n_P-no of passengers that will be participating at Piassa terminal.

n_A-no of passengers that will be participating at Addis ketema terminal.

n_L-no of passengers that will be participating at Leghar terminal.

3.5. Types and Sources of Data

3.5.1. Primary Data Source

The nature of Primary sources are uninterrupted, original or new materials and primary sources. This character provides current and factual information about the study. As well as the data's being gathered are collected for the first time, being fresh and also original. The primary sources of the study includes questionnaires, observations and interviews.

Questionnaire: questionnaires the most common and popular ways of data collection methods. The capability and ability of having access to obtain data from wide and large population makes it to be primarily selected. In this study the questionnaires are close - ended questions and based upon SERVPERF model. While measuring the customer expectation and perceived service quality there are five scale determining options from strongly disagree to strongly agree.

Observation: it is also on means of collecting data by looking it to the nature and the effect of the problem that it puts upon the surrounding and society.

3.5.2. Secondary Data Source

The secondary sources of data will be taken from statistical report of AACBSE. These also includes extracting data's, reports and other published and un-published documents related to the area of study.

3.6. Data Collection

Data's were collected through online questionnaires as well distributing the questionnaires physically based on the desired and selected areas for the survey. Among the questionnaires 104 were being valid and taken for the study to assess the effect.

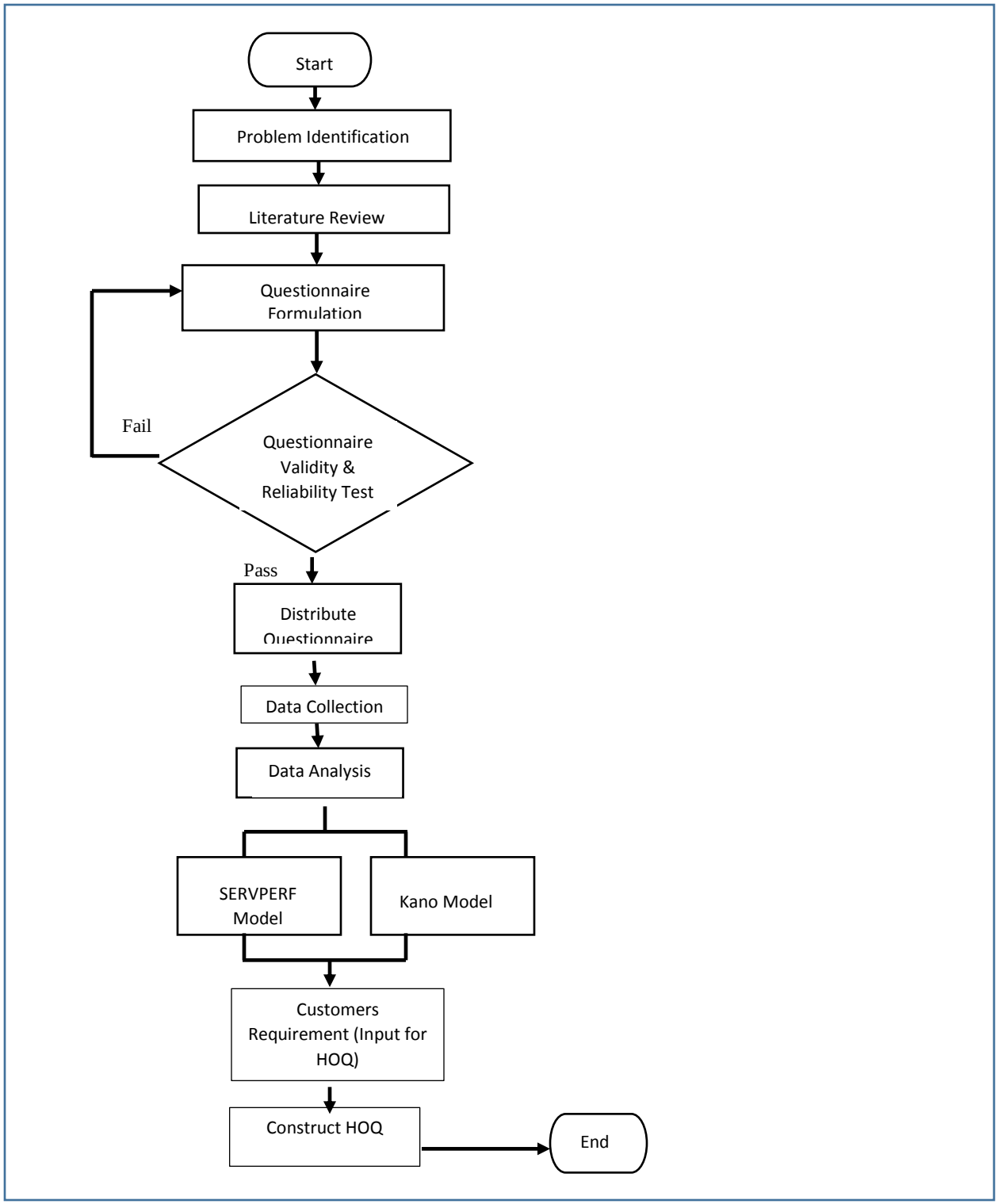


Diagram 3.2.Methodology

3.7.Methodological Phases

The study involves phase's three steps of assessing the service being delivered by AACBSC that are described as follows.

I. Measuring the current level of the service being delivered by the AACBSE: This stage mainly investigates the service that is given to the customers instantly. The analysis examined the five service quality dimensions with their respective items being represented as shown below. SERVPERF model was utilized as it aims in describing the performance of a service. The data was analyzed after being gathered using a SERVPERF questionnaires and Statistical Package for Social Sciences (SPSS) software was used for undertaking descriptive analysis. Considering the aim of the study descriptive analysis were chosen as they represent and interpret data in a clear and meaningful manner, as well as their ability to show the respondents' attitudes towards the service quality level.

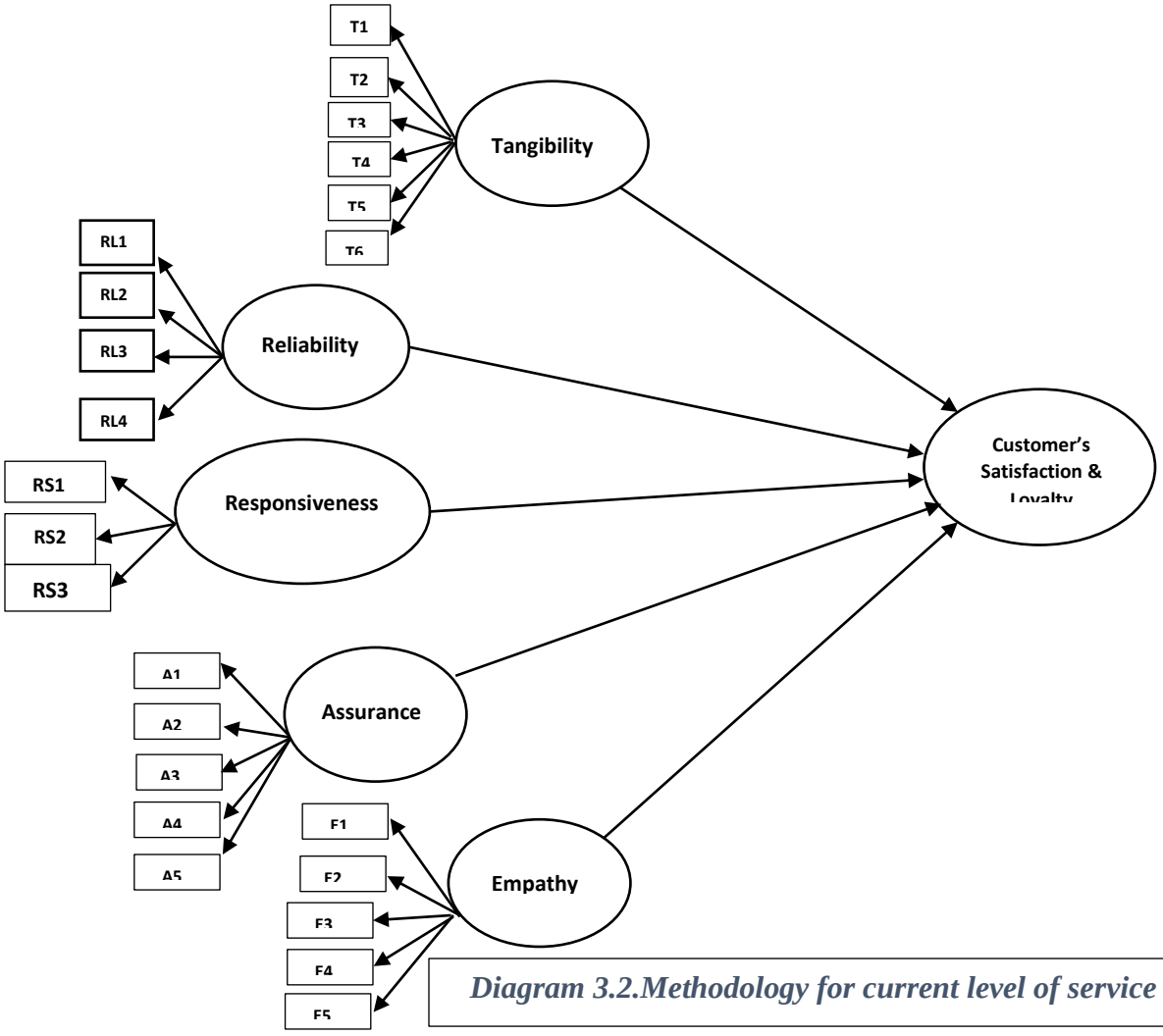


Diagram 3.2.Methodology for current level of service

II. Identifying the relation and effect of perceived service quality dimensions on customer's satisfaction and loyalty

This stage was executed after determining the current performance of the service being delivered in relation with customer's satisfaction and loyalty. Investigation of service quality dimensions outcomes from SERVPERF questionnaire as well Kano model are included to depict their consequences they put upon customers satisfaction and loyalty.

III. Developing strategy for enhancing the service delivered

In the final stage an enhancement strategy using HOQ was constructed by using the output categories' determined from Kano model as customer's requirement. The categories were obtained through prioritization of features that have a significant effect among the service qualities being assessed and demanding an improvement with in the study.

3.8. Ethical Considerations

Ethical research practices require that data collection and publication are conducted in a way that safeguards respondents from any potential harm (Cacciattolo, 2015; Akaranga & Makau, 2016; Arifin, 2018). Protecting respondents' safety is a fundamental aspect of ethical research (Arifin, 2018). Ethical considerations encompass informed consent, voluntary participation, the principle of "do no harm," confidentiality, anonymity, and the analysis of only relevant data (Akaranga & Makau, 2016; Arifin, 2018).

In this study, all relevant information from the literature has been properly cited and included in the reference section. Data collected from both governmental and non-governmental organizations were kept confidential and reported accurately without any alterations. Participants were thoroughly informed about the research purpose and the intended use of their responses. Their participation was entirely voluntary, with the option to withdraw at any time without needing to

CHAPTER FOUR

4. Result and Discussion

4.1. Process study of case company (AACBSE)

The process of the study mainly incorporates transport service. The common paths and methods that are followed in transport service are as follows.

1. Waiting at the Bus Stop: basically the initial process in which customers /passengers experience waiting for the bus service of the route they wish to take. Checking for signage or information at the bus stop is mandatory to be ensure and get the service.

2. Boarding the Bus: the second step that involves passengers to enter the bus in the case of taking the origination or starting station and allowing passengers to exit first before boarding. If it is not. The procedures prior entering includes if there appears to be a line or queue, waiting for your turn to board, being ready to pay the correct fare and ensure the ticket or pass is valid for the journey.

3. Finding a Seat: After entering the next move will be to find for available seat. In the case there is absence of available seats, being prepared to stand while holding onto the provided handrails or straps for stability is recommended.

4. Requesting a Stop: when arriving at the destination to get off at a specific stop, signaling the driver by pressing the designated button, pulling a cord if available or waiting the bus to stop are entertained. While requesting anticipate the stop in advance and making move towards the exit when the bus is approaching is recommended.

5. Exiting the Bus: This is the last procedure in which the passengers move towards the exit doors as the bus approaches the desired stop. Being mindful of other passengers and allow them to exit first if they are closer to the doors will be better way to exit safely.

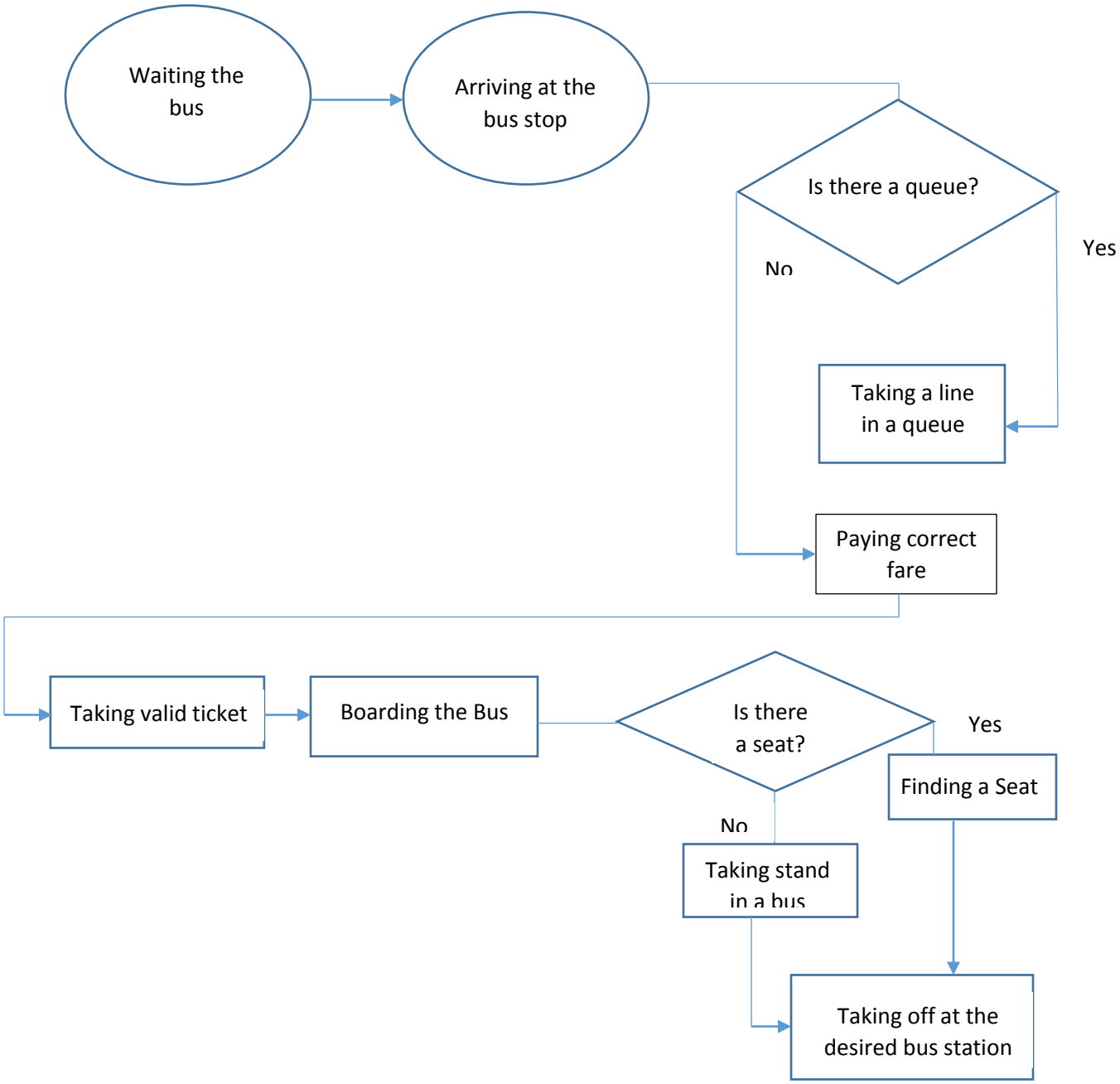


Diagram 4.1.Process of using Transportation Service

4.2 Measuring and Analyzing Phase

The data analysis will be done by integrating the data's obtained in quantitative and qualitative approaches. The data's will be analyzed using Kano model to prioritize the attributes with in the service followed by deriving strategy through HOQ (House of Quality).The collected primary and secondary data will be evaluated using Cronbach's alpha reliability for the questionnaire, descriptive analysis (mean, percentage) used for presenting the data's using tables in a clear and

precise way. HOQ will be used for prioritizing the features that are critical and found to be the most influencing using Kano model. The most commonly used approaches entertained in research are quantitative approach, qualitative approach and mixed approach. The reason the study employs both qualitative and quantitative approaches is mainly to attain a better insight and recognition of the problem and its effect.

The analyzing phase begins by assuring the reliability and validity of the study and measuring variables as they are the foundation for mimic the real situation. Cronbach's alpha is among the most extensively and widely used tools that assures reliability. It is nature of being well-established statistic that could be found in practically every work presenting an evaluation of a measure and becomes a key assets of classical test theory (Schweizer, 2011).Cronbach's alpha ranges from 0 to 1. As the number is closer to zero, the reliability becomes weak and as the number approaches to 1 assures strong reliability. The table below describes the status of the ranges with their respective interpretations. This paper uses Cronbach's alpha reliability to determine the reliability. Though Cronbach's alpha has been widely criticized as a trustworthiness estimate for a group of items according to (Malkewitz et al., 2023).

Cronbach's alpha Values	**Status**
≤ 0.5	Poor
$0.6 \leq x < 0.7$	Questionable
$0.7 \leq x < 0.8$	Acceptable
$0.8 \leq x < 0.9$	Good
≥ 0.9	Excellent

Table 4.1.Cronbach's alpha Values Indications

No	Service Quality Dimensions	Statements	Cronbach alpha's value obtained
1	CLS 1	How do you rate the service being provided by AACBSE?	0.756
2	CLS 2	How likely are you going to use service in the future?	0.765

Table 4.2.Cronbach's alpha Values of CLS1&CLS2

Service Quality Dimensions	Statements	Cronbach alpha's value obtained
Tangibility	AACBSE holds up-to date equipment's.	**0.858**
	AACBSE provides aesthetic and attractive features with in the buses.	
	The displays showing the destination places are clearly seen and working.	
	The buses internal parts is clean	
	Their employees appear in neat and a well-dressed fashion.	
	The accessories like TV, Radios and charging boards are working properly.	
Reliability	Information regarding the bus arrival and departure is available to the passengers.	**0.726**
	The drivers and coordinators give the service right on the scheduled time.	
	The buses arrive exactly in their early beginning schedule in the morning	
	The buses give service exactly until the services ends in late hours at night.	
Responsiveness	Drivers are willing to provide fast and safe transport service.	**0.839**
	The driver /coordinators inform passengers and take immediate solutions if there appears any accidental conditions.	
	The drivers /coordinators resolve problems directly and immediately within short period of time also without affecting the majority users.	
Assurance	The drivers and ticket person are knowledgeable about the places along the trip	**0.714**
	The seats are comfortable and safe throughout the journey.	
	The driver's ticket person and coordinators behavior assure the customers having safe trip.	
	AACBSE starts the service at the right origination place, station or terminal.	
	Passengers feeling safe with the driving skill of AACBSE driver's.	
	The drivers give first for those who are in need of help or aid.	

Empathy	The driver's ticket person and coordinators apologize if they made any mistake.	**0.753**
	Drivers load and unload passengers at places safe and favorable for passengers.	
	The driver, ticket person and coordinators have courage to understand customer's need and specific requirements.	
	The driver's ticket person and coordinators reply questions in a courteous and polite way.	

Table4. 3.Questionnaire Statements and Cronbach's alpha Values

4.3. SERVPERF- Model Analysis

I. Demographic Data Analysis

1. Age

The study attained respondents in variety of age ranges in which 55.77% were found from18 to 30 years old ,31.73 % from 31 to 40 and 12.50% for 41 to 55 ranges. This implies that most of the respondents are to be young aged.

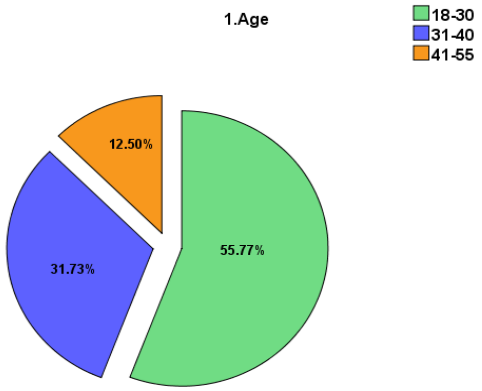


Figure 4. 1. Age Range of Respondents'

2. Gender

In the study 78.85 % were males and the remaining were females. This shows that males are the main users for the service.

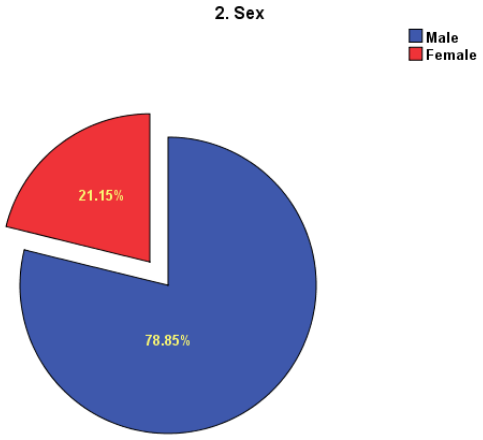


Figure 4.2. Respondents' Gender percentage

3. Level of education

The literacy level and academic background of the respondents was found out to be 88.46% were holders of Degree and above. Both TVET/Diploma and Secondary School possess 5.77% each. This implies the respondents have better insight towards the study.

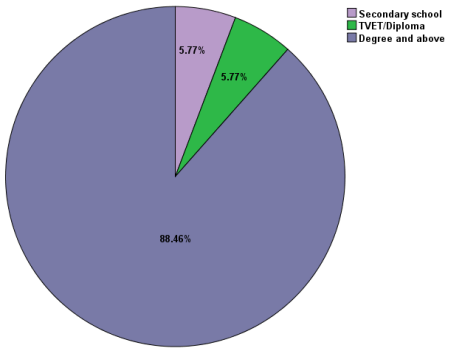


Figure 4.3. Respondents' Educational Background

II) Experience of users

1) Duration of using the service

Among the respondents 73.08 % were sincere in using the service for three years and above 11.54% have used from 1 to 2 year and 15.38 less than a year. This indicates that the survey and the addressed respondents was compatible that supports this paper.

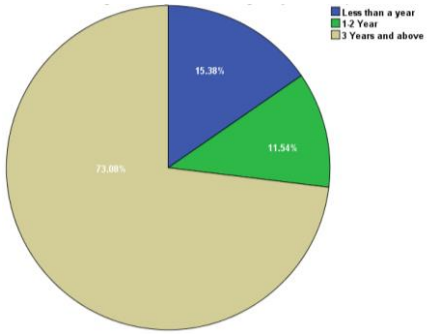


Figure 4.4. Respondents' Duration of Service

2) Distance travelled

From the survey the respondents who experience long distance for their journey using the case company are 42.31%, 53.85% for middle distance and remaining 3.85% short distance. This implies that the survey has accompanied concerned parties for assessing the service.

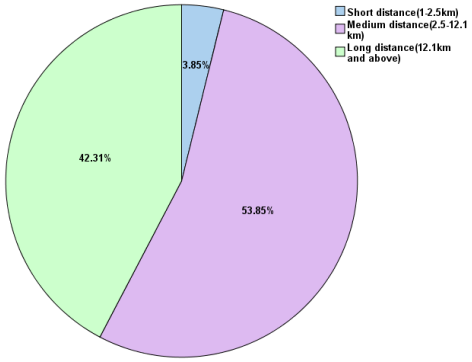


Figure 4.5.Respondents' Distance travelled

3) Preferred Quality

Among the other service providers the case company delights customers through favorable conditions .Among this conditions customers and passengers was primarily attracted 60.58% for the service being affordable secondly 15.38% other reasons out of the given alternatives, 14.42

% due to being easily available, 3.85% for its fast and cheap service accompanied each alone with the least 1.92% being comfortable were the main reasons behind the customers.

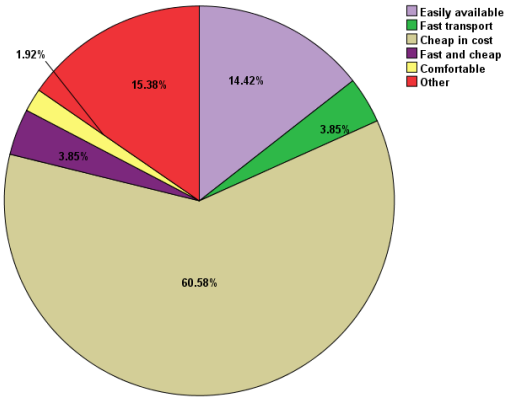


Figure 4.6. Respondents' Preferred quality

Based on the respondent's backgrounds, it is possible to conclude that they have a high degree of knowledge and expertise with the service, consequently confirming the survey data's reliability and relevance. This variation guarantees that the survey reflects a wide range of user experiences. These data indicate that price and availability are important elements in customer satisfaction, with a large majority of customers also appreciating other features of the service. In general, the survey has involved concerned and direct stakeholders for detailed information about the delivered service quality of the case company.

II) Descriptive Analysis

The descriptive analysis are employed for this study as they have the strength to reveal measurement of performance. The study of (Mujinga, 2019) can be a demonstration of using this analysis for measuring retail banking service. Taking the data from the questionnaire filled by respondents that touched service quality dimensions in the Servperf model. The analysis extracted from SPSS are discussed as follows.

From the data described among the all the quality dimensions of SERVPERF model **REL 2**"***The drivers and coordinators give the service right on the scheduled time*** " holds least mean score **1.57** and the highest score is obtained at **A4** "***AACBSE starts the service at the right origination place, station or terminal*** "with a mean score of **2.84**.

Tangibility

Referring to the tangibility dimension of service quality the output obtained from SPSS is shown in the below table. T5 "AACBSE provides aesthetic and attractive features with in the bus"T1 holding "AACBSE holds up-to date equipment's". Among the division of theses service quality dimension the mode for all the sub factors is 2 as well as the median.

		T1	T2	T3	T4	T5	T6
N	Valid	104	104	104	104	104	104
	Missing	0	0	0	0	0	0
Mean		1.72	1.99	1.69	1.73	1.60	1.77
Median		2.00	2.00	2.00	2.00	2.00	2.00
Mode		2	2	2	2	2	2
Std. Deviation		.703	.631	.684	.595	.549	.627
Variance		.494	.398	.468	.354	.301	.393

Table 4.4.Output results of Tangibility Dimension

From the data, **T1** "*AACBSE holds up-to date equipment's*." mean of **1.72** with standard deviation **0.703** and median 2 implies that the mean is rather low these signifies customer perceptions or assessments of service quality are not outstanding on average. The lower mean indicates that there appears service fails to fulfill consumer expectations. A low standard deviation indicates that the responses are closely concentrated around the mean. Thus, there is minimal variation or dispersion in the ratings, reflecting a consistent experience of low service quality across the respondents. The median of 2 represents the center value. The median is greater than the mean showing that the distribution is possibly weighted toward less favorable outcomes. Concluding low service quality is experienced and there is a need for improvement.**T2**"*AACBSE provides aesthetic and attractive features with in the buses"* holds mean of **1.99** which is greater than the sub factors among tangibility dimension following by mode and median 2 with a standard deviation of **0.631.** Due to the fact the mean exceeds the sub-factors within the tangibility dimension, the overall average rating is nearly higher than the average rating of the individual sub-factors. This shows that certain tangibility sub-factors may be performing below average, lowering the total tangibility grade. Because the mode and median are both 2 shows there is a concentration of responses centered on this value, which may reflect a

shared perspective or experience. **0.631** of standard deviation, indicates comparatively low standard deviation, indicates that the ratings are closely concentrated around the mean. It means that there is little variation or dispersion in the assessment throughout this indicates a left-skewed distribution and needs a room for improvement.**T3"***The displays showing the destination places are clearly seen and working*" had mean and standard deviation **1.69** and **0.684** respectively as the mean and median are the same throughout this dimension with value of 2. Mean rating of 1.69 indicates that respondents evaluated the statement relatively low referring that respondents did not believe the displays to be clearly visible or in proper functioning order on average.in the meanwhile, standard deviation of 0.684 suggests that the evaluations vary moderately.as a result there is a need for improvement with the sub factor. **T4**"*The buses internal parts is clean*" possess mean **1.73** and standard deviation **0.595** According to this data, the mean rating of 1.73 indicates that respondents regarded the internal cleanliness of the buses low on average. The standard deviation of 0.595 suggests that the evaluations vary moderately. It is possible that there are concerns with the cleanliness of the bus's interior components. Thus this indicates that there is demand for development in this particular aspect of the service.**T5** "*Their employees appear in neat and a well-dressed fashion"* had a mean of **1.60** and standard deviation **0.549** describing According to this data, the mean evaluation of 1.60 indicates that, on average, respondents consider employees' appearance in terms of neatness and well-dressed fashion as relatively low. The standard deviation of **0.549** suggests that the ratings are comparatively diverse. This decrease in the mean indicates that this particular element need improvement. Through identifying and addressing underlying issues related to employee appearance.**T6** "*The accessories like TV, Radios and charging boards are working properly"* of mean **1.77** and standard deviation **0.627.** The mean implies that customers revealed a relatively low satisfaction furthermore the standard deviation indicates the responses were relatively consistent the ratings were relatively constant or grouped around the mean, showing that customers' perceptions were relatively aligned. Overall, it appears that customers indicated discontent with the proper functioning of the accessories, with a significant number of customers choosing the "Disagree" option, based on the data provided.

Reliability

This dimension constitutes RL 1, RL2, RL3 and RL 4. Among these RL 1 holds the highest mean 1.73 under this division and RL4 holds the lowest mean 1.64 among the overall service dimensions as indicated previously.

		RL1	RL2	RL3	RL4
N	Valid	104	104	104	104
	Missing	0	0	0	0
Mean		1.73	1.57	1.71	1.64
Median		2.00	1.00	1.00	1.00
Mode		2	1	1	1
Std. Deviation		.672	.012	.962	.787

Table 4.5.Output results of Reliability Dimension

RL1" *Information regarding the bus arrival and departure is available to the passengers*" mean of **1.73** and standard deviation **0.672** with mode and median **2** can be interpreted as 1.73 mean value indicates that customers leaned toward disagreement or a negative perception regarding the availability of bus-related information. The standard deviation of 0.672 illustrates the dispersion of this dimension. As larger standard deviation implies scores are more varied, whilst a smaller standard deviation indicates judgments being less variable. Customers evaluated the availability of information on bus arrival and departure as quite low on average. The fact that the mode and median are both 2 indicates that the response choice "disagree" was the most often chosen and is located in the center of the replies. This shows that a significant number of consumers were dissatisfied with this sub factor. **RL2** "*The drivers and coordinators give the service right on the scheduled time*" had **1.57** mean, mode and median **1** along with standard deviation **1.012.** This measures can tell that mean of 1.57 corresponds customers sloped toward having a negative perception of the drivers' and coordinators' punctuality. The mode being 1, meaning that the customers responded "**strongly disagree**" at most and the same as the median which is the middle of the responses. This demonstrates that a significant number of customers were strongly dissatisfied with the drivers and coordinators providing service on time. Additionally standard deviation reflects that the variety of the customer's opinions were more

diversified. **RL3** "*The buses arrive exactly in their early beginning schedule in the morning*" mean of **1.71** and standard deviation **0.962** following with mean and median **1**. The mean suggests that customers expressed a negative perception or disagreement with the punctuality of buses in the morning. The median and mode confirm that a large percentage of commuters voiced "strongly disagree" and standard deviation 0.962 indicates that ratings for this dimension varied. Customers usually indicated discontent or disagreement with the timeliness of buses arriving on time in the morning, though that consumer opinions were not particularly consistent.**RL4** "*The buses give service exactly until the services ends in late hours at night* "with **1.64** mean ,**0.787** standard deviation and same value 1 for both the mode and median **.** 1.64 mean can be taken as customer's evaluation towards the buses' ability to offer service until late at night as relatively low. Where showing a tendency towards disagreement. The fact that the mode and median are the same emphasizes the commuters' consensus regarding their dissatisfaction with the bus service duration. The variety of the ratings is indicated by the standard deviation of 0.787.as a result it needs an improvement measures to be taken.

Responsiveness

Under this dimension there appears RS 1, RS 2 and RS3 with highest mean of RES 1 and RES2 lowest score 2.28 and 1.92 respectively. The sub factors categorized under responsiveness share the same mode and median value which is **2** implying that the most frequent choice chosen by the customers is "**Disagree**" as well it is the middle value being entertained.

RS1 "*Drivers are willing to provide fast and safe transport service."* accompani**es** mean **2.28** and standard deviation **1.24.**this states that as the mean is closer to 2 shows their exists dissatisfaction among the customers and the standard deviation shows the variety of the respondents with this specific topic is relatively dispersed.

		RS1	RS2	RS3
N	Valid	104	104	104
	Missing	0	0	0
Mean		2.28	1.92	2.09
Median		2.00	2.00	2.00
Mode		2	2	2
Std. Deviation		1.242	.900	.946

Table4.6.Output results of Responsiveness Dimension

This tells that customer perceptions and opinions about drivers' willingness to provide fast and safe transportation varied significantly. However as the level of dissatisfaction is low it needs an improvement.**RS2** *"The driver /coordinators inform passengers and take immediate solutions if there appears any accidental conditions"* contains a mean and standard deviation value of **1.92** and **0.9** respectively. It can be stated that this sub factor needs an enhancement due to the mean approaches to 2 telling that the customers are dissatisfied by the Likert scale designating 2 is "disagree" and standard deviation being lower than mean and standard deviation being smaller implying the common perceptions with is the customers is being low. So take overs for delivering quality service are needed. **RS3** *"The drivers /coordinators resolve problems directly and immediately within short period of time also without affecting the majority users"* holds mean **2.09** and standard deviation **0.946.**simillarly it can be said that mean as being closer to 2 it shows disagreement in the service provided under this specific issue and standard deviation being lower than the mean and having smaller value indicates the responses are relatively diversified with the customers and there appears to be measures to be undertaken with in delivering the service.

Assurance

This dimension is mainly assessed through A1, A2, A3, A4and A5.among this 2.18 and 2.81 are scored under A1 and A4 respectively, where A4 is the highest score recorded over all the service dimensions. The mode and median for all the sub factors except A4 holds the same value both

are **2.** It illustrates that the most common response among passengers was 2 in which it was assigned as "**Disagree**" option in the Likert scale , as well as the value in the middle when the ratings were arranged in ascending or descending order is 2.

A1 "*The drivers and ticket person are knowledgeable about the places along the trip*" holds a mean of **2.18** and standard deviation of **0.890** reveals that, on average, consumers regarded drivers' and ticket agents' knowledge of the locations along the route as quite low. The standard deviation shows the low variability that customers had in common about the drivers and ticket takers as having inadequate awareness. **A2** "*The seats are comfortable and safe throughout the journey*" with a mean **2.45** and **1.004** can be described as 2.45 mean Customers, on average, inclined toward dissatisfaction or reported a considerably less favorable opinion related to the comfort and safety of the chairs. The evaluations did not cluster strongly around the mean, indicating a greater range of responses. The variability shows that consumers had varied feelings and experiences with the chairs' comfort and safety, with some considering them as more comfortable and safe and others as less so.**A3** "*The driver's ticket person and coordinators behavior assure the customers having safe trip*" obtains a mean **2.28** and **0.908** standard deviation illustrates Customers assessed the behavior of the driver, ticket agent, and coordinators in insuring a safe travel as rather poor on average due to the value of mean .

		A1	A2	A3	A4	A5
N	Valid	104	104	104	104	104
	Missing	0	0	0	0	0
Mean		2.18	2.45	2.28	2.81	2.51
Median		2.00	2.00	2.00	3.00	2.00
Mode		2	2	2	4	2
Std. Deviation		.890	1.004	.908	1.215	1.005

Table 4.7.Output results of Assurance Dimension

Additionally the standard deviation reflects that customer's opinion did not lie strongly around the mean, indicating a greater range of responses. **A4** "*AACBSE starts the service at the right*

origination place, station or terminal" had a mean of **2.81**with **1.215** standard deviation, mode **4** and median **3** implying that, on average, customers agreed or had a moderate opinion about AACBSE beginning service at the correct origination point, station, or terminal. The standard deviation reveals that users had different feelings and experiences with AACBSE's consistency in commencing the service at the correct spot, with some thinking it as more reliable and others as less. The mode of 4 indicates that the rating of "4" was the most common response among passengers. This suggests that a significant number of passengers were generally satisfied with AACBSE starting the service at the correct origination place, station, or terminal. The median of 3 indicates that it was the middle value when the ratings were arranged in ascending or descending order. This suggests that there was a relatively balanced distribution of ratings above and below the median. Some passengers rated AACBSE's performance higher than the median, while others rated it lower.it seems that, on average, passengers moderately agreed that AACBSE starts the service at the right origination place, station, or terminal**A5** "*Passengers feeling safe with the driving skill of AACBSE driver's*" mean **2.51** along standard deviation **1.005** can be described as On average, inclined toward agreement or reported a moderate opinion of feeling safe with AACBSE drivers' driving skills. This means that passengers' perceptions and feelings about their safety with AACBSE drivers' driving skills differed to some amount. The evaluations did not cluster strongly around the mean, indicating a greater range of responses.

Empathy

Taking this dimension their appears to be five dimensions E1, E2, E3, E4 and E5 with the highest score of E1 2.58 and least value 1.63 obtained from E3and E4.**E1**" *The drivers give first for those who are in need of help or aid"* holds mean of **2.58** mode and median having the same value **2** and standard deviation **1.068** reveals that passengers had a moderate perception of the drivers' readiness to prioritize those in need of support or assistance. Using the Likert scale, it shows that passengers, on average, agreed although not strongly. Perceptions and experiences differed taking the standard deviation. The evaluations did not converge strongly around the mean, indicating a greater range of responses. On average, passengers believed that drivers prioritize individuals in need of assistance However, there was considerable disagreement among them, and a large proportion of passengers assessed the drivers' behavior as "2" on the Likert scale.**E2** "*The driver's ticket person and coordinators apologize if they made any mistake"* holds

1.78 and **0.788** mean, and standard deviation respectively with mode and median the same value **2.** Implies that, below the scale's midway reveals that, on average, passengers were disagreed. 0.788 standard deviation implies that the ratings tend to be consistent. As the evaluations were closer together and less scattered apart.

		E1	E2	E3	E4	E5
N	Valid	104	104	104	104	104
	Missing	0	0	0	0	0
Mean		2.58	1.78	1.63	1.63	1.72
Median		2.00	2.00	1.00	1.00	1.00
Mode		2	2	1	1	1
Std. Deviation		1.068	.788	.764	.791	.939

Table 4. 8.Output results of Empathy Dimension

The fact that the mode and median are both 2 indicates that the rating of "2" was the most frequent answer among passengers, as well as the midway value when the ratings were ordered in ascending or descending order. **E3** "*Drivers load and unload passengers at places safe and favorable for passengers"* mode and median same value of **1** followed by **1.63** and **0.764** mean and standard deviation respectively. The fact that the mode and median are both 1 indicates that the rating of "1" was the most popular answer among passengers, as well as the midway value. Because a large proportion of passengers assessed the drivers' abilities to load and unload passengers in safe and convenient locations as extremely poor. Passengers rated the drivers' performance in this category more intense below the midpoint of the scale. The majority of passengers were dissatisfied. A standard deviation of 0.764 suggests that the ratings are generally stable. This suggests that passengers' perceptions and experiences with the drivers' capacity to load and unload passengers in safe and convenient places were relatively constant. When compared to dimensions with greater standard deviations, the evaluations were closer together and less dispersed apart.**E4**" *The driver, ticket person and coordinators have courage to understand customer's need and specific requirements"* had a mean of **1.63** standard deviation **0.791** and the same value for mode and median value **of 1.** Since the mean and median were both 1 indicates that the rating of "1" was the most frequent answer among passengers, as well as the midway value when the ratings were ordered in ascending or descending order.1.63 indicates

that, on average, customers considered the capacity of the driver, ticket person, and coordinators to comprehend customer wants and special requirements as being below the middle of the scale, indicating disagreement. The standard deviation of 0.791 suggests that the evaluations were more evenly distributed. According to this interpretation, passengers had a high unfavorable attitude toward the ability of the driver, ticket person, but and coordinators to comprehend their wants and specific demands.**E5**" *The driver's ticket person and coordinators reply questions in a courteous and polite way"* has a mean of **1.72** mode and median **1** with standard deviation **0.939** The fact that the mean and median were both 1 indicates that the rating of "1" was the most popular response among passengers, and it was also the middle value that passengers evaluated very badly, showing a lack of civility and politeness. 1.72 indicates that, on average, travelers rated in the middle of the scale. On average, they were divided, although not strongly. The value 0.939 suggests that the evaluations vary somewhat. Indicating that the views and experiences of travelers. Although courteous and polite replies differed to some extent, it indicates that passengers had a significantly poor view of the manner in which the driver's ticket person and coordinators responded to inquiries. The average rating was lower than the scale's midway, suggesting a considerable level of dissatisfaction.

Dimensions		**Mean**	**Total mean of the dimension**	**Standard Deviation**
Tangibility	T1	1.72	1.75	.703
	T2	1.99		.631
	T3	1.69		.684
	T4	1.73		.595
	T5	1.60		.549
	T6	1.77		.627
Reliability	REL1	1.73	**1.66**	.672
	REL2	**1.57**		.512
	REL3	1.71		.962
	REL4	1.64		.787
Responsiveness	RES1	2.28	2.09	1.242

	RES2	1.92		.900
	RES3	2.09		.946
Assurance	A1	2.18	**2.446**	.890
	A2	2.45		1.004
	A3	2.28		.908
	A4	**2.81**		1.215
	A5	2.51		1.005
Empathy	E1	2.58	1.868	1.068
	E2	1.78		.788
	E3	1.63		.764
	E4	1.63		.791
	E5	1.72		.939

Table 4. 9.Total Mean of Dimensions

Descriptive Analysis Results and Conclusion

Prior the descriptive analysis independent t test and One way ANOVA measurements were undertaken using SPSS in order to procced the descriptive analysis. This aims at assuring the demographic data of the respondents' sex, age and educational background doesn't alter and creates variability with in the responses. The results from the tests were found to be above the p value 0.05 telling that the demographic factors don't affect the variables to be measured in the analysis.

The analysis of customer satisfaction and service quality at AACBSE reveals a consistent perception of low service quality across tangibility, reliability, responsiveness, assurance, and empathy dimensions. In terms of tangibility, factors such as the condition of equipment, the aesthetics and functionality of buses, and the clarity of destination displays were rated poorly, indicating that AACBSE fails to meet consumer expectations in these areas. The reliability dimension, assessing the availability of bus-related information and the punctuality of services, also reflected negative customer experiences. Similarly, responsiveness, which constitutes willingness and ability of staff to provide prompt services, was rated unsatisfactorily. The

assurance dimension, encompassing aspects like employee knowledge, courtesy, and ability to instill confidence, showed significant dissatisfaction among customers. Finally, empathy that measures degree of personalized attention and care provided by staff, was also perceived negatively, suggesting that AACBSE lacks the ability to make customers feel valued and understood.

4.4. Kano Model Analysis

The Kano model categorizes traits or features into distinct kinds depending on their influence on customer satisfaction. The categories and their interpretations are Must-be, one dimensional, Attractive and Indifferent. Features and aspects are classified according to the four categories of Kano model along with the frequency and the number or frequency of responses from customers. According to the data being gathered. Generally Kano classification based on left most wins' principle consider Must-be > One-dimensional > Attractive > Indifferent are taken as base for analyzing data.

Statement Code	A	O	M	I	R	Q	TOTAL
K1	**51**	13	0	32	2	6	104
K2	**42**	34	3	17	5	3	104
K3	**47**	40	2	13	0	2	104
K4	31	3	**70**	0	0	0	104
K5	27	9	**50**	15	3	0	104
K6	17	23	**44**	20	0	0	104
K7	9	16	**64**	15	0	0	104
K8	**46**	22	2	25	9	0	104
K9	29	**58**	3	14	0	0	104
K10	15	**51**	17	22	0	0	104
K11	**53**	19	4	28	0	0	104
K12	18	**70**	2	14	0	0	104
K13	27	**30**	28	19	0	0	104
K14	5	**53**	9	14	19	4	104
K15	14	35	**45**	10	0	0	104
K16	22	**40**	33	9	0	0	104

Table 4. 10.Output results of Kano Model Analysis

Categorizing the Kano Statements

From the gathered data this study classified five aspect of services as must be requirements which are K4, K5, K6, K7and K15 category. Among those the most frequent aspects K4 with 70 responses K7 ,64 responses K5,50 responses K15 ,45 responses and K6 with 44 responses when arranged in descending order. This can be interpreted as K4 referring to Arrival of buses on scheduled time is the primary issue in which it needs a focus for improvement and enhancement. Cleanness and attractive feature of buses labeled as K7 urging attention in the second place.K5 arrival and destination being displayed on buses is the third aspect of the service demanding a change. K15 ticketing queue start and K6 Correctly displaying its current pathway are followed consecutively expecting an advancement.

One –dimensional categories include K12, Being treated in a polite way with 70 respondents. K9, Functioning of air conditioning with in the buses 58 responses.K14 Stoppage of buses at every stations 53 responses, K10 Tickets showing the exact amount 51responses, K16 Capacity of loading passengers 40 responses and K13 Receiving a change immediately with 30 responses have been gathered in descending order for progress.it can be concluded that elements or characteristics that have a direct influence on customers happiness and interaction with their degree of fulfillment. Under attractive category K11 Being served with neat and attractive cloth 53 responses, K1 Using modern ticketing system via mobile phones 51 responses K3 Installing screens showing arrival and departure time of buses responses 47 responses K8 Using of accessories like TV and radio responses 46 responses and K2 Developing tracking system for the buses 42 responses are taken as aspects of the service that will delight the customers without their expectation.

Statement code	Questions related to	Category
K1	Using modern ticketing system via mobile phones	A
K2	Developing tracking system for the buses	A
K3	Installing screens showing arrival and departure time of buses	A
K4	Arrival of buses on scheduled time	M
K5	Displaying destination and arrival places on the buses	M

K6	Correctly displaying its current pathway	M
K7	Cleanness and attractive feature of buses	M
K8	Proper functioning and usage of accessories like TV and radio	A
K9	Functioning of air conditioning with in the buses	O
K10	Tickets showing the exact amount	O
K11	Being served with neat and attractive cloth	A
K12	Being treated in a polite way	O
K13	Receiving a change immediately	O
K14	Stoppage of buses at every stations	R
K15	ticketing queue start	M
K16	Capacity of loading passengers	O

Table 4. 11.Categories of Kano Model Analysis

4.4.1. Customer satisfaction coefficient

Customer satisfaction coefficient are basic and necessary in improving service and assessing the customer's perception about the service. The study of (Mkpojiogu & Hashim, 2016) argues that Kano model is limited as it only assess the qualitative aspect through satisfaction coefficient. That determines the degree of strength on the non-fulfillment affecting customer's experience.

The customer satisfaction (CS^+) coefficient is between 0 to 1.The value being closer to one, the higher the effect it puts upon customer satisfaction. Conversely, a CS coefficient approaches to 0 it implies the particular feature has very little influence on customer satisfaction. In the meanwhile, considering dissatisfaction coefficient (CS^-) or negative CS-coefficient (DI) ranges from zero to minus one. The interpretation of the value considered as the higher the influence of non-fulfilling of requirements on customer dissatisfaction as it approaches -1 and vice versa for 0. The CS^--coefficient is always a minus number, which underlines the negative influence on satisfaction if the feature in question is absent.

The satisfaction and dissatisfaction coefficients are computed as below;

Customer coefficient of satisfaction $= \frac{A+O}{A+O+M+I}$

Customer coefficient of dissatisfaction $= -\frac{O+M}{A+O+M+I}$

Statement code	Category	Customer coefficient of satisfaction $\frac{A+O}{A+O+M+I}$	Customer coefficient of dissatisfaction $-\frac{O+M}{A+O+M+I}$
K1	A	0.66	**- 0.135**
K2	A	**0.8**	- 0.378
K3	A	0.861	- 0.415
K4	M	0.32	- 0.69
K5	M	0.356	- 0.584
K6	M	0.378	- 0.650
K7	M	**0.225**	**- 0.77**
K8	A	0.715	- 0.25
K9	O	0.843	- 0.58
K10	O	0.621	- 0.66
K11	A	0.689	**- 0.213**
K12	O	0.85	- 0.699
K13	O	0.543	- 0.56
K14	O	0.386	- 0.5
K15	M	0.47	- 0.769
K16	O	0.59	- 0.708

Table 4. 12.Customer satisfaction Coefficient of Kano Model Analysis

Kano evaluation for the employees (Internal)

The Kano evaluation was undertaken in consideration of the employees. This study was undertaken to figure out the obstacles employees face while delivering the service. This will be helpful for assessing the challenges and improve for a better service. The Kano statements under this category starts from K1 to K9 accordingly. The Kano statement contain both the functional and dysfunctional statement for each of them.

Kano Category / Kano Statements	A	O	M	I	R	Q	Total
K1	2	5	**12**	2	3	1	25
K2	6	**12**	1	4	1	1	25
K3	5	7	**11**	1	0	1	25
K4	**15**	3	7	0	0	0	25
K5	7	5	**9**	3	0	1	25
K6	**10**	9	6	0	0	0	25
K7	2	9	**13**	1	0	0	25
K8	1	2	**17**	5	0	0	25
K9	9	3	**10**	2	0	1	25

Table 4.13.Kano Evaluation table Analysis (Internal)

From the Kano evaluation table it can be concluded that from the statements there has been obtained five under Must- be, two attractive and one one-dimensional categories. Generally it is summarized in the below table.

Statement code	Questions related to	Categories
K1	AACBSO prepares technical upgrade training regarding the new technologies.	M
K2	AACBSO providing regular customer service training and others related for the service.	O
K3	AACBSO offering overtime salary for extra time workers.	M
K4	AABCSO provides uniform fashionable	A
K5	AACBSO ensuring safety of drivers and ticket persons arrival and departure	M
K6	Implement ISO working principles	A
K7	Regular maintenance	M
K8	AACBSO reviewing and adjusting salary and incentives	M
K9	AACBSO facilitating Proximity-based workplace relocation	M

Table 4.14.Categories of Kano Evaluation table Analysis

Finally it can be concluded that the Must –be categories are those criteria's that are demanding for the service delivery. This implies there should be an improvement technique or tool needed to employed for overcoming the obstacles observed through working with this specific criteria's.

4.7. Integrating SERVPERF and KANO MODEL TO HOQ

This study uses Servperf, Kano and QFD tool HOQ (House of Quality) all together. The tools were selected based on their significance as Servperf liberates the gaps in the performance, Kano for its Prioritization and HOQ for constructing strategies for an improvement. Amongst the Quality measuring Models i.e.

Synergy of Kano and HOQ

The integration QFD AND Kano is vital in identifying customer demands as the Kano model play its role in categorizing customers demand (Apornak, A. 2017).the study of (Chandra and Rashed, 2007) also consolidates that associating QFD and Kano model was used for analyzing the customer satisfaction level. As well it also indicates customers satisfaction level is strongly answers the, and transforms Qualitative customer requirements to qualitative parameters, deploying quality service. In the meanwhile , (Hsu et al.,2007) integrated Kano model and HOQ for improving PDC ( )prioritizing by identifying nonlinear linkages. However, emphasizing the need of precise prioritizing of PDCs and applying the suggested technique to additional home appliance goods was executed by HOQ that derives significant competitive advantage to the case company.

Integration of Servperf and HOQ

There interdisciplinary relation between Servperf and HOQ in addressing the service quality gaps and taking improvement is beneficiary. This is factual as (Surjani et al., 2013) showed that service quality was examined through Servperf Methodology taking HOQ as an Improvement technique. On the other hand, (Tian & Yu, 2013) high lightened service quality performances influencing customer happiness were assessed and HOQ among the QFD tools was selected for enhancing the service. As well (Loya et al., 2023) utilized Quality Function Deployment by transforming Customer Requirements to Technical Requirements via HOQ for a sustainable improvement of service quality being delivered after assessing the existing performance.

Hence it can be concluded that the approach of HOQ and Servperf being blended aids organizations delivering highest service quality to satisfy their diverse demands.

Steps to develop HOQ

Constructing HOQ involves a series of steps. According to (Sahay, 2023b) the stages include identifying customers' requirements (What's),Technical requirements (How's),Designing the quality matrix , determining the relationships, prioritize customer requirements ,establishing importance ratings and identifying correlation between technical requirements and customer requirements.

Customers need (What's):- concerned in capturing customer feedback and VOC input for each essential consumer group including your client's demands and the importance or weight assigned to each need. In this study it refers to the passengers demand and request towards the service perceived. The customer's voice is taken from the study using the Kano categories which are grouped under must – be divisions.

1- Late arrival of buses on scheduled time

2- Lack of displaying destination and arrival places on buses

3- Incorrect displaying its current pathway

4- Lack of cleanness and attractive feature of buses

5- Not giving tickets according to queue

Step 2 Technical requirements (How's):-refers to the Engineering characteristics which involve technical aspects or design parameters that are related for solving the demand or voice of customers.in short it is the step for discussing the way to solve and enhance the obstacles derived from customer's needs. Considering and referring to the common requirements of customers different literatures were referred in this study shown in the below table. Some are taken as a strategy taken into account the common features they shared.

Proposed solutions	Emphasizes on	Authors	Titles
Regular Automated Vehicle Fleet management and schedule optimization	• Using technology to monitor traffic and communicate amongst vehicles. • Allows improve car and driver allocation. • provides information on mileage, fuel consumption, driver performance, maintenance issues, and driver status • Applicable for large fleet organizations optimize fleet management. Driver and vehicle assignment.	(Aljaafreh et al., 2011)	**Vehicle data acquisition system for fleet management automation**
GPS Tracking and Real-Time Monitoring	Concludes that • Employing a real-time GPS monitoring app in case of Malaysian states enhanced all of the identified characteristics.	(Chan et al., 2020)	**Sustainability of Public Transportation: An Examination of User Behavior to Real-Time GPS Tracking Application**
Regular Maintenance and Cleaning Services	Without adequate maintenance scheduling • It is extremely impossible to ensure the requisite number of operable buses for each morning shift. • Better maintenance plan proposed was repairing taking place in the morning and afternoon • Reduces cost and save money • Foster customers happiness and retention	(Adonyi et al., 2013)	**Scheduling of bus maintenance by the P-graph methodology**
	• improve the attractiveness of buses and operate more comfortable • Aims at establishing environmentally friendly and energy-efficient vehicles • Utilized innovative solutions in the fields of energy management, design of vehicles and facilities	(Corazza et al., 2016)	**Experiences of innovation in public services for sustainable urban mobility**
Automated Ticketing System	In the study, mobile application was utilized enables • Provides passengers to observe real-time position of buses • To know the expected arrival time • current passenger count • visualization of the available seat positions within the buses prior it's arrival • Attains necessary travel data • Solves common difficulties public transportation and improves the service quality.	(Weligamage et al., 2022)	**An Approach of Enhancing the Quality of Public Transportation Service in Sri Lanka using IoT**

Implement an integrated passenger information system	Proposes a modeling approach • Applied to all levels of data supply of transportation information systems. • Employed for analysis and planning • Policy assessment and decision making. • Prioritized the integration of operator's (back-end) and passenger's (front-end) sides. • Increases operational efficiency Along with customer perception of the service quality	(Csiszár & Nagy, 2017)	**Model of an integrated air passenger information system and its adaptation to Budapest Airport**
Regular driver training and technology education	• Employees not properly trained struggle performing assignments efficiently lead to negative quality perception	(Ghobadian et al., 1994)	**Service Quality: Concepts and Models**
Employee recognition or appreciation initiatives	Employee acknowledged and rewarded for enhancement of service as employees are • Internal service consumers, influences outward service quality • Provide insight to factors that impair service quality • Exposed to the company's service delivery system on a daily basis.	(Berry et al., 1994)	**Improving service quality in America: Lessons learned**
Proximity-based workplace relocation	Flexible Work Arrangement (FWA) • Attains beneficial influence on employee engagement • Including favorable recruiting increasing engagement • Puts negative impact with turnover intentions implying workers being less eager to quit the firm	(Kant et al., 2021)	**Flexible Work Arrangements and Work-Life Balance**
	• Physical health, absenteeism, somatic complaints, and physical exercise were affected positively with FWA • There appears significant associations between FWA policies and improved physical health, lower absenteeism, and fewer somatic symptoms.	(Shifrin & Michel, 2022)	**Flexible Work Arrangements and Employee Health: A Meta-Analytic Review**

Table 4.15.Literature review related to technical requirements

Step 3 Developing relationship matrix

The relation matrix was established using Customers rating answering the question how customers perceive the marketplace and your competition's ability to meet each of their

requirements. The symbols are designated to their respective values (rates) as there is strong positive correlation exist positive correlation between variables. On the contrary strong negative correlation implies nearly perfect negative correlations. In this study the highest value or weight is 9 representing Very related and lowest was 0 indicating not related variables.

Symbols	Descriptions	Value(rate)
⊙	Strong Positive	9
○	Positive	3
△	Weak	1
▬	Not related	0

Table 4.16.symbols of relationship matrix

Step 4 Relationship matrix ⊙

Relationship matrix deals in describing the relationship among customer requirements and technical requirements for the service. The proposed technical characteristics were designed and thoroughly discussed with the related parties of the case company selecting the best alternative for better delivery of service. While constructing HOQ there exists absolute and relative values. Absolute values refers to the sum of weights of relationships indicating the degree at which customer's requirement and technical requirements met. The total score of technical features and customers demand are represented by relative values.

The developed relationship matrix shown on the below table consists of 11 very related, 5 related, 3 weak and 21 not related relations. Among the 40 customer requirements and technical characteristics. Categorizing them under their weights of relation.

1. **Strong Positive relationships**

From the described customers' requirements **"Late arrival of buses on scheduled time"** relation was much related to the technical requirements ***Regular Automated Vehicle Fleet management and schedule optimization, GPS Tracking and Real-Time Monitoring, Implement an integrated passenger information system, Employee recognition or appreciation***

initiatives and ***Proximity-based workplace relocation.*** The second closer relation exists between **"Lack of cleanness and attractive feature of buses"** and ***Regular Maintenance and Cleaning Services.*** Third most related" **Not giving tickets according to queue"** and **Automated Ticketing System.** Fourth attribute "**Lack of displaying destination and arrival places on buses"** with ***Regular Maintenance and Cleaning Services*** and ***Regular driver training and technology education.*** The last customer requirements" **Lack of Incorrect displaying its current pathway"** accommodates very related relationships with **Regular Maintenance and Cleaning Services** and **Regular driver training and technology education.**

2. **Positive relationships** △

In the study **positive relation observed "Late arrival of buses on scheduled time"** and ***Regular Maintenance and Cleaning Services.*** **Not giving tickets according to queue** and ***Implement an integrated passenger information system*** and ***Employee recognition or appreciation initiatives*****. Lack of displaying destination and arrival places on buses** and ***Implement an integrated passenger information system*****. Lack of Incorrect displaying its current pathway** and ***Implement an integrated passenger information system.***

3. **Weak relationships** ◯

Weak relationship appears in between **"Late arrival of buses on scheduled time "**and ***Automated Ticketing System.*** "**Lack of cleanness and attractive feature of buses**" with ***Automated Ticketing System*** and ***Employee recognition or appreciation initiatives*** possess weak relations.

4. **No Relationships** (----)

From the findings there exist no relation with that of "Late arrival of buses on scheduled time" to ***Regular driver training and technology education*****.** "Lack of cleanness and attractive feature of buses" with ***Regular Automated Vehicle Fleet management and schedule optimization, GPS Tracking and Real-Time Monitoring, Implement an integrated passenger information system, Regular driver training and technology education*** *and* ***Proximity-based workplace relocation.*** "Not giving tickets according to queue" and ***Regular Automated Vehicle Fleet management and schedule optimization, GPS Tracking and Real-Time Monitoring, Regular Maintenance and Cleaning Services, Implement an integrated***

passenger information system, Proximity-based workplace relocation. "Lack of displaying destination and arrival places on buses" ***Regular Automated Vehicle Fleet management and schedule optimization, GPS Tracking and Real-Time Monitoring, Automated Ticketing System, Implement an integrated passenger information system, Employee recognition or appreciation initiatives, Proximity-based workplace relocation.***

Weight	Technical requirements (How's) / Customers Demand (What's)	Regular Automated Vehicle Fleet management and schedule optimization	GPS Tracking and Real-Time Monitoring	Regular Maintenance and Cleaning Services	Automated Ticketing System	Implement an integrated passenger information system	Regular driver training and technology education	Employee recognition or appreciation initiatives	Proximity-based workplace relocation
5	Late arrival of buses on scheduled time	⊙	⊙	○	△	⊙	—	⊙	⊙
4	Lack of cleanness and attractive feature of buses	—	—	⊙	△	—	—	△	—
4	Not giving tickets according to queue	—	—	—	⊙	—	○	○	—
3	Lack of displaying destination and arrival places on buses	—	—	⊙	—	○	⊙	—	—
3	Lack of Incorrect displaying its current pathway	—	—	⊙	—	○	⊙	—	—
Absolute value		9	9	**30**	11	15	21	13	9
Relative value		45	45	**105**	45	63	66	61	45

Table 4.17.Developed Relationship matrix

Correlation test

This study uses correlation test with in the service quality dimensions and customer's satisfaction and loyalty for determining the impact in which they will impose on each other through their relationships. The test mainly uses SPSS version 27 software for analyzing using spear's man correlation .Spearman's correlation test was selected based on the distribution of the data other than other test available. The test were made in two classifications. Primarily with in overall service along with customer satisfaction & loyalty. Secondly between the service quality dimensions (tangibility, reliability, responsiveness, assurance and empathy).

Overall service and customer satisfaction &loyalty

The relationship between overall service and customer satisfaction &loyalty

Correlations

		Overall service	CL2	CL1
Overall service	Pearson Correlation	1	-.216*	-.217*
	Sig. (2-tailed)		.027	.027
	N	104	104	104
CL2	Pearson Correlation	-.216*	1	.694**
	Sig. (2-tailed)	.027		.000
	N	104	104	104
CL1	Pearson Correlation	-.217*	.694**	1
	Sig. (2-tailed)	.027	.000	
	N	104	104	104

Table 4.18.Correlation Matrix Customer Satisfaction & Loyalty

Service quality dimension and customer satisfaction &loyalty

The dimensions of service quality have been assessed in relation to customers' satisfaction &loyalty through spearman's correlation. The tangibility dimension have been assessed where the correlation coefficient was found to be **0.424**** with significance **.000**. Based on the interpretation of spearman's correlation the range tends to be between -1 and +1.As the coefficient of 0.424** and the significant p-value of .000, we can conclude that there is a

statistically significant and moderate positive relationship between the variables. This means that as one variable increases, the other variable tends to increase as well, and this relationship is unlikely to be due to random chance.

This can be interpreted as the correlation coefficient explains there appears to be moderate to strong positive relationship. This means that as the total tangibility score increases, the combined CL1 and CL2 scores tend to increase as well. The strong positive correlation between Tt and CLT implies that the perceived tangibility of the service (represented by Tt) is closely related to the combined scores of CL1 and CL2, which likely represent specific aspects of customer loyalty.

Service Quality Dimensions	**Customers Satisfaction &Loyalty**	
	Correlation Coefficient	**Sig .(2-tailed)**
Tangibility	.424**	.000
Reliability	.435**	.000
Responsiveness	-.098	0.321
Assurance	0.339**	.000
Empathy	0.318	.000

Table 4.19.Correlation Coefficient of Service Quality Dimensions

RLt (Reliability Loyalty Total) and CLT (Customer Loyalty Total) both exhibit significant positive correlations with each other. The correlation coefficient of .435** between RLt and CLT indicates a moderate positive relationship, while the correlation coefficient of .644** between CLT and RLt indicates a strong positive relationship. These findings suggest that there is a connection between customer loyalty and the reliability dimension of loyalty. As the combined scores of RL1, RL2, RL3, and RL4 (representing reliability loyalty) increase, the combined scores of CL1 and CL2 (representing customer loyalty) also tend to increase. The strength of the correlation coefficient suggests that customer loyalty (CLT) has a stronger association with reliability loyalty (RLt) than the individual components of RLt (RL1, RL2, RL3, and RL4) have among themselves. This indicates that customer loyalty plays a more influential role in predicting overall reliability loyalty. The significant

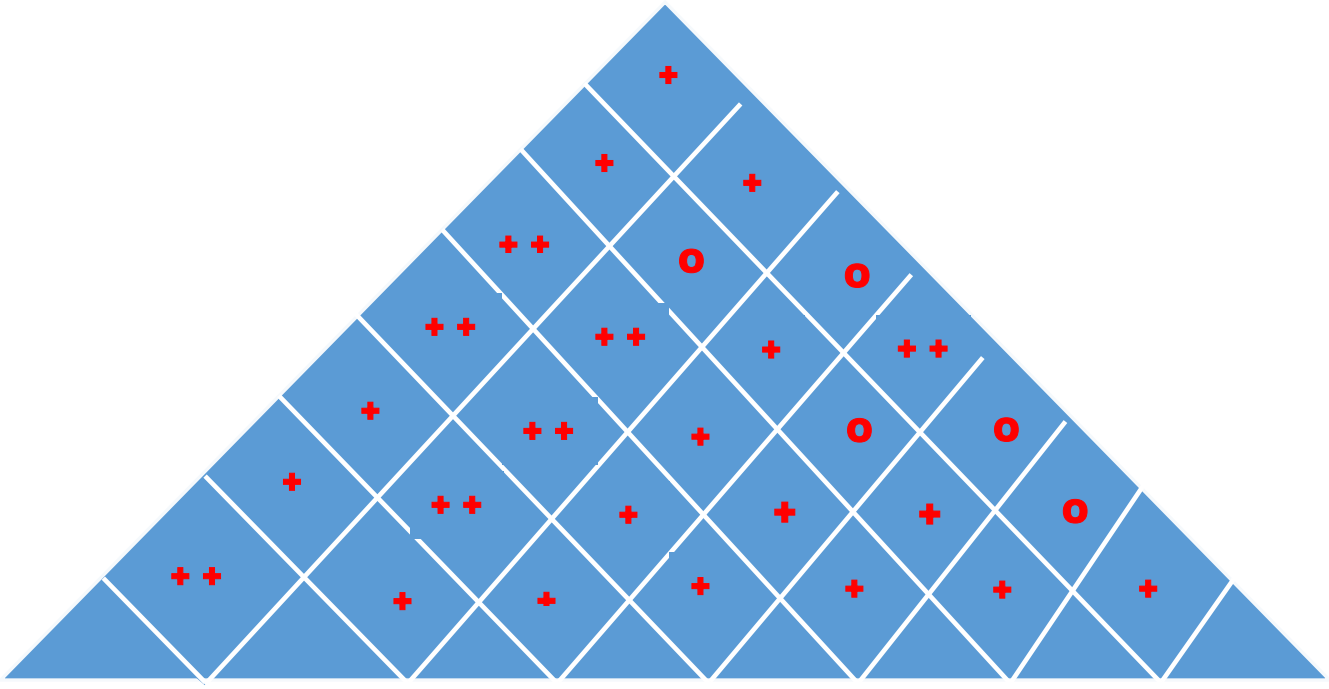
correlation coefficients ($p < 0.01$) indicate that these relationships between RLt and CLT are unlikely to occur by chance, further supporting the notion that there is a meaningful association between customer loyalty and reliability loyalty.

The correlation coefficient of -.098 between RSt and CLT suggests a weak negative relationship between responsiveness and customer loyalty. However, this correlation is not statistically significant with a p-value of .321, indicating that the relationship may be due to chance. In other words, based on the data analyzed, there is no significant evidence to suggest a strong or meaningful association between responsiveness (RSt) and customer loyalty (CLT). The weak negative correlation coefficient implies that as the combined scores of responsiveness (RS1, RS2, and RS3) slightly decrease, the combined scores of customer loyalty (CL1 and CL2) may also decrease slightly. However, this relationship is not strong enough to draw any definitive conclusions. It's important to note that correlation does not imply causation, and there may be other factors influencing customer loyalty that are not captured in this analysis. Further investigation or analysis may be required to better understand the relationship between responsiveness and customer loyalty.

The correlation analysis between CLT (Customer Loyalty Total) and At (Assurance Total) reveals the following:. Correlation Coefficient: The correlation coefficient between CLT and At is 0.339. This value indicates a moderate positive correlation between the two variables.2. Significance Level: The significance level (p-value) for the correlation between CLT and At is 0.000. This value suggests that the observed correlation is statistically significant at a high level of confidence ($p < 0.01$).Interpretation: The results indicate that there is a statistically significant positive relationship between customer loyalty and assurance. A correlation coefficient of 0.339 suggests a moderate positive association, indicating that as assurance levels increase, customer loyalty tends to increase as well. This finding suggests that providing a sense of assurance to customers can positively impact their loyalty. However, it's important to note that correlation does not imply causation, and there may be other factors influencing the relationship between customer loyalty and assurance

The correlation analysis between CLT (Customer Loyalty Total) and Et (Empathy Total) reveals the following: Correlation Coefficient: The correlation coefficient between CLT and Et is 0.318. This value indicates a moderate positive correlation between the two variables...

Significance Level: The significance level (p-value) for the correlation between CLT and Et is 0.000. This value suggests that the observed correlation is statistically significant at a high level of confidence ($p < 0.01$).Interpretation: The results indicate that there is a statistically significant positive relationship between customer loyalty and empathy. A correlation coefficient of 0.318 suggests a moderate positive association, indicating that as empathy levels increase, customer loyalty tends to increase as well. This finding implies that empathetic customer service or interactions have the potential to positively impact customer loyalty. Consequently, it's important to note that correlation does not imply causation, and there may be other factors influencing the relationship between customer loyalty and empathy.



Regular Automated Vehicle Fleet management and schedule optimization	GPS Tracking and Real-Time Monitoring	Regular Maintenance and Cleaning Services	Automated Ticketing System	Implement an integrated passenger information system	Regular driver training and technology education	Employee recognition or appreciation initiatives	Proximity-based workplace relocation

Diagram 4.1.Correlation matrix of HOQ

CHAPTER FIVE

5. Conclusion and Recommendations

The study assessed AACBSE's service quality perceived by its customers using the five dimensions that are tangibility, reliability, responsiveness, assurance, and empathy. The results revealed that the consistently low ratings and underscore of the dimensions are as a result of widespread sentiment of dissatisfaction among respondents. Specifically, the reliability dimension having total mean score of 1.66 is the lowest showing customers had strongly disagreeing opinion on the reliability and revealing their disagreement on the assurance dimension with the service they perceived with a mean score of 2.44 which is the highest among the others. Both the results shows that reliability is the severe dimension that puts high impact on the satisfaction and loyalty, tangibility, empathy ,responsiveness and assurance dimension arranged in descending order.

The Kano model as well shows the Must be categories that need to be fulfilled and improved are K4,K5,K6,K7 and K15 in which they are used as an input when constructing the HOQ for enhancement of the service. In addition this category was also applied for evaluating the internal customers that are the employee of the case company and identified. From the survey K1, K3, K5, K7, K8 and K9 were found out to be Must be urging an improvement, K4 and K6 being attractive features along with K2 being one dimensional attribute. The relationship matrix constructed based on the Kano evaluation table outcomes where constitutes 11 very related, 5 related, 3 weak and 21 not related relationships depending on their weights and intimacy. Taking the correlations test the HOQ was constructed possessing 7 strong relationships, 16 moderate relationships and 5 weak relationships among the proposed solutions being provided.

In general findings highlight critical areas requiring immediate attention, such as the maintenance and modernization of bus equipment, the punctuality and reliability of services, and the professional appearance and behavior of employees. Additionally, the need for improved responsiveness and personalized customer care is evident. Addressing these issues could significantly enhance customer satisfaction and loyalty. The results emphasize the need for AACBSE to undertake comprehensive service improvements to meet and exceed customer expectations, thereby improving overall service quality and customer satisfaction.Taking both

the servperf analysis of the internal and external customers the recommendation that the case company should follow are discussed below regarding the major short comings related to Late arrival of buses on scheduled time, Lack of displaying destination and arrival places on buses, Incorrect displaying its current pathway, Lack of cleanness and attractive feature of buses and giving tickets related issues can overcome through the listed solutions.

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APPENDIX

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
T1	104	1	5	3.61	1.332	-.370	.237	-1.304	.469
T2	104	1	5	3.38	.998	-.481	.237	-.321	.469
T3	104	1	5	3.55	1.181	-.567	.237	-.650	.469
T4.	104	1	5	3.41	1.111	-.275	.237	-1.129	.469
T5.	104	1	5	3.88	1.030	-.885	.237	.122	.469
T6	104	2	5	3.80	.840	-.501	.237	-.146	.469
RL1	104	1	5	3.84	.956	-.886	.237	.534	.469
RL2	104	2	5	3.93	.958	-.877	.237	-.017	.469
RL3	104	1	5	3.45	1.060	-.545	.237	-.341	.469
RL4	104	1	5	3.23	1.054	.131	.237	-.916	.469
RS1	104	1	5	3.03	1.311	.051	.237	-1.308	.469
RS2	104	1	5	2.69	.976	.656	.237	-.560	.469
RS3	104	1	5	2.91	.936	.537	.237	-.268	.469
A1	104	1	5	2.24	.876	.834	.237	.950	.469
A2	104	1	5	2.49	.985	1.052	.237	.092	.469
A3	104	1	5	2.38	.928	.717	.237	-.168	.469
A4	104	1	5	3.13	1.124	-.145	.237	-.787	.469
A5	104	1	5	2.60	.971	.762	.237	-.190	.469
E1	104	1	4	2.36	.891	.489	.237	-.458	.469
E2	104	2	5	3.48	.924	-.206	.237	-.831	.469
E3	104	2	5	3.43	.879	-.097	.237	-.715	.469
E4	104	2	5	3.47	.723	-.368	.237	-.287	.469
E5	104	1	5	3.52	.847	-.647	.237	.451	.469
Valid N (listwise)	104								

Tangibility Dimension

Statistics

		T1	T2	T3	T4	T5	T6
N	Valid	104	104	104	104	104	104
	Missing	0	0	0	0	0	0
Mean		1.72	**1.99**	1.69	1.73	**1.60**	1.77
Std. Error of Mean		**.069**	.062	.067	.058	**.054**	.061
Median		2.00	2.00	2.00	2.00	2.00	2.00
Mode		2	2	2	2	2	2
Std. Deviation		**.703**	.631	.684	.595	**.549**	.627
Variance		**.494**	.398	.468	.354	**.301**	.393
Skewness		.451	.007	1.037	.446	.147	.454
Std. Error of Skewness		.237	.237	.237	.237	.237	.237
Range		2	2	3	3	2	3
Sum		179	207	176	180	166	184

Reliability Dimension

Statistics

		RL1	RL2	RL3	RL4
N	Valid	104	104	104	104
	Missing	0	0	0	0
Mean		**1.73**	**1.57**	1.71	1.64
Median		2.00	1.00	1.00	1.00
Mode		2	1	1	1
Std. Deviation		**.672**	**.512**	.962	.787
Variance		**.451**	**1.025**	.926	.620
Range		2	4	3	2
Sum		180	163	178	171

Responsiveness Dimension

Statistics

		RS1	RS2	RS3
N	Valid	104	104	104
	Missing	0	0	0
Mean		**2.28**	**1.92**	2.09
Median		2.00	2.00	2.00
Mode		2	2	2
Std. Deviation		**1.242**	**.900**	.946
Variance		**1.543**	**.810**	.895
Range		4	3	4
Sum		237	200	217

Assurance Dimension

Statistics

		A1	A2	A3	A4	A5
N	Valid	104	104	104	104	104
	Missing	0	0	0	0	0
Mean		**2.18**	2.45	2.28	**2.81**	2.51
Median		2.00	2.00	2.00	3.00	2.00
Mode		2	2	2	4	2
Std. Deviation		**.890**	1.004	.908	**1.215**	1.005
Variance		**.792**	1.007	.824	**1.477**	1.010
Range		4	4	3	4	4

Empathy Dimension

Statistics

		E1	E2	E3	E4	E5
N	Valid	104	104	104	104	104
	Missing	0	0	0	0	0
Mean		**2.58**	1.78	1.63	**1.63**	1.72
Median		2.00	2.00	1.00	1.00	1.00
Mode		2	2	1	1	1
Std. Deviation		**1.068**	.788	**.764**	.791	.939
Variance		**1.140**	.621	**.584**	.625	.883
Range		3	4	3	3	4
Sum		268	185	170	169	179

Validity Test of Service Dimensions

1. Tangibility Dimension

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.858	.854	6

Item Statistics

	Mean	Std. Deviation	N
1. AACBSE holds up-to date equipment's.	3.05	.999	20
2. AACBSE provides aesthetic and attractive features with in the buses.	2.30	1.261	20
3. The displays showing the destination places are clearly seen and working.	2.60	1.095	20
4.The buses internal parts is clean	1.90	1.071	20
5. Their employees appear in neat and a well-dressed fashion.	2.40	.821	20
6. The accessories like TV, Radios and charging boards are working properly.	1.85	.671	20

Reliability **Dimension**

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.726	.718	4

Item Statistics			
	Mean	Std. Deviation	N
7. Information regarding the bus arrival and departure is available to the passengers.	1.85	.745	20
8. The drivers and coordinators give the service right on the scheduled time.	2.40	1.188	20
9. The buses arrive exactly in their early beginning schedule in the morning.	3.30	.733	20
10.The buses give service exactly until the services ends in late hours at night	2.65	.988	20

Responsiveness Dimension

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.839	.847	3

Item Statistics			
	Mean	Std. Deviation	N
11. Drivers are willing to provide fast and safe transport service.	3.35	.933	20
12. The driver /coordinators inform passengers and take immediate solutions if	2.95	.826	20

there appears any accidental conditions.			
13. The drivers /coordinators resolve problems directly and immediately within short period of time also without affecting the majority users.	2.30	1.031	20

Assurance Dimension

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.714	.722	5

Item Statistics			
	Mean	Std. Deviation	N
4.1. The drivers and ticket person are knowledgeable about the places along the trip	4.05	.759	20
4.2. The seats are comfortable and safe throughout the journey.	2.95	1.276	20
4.3. Passengers feel safe and confident with the driving skill of the driver.	4.05	.686	20
4.5. The driver's ticket person and coordinators behavior assure the customers having safe trip.	2.95	.999	20
4.6. AACBSE delivers the service at the right origination place, station or terminal.	3.55	1.276	20

Empathy Dimension

Reliability Statistics		
Cronbach's	Cronbach's	N of Items

Alpha	Alpha Based on Standardized Items	
.753	.767	5

Item Statistics			
	Mean	Std. Deviation	N
4.1. The drivers give first for those who are in need of help or aid.	3.70	1.031	20
4.2. Drivers load and unload passengers at places safe and comfortable for the passengers.	3.40	1.046	20
4.3. The driver's ticket person and coordinators apologize if they made any mistake.	2.55	.826	20
4.4. The driver, ticket person and coordinators have courage to understand customer's need and specific requirements.	3.00	.795	20

Tangibility Correlations

Correlations									
			CL2	CL1	T1	T2	T3	T4.	T5.	T6
Spearman's rho	CL2	Correlation Coefficient	1.000	.644**	.11	.32	.14	.27	.173	.239*
		Sig. (2-tailed)	.	.000	.234	.001	.147	.005	.079	.014
	CL1	Correlation Coefficient	.644**	1.000	-.038	.309**	.133	.343**	.338**	.122
		Sig. (2-tailed)	.000	.	.701	.001	.179	.000	.000	.217
	T1	Correlation Coefficient	.118	-.038	1.000	-.095	-.064	.068	.027	-.015
		Sig. (2-tailed)	.234	.701	.	.337	.516	.490	.782	.884
	T2	Correlation Coefficient	.326**	.309**	-.095	1.000	.445**	.471**	.349**	.360**
		Sig. (2-tailed)	.001	.001	.337	.	.000	.000	.000	.000
	T3	Correlation	.143	.133	-.064	.445**	1.000	.677**	.498**	.436**

		Coefficient								
		Sig. (2-tailed)	.147	.179	.516	.000	.	.000	.000	.000
	T4.	Correlation Coefficient	.271**	.343**	.068	.471**	.677**	1.000	.576**	.484**
		Sig. (2-tailed)	.005	.000	.490	.000	.000	.	.000	.000
	T5.	Correlation Coefficient	.173	.338**	.027	.349**	.498**	.576**	1.000	.441**
		Sig. (2-tailed)	.079	.000	.782	.000	.000	.000	.	.000
	T6	Correlation Coefficient	.239*	.122	-.015	.360**	.436**	.484**	.441**	1.000
		Sig. (2-tailed)	.014	.217	.884	.000	.000	.000	.000	.
**. Correlation is significant at the 0.01 level (2-tailed).										
*. Correlation is significant at the 0.05 level (2-tailed).										

Reliability Correlations

Correlations

			CL2	CL1	RL1	RL2	RL3	RL4
Spearman's rho	CL2	Correlation Coefficient	1.000	.644**	.351**	.049	.179	.173
		Sig. (2-tailed)	.	.000	.000	.621	.069	.079
	CL1	Correlation Coefficient	.644**	1.000	.213*	.021	.201*	.228*
		Sig. (2-tailed)	.000	.	.030	.832	.040	.020
	RL1	Correlation Coefficient	.351**	.213*	1.000	.158	.435**	.180
		Sig. (2-tailed)	.000	.030	.	.110	.000	.068
	RL2	Correlation Coefficient	.049	.021	.158	1.000	.370**	-.175
		Sig. (2-tailed)	.621	.832	.110	.	.000	.076
	RL3	Correlation Coefficient	.179	.201*	.435**	.370**	1.000	.334**
		Sig. (2-tailed)	.069	.040	.000	.000	.	.001
	RL4	Correlation Coefficient	.173	.228*	.180	-.175	.334**	1.000
		Sig. (2-tailed)	.079	.020	.068	.076	.001	.
**. Correlation is significant at the 0.01 level (2-tailed).								
*. Correlation is significant at the 0.05 level (2-tailed).								

Responsiveness Correlations

Correlations							
			CL2	CL1	RS1	RS2	RS3
Spearman's rho	CL2	Correlation Coefficient	1.000	.644**	-.098	.111	-.122
		Sig. (2-tailed)	.	.000	.321	.261	.218
	CL1	Correlation Coefficient	.644**	1.000	-.076	.125	.061
		Sig. (2-tailed)	.000	.	.442	.208	.538
	RS1	Correlation Coefficient	-.098	-.076	1.000	-.094	.082
		Sig. (2-tailed)	.321	.442	.	.345	.406
	RS2	Correlation Coefficient	.111	.125	-.094	1.000	.305**
		Sig. (2-tailed)	.261	.208	.345	.	.002
	RS3	Correlation Coefficient	-.122	.061	.082	.305**	1.000
		Sig. (2-tailed)	.218	.538	.406	.002	.

**. Correlation is significant at the 0.01 level (2-tailed).

Assurance Correlations

Correlations									
			CL2	CL1	A1	A2	A3	A4	A5
Spearman's rho	CL2	Correlation Coefficient	1.000	.644**	-.109	-.072	.092	.021	-.063
		Sig. (2-tailed)	.	.000	.272	.465	.351	.834	.527
	CL1	Correlation Coefficient	.644**	1.000	.025	-.030	.181	.115	.124
		Sig. (2-tailed)	.000	.	.802	.760	.066	.244	.209
	A1	Correlation Coefficient	-.109	.025	1.000	.262**	.339**	.023	.544**
		Sig. (2-tailed)	.272	.802	.	.007	.000	.820	.000
	A2	Correlation Coefficient	-.072	-.030	.262**	1.000	.059	.148	.231*
		Sig. (2-tailed)	.465	.760	.007	.	.554	.133	.019
	A3	Correlation Coefficient	.092	.181	.339**	.059	1.000	.236*	.380**

		Sig. (2-tailed)	.351	.066	.000	.554	.	.016	.000
	A4	Correlation Coefficient	.021	.115	.023	.148	.236*	1.000	.190
		Sig. (2-tailed)	.834	.244	.820	.133	.016	.	.054
	A5	Correlation Coefficient	-.063	.124	.544**	.231*	.380**	.190	1.000
		Sig. (2-tailed)	.527	.209	.000	.019	.000	.054	.
**. Correlation is significant at the 0.01 level (2-tailed).									
*. Correlation is significant at the 0.05 level (2-tailed).									

Empathy Correlations

Correlations

			CL2	CL1	E1	E2	E3	E4	E5
Spearman's rho	CL2	Correlation Coefficient	1.000	.644**	-.093	-.156	.084	.029	.116
		Sig. (2-tailed)	.	.000	.350	.115	.397	.770	.240
	CL1	Correlation Coefficient	.644**	1.000	.155	-.169	.094	.141	.239*
		Sig. (2-tailed)	.000	.	.116	.086	.344	.154	.014
	E1	Correlation Coefficient	-.093	.155	1.000	.060	.090	.209*	.151
		Sig. (2-tailed)	.350	.116	.	.542	.362	.033	.127
	E2	Correlation Coefficient	-.156	-.169	.060	1.000	.354**	.451**	.371**
		Sig. (2-tailed)	.115	.086	.542	.	.000	.000	.000
	E3	Correlation Coefficient	.084	.094	.090	.354**	1.000	.495**	.291**
		Sig. (2-tailed)	.397	.344	.362	.000	.	.000	.003
	E4	Correlation Coefficient	.029	.141	.209*	.451**	.495**	1.000	.398**
		Sig. (2-tailed)	.770	.154	.033	.000	.000	.	.000
	E5	Correlation Coefficient	.116	.239*	.151	.371**	.291**	.398**	1.000
		Sig. (2-tailed)	.240	.014	.127	.000	.003	.000	.
**. Correlation is significant at the 0.01 level (2-tailed).									
*. Correlation is significant at the 0.05 level (2-tailed).									

Correlation Matrix

Correlations

		Overall service	CL2	CL1	T1	T2	T3	T4.	T5.	T6	RL1	RL2	RL3	RL4	RS1	RS2	RS3	A1	A2	A3	A4	A5	E1	E2	E3	E4	E5
Overall service	Pearson Correlation	1	-.216*	-.217*	-.042	-.076	.144	-.091	-.088	.092	.039	.098	.236*	-.106	.145	-.014	-.056	.034	-.074	-.092	-.185	-.022	-.221*	.106	.085	.237*	.149
	Sig. (2-tailed)		.027	.027	.673	.443	.145	.360	.377	.354	.694	.322	.016	.284	.143	.889	.575	.735	.455	.352	.061	.824	.024	.284	.392	.016	.130
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
CL2	Pearson Correlation	-.216*	1	.694**	.093	.302**	.106	.234*	.150	.214*	.393**	.018	.096	.144	-.115	.085	-.140	-.126	-.048	.139	.050	-.061	-.095	-.121	.103	.070	.121
	Sig. (2-tailed)	.027		<.001	.346	.002	.285	.017	.129	.029	<.001	.854	.331	.145	.246	.394	.157	.202	.632	.160	.616	.542	.338	.221	.300	.483	.220
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
CL1	Pearson Correlation	-.217*	.694**	1	-.052	.336**	.164	.362**	.320**	.176	.210*	.023	.183	.200*	-.120	.111	.034	-.013	.002	.152	.108	.073	.134	-.138	.114	.203*	.292**
	Sig. (2-tailed)	.027	<.001		.602	<.001	.095	<.001	<.001	.075	.032	.819	.062	.042	.224	.263	.728	.894	.988	.122	.277	.461	.174	.162	.249	.039	.003
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
T1	Pearson Correlation	-.042	.093	-.052	1	-.060	-.046	.072	.034	-.011	.025	-.051	.059	-.045	-.071	.115	.004	-.101	-.021	-.002	.114	-.109	-.036	-.152	-.068	-.228*	-.066
	Sig. (2-tailed)	.673	.346	.602		.545	.640	.469	.728	.911	.800	.604	.554	.649	.472	.246	.972	.307	.829	.985	.251	.269	.716	.123	.490	.020	.504
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
T2	Pearson Correlation	-.076	.302**	.336**	-.060	1	.495**	.477**	.330**	.394**	.270**	.241*	.201*	.016	-.083	.093	-.006	-.073	.132	.258**	.317**	.012	.041	.092	.384**	.110	.519**
	Sig. (2-tailed)	.443	.002	<.001	.545		<.001	<.001	<.001	<.001	.006	.014	.041	.869	.403	.349	.955	.459	.181	.008	.001	.907	.678	.351	<.001	.268	<.001
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
T3	Pearson Correlation	.144	.106	.164	-.046	.495**	1	.676**	.479**	.406**	.235*	.299**	.413**	.108	.121	.030	.201*	.106	.184	.045	.171	.144	-.039	.201*	.349**	.183	.479**
	Sig. (2-tailed)	.145	.285	.095	.640	<.001		<.001	<.001	<.001	.016	.002	<.001	.275	.220	.764	.040	.284	.062	.650	.083	.144	.691	.041	<.001	.062	<.001
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
T4.	Pearson Correlation	-.091	.234*	.362**	.072	.477**	.676**	1	.563**	.454**	.174	.154	.384**	.316**	-.015	.020	.147	.066	.168	.127	.180	.084	.007	.041	.173	-.027	.357**
	Sig. (2-tailed)	.360	.017	<.001	.469	<.001	<.001		<.001	<.001	.078	.118	<.001	.001	.880	.841	.137	.503	.089	.200	.067	.395	.945	.680	.079	.783	<.001
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
T5.	Pearson Correlation	-.088	.150	.320**	.034	.330**	.479**	.563**	1	.497**	.412**	.090	.434**	.197*	.132	.241*	.250*	.260**	.300**	.295**	.417**	.289**	.165	.054	.168	.145	.509**
	Sig. (2-tailed)	.377	.129	<.001	.728	<.001	<.001	<.001		<.001	<.001	.365	<.001	.045	.181	.014	.010	.008	.002	.002	<.001	.003	.094	.589	.089	.142	<.001
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
T6	Pearson Correlation	.092	.214*	.176	-.011	.394**	.406**	.454**	.497**	1	.490**	.345**	.343**	.152	.182	.279**	.249*	.251*	.273**	.088	.378**	.137	.136	.151	.225*	.142	.489**
	Sig. (2-tailed)	.354	.029	.075	.911	<.001	<.001	<.001	<.001		<.001	<.001	<.001	.124	.065	.004	.011	.010	.005	.374	<.001	.165	.170	.125	.022	.150	<.001
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
RL1	Pearson Correlation	.039	.393**	.210*	.025	.270**	.235*	.174	.412**	.490**	1	.189	.447**	.182	.050	.258**	.114	.186	.076	.192	.292**	.096	.149	.112	.328**	.309**	.249*
	Sig. (2-tailed)	.694	<.001	.032	.800	.006	.016	.078	<.001	<.001		.054	<.001	.064	.612	.008	.248	.058	.446	.051	.003	.335	.132	.259	<.001	.001	.011
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
RL2	Pearson Correlation	.098	.018	.023	-.051	.241*	.299**	.154	.090	.345**	.189	1	.355**	-.254**	-.145	-.054	.232*	-.212*	.303**	-.255**	-.010	-.249*	-.017	.048	.127	.046	.319**
	Sig. (2-tailed)	.322	.854	.819	.604	.014	.002	.118	.365	<.001	.054		<.001	.009	.141	.590	.018	.031	.002	.009	.923	.011	.863	.629	.198	.641	<.001
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
RL3	Pearson Correlation	.236*	.096	.183	.059	.201*	.413**	.384**	.434**	.343**	.447**	.355**	1	.323**	.228*	.229*	.284**	.143	.111	.068	.168	-.019	.147	.014	.247*	.353**	.309**
	Sig. (2-tailed)	.016	.331	.062	.554	.041	<.001	<.001	<.001	<.001	<.001	<.001		<.001	.020	.019	.003	.147	.262	.491	.087	.848	.137	.889	.012	<.001	.001
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
RL4	Pearson Correlation	-.106	.144	.200*	-.045	.016	.108	.316**	.197*	.152	.182	-.254**	.323**	1	.206*	.268**	.198*	.181	-.185	.315**	.146	.026	-.006	.094	.206*	.123	.115
	Sig. (2-tailed)	.284	.145	.042	.649	.869	.275	.001	.045	.124	.064	.009	<.001		.036	.006	.044	.066	.060	.001	.140	.797	.955	.341	.036	.212	.247
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
RS1	Pearson Correlation	.145	-.115	-.120	-.071	-.083	.121	-.015	.132	.182	.050	-.145	.228*	.206*	1	-.099	.105	.400**	-.041	.366**	.103	.162	.041	-.124	.031	.201*	.039
	Sig. (2-tailed)	.143	.246	.224	.472	.403	.220	.880	.181	.065	.612	.141	.020	.036		.316	.289	<.001	.678	<.001	.299	.101	.679	.211	.753	.041	.695
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
RS2	Pearson Correlation	-.014	.085	.111	.115	.093	.030	.020	.241*	.279**	.258**	-.054	.229*	.268**	-.099	1	.321**	-.049	.118	.196*	.383**	.001	.127	-.222*	.077	-.109	.078
	Sig. (2-tailed)	.889	.394	.263	.246	.349	.764	.841	.014	.004	.008	.590	.019	.006	.316		<.001	.622	.233	.046	<.001	.994	.199	.024	.434	.271	.433
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
RS3	Pearson Correlation	-.056	-.140	.034	.004	-.006	.201*	.147	.250*	.249*	.114	.232*	.284**	.196*	.105	.321**	1	.180	.152	.218*	.076	.226*	.270**	.172	.140	.046	.229*
	Sig. (2-tailed)	.575	.157	.728	.972	.955	.040	.137	.010	.011	.248	.018	.003	.044	.289	<.001		.068	.124	.026	.444	.020	.006	.081	.155	.640	.020
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
A1	Pearson Correlation	.034	-.126	-.013	-.101	-.073	.106	.066	.260**	.251*	.186	-.212*	.143	.181	.400**	-.049	.180	1	.143	.375**	.046	.459**	.175	.264**	.028	.218*	.157
	Sig. (2-tailed)	.735	.202	.894	.307	.459	.284	.503	.008	.010	.058	.031	.147	.066	<.001	.622	.068		.147	<.001	.645	<.001	.075	.007	.781	.026	.111
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
A2	Pearson Correlation	-.074	-.048	.002	-.021	.132	.184	.168	.300**	.273**	.076	.303**	.111	-.185	-.041	.118	.152	.143	1	.015	.185	.209*	.253**	.080	-.225*	.027	.297**
	Sig. (2-tailed)	.455	.632	.988	.829	.181	.062	.089	.002	.005	.446	.002	.262	.060	.678	.233	.124	.147		.882	.060	.033	.010	.421	.022	.787	.002
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
A3	Pearson Correlation	-.092	.139	.152	-.002	.258**	.045	.127	.295**	.088	.192	-.255**	.068	.315**	.366**	.196*	.218*	.375**	.015	1	.257**	.379**	.150	-.059	.080	.046	.188
	Sig. (2-tailed)	.352	.160	.122	.985	.008	.650	.200	.002	.374	.051	.009	.491	.001	<.001	.046	.026	<.001	.882		.008	<.001	.129	.550	.421	.646	.056
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
A4	Pearson Correlation	-.185	.050	.108	.114	.317**	.171	.180	.417**	.378**	.292**	-.010	.168	.146	.103	.383**	.076	.046	.185	.257**	1	.202*	.242*	-.110	.245*	-.067	.222*
	Sig. (2-tailed)	.061	.616	.277	.251	.001	.083	.067	<.001	<.001	.003	.923	.087	.140	.299	<.001	.444	.645	.060	.008		.040	.013	.268	.012	.500	.024
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
A5	Pearson Correlation	-.022	-.061	.073	-.109	.012	.144	.084	.289**	.137	.096	-.249*	-.019	.026	.162	.001	.228*	.458**	.209*	.379**	.202*	1	.572**	.251*	.241*	.384**	.080
	Sig. (2-tailed)	.824	.542	.461	.269	.907	.144	.395	.003	.165	.335	.011	.848	.797	.101	.994	.020	<.001	.033	<.001	.040		<.001	.010	.014	<.001	.417
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
E1	Pearson Correlation	-.221*	-.095	.134	-.036	.041	-.039	.007	.165	.136	.149	-.017	.147	-.006	.041	.127	.278**	.175	.253**	.150	.242*	.572**	1	.050	.074	.219*	.164
	Sig. (2-tailed)	.024	.338	.174	.716	.678	.691	.945	.094	.170	.132	.863	.137	.955	.679	.199	.006	.075	.010	.129	.013	<.001		.617	.454	.025	.095
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
E2	Pearson Correlation	.106	-.121	-.138	-.152	.092	.201*	.041	.054	.151	.112	.048	.014	.094	-.124	-.222*	.172	.264**	.080	-.059	-.110	.251*	.050	1	.351**	.428**	.348**
	Sig. (2-tailed)	.284	.221	.162	.123	.351	.041	.680	.589	.125	.259	.629	.889	.341	.211	.024	.081	.007	.421	.550	.268	.010	.617		<.001	<.001	<.001
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
E3	Pearson Correlation	.085	.103	.114	-.068	.384**	.349**	.173	.168	.225*	.328**	.127	.247*	.206*	.031	.077	.140	.028	-.225*	.080	.245*	.241*	.074	.351**	1	.547**	.295**
	Sig. (2-tailed)	.392	.300	.249	.490	<.001	<.001	.079	.089	.022	<.001	.198	.012	.036	.753	.434	.155	.781	.022	.421	.012	.014	.454	<.001		<.001	.002
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
E4	Pearson Correlation	.237*	.070	.203*	-.228*	.110	.183	-.027	.145	.142	.309**	.046	.353**	.123	.201*	-.109	.046	.218*	.027	.046	-.067	.384**	.219*	.428**	.547**	1	.357**
	Sig. (2-tailed)	.016	.483	.039	.020	.268	.062	.783	.142	.150	.001	.641	<.001	.212	.041	.271	.640	.026	.787	.646	.500	<.001	.025	<.001	<.001		<.001
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
E5	Pearson Correlation	.149	.121	.292**	-.066	.519**	.479**	.357**	.509**	.489**	.249*	.319**	.309**	.115	.039	.078	.229*	.157	.297**	.188	.222*	.080	.164	.348**	.295**	.357**	1
	Sig. (2-tailed)	.130	.220	.003	.504	<.001	<.001	<.001	<.001	<.001	.011	<.001	.001	.247	.695	.433	.020	.111	.002	.056	.024	.417	.095	<.001	.002	<.001	
	N	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Proposed solutions	Emphasizes on	Authors	Titles
Regular Automated Vehicle Fleet management and schedule optimization	• Using technology to monitor traffic and communicate amongst vehicles. • Allows improve car and driver allocation. • provides information on mileage, fuel consumption, driver performance, maintenance issues, and driver status • Applicable for large fleet organizations optimize fleet management. Driver and vehicle assignment.	(Aljaafreh et al., 2011)	**Vehicle data acquisition system for fleet management automation**
GPS Tracking and Real-Time Monitoring	Concludes that • Employing a real-time GPS monitoring app in case of Malaysian states enhanced all of the identified characteristics.	(Chan et al., 2020)	**Sustainability of Public Transportation: An Examination of User Behavior to Real-Time GPS Tracking Application**
Regular Maintenance and Cleaning Services	Without adequate maintenance scheduling • It is extremely impossible to ensure the requisite number of operable buses for each morning shift. • Better maintenance plan proposed was repairing taking place in the morning and afternoon • Reduces cost and save money • Foster customers happiness and retention	(Adonyi et al., 2013)	**Scheduling of bus maintenance by the P-graph methodology**
	• improve the attractiveness of buses and operate more comfortable • Aims at establishing environmentally friendly and energy-efficient vehicles • Utilized innovative solutions in the fields of energy management, design of vehicles and facilities	(Corazza et al., 2016)	**Experiences of innovation in public services for sustainable urban mobility**
Automated Ticketing System	In the study, mobile application was utilized enables • Provides passengers to observe real-time position of buses • To know the expected arrival time • current passenger count • visualization of the available seat positions within the buses prior it's arrival • Attains necessary travel data	(Weligamage et al., 2022)	**An Approach of Enhancing the Quality of Public Transportation Service in Sri Lanka using IoT**

	• Solves common difficulties public transportation and improves the service quality.		
Implement an integrated passenger information system	Proposes a modeling approach • Applied to all levels of data supply of transportation information systems. • Employed for analysis and planning • Policy assessment and decision making. • Prioritized the integration of operator's (back-end) and passenger's (front-end) sides. • Increases operational efficiency Along with customer perception of the service quality	(Csiszár & Nagy, 2017)	**Model of an integrated air passenger information system and its adaptation to Budapest Airport**
Regular driver training and technology education	• Employees not properly trained struggle performing assignments efficiently lead to negative quality perception	(Ghobadian et al., 1994)	**Service Quality: Concepts and Models**
Employee recognition or appreciation initiatives	Employee acknowledged and rewarded for enhancement of service as employees are • Internal service consumers, influences outward service quality • Provide insight to factors that impair service quality • Exposed to the company's service delivery system on a daily basis.	(Berry et al., 1994)	**Improving service quality in America: Lessons learned**
Proximity-based workplace relocation	Flexible Work Arrangement (FWA) • Attains beneficial influence on employee engagement • Including favorable recruiting increasing engagement • Puts negative impact with turnover intentions implying workers being less eager to quit the firm	(Kant et al., 2021)	**Flexible Work Arrangements and Work-Life Balance**
	• Physical health, absenteeism, somatic complaints, and physical exercise were affected positively with FWA • There appears significant associations between FWA policies and improved physical health, lower absenteeism, and fewer somatic symptoms.	(Shifrin & Michel, 2022)	**Flexible Work Arrangements and Employee Health: A Meta-Analytic Review**

Questionnaire

Dear Respondents, I am a MSC student at AAiT conducting a study for my master's degree thesis on industrial engineering titled "***Improving and Optimizing Service Quality in Transport Service: Case of Anbessa City Bus Service Enterprise (AACBSC)".*** Your answers are so much helpful to complete this survey on time, so I kindly request you to complete and return these questionnaire.

Thanks for your participation, if you have any questions regarding this study, you're warmly welcomed.

Kalkidan Bekele,

E-mail: kalabrham21@gmail.com
Mobile phone: +251942406535

Dear respondents, the questions will be answered by giving (√) symbols for each statements.

SECTION –I, Demographic Information

Please provide me with some information about yourself. Please make "√"

1. Among which age brackets do you belong?

☐ Below20 years ☐ 20-25 years ☐ 26-30 year's ☐ 31-35 years ☐ 36-40 years

☐ 41and above

2. Sex ☐ Male ☐Female

3. Level of formal education?

☐Primary school ☐ secondary school ☐ TVET ☐ Diploma ☐BA/BSC/ LLB

☐ Master's ☐PhD others----------

4. What is your occupation?

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5. What is your marital status? ☐ Married ☐single ☐divorced ☐ widowed

SECTION II

QUESTIONS RELATED TO THE PURPOSE OF USING ANBESSA CITY BUS TRANSPORT

1. For how long have you been a customer of Anbessa city bus transport?

☐Less than one year ☐ 1-2 year's ☐ 3 years

2. For what purpose do you use the bus transport?

☐To go to School ☐ to go to Work and back to home ☐ to go to other places

3. Based on the type of distance, which type of service do you use Anbessa city bus transport?

☐Short distance ☐Medium distance ☐ Long distance

4. Why do you choose to use Anbessa city bus transport?

☐It is easily available ☐ it provides fast transport service ☐it is cheap ☐It is comfortable

☐other reasons, if any ----------

5. How is your trip frequency?

☐Always ☐ often ☐ sometimes

6. How frequent the buses arrive?

☐less than 5 min ☐5- 15 min ☐15-30min

☐30min -1hr ☐Above 1hr

7. Does the bus arrives based on schedule?

☐Yes ☐No

8. How do you rate the standards of service provided by Anbessa city bus transport?

☐ Improved ☐ little Declined ☐moderate ☐did not changed ☐Cannot rate

SECTION III: QUESTIONNAIRES FOR USERS OR PASSENGERS ON THE EXPECTATION OF PASSENGERS

Listed below are descriptive statements about the expectations of service experienced in Anbessa bus transport, for each statement please indicates to which degree you display the behavior described according. Please make a √"in the box.

Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.Tangibility	1	2	3	4	5
1.1 how much do you agree if the time schedule and route of the bus are being clear, knowable and unambiguous					
1.2 How much do you agree Anbessa bus transport should have modern way of tracking time schedule and route of buses?					
1.3 do you agree that Anbessa bus should shift to a modern means ticketing.					
1.4. How much do you agree and consider on the cleanness of internal parts of buses?					
1.5. Shall the employees wear a uniform& neat clothes in a well-dressed					

fashion?					
2.Reliability	1	2	3	4	5
2.1. How much do you agree on the availability of Information should be regarding the bus arrival and departure time to the passengers.					
2.2. How much do you agree the drivers and coordinators giving the service right on the scheduled time?					
2.3. how much do you agree drivers and coordinators should acknowledge interest of passengers					
2.4. What is your rate of agreement on ticket giving person being honest returning repayment of debt?					
2.5. How much do you agree the ticketing starting according to the lines of queening?					
3.Responsiveness	1	2	3	4	5
3.1. How much do you agree on the drivers being willing to provide fast and safe transport service.					
3.2. how much do you agree on the way drivers and ticket					

person must answer towards customers questions in sincere and open minded way					
3.3. How much do you agree on the drivers giving first for pregnant women's and peoples with disability must be.					
3.4. Do you agree that the driver /coordinators must inform passengers if there appears any accidental conditions?					
3.5. How do you rate you agreement towards the drivers /coordinators resolving problems with customers independently without affecting the majority users?					
4.Assurance	1	2	3	4	5
4.1. Do you agree that the drivers and ticket person should be knowledgeable about the places along the trip?					
4.2.How much do you agree on the seats being comfortability & safe					
4.3. How much do you agree					

Passengers feeling safe with the driving skill of the driver?					
4.4 At what rate do you agree the driver, ticket person and coordinator should assure the health and safety of the passengers by controlling and not letting person's drunk, smoking, chewing chat and others					
4.5. Do you think driver's ticket person and coordinators behavior must assure the customers having safe trip.					
5.Empathy	1	2	3	4	5
5.1. Do you agree that the Bus routes must be designed with convenient bus stop stations?					
5.2. How much do you agree drivers should load and unload passengers at the right bus stations?					
5.3. How much do you agree on the driver's, ticket person and coordinators apologizing if they made any mistake?					
5.4. How do you agree the driver, ticket person and					

coordinators showing courage to understand customer's need and specific requirements?					
5.2. How much do you agree the driver's, ticket person and coordinators must reply questions in a courteous and polite way?					

SECTION IV: QUESTIONNAIRES FOR USERS OR PASSENGERS ON THE PERCEPTION OF USERS OR PASSENGERS

Listed below are descriptive statements about serve quall dimensions on the perceptions of service experienced in Anbessa city bus transport, for each statement please indicates to which degree you display the behavior described according. Please make a √"in the box

Statements	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
1.Tangibility	1	2	3	4	5
1.1 The time schedule and route of the bus is clear, knowable and unambiguous					
1.2 Anbessa bus transport have modern way of tracking time schedule and route of buses.					
1.3 Anbessa follows a better means ticketing and inspection equipment's.					
1.4.The buses internal parts					

is clean					
1.5. Their employees appear in neat and a well-dressed fashion.					
2.Reliability	1	2	3	4	5
2.1. Information regarding the bus arrival and departure is available to the passengers.					
2.2. The drivers and coordinators give the service right on the scheduled time.					
2.3. The drivers and coordinators acknowledge interest of passengers					
2.4. The ticket giving person he/she is honest in returning repayment of debt.					
2.5. The ticketing start according to the lines of queening.					
3.Responsiveness	1	2	3	4	5
3.1. Drivers are willing to provide fast and safe transport service.					
3.2. The drivers and ticket person are sincere and open minded in answering customers questions.					
3.3. The drivers give first for					

pregnant women's and peoples with disability.					
3.4. The driver /coordinators inform passengers if there appears any accidental conditions.					
3.5The drivers /coordinators resolve problems with customers independently without affecting the majority users.					
4.Assurance	1	2	3	4	5
4.1. The drivers and ticket person are knowledgeable about the places along the trip					
4.2. The seats are comfortable and safe throughout the journey.					
4.3. Passengers feel safe with the driving skill of the driver.					
4.4 The driver, ticket person and coordinator assure the health and safety of the passengers by controlling and not letting person's drunk, smoking, chewing chat and others.					
4.5. The driver's ticket person and coordinators					

behavior assure the customers having safe trip.					
5.Empathy	1	2	3	4	5
5.1. The Bus routes are designed with convenient bus stop stations.					
5.2. Drivers load and unload passengers at the right bus stations.					
5.3. The driver's ticket person and coordinators apologize if they made any mistake.					
5.4. The driver, ticket person and coordinators have courage to understand customer's need and specific requirements.					
5.2. The driver's ticket person and coordinators reply questions in a courteous and polite way.					

SECTION V: Kano Model Questionnaires

K1	How do you feel toward if AACBSE uses modern ticketing system using mobile phones?
K2	How do you get if AACBSE develops tracking system of buses?
K3	How would you feel if AACBSE installs screens on station and terminals to show the arrival and departure time of buses?
K4	How do you feel if the buses arrive on the scheduled time?
K5	How do you feel if the destination and arrival places are displayed on the buses?
K6	How would you take if the buses correctly displays its current pathway?
K7	How do you feel if the buses are clean and attractive?
K8	How do you feel if the accessories like TV and radio are being displayed during the trip?
K9	How do you feel if the air conditioning is working inside the buses for cooling purpose?
K10	How do you feel if the ticket shows the correctly paid amount?
K11	How do you feel if the ticket person and the drivers serve you with neat and attractive cloth?
K12	How would you feel if the AACBSE employees (Drivers/ticketing persons) treats you in a polite way while delivering the service?
K13	How would you feel if the ticket person is able to give you change immediately?
K14	How do you feel if the bus stops at each and every station?
K15	How do you feel if the ticketing starts according with the line of queueing?
K16	How do you feel if the drivers load passengers beyond the optimum capacity?

Questionnaire for internal employees and top management

1. How would you rate the overall service quality from 1 to 5, provided by your transport company?

2. What specific aspects of your service do you think contribute to a positive customer experience?

3. Can you identify any areas where your service quality might be lacking or needs improvement?

4 What do your company's customers often complain about?

5. Are there any challenges or obstacles you frequently encounter while delivering high-quality service?

6. What difficulties (challenges) does your company face in providing quality service to its customers?

7. How would you describe the level of teamwork and collaboration among employees in maintaining service quality?

8. Have you received adequate training and support to ensure that you can deliver service excellence consistently?

9. Are there any specific suggestions or ideas you would like to propose to enhance service quality?

10. How well do you think our company addresses customer complaints or feedback related to service quality?

11Are there any specific customer service or communication skills you believe are crucial for delivering exceptional service in the transport industry?

12. In your opinion, what differentiates your transport service from competitors in terms of service quality?

13. Can it be said that AACBSE satisfied customers with the current services being provided?

14. What do you think are the sources of low customer satisfaction?

15. What do you think should be done to update and improve the service?

16. Does your company ask customers feeling about your company performance?

17. Does your company charitable to implement and adopt the result of this study?

Kano – type Questionnaies

	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	How do you feel? If AACBSE prepares technical upgrade training regarding the new technologies.					
2	If AACBSE does not prepare technical upgrade training regarding the new technologies, how would you feel?					
3	How do you feel? If AACBSE arranges skill gap training for employees?					
4	How would you feel if AACBSE did not arrange skill-gap training for employees?					
5	How do you feel? If AACBSE fulfills professional uniform dressing,					
6	B How would you feel if AACBSE does not fulfill professional uniform dressing?					
7	How do you feel? If AACBSE begins to offer incentives.					
8	How would you feel If AACBSE does not offer incentives?					
9	How would you feel if AACBSE provided you with customer service training?					
10	How would you feel if AACBSE did not provide you with customer service training?					