ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTEMENT OF MANGEMENT, MSc

FARE COLLECTION MANAGEMENT IN GOVERNMENT OWNED PUBLIC BUS TRANSPORT OF ADDIS ABABA

BY

ERMIAS BELACHEW WUBISHET

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FARE COLLECTION MANAGEMENT IN GOVERNMENT OWNED PUBLIC BUS TRANSPORT OF ADDIS ABABA

A thesis submitted to the school of graduate studies of the Addis Ababa University, College of Business and Economics, in partial fulfilment for Master's degree in Management Specialization on Total Quality and Organizational Excellence.

By

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DECLARATION

I the undersigned hereby declare that this senior essay is my original work prepared under the guidance of Dr.Tilahun Teklu. All source of material used for the manuscript have acknowledgment.

Addis Ababa

April, 2021

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Signature

CERTIFICATION

This is to certify that the thesis entitled **"**Fare Collection Management in government owned public bus transport of Addis Ababa", submitted to the School of Graduate Studies of Addis Ababa university in partial fulfillment of the requirements for the award of the Degree of Master of Science (MSc) in Management, has been prepared by Mr. Ermias Belachew under our guidance and supervision.

Therefore, I hereby declare that no part of the Research report has been submitted to any other university or institution for the award of any Degree or Diploma and the matters embodied in the research report have been duly acknowledged.

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Advisor's Name: Tilahun Teklu (Dr.)

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Date: _____

ABSTRACT

Transportation is one of the most important sectors of country's development. The sector is characterized by a shift in technology and knowledge. The experience of developed countries in the transport sector shows that institutional or operational excellence is important for maximizing the service quality and performance of the bus operators through improvement of bus Fare Collection Management (FCM). A major share of the revenue of a public transport operator comes through the collection of fares from its commuters and can be considered as "blood vessel" for them. The existing bus FCM in Addis Ababa is tedious, challenging in reconciliation and exposed to loss of revenue and the service rendered by the bus operators is not to the desired level and every year subsidized by hundreds-millions of birr by the city administration.

The objective of the paper was to study the existing fare collection management; specifically assessing its effectiveness and propose possible approaches to improve its service quality of government-owned public bus transport of Addis Ababa namely; Anbessa City Bus Service Enterprise (ACBSE) and Sheger Mass Transport Service Enterprise (SMTSE). The population and target group in this study was passengers and employees of ACBSE and SMTSE. Five dimensions of service quality attribute adapted from the European standard for public passenger transport service quality, EN13816 which provide to measure convenience and service quality in public transport. These are namely: customer care, information richness, comfort, security and environmental impact. This attributes were the independent variables, and on the other hand fare collection management service quality was the dependent variable. Structured questionnaire, semi-structured interview and field observation utilized as an instrument for data collection. The questioner was distributed to 385 passengers with response rate of 96% and the semi-structured interview was conducted for staffs of the two bus operators. A quantitative study with explanatory research design and stratified probability sampling was used and SPSS version 23 software was utilized to analyze descriptive and inferential statistics to see the effect and the relationship of each dimension on fare collection management service quality. The collected analysis showed that all the independent variables has a positive and has a significant relationship with service quality. Standalone ticketing system and limited data, unsatisfied customer, institutional setup challenges, revenue loss, lack of fare policy, and financial and technical constraint in improving the FCM were the major findings and this issues shall be addressed by indorsing technology and strategic solutions and support to achieve an improved operationally excellent operator by enhancing the service quality of FCM.

Keywords: Fare Collection Management, service quality, operational excellence

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LIST OF ACRONYMS AND ABREVITIONS

Abbreviations	Description
AACTA	Addis Ababa City Transport Authority
AACRA	Addis Ababa City Roads Authority
AALRT	Addis Ababa Light Rail Transit
AATB	Addis Ababa Transport Bureau
APTA	American Public Transport Association
ACBSE	Anbessa City Bus Service Enterprise
DVLCA	Drivers and Vehicles License Controlling Authority
FCM	Fare Collection Management
FTA	Federal Transport Authority
GIS	Geographic Information System
GPS	Global Positioning System
SMTSE	Sheger Mass Transport Service Enterprise
TDS	Trip Data Sheet
TMA	Traffic Management Agency
TPMO	Transport Program Management Office
ITS	Intelligent Transportation Systems

KEY TERMS

Articulated Bus: Typically an 18m-long bus, with three doors, one pivoting joint in the bus body, three axles and a capacity of approximately 170 passengers**.**

Bi-Articulated Bus: Typically a 25m-long bus, with five doors, two pivoting joints in the bus body, four axles and a capacity of approximately 250 passengers.

Bus lane: A traffic lane reserved for buses that may be painted, striped or signed, but is not physically separated from mixed traffic. Buses are given priority in the lanes either throughout the day, or during specific intervals, and sometimes taxis, high occupancy vehicles and bicycles are permitted to share the bus lanes. Because other traffic is not physically prevented from entering the lanes, the travel time savings is typically small, relative to a bus way.

Bus way: A priority lane for buses physically segregated from mixed traffic by curbs, rumble strips, guiderails or other barriers.

Conventional Bus: Typically a 12m-long bus, with 1–2 doors and capacity of approximately 80 passengers. Conventional buses can have low or high floors.

Depot: a transport infrastructure that serve a buses with parking facilities, bus maintenance and cleaning facilities, fuel

Electronic (Automatic) Fare Collection: Efficient cashless passenger fare payment system, incorporating magnetic stripe fare cards or smartcards, fare validation devices, turnstiles and ticket vending machines. Fare collection can be on-board or off-board the bus, but off-board fare collection reduces passenger boarding times and therefore vehicle delays.

Integration: Bus systems can have three levels of integration: physical, operational and fare integration. Physical integration refers to infrastructure that allows passengers to transfer between bus routes and other modes of transport; operational integration involves co-ordination of schedules; fare integration involves payment of a single fare or reduced fares for combined services.

Intelligent Transportation System (ITS) : A suite of technologies that allows for dynamic control and operation of a transit system, including automatic vehicle locators, centralized vehicle control, integrated traffic signal control, automatic fare collection and real-time passenger information systems.

Terminal: A Bus terminal, or Public Transport Terminal, is the point where a bus/taxi route starts or ends, where vehicles stop, turn or reverse, and wait before departing on their return journeys.

Trolley Bus: An electric rubber-tired bus drawing current from overhead wires to which it is tethered. Similar to a street car or trolley, with rubber tires instead of track.

Turnstile: A gate consisting of a post that act as a pivot for rotating arms; set in a passageway for controlling the persons entering.

Organizational performance: is the organization's ability to meet economic standards of profitability, market share (customers) and efficiency (processes) whilst enhancing shareholder value

Operational Excellence: is a component of organizational leadership and stresses usage of principles, systems, and tools that result in continuous improvement.

Source: (WRI, 2010), (APTA, 2020), (Timothy & Benjamin, 2019),

CHAPTER ONE: INTRODUCTION

1.1. Background of the Study

It is obvious that riders constantly traveling every hour and every day from a certain origin to a specific destination by different transport modes to meet their fundamental economic and social demands. Transport modes are how passengers and freight achieve their mobility. They fall into one of three basic types, depending on over what surface they travel; land (road, rail, and pipelines), water (shipping), and air (Rodrigue, 2013). Land transportation is one of the modes that dwellers frequently commute that enables them to fulfill socio-economic needs.

From various types of road transportation, public transport is usually designed for urban and suburban inhabitants. It includes different vehicles like city buses, trains, mini-buses and others that provide mobility to the general public and carry passengers to destinations for a fee.

Public transportation is an important element in day-to-day activities in Addis Ababa, it is a relatively affordable means of transportation, and promotes the reduction of environmental pollution and traffic accidents. Even though the role of public transportation in the city's business activity is notable, the service is not at the required level. Currently, the city is experiencing unpredictable social and economic development with rapid population growth and migration of people from different regions of the city. As a result, the travel demand in the city is increasing alarmingly exceeding the supply which results in a shortage of transport service to dwellers. It is a common situation to see very long, tedious and time-wasting queue to get the public transportation service every day.

These Problems hurt the delivery of mass transport services, as well as an impact on service quality, is significant. Many factors may reduce service quality and not meeting the expectations of the transit customer. The major contributing factor is the lack of integrated, comprehensive, user-friendly and cost-effective fare Collection management that reflects the latest technology. This will not only result to hinder the quality and satisfaction of the customer, but also a loss of revenue and profit from the service provider. The study is aimed to show by enhancing the public transport fare management how to improve customer satisfaction and service quality as well as the performance, revenue, and profitability of the public transport provider. So what is Fare Collection Management?

Fare Collection Management (FCM) is part of operation management in public transport focuses on the handling and management of transport fares in the entire fare collection process. It

includes all the process from the preparation of the fare media; like request to print companies for printing of the tickets for this particular study, issued to the bus cashiers and collected the cash upon service delivery and finally reconciled cash against tickets. This is a continuous cyclic process which is done daily. The main tasks of operators; specifically, Sheger & Anbessa for this study are to provide transport service to passengers. The Transport fare act as a bridge that connects the passenger and the operator. This fare amount usually set by the concerned Transport Authority that controls the transport operators by considering different factors like socio-economic activities of the city, operator's performance, service quality, fuel price in the international market, passenger's affordability, etc. Once the fare is set the fare collection operation proceeds and the operator collects almost all of its revenue from the collected fare. This revenue expected to cover all the expenses of the operator. Usually, an operator's main intention is to cover all costs as well as to maximize the profit. But the reality is not as such; operators usually subsidized a huge amount of finance from the municipality side as well as with the exception of minor improvement on some facilities, the service rendered is quite poor.

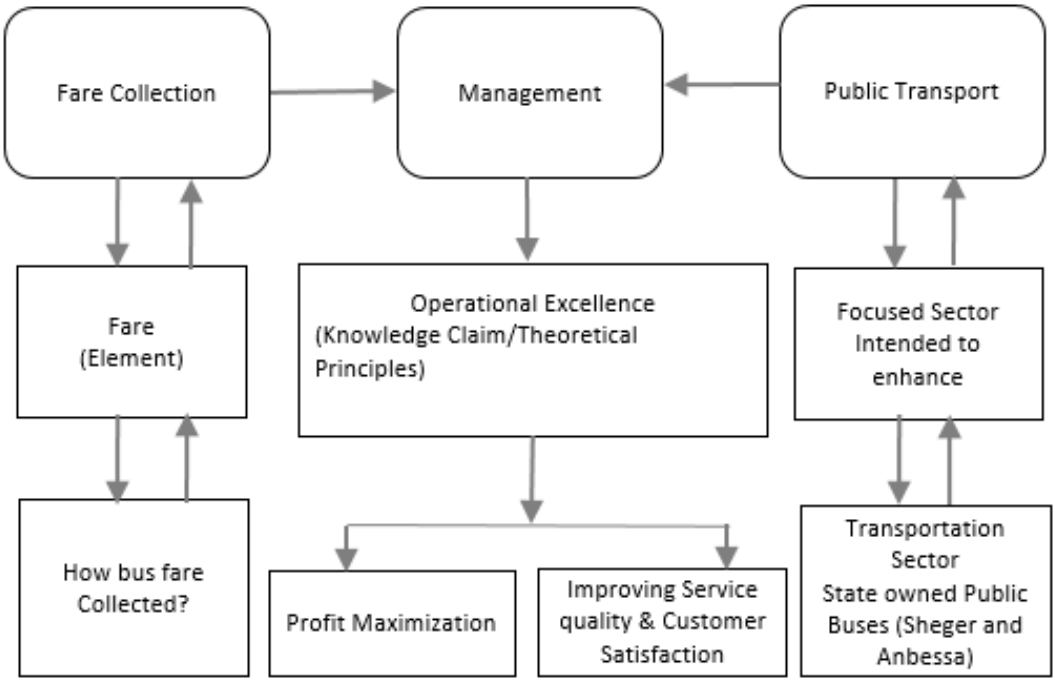
The modal share of public transport is estimated 79.6% of minibuses (includes blue and intercity used locally to relieve peak demands), 10.1% of Yellow Taxi, 3% of Higher Midibus, 3%Anbessa Buses, 1 % of Sheger Buses and 3 % of Public Service Employees Transport Service Enterprise (Addis Ababa Transport Authority, 2017).

Anbessa City Bus and Sheger Mass Transport are the two governments owned operators that serve public bus transport service to the city. Anbessa City Bus Services Enterprise is the oldest and largest public bus operator in Addis Ababa. Anbessa was founded in 1945. It has a fleet of 878 buses, operates about 124 routes from four bus terminals in the city. Anbessa buses perform about 2,800 trips and carry about 225,000 passengers per day (Anbessa City Bus Service Enterprise, 2017).

Sheger Mass Transportation Service Enterprise is a new public enterprise set up by Addis Ababa City Government to augment public transport services in the city. Sheger has been formed under Addis Ababa City Government Sheger Mass Transport Service Enterprise Regulation No. 70/2015 dated 10th September 2015 with the objectives of providing fast and accessible formal bus transport service for students; fast bus transport service to the public of the city; and integrated transport service corresponding with other public transport providers. Sheger is fully funded by the City Administration of Addis Ababa. Sheger started bus operations in May 2016.

Even though there are different varieties of public transport modes in the city, the level of service they provide is not up to the standard and could not efficiently serve the public. In this regard, the FCM of most public transport services, i.e.,the city buses, minibus and other types of public transport in the city are outdated, not methodically planned and coordinated. Most of them collect their fares inside vehicles. The Anbessa city bus, Sheger Mass Transport, and others require the purchase of a ticket to generate revenue for the operators. Tickets bought at the time of the journey. It usually requires at least two tickets to get to work per direction and they are valid for a single trip. When fares are collected at vehicles in the form paper based tickets causing slower services and dwell time to increase. Dwell time is a time that is spent during boarding or alighting of passengers. It is one common measure of efficiency in public transport, shorter dwell times are usually desirable. In addition to this, a huge amount of time lost and cumbersome during cash reconciliation at operator offices.

The paper specifically focuses on operational management and service quality of fare collection of the two state-owned operators; Anbessa City Bus Service Enterprise (ACBSE) and Sheger Mass Transport Service Enterprise (SMTSE) and the challenges which they are currently facing and by considering different literatures and international practices the paper try to indicate probable solutions, methodologies, and management practices that will ultimately improve the service, efficiency and reduce operating cost.



Source: The researcher, 2020

Figure 1. Fare Collection Management Study Model

1.2. Area of the Study

The area of the study will focus on one of the busiest, congested and very dense in population in the country Addis Ababa city, Ethiopia. Three Bus Terminals namely Piassa, Megenagina, and Mexico terminals of Anbessa and Sheger public bus route corridors to assess the physical features, and the general issues how public transport fares are collected, organized, managed and sent to the corporate operator office.

1.3. Statements of the problem

The Transport Policy of Addis Ababa (August 2011) has identified many challenges concerning the public transportation services of the city. This includes in-sufficient public transport provision, limited coverage roads, lack of standard public transport service provision and rising transport fares are among others. It also noted that the operation of the public transport operation is not methodically planned and coordinated.

In the same way, draft and unpublished Addis Ababa Transport Strategy (July 2019) also design five strategic directions to address the above-stated challenges and is planned to be implemented over the next ten years. One of the strategic direction is improving the service quality of public transportation modes and operations. Implementation of Integrated Fare Collection Management is the major task to achieve service quality with the use of technologies. Integrated fare collection means when one customer wants to move from one place to another through different public transport modes like by bus, by train and by taxi, no additional fare media (fare media is like printed ticket, smart cards or mobile Application system) required for billing for the rendered service.

But in reality, it is not the case, one of the limitations in operations management of state-owned public bus transports are the integration in fare collection management system. Fares are usually collected inside the bus through a printed ticket media. This will lead to unnecessary wastage of time at every bus stations which results in poor efficiency of bus operations and has an impact on the quality of service to customers and risk of falsification during the journey. It is also a time consuming during reconciliation of cash at Bus depot.

Whatever the transport infrastructure development such as building a depot, terminals, administration buildings, dedicated lanes and the purchase of modern buses for a certain

transport operator, without the incorporation of enhanced & modernized transport fare collection management, the operator will not attain the expected service quality and profitability.

In general, here are some of the major problems faced by the state owned Public Bus Transport on fare collection management

- The public bus transport fares collection process is tedious and its management is cumbersome.
- Due to poor transportation fare collection management process, it has caused a gap in the service quality of transport services.
- The existing fare collection is exposed to revenue loss by the operators as well as the passengers and technology not applied in the process. This has a great impact on service revenue and hinders maximizing the profit by the operator.
- There is no integration of fare collection among public bus transports providers and this has a contribution to the inefficient performance of the operator and
- Lack of adequate awareness and minimal focus on the actors and stakeholders involved in the delivery of transport services as well as fare collection management.

1.4. The research objectives

1.4.1. General Objective

The general objective of the paper is to study the existing manual fare collection system and propose possible approaches to improve the fare collection management of government-owned public bus transport of Addis Ababa; Anbessa City Bus Service Enterprise (ACBSE) and Sheger Mass Transport Service Enterprise (SMTSE).

1.4.2. Specific objectives

The specific objective of the study is;

1. To study the fare collection service quality of a government-owned Public Bus Transport of Addis Ababa.
2. To assess the existing Fare collection management practices and challenges in public transport of Addis Ababa in general and services rendered by ASCBSE and SMTSE in particular.
3. To review International best practices fare collection management in public transport.

4. To propose possible solutions, strategies, and approaches to improve fare collection management in government-owned public bus transport of Addis Ababa as well as to show their benefit.
5. Examine the relationship between proposed dependent and independent variables.

1.5. Research Question

To achieve the above stated research objectives, a research questions was developed:

- What are the impact of the independent variables (Passenger Care, Information Richness, Comfort, Security and Environmental Impact) on the dependent variable (Service Quality of fare collection management)?
- What are the international best practices and experience in fare collection management towards the public bus transport?
- What possible strategies and approaches to improve fare collection management in government-owned public bus transport of Addis Ababa?

1.6. Significance of the study

Addis Ababa capital city of Ethiopia one of the commercial political center and rapid urban growth of Ethiopia. As the urbanization increase, the migration of people to the city increases causing the mobility of road users rises and ability to go from one end of the city to other. Commuters usually prefer most convenient, affordable, user friendly in particular and best quality of service in general type of transport. Public bus transport is one of the modes of transport striving to address the mobility demand of passengers at the required service standard. The operation of the public bus transport financially supported through subsidy from the city administration as well as the revenue collected from passengers which is called a Fare. This revenue act as a “bridge” that connect the service provider and the service seeker. The study mainly focuses on Fare Collection Management in government owned public bus transport of the city which has an impact on the service quality from customer point of view and enable to enhance the operational performance of the operator.

This study will help to understand by improving the process of fare collection management with inclusion of technological features of the stated owned public bus transport; the service quality rendered will be improved and operational excellence ameliorated. Therefore, the study tends to pave the way for the relevant bodies to take in to considerations the problems recognized by the

study and helps to mitigate the challenges of the fare collection management faced by the public transport and it will be helpful from the outcome of the study and the recommendations for different responsible bodies and other stakeholders relevant to the transport industry.

1.7. Limitations of the study

Major limitation of this study were unavailability of secondary data on Fare Collection Management of Public bus transport and difficulties and challenges while collecting data due to pandemic issues and sometimes unwilling to provide information by target groups and some personal challenges for further detail observation and analysis.

1.8. Organization of the paper

This research paper was organized and summarized in to five chapters.

Chapter One—Introduction—serves as an introduction and provides the study background, the study area, Problem statement, research question, and study objectives.

Chapter Two—Review of Related Literature—presents a review of literature related to the research and describes the present state of knowledge in the areas of service quality in Public Transport in General and Fare collection management in particular.

Chapter Three—Research Methodology—covers design of the research methodology

Chapter Four —Data Analysis and Findings—describes the preparation of data for the analysis, statistical analysis of the data and presents major findings and results of the research

Chapter Five—Summary of the Research Finding, Conclusions and Recommendation—presents the summary of the research findings and conclusions of the study and outlines recommendations.

References— To provide the reader with a list of related literature utilized to conduct the research and prepare this report.

2.1. Introduction

Transportation is one of the most important sectors for the development of a country. The transport sector is characterized by a shift in technology and knowledge that employs a large number of human resources and is directly or indirectly linked to other sectors. The constitutional right of movement of people is provided by transportation, and the variety of goods and items are transported from one place to the other, contributing to the social, economic and political interactions and contributes positively to man's failure to survive. In order to make urban transport sustainable, a variety of work needs to be done on technology, operating management, service quality solutions, transportation access and the like, and the role it plays in facilitating mass transport.

If cities giving priority on mass transportation for the movement of the community, the transport demand and the operational service problems will be addressed with in short period of time even though an initial investment required for implementation of the infrastructure. The concerned authority or city administration must allocate the necessary budget and resources for implementation. Once the transport infrastructure is properly constructed and operational service of the mass transport started, the concerned stakeholders trying to maximize the profit as well as service quality. This geared to achieve their intended operational service goals by conducting various studies and designing projects.

The experience of developed countries in the transport sector shows that institutional or operational excellence is needed to maximize service quality and performance of the service provider through improvement & implementation Fare Collection Management (FCM) by the use technologies. These technologies usually related with Intelligent Transport System (ITS). ITS is a generalized term used to describe the variety of technologies and strategies that allow improvements to the flow of the transit systems. It includes the application of computers, different sensors, electronic devices, communication technologies, etc to manage transport challenges and gives a good platform for the implementation of convenient fare collection system for riders.

FCM is an essential and important part of the public transport management and operations. A major share, if not the whole of it, of the revenue of a public transport operator comes through the collection of fares from its commuters. The fare collection system together with the ticketing

process is an important point of interface between public transport and its users. As such, the fare collection system and ticketing process have to be efficient, reliable and convenient for riders.

2.2. Public Transportation Benefits and its impacts

The use of the public transportation system provides various benefits to the local economy, to the individual and the public at large. It is useful in various ways. The provision of good public transport enables cities to thrive and fulfill their economic, environmental and social aspirations. It is vital to make urban areas successful by the use of mass transit, enabling people to access jobs and services, employers to access labor markets and business to reach customers for services.

2.2.1. Economic Impact of Public Bus Transportation Investment

Investors are working to benefit themselves and the wider community by investing their money in various investment activities. From different investment options, transport investment is a multi-project sector investment, which requires a large amount of capital.

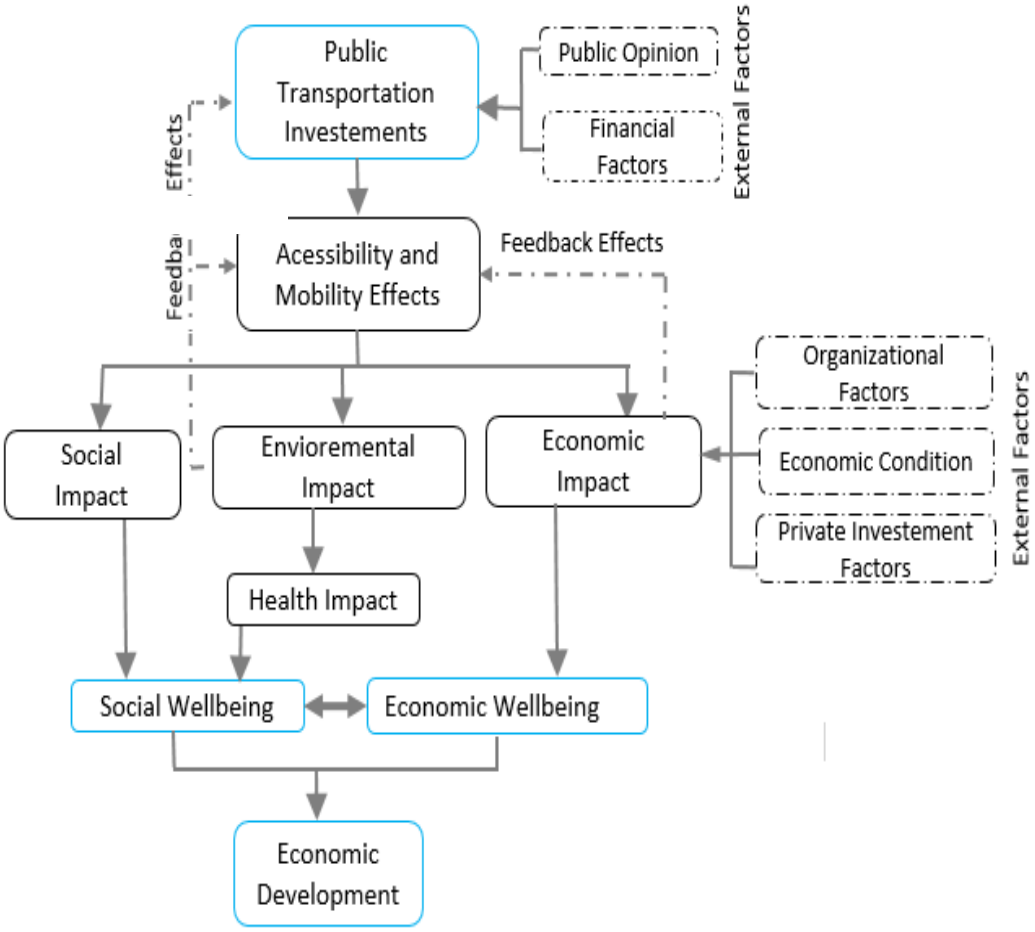
Once the investment is done, it will continue to serve from generation to generation for many years to come. In terms of economic implications, public bus transport investment specifically has a significant impact. In particular, for those with large and continued public transport infrastructure, it will have broad economic benefits by improving road network, facilitating human activity, transforming the area into a business zone.

Public bus transport has an impact on the national economy; particularly large public transport infrastructure project enables wider economic benefits and societal values (EDRG, 2014). According to this study the public transport investment impacts by two mechanisms; impact of spending and cost & productivity impact. Impact of spending is the act of investing money in public transportation facilities and operations supports jobs and income for the industry, as well as jobs and income in supplier industries and other affected elements of the economy, and costs and productivity impacts is seen the public transportation services that are enabled by the investment provide enhanced mobility, time and cost savings; leading to broader economic growth occurs as a result of changes in disposable household income, business productivity and market access.

For every dollar invested in public transportation, approximately $ 5 in economic return is generated, and for every $1 billion investment in the sector, 50,000 jobs are created & supported.

With the same situation; an investment of $10 million in public transportation generates about $ 32 million increased business sales and residential property values for homes located near public transit with high-frequency service (APTA, 2020).

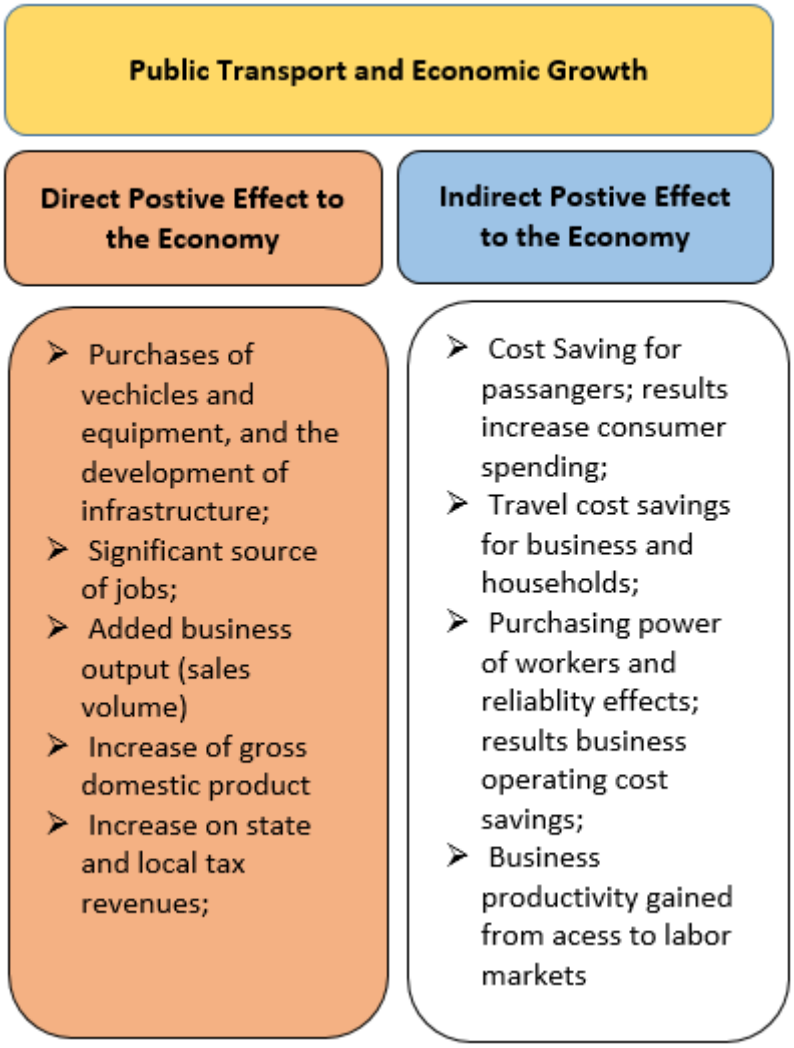
Public transport contributes to all aspects of urban life, and consequently needs to consider Economic, Environmental and social impacts. Economic- Public expenditure and income, user time savings, reliability and wider economic impacts. Environmental-noise, air quality, greenhouse gases, landscape, townscape, historic heritage and water environment, and social-safety, security, accessibility, mode interchange, land-use policy, physical fitness and journey ambience (UITP, 2009). The following figure depict consequential effects of the implementation of public transportation investments to the economic development through various process, impacts and factors.



Source: Adapted from Leung (2006)

Figure 2. Transport Investment and Economic Development

Following a wide and repeated public transportation investments in certain city, this will result a direct and indirect effect to the economy. This positive effects are explained in following figure.



Source: UNECE

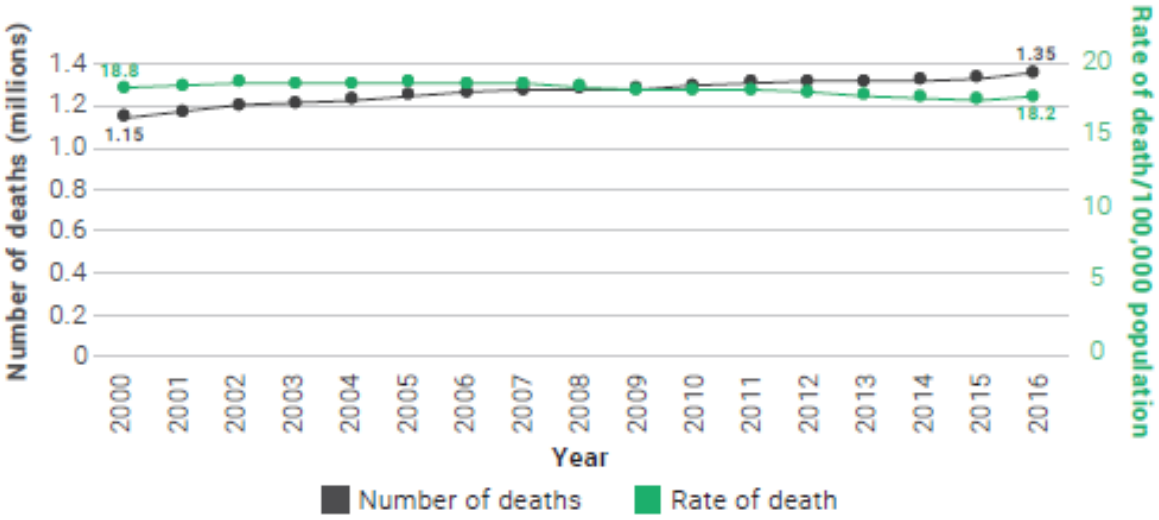
Figure 3. Economic growth through investments in public transport

(Sustainable urban mobility & public transport)

2.2.2. Public Bus Transport Traffic Safety

Each year nearly 1.3 million people die as a result of a road traffic collision more than 3000 deaths each day and more than half of these people are not travelling in a car. Twenty to fifty million more people sustain non-fatal injuries from a collision, and these injuries are an important cause of disability worldwide. 90% of road traffic deaths occur in low-and middle-income countries, which claim less than half the world's registered vehicle fleet. Road traffic injuries are among the three leading causes of death for people between 5 and 44 years of age. Unless immediate and effective action is taken, road traffic injuries are predicted to become the fifth leading cause of death in the world, resulting in an estimated 2.4 million deaths each year.

This is, in part, a result of rapid increases in motorization without sufficient improvement in road safety strategies and land use planning. The economic consequences of motor vehicle crashes have been estimated between 1% and 3% of the respective GNP of the world countries, reaching a total over $500 billion. Reducing road casualties and fatalities will reduce suffering, unlock growth and free resources for more productive use (WHO, 2011).



Source: (WHO, 2018)

Figure 4. Number and Rate of Road Traffic Death per 100,000 populations 2000-2016

However, road traffic injuries are unacceptable and can be preventable. There are various mechanisms to overcome these problem. One of the effective intervention in alleviating the road crash and injuries is promoting the public transport. Providing access to safe, affordable, and sustainable transport for all improves the road safety, especially by expanding public transport with special attention to the needs of those in vulnerable road users like women, children, persons with disabilities, and older persons (WHO, 2018).

Taking Public transportation is much safer in terms of traffic accidents than driving a car. For example, private vehicle occupants have a fatality rate per person trip rate which is 23 times larger than those for bus passengers (Beck, et al., 2007). This is because the drivers of mass transit have often received better training while taking their driver's license and they regularly offered by the organization for various driving and transit service training. Besides, the service operation makes it safer as drivers receive soft skills and behavioral training.

Another factor related to Public bus traffic safety is the condition and safety of buses. Since the Public buses are maintained with proper vehicle maintenance facilities and hygiene at their depot

centers, the technical efficiency of the vehicle is relatively safer than that of a private vehicle. In the mass transit depots, there are facilitated garages, bus wash and a variety of spare parts accessories, as well as a technical team that monitors the necessary maintenance condition of the public bus.

In some countries, the availability of a dedicated lane for public bus transit, especially in major cities, will have its contribution to traffic safety. This makes it less likely to be exposed to traffic accidents and fatalities due to the limited speed limit of buses on the route. Other transport modes are not riding in the dedicated lane so that there is no conflict on the traffic flow.

Therefore, an improvement in public transport causes reducing the rate of mode shift to private cars and motorcycles and avoiding exposure to risk.

2.2.3. Urban Mobility and Public Transportation

Public transportation can convey many more people in much less space than individual automobiles, which helps to keep traffic congestion lower, which in turn reduces air pollution from idling vehicles, and helps riders avoid the stress that comes from daily driving in highly congested areas. This situation usually recognized in developed countries. Taking public transportation instead of owning a second vehicle can save (on average) more than $9,823 a year (NET, 2017), and for those who ride instead of driving the primary vehicle, can save individuals a significant amount of money each month in avoided fuel, maintenance, parking, and other expenses.

Taking public transportation can free up a significant amount of time and attention, as someone else is doing the driving, which allows riders to spend their transit time reading, working, studying, or being entertained instead of having to watch the road (APTA, 2020)

2.2.4. Mass Transit and Greenhouse effect

The transport sector is responsible for a portion of air pollutants release as well as emission of carbon dioxide (CO2) and other global warming pollutants that contribute to climate change. A major portion of these releases and emissions is attributed to the older type of road vehicles that are powered by fossil fuels combustion engines, end that do not meet (yet) the new emission limits(United Nations, 2015).

By moving people more efficiently, public transit produces significantly less air pollution per passenger mile than a standard car carrying a single driver. Buses emit 20% less carbon

monoxide, 10% as much hydrocarbons and 75% as much nitrogen oxides per passenger mile as an automobile with a single occupant (NET, 2017). Together with reducing air pollution, it also more fuel-efficient per passenger per mile as compared automobiles which have a contribution to the amount of energy necessary for the transportation.

Greenhouse gas pollution is ever on the rise and that's the reason states, organizations, and environmentalists advocate for emission reduction techniques. By using public transport, you'll be able to cut back on greenhouse gas emissions by more than half. Research has proved that only three to eight people on a public transport bus are able to cut emissions by half compared to an individual commuting in a personal car by himself or herself (Future Conserve Energy, 2020)

2.2.5. Social Interaction on Public Transport

As public transport plays a vital role in facilitating the movement of people from place to place, it has also a social communication benefits. Public transport serves as a bridge for people to exchange their religious, cultural and emotional identities to strengthen their social relationships.

When people experience grief, friends, family, and close friends share their emotions through the use of public transportation, and to celebrate their happiness together through various events with this mode of transport.

Most of the day-to-day work to home trips and vice versa is done in the community by mostly in public buses. When students going to school, they will be served by either school buses designed for them or they will share the normal bus services with the community. The public also uses public transport to deal with medical facilities, visit religious institutions, entertain at sports centers and festivals, to perform their duties and responsibilities at various governmental and private institutions.

With the use of public bus transport, the customer has the advantage of getting to know one another, sharing life experiences, and developing a sense of belonging. Along the way, passengers discuss political, economic and social issues. Public transportation is used by people from diverse backgrounds with varied cultures, norms and ways of living. If a traveler opt for public transportation, it means he will have the chance to people watch and even get to learn the nature of different people at the same time he will be able to interact with lots of people from different cultures as opposed to traveling private. There are also situations in the life of disadvantaged communities who are sometimes relieved of their problems by expressing their concerns to the commuter, and there are also many examples to have partners and ended with

marriages in regular relationships. Public transport is used by thousands and diverse people across the society as opposed to private travel which only means you are traveling by yourself or your relatives. If you use public transport, you have all the room to make friends and enjoy the ride by meeting interesting new people (Future Conserve Energy, 2020)

In addition, using public transport can reduce feelings of loneliness and mental stress. Some commuter deliberately uses transit to reduce stress or loneliness without having any place to go. Public transport has the potential to create an environment where face-to-face social interactions are more likely, which research has shown to be beneficial for mental health. Trips on public transport can be the only time we encounter others outside of our communities of family, friends, and colleagues (Jounila, 2019). Research suggests that efforts to tackle social isolation should start with public transport and talking to people in the next seat can not only make you feel better, but it actually improves your health and well-being (Broom, 2019)

2.3. Service Quality in Public Bus Transport

Bus service performs a significant function for movement of considerable number of people in developing cities where the mobility needs are increasing due to rapid urbanization. Even though bus service plays crucial role for transportation of significant number of people in emerging cities, their services are frequently insufficient to meet demand. Usually the services provided by the buses are insufficient (Ali, 2010). Service quality is a subject that has aroused considerable interest both in academic research and in public and private service sector, where managers are inclined towards customer-focused service and continuous performance improvement. Specifically, in public transport, service quality is a matter of the greatest importance because an improvement of quality levels can attract further users (Eboli & Mazzulla, 2008). Several Studies concerning Satisfaction and Dissatisfaction in public bus transport have been studied to develop and create attractive public bus transport. The transport authorities and agencies identified high frequency of services that are reliable, and fares that offer value for money as important needs of public bus transport users. In some developing countries, the transport system have been criticized for their low quality of services, like lack of punctuality, irregularity, and substandard conveniences (Mishra & Nandagopal, 1993).

On one hand, satisfaction is defined as the fulfillment customer needs. It is a judgment that a product or service feature or the product or service itself provides a pleasurable level of consumption-related fulfillment, including levels of under or over fulfillment (Budiono, 2009).

Satisfaction is defined as "fulfillment of a need, demand, claim, desire, etc." Need fulfillment is a comparative process giving rise to satisfaction responses. The dominant theoretical model employed in research into customer satisfaction is the expectancy/disconfirmation model in which customers are satisfied or dissatisfied if their experience and perceptions of the service they perceive exceed (fall short of) their expectations (Payne & Holt, 2001). Within this framework, satisfaction is analyzed by examining the expectation of service quality and the attributes of the service quality that influence the experience and perceptions. On the other hand, service quality is defined as a comparison between customer expectation and perception of service (Gronroos, 1984).

2.3.1. Measuring Service Quality and Passenger Satisfaction in Public Bus Transport

Many literatures and techniques are formulated to measure service quality and customer satisfaction. Specifically, in public transport, service quality and passenger satisfaction has a greater importance for improvement of convenience to use so that it can attract further users, reduces in the use of private cars, contributes in minimization of air and noise pollution and energy consumption and conduces in solving problems like traffic jams and traffic accident.

Transit quality of service reflects two important aspects of transit service: (1) the degree to which transit service is available to given locations and (2) the comfort and convenience of the service provided to passengers (Transportation Research Board, 2000). It argues that quality of service measures differs from both traditional highway service quality measures, which are more vehicle-oriented than person-oriented, and from the numerous utilization and economic performance measures routinely collected by the transit industry, which tend to reflect the transit operator's point-of-view.

One of the early studies on the quality of public transport system from customer perspective was stated by (Silcock, 1981). He identified five major factors integral to public transport industry, namely the measures of accessibility, reliability, comfort, convenience and safety. In the same manner (Eboli & Mazzulla, 2012) identified studies regarding quality determinants in public transportation the aspects mainly characterizing the public bus services are: service availability, service reliability, comfort, cleanliness, safety and security, information, customer care and environmental impacts. Each of these aspects can be measured in many ways by considering different indicators.

Service availability

The attributes belonging to this category of service aspects are represented by characteristics of the route of the bus line in terms of path and coverage, number of bus stops, distance between bus stops, location of the bus stops, and characteristics of the service, like service frequency, span of service, travel time, need for transfers.

Service reliability.

Service reliability is one of the most investigated transit service aspects and it is considered as a very important aspect for the transit users. Turnquist and Blume (1980) define transit service reliability as "the ability of the transit system to adhere to schedule or maintain regular headways and a consistent travel time" which is reliability mostly related to transit schedule adherence.

Comfort.

Comfort during the journey is important for transit users, both the physical comfort regarding vehicles and comfort regarding ambient conditions on board or at stops. Comfort on board means having soft and clean seats, comfortable temperature, not many people on board, smoothness of the bus ride, low levels of noise and vibrations, not nasty odors.

Cleanliness.

The indicators regarding cleanliness refer to the physical condition of vehicles and facilities, and specifically the cleanliness of the bus interior and exterior, having buses and shelters clean of graffiti, cleanliness of seating and windows, and so on.

Safety and security.

The aspect linked to safety indicates the degree of safety from crime or accidents and the feeling of security resulting from psychological factors; therefore, this aspect refers not only to safety from crimes while riding or at bus stops and from accidents, but also to safety related to the behavior of other persons and to the bus operation. Generally, the term "safety" is used to indicate the possibility of being involved in a road accident, while the term "security" refers to the possibility of becoming the victim of a crime.

Information Richness.

Another service aspect affecting transit service quality is linked to the availability of information pertinent to the planning and execution of a journey. Passengers need to know how to use transit

service, where the access is located, where to get off in the proximity of their destination, whether any transfers are required, and when transit services are scheduled to depart and arrive.

Customer/Passanger care.

Customer care includes those elements needed to make easier and more pleasant the journey, like courtesy and knowledge of drivers, courtesy and helpfulness of ticket agents, personnel appearance, together with elements linked to the easiness of purchasing tickets or paying fare, presence and condition of the ticket issuing and validation machines, and effectiveness of the ticket selling network.

Environmental Impacts.

The service aspect regarding the impacts of the bus systems on the environment includes effects in terms of emissions, noise, visual pollution, vibration, dust and dirt, odour, waste, but also effect of vibrations on road and natural resources consumption in terms of energy or space.

According to (Eboli & Mazzulla, 2008) methods of measuring service quality and customer satisfaction identified in to two categories: The first category includes techniques of statistical analysis, such as quadrant and gap analysis, factor analysis, scatter graphs, bivariate correlation, cluster analysis, and conjoint analysis. Some of these techniques provide an evaluation of the service attributes; others provide the relationship of the service attributes with overall satisfaction. The second category of methods consists in the estimation of coefficients by modelling. Here models are used that relate global service quality (dependent variable) to some attributes (independent variables). Some of these models are regression models, structural equation models and Logit models

2.3.2. Service Quality Standards in Public Transport

There are also some international standards in valuating and measuring the quality of service rendered by the transport agencies. From the developed countries; there is a European Standard for public passenger transport service quality, EN13816 which provide to measure convenience and service quality in public transport.

European Service Quality Standards EN13816

The European Standard EN13816 provides a useful theoretical and practical framework for organizations to define and set convenience targets. It offers guidance on methodology for setting targets and measuring quality, and provides a comprehensive list of areas that together

make up the service quality delivered to customers. The list of areas can help organizations ensure that they are considering the whole customer experience. For example, whilst aspects of journey time may be the most obvious aspects of convenience, customers are also affected by issues such as ease of obtaining information, and operating hours. The eight aspects of customer service quality as defined by EN13816 is presented in Table 1.

Attributes of Service Quality	Description
Availability	Extent of the service offered in terms of geography, time (operating hours) frequency and transport mode
Accessibility	Access and egress to/from the public transport system including interface with other transport modes
Information	Systematic provision of knowledge about the system to assist the planning and execution journeys
Time	Aspects of time relevant to the planning and execution of passenger and train journeys, including journey time, punctuality and reliability
Customer Care	Service elements introduced to match the requirements of any individual customer, including staff reaction to customer complaints and kindness of staff
Comfort	Including crowding, cleanliness and service elements introduced for the purpose of making public transport journeys as comfortable as is reasonably possible.
Security	Offering safety and security to customers for the whole journey
Environmental Impact	Effect on the environment resulting from the provision of a public transport service (pollution and noise)

Source: Adapted from: European Committee for Standardization, 2002

Table 1. Eight attributes of service quality as defined by EN 13816

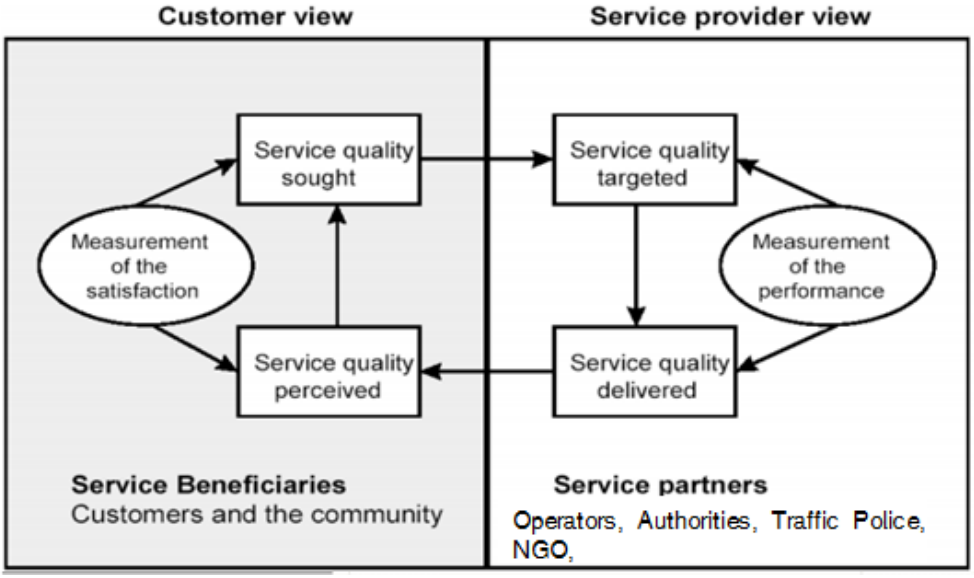
The EN13816 standard also illustrates a Quality Loop diagram, which defines a clear process to ensure that the service provided can meet the needs of existing and potential users most effectively, and as convenient as possible.

The Quality Loop links the perspective of the users ("Service Beneficiaries") with that of the operators and authorities ("Service Partners") by setting out the steps by which the latter can most effectively meet the needs of the former, thus maximizing the convenience of the service.

The aim of the public transport provider should be to 'minimize the gap' between the service quality sought, targeted, delivered and perceived.

Service quality perceived by customers will tend to reflect the service actually delivered, hence satisfaction measurement relates the level of service perceived with the level of quality sought, the final link in the Quality Loop – this measures how well the service meets customers' expectations. Since satisfaction relates quality perceived with quality sought, there is no direct link between satisfaction and the planned service (targeted quality). Therefore it is possible to have low satisfaction scores even where the level of service provided exactly matches that targeted – i.e. everything works according to plan.

Hence the quality loop illustrates the distinction between customer satisfaction which is a subjective measure of success, and performance measurement, which is an objective measure of success. Both types of measurement are required to understand how well the organization is serving the customer.



Source: Adapted from: European Committee for Standardization, 2002

Figure 5. European Service Quality Standards (EN 13816 Service Quality Loop)

2.4. Operational Excellence (OpEx) of Operation

In every business or service operations, there is at least one area that could be improved. However, the question is how a meaningful change or improvement takes place within an organization. The change sometimes occur through a major initiative or total disruption within the business. Usually change happens slowly and more gradually over time. Operational excellence is an example of this type of change.

Operational Excellence (OpEx) is somehow difficult to explain and the descriptions are too broad. To describe it in general and simple words; it is to mean being best class and excellence in everything we operate and we do. These interpretations are challenging to translate in to practical actions. It is a widely accepted organizational leadership methodology that transforms to sustainable improvement of an organization in meeting the demands of its customers.

Striving to achieve operational excellence is one of the most important contributors to an organization's sustainable performance and growth. Companies that reach for a higher level of operational excellence gain numerous benefits a systemic, evolving and effective approach to business operations; a continually productive and innovative workforce; and an organization that consistently realizes sustainable growth and increasing valuation (Brian R., 2014).According to Sergei Brovkin (2019) operational excellence enables an organization to do more with the same staff through better employee engagement and streamlined processes. It is not about cutting resources, but rather about figuring out together how we can better apply our resources.

Further, (Breyfogle, 2008), Operational Excellence (OE) strategy describes an operations model that creates a business management methodology that encourages process improvement and innovation. Operational Excellence is a component of organizational leadership and stresses usage of principles, systems, and tools that result in the sustainable improvement of Key Performance Metrics (KPMs). KPMs are figures and data representative of an organization's actions, abilities, and overall quality. It includes sales, profit, return on investment, customer happiness, customer reviews,personal reviews, overall quality, and reputation in a marketplace. Key Performance metrics can vary considerably when viewed through different industries. They are integral to an organization's success. It's important that organizations select their chief performance metrics and focus on these areas because these metrics help guide and gauge an organization's success. Key success factors are only useful if they are acknowledged and tracked.

In the same way Operational Excellence is a well-established management philosophy. It is a philosophy of Leadership, Teamwork, and Problem Solving, resulting in Continuous Improvement throughout the organization by focusing on the needs of the customer, empowering employees, and optimizing existing activities in the process(David, 2015).

Operationally excellent companies manage their operations with the goal of delivering their product or service to the customer at the exact moment they desire it, at the lowest cost, with the smallest effort, and at the price the customer wants to pay. Literature on operational excellence

for service sectors such as public bus operator service is relatively scare as compared to manufacturing sector. However, the researcher has made to describe and explain operational excellence relating to customer satisfaction and service delivery for bus operator service.

2.4.1. Factors lead to Operational Excellence

There are many factors that can lead to operational excellence, i) Leadership, ii) Management; iii) Human resource management practices; iv) Operations strategy, and v) Organizational culture(Timothy & Benjamin, 2019).

Source: The researcher adapted from: (Timothy & Benjamin, 2019)

Figure 6. Operational Excellence Factors

i) **Leadership** –Many studies has been conducted in defining and describing leadership. The definition has evolved over time and is applied specifically in context. However, as a general definition leadership is a process of interactive influence that occurs when people accept someone as their leader within a given context (Silva, 2016).

Leadership is essential to establishing the appropriate organizational structure and focused processes that will improve operational excellence. Leadership articulates and defines the shared values and common purpose, and prioritizes the things that truly matter to drive the highest levels of operational excellence. The direction needed to support this

is delivered to the organization through proper tools and training, as well as employee involvement, clear communication of the rules, open dialogue and alignment.

ii) **Management** – According to an authority on management theory, Henri Fayol states that, management is to forecast and plan, to organize, to command, to co-ordinate and to control.

iii) **Human Resource Management Practices**- Human Resource Management (HRM) is defined as a system of activities and strategies that focus on successfully managing employees at all levels of an organization to achieve organizational goals (Byars & Rue, 2006). Operational excellence cannot occur without human interactions, effectiveness and capabilities. Essentially, the purpose of HRM is to maximize the productivity of an organization by optimizing the effectiveness of its employees. Therefore, successful implementation of these activities or practices is an important aspect for achieving operational excellence.

iv) **Operations Strategy** – an operations strategy is a deliberate plan of action based on a pattern of decisions which shape the long-term capabilities of any type of operation and their contribution to the organization-wide strategy, through the reconciliation of market requirements with operations resources (Slack & Lewis, 2011). It is implemented by a firm to dictate what and how they will employ their resources in the production of products or services. An operations strategy is a necessary element for a business to achieve operational excellence as it is the overarching framework that operational excellence is built on. It also supports and aligns to the overall firm's corporate strategy. Strategy in a business organization is essentially about how the organization seeks to survive and prosper within its environment over the long-term (Slack, Chambers & Johnson, 2004).Therefore, the operations strategy has a direct impact on the basis on which an organization is able to sustain itself in the long run.

v) **Organizational Culture:** According to (Schein, 2004), culture involves three basic human activities; what people think, what people do, and what people create. He also states that, several common properties of organizational culture arise; i.e., culture is shared, learned, transmitted cross-generationally, symbolic, adaptive, and integrated.

In addition,(Peters & Waterman, 2006)promote the theory of organizational excellence. Their theory maintains that the culture that an organization adopts is directly linked to its success. Therefore, successful companies are characterized by cultural practices which put emphasis on action, customer-centricity, innovation, productivity, value-based effort,

simplicity in what they do, and economic and efficient utilization of resources. This implies that organizations are likely to stay in businesses if their cultural values provide for a platform to continuously strive for operational excellence.

vi) **Innovation:** It is obvious that innovation is a key component to achieving and sustaining operational excellence. According to Neely and Hii (1998), there are two types of innovation in operations excellence that are applicable to the three dimensions stated above namely; i) Radical – which follows a breakthrough radical change approach and ii) Incremental – which is a progressive elaboration and improvement approach. These are complementary in an operational excellence strategy implementation whereby it provides the platform for both to be achieved effectively.

2.4.2. Barriers of Operational Excellence

There are many barriers in utilizing OpEx. As per (OECD, 1992) guide line the barriers categorized as internal and external to an organization. According to the report, the external barriers include the i) lack of infrastructure, ii) inadequate technologies, iii) deficiencies in education and training systems and iv) inappropriate or lack of government policy. Internal barriers include; i) rigid organizational arrangements and procedures, ii) hierarchical and formal communication structures, iii) conservatism and conformity, iv) lack of vision, v) resistance to change, vi) lack of motivation, vii) risk-avoiding attitudes and viii) overall neglect and misuse of talents within the organization.

Factors perceived as restrictive to product/process innovation include; i) fear of imitation, ii) high costs of innovation, iii) insufficient government support, iv) lack of information, v) lack of qualified personnel, vi) no market or insufficient knowledge about markets, and vii) shortage of support/infrastructure in the region.

2.4.3. Operational Excellence Principles and Models

The basis of OpEx is best articulated by principles in the Juran and Shingo Models(Joseph, 2019).

The Juran Model Guiding Principles:

1. Grasp Juran's universal principles that form the basis to answer the question, "what do we need to do differently than we are doing today?"
2. Move your culture from thinking about quality as a product attribute (little q) to quality as a great customer experience (Big Q).

3. Understand when and how to engage leadership & the workforce to drive performance.
4. Build an effective and efficient change infrastructure complete with a set of methods
5. Drive business process effectiveness and agility.

The Shingo Model

1. Focus on process, and all outcomes are the consequence of a process.
2. Embrace scientific thinking. Innovation and improvement are the consequence of repeated cycles of experimentation and learning.
3. Flow and pull value. Value for customers is maximized when it is created in response to real demand and a continuous and uninterrupted flow. Anything that disrupts the continuous flow of value is waste.
4. Ensure quality at the source. Perfect quality can only be achieved when every element of work is performed perfectly the first time and every time. When and if errors occur, they must be detected and corrected at the point and time of their creation.
5. Seek perfection. Perfection is an aspirational goal that is not likely to be achieved, but the pursuit of which creates a mindset and culture of both continuous and radical improvement.

2.5. Fare Collection Management in Public Transport

Fare is usually the main source of income for public transport services. It is usually expected that the fare income should cover the operating cost of a public transport system when no subsidy from the government is paid to the operator.

Fares can affect passenger demand. If the fares are too high, fewer passengers will make use of the service. It is very important to look at the income of the population, to decide what proportion of their household income they can afford to use for public transport. The maximum percentage of household income spent on public transport should be10%.The government usually controls public transport fares in most developing countries and how fares are regulated is usually based on political rather than financial or economic considerations and authorities are under pressure to keep fares down despite rising costs (Armstrong-Wright, 1993).

The intention to keep fares down may be to protect the interest of the public, but this does not keep pace with increasing costs. This often leads to the long-term decline in the quality of services provided because operators often reduce their costs by lowering the standards of

service, saving on maintenance and repairs and not making any specific provision for replacements, which leads losing a passenger.

2.6. Fare Collection and its Management System

A management system is how organizations ensure things get done. If a certain organization holds regular staff meetings, project site visits or make a schedule of activities to be done are part of its management system. Taken as a whole, all of the processes, formal and informal, that enable organizations to deliver its products or services, make up its management system.

Management systems can be simple or complex, ongoing or ad hoc, standard across the organization or distinct to individuals. And of course, different management systems can result in varying degrees of effectiveness.

The same is true for public transport service providers. Operators usually try to maximize the service quality to satisfy customers at the same time to increase profitability.

The fare collection system is a key interface between a transit operator and its passengers. It can be considered as indirect contractual agreements between the operators to render transit service while the commuter to pay the fare. It directly affects how passengers experience and perceive the operator and its services. In general, the passenger expects a fare system that:

- Allows easy transfer between transport modes and different transit providers;
- Provide easy access to fare media
- Fast, easy to understand and use, with reliable fare transactions;
- Minimized transport cost
- Offers payment options that suit their particular travel needs (frequent, infrequent, weekly, daily, cross-boundary, short-distance, etc);

To meet the needs of both the passenger and the transit operator, the fare system should be:

- Simple: customer-friendly, easily understood and used by riders and staff;
- Quick: allowing fast transactions (turnstiles/boarding, purchases);
- Flexible: adaptable to changing fare strategies, loyalty schemes, and integration with other systems;
- Economical: Providing for cost-effective administration, maintenance, capital investment;
- Reliable: Meeting high standards for reliability, and easy to maintain;
- Secure: Minimizing the potential for fraud and fare evasion, providing a secure environment for revenue, and meeting privacy requirements; and

- Information-rich: Providing data for marketing, finance, service planning, and workforce productivity

Thus, the greatest challenge for a fare collection management system is to determine a fare collection system that reconciles the user's need for affordable public service with the commercial interests of the operators, while at the same time pursuing the authority's social objectives.

2.6.1. Fare types and structure in Public Transport

Different fare collection methods are exhibited by operators for their transport service provisions. Depending upon several service characteristics, the fare can be categorized into two, journey based fare and passenger based fare.

❖ **Journey Based Fare**

A journey based fare reflects a situation where the price depends on the characteristics of a journey or travel. This may include such as time of travel, distance traveled or modes of transport. Journey based fare can be seen as cost-effective pricing; some modes cost less to operate than others; off-peak services are cheaper to provide than peak services; it costs less to provide services for short trips than for long ones.

Journey based fare structure can be divided into the following categories;

- **Flat Fare: -** The simplest system in which all passengers are changed identical fares regardless of the transport route, distance traveled, or type of passenger. This fare system usually fits well in a situation where a majority of passengers travel approximately the same distance.
- **Route Fare: -** Each transport route has its fare. This system is often applied in cities where the transport operator businesses are granted by city authorities per route.
- **Zonal Fare: -** This can be network-based or route based; the network is sub-divided into zones-with flat fare within each zone and the fare is determined according to the number of zones crossed by the passenger.
- **Distance-Based Fare: -** The fare is applied based on the distance traveled applied. Usually, each route is divided into fare sages, with an identifiable boundary point for each stage. The spacing of the fare stages may be varied to reflect differences in operating costs or different demand characteristics, on different sections of a route.

Such a system may be considered to be reasonably equitable since the fare for each journey is related to the distance traveled. The finer the fare scale, the more equitable it becomes, provided that the distances between fare stages are consistent.

❖ **Passenger- Based Fare**

This type of fare system in public transport reflects the situation where the price depends on the characteristics of the passenger like Age, Physical ability, gender, social or economic status. Such kind of fare system is often used by commercial companies as another means to segment the market and maximize revenue. In the case of public transport operators, however, it may be appropriate to consider this form of price discrimination as being socially (concessionary fares) rather than commercially motivated– at least in the case of discounts for captive passengers such as children and elderly people. Concessionary fares include children, pupils and students, elderly people and pensioners, disabled, unemployed people, police, and the army.

2.6.2. Components of Fare Systems

Fare systems consist of various components:

- ✓Fare structure or policy – flat fare, fare-by-distance, fare-by-time-of-day, transfers between modes, concession fares;
- ✓Fare media – tickets, tokens, passes, cash, magnetic or smart cards;
- ✓Fare collection procedures – pay-on-entry, pay-on-exit, proof-of-payment, honor fare; and
- ✓Fare collection equipment or technology – fare boxes, electronic registering fareboxes; and turnstiles, equipment to read magnetic stripes, smart cards or proximity cards.

2.6.3. Challenges of an outdated fare collection system

If a transit service provider is still using tickets to collect fares, then it is clear how much of a hassle traditional fare collection can be. Without software or systems to manage a public transportation fare collection management system, the risk facing many serious problems, often caused by human error.

The result of outdated methods for fare collection are:

- **Expensive** – The number of tickets, tokens, and vouchers that must be produced, tracked, and stored will have high ongoing costs just to keep system running
- **Time-Consuming** – Without an automatic fare collection system, endless paperwork can pile up. This puts the operator hundreds of hours behind and racks up enormous labor costs year in and year out.

- **Impossible To Track** – Paper-based fare collection systems are easy to manipulate and difficult to manage. This makes reporting an impossible task while leaving a high risk for waste, fraud, and abuse.

2.7. Public Transport Pricing and Ticketing

Public Transport Pricing

The price of a product or service is its exchange value. In public transport, it is the exchange value of a journey (one or more trips).

In principle, the level of fares should be such that the total revenue earned by a public transport service is sufficient to cover the total cost of providing it plus a reasonable profit. This principle would be fine if public transport was operated as a fully commercial service. But this is not the case in the majority of cities/regions including Addis Ababa where public transport is at the authority's initiative and is implemented pursuing social objectives. Consequently, public transport price policy should find the right balance between several contradictory objectives (Mohamed, 2008):

For the authority

- Increasing the number of citizens using public transport
- Setting low prices and simple tariffs
- Balancing prices and encouraging social inclusion
- Minimizing public subsidies or financial compensation

For the operator

- Covering costs and maximizing profit
- Building an attractive public transport system (image, loyalty)

For the passenger

- Minimizing transport cost
- Traveling in 'good' conditions

Public Transport Ticketing

Ticketing is a tool for the implementation of a pricing policy with the consideration of operational, commercial and social objectives. The ticketing system is the translation of fares into concrete means of payment (for the passenger) and fare collection (for the operator).

Ticketing Media

Whatever the fare structure and the payment scheme, for the passenger it is often the user-friendliness of the system that will be most important. In this respect, harmonizing and integrating fares and ticketing will facilitate the use of public transport. An integrated ticketing system is defined as one in which it makes no difference, in terms of price, if a passenger has to board more than one public transport vehicle to complete their journey. Fare integration provides an incentive to travel because public transport is much easier to use and more accessible to travelers.

New technologies (e-ticketing) can be a great help in implementing complex fare structure and fare integration while keeping the system easy to use.

2.8. Fare Collection Technologies

Technology plays an important role in the efficiency and reliability of the business operation management. If the technology is used properly, it will not only increase the efficiency of the service provider but also improve the user's satisfaction and confidence. Nowadays, technology is being used in almost all industries and service sectors of the developed world, and it has brought the world into one village. In this regard, various technologies have been used to make the transport service sector more user and environmentally friendly, accessible, effective, and efficient.

There are different types of technology utilized in managing the fare collection specifically in public transport and has brought many benefits to the sector. The following are major technologies utilized in delivering the public transport services.

- SMS tickets

SMS ticket is a specific type of electronic travel document that allows electronic ordering of tickets through SMS sent from a mobile phone. Payment is done by sending short text messages SMS in a special form on a specific phone number. The service system returns a message that a passenger shows when checked by transport inspection of travel documents as the authorized employee may check the display unit of the passenger mobile device (Olivková, 2012).

- RFID technology

Another alternative is to use non-cash check-in technology RFID (Radio Frequency Identification) allowing contactless identification and data transmission by synergies of

electromagnetic alternating fields acting between the chip and the sensor. As data media passive or active chips are used. The application of the technology can be found not only for public transport system, it is also used as warehouse automation technology, attendance, access respectively, catering systems etc. The card is an intelligent storage medium with a high degree of security and therefore its use is safe for many other applications (Olivková, 2012).

- NFC technology

NFC (Near Field Communication) is a new technology enabling contactless data exchange between two NFC devices over a distance of 2–10 cm. In simplicity, it can be described as a technology that combines Smart Card (RFID) and mobile phone. NFC is used for electronic ticketing in public transport, but also as a means of payment (card). NFC has the potential to become the most widely used technology in the sector of mobile payments and communication technologies of the future (Olivková, 2012)

- Check-In / Check-Out

The procedure is based on the principle of login and logout of the passengers through the smart card; the passenger is checked by means of an electronic wallet with the allocation of appropriate financial amount. Checking terminals are located on each door. When entering the vehicle and attaching a smart card to a terminal the electronic wallet counts a deposit ticket to the destination stop. When a passenger is to exit he/she attaches the card to a terminal again and this deposit will recalculate the price that corresponds to the actual distance travelled. The check-in method, which is used by passengers that do not possess time fare, simulates a single electronic ticket. For regular passengers card works as a long-term prepaid time ticket and passenger is usually not required to attach the card to the terminal. This method of checking place increased demands on the passenger's frequent manipulation with a smart card and also on the required equipment of the carriers' vehicles (Olivková, 2012).

2.9. International Best Practice

2.9.1 "TAP & GO Card" Kigali, Rwanda

Rwanda is a small landlocked country like Ethiopia which is found in the central part of Africa. Kigali is the capital city and located in the geographical heart. It is made of three districts with a total of 1.2 million inhabitants. The country has emerged as a dominant technology hub in the Africa continent where technology and innovation is exported across Africa. AC group is a local Rwandan technology company that transform the country public bus fare collection system. All

public buses in Kigali utilize an integrated electronic ticketing system. The system has been implemented on more than 500 buses within the city. It bosts 2 million customers with over 170 million transactions.

System description

The Tap & Go card initiative in Kigali is a NFC (Near Field Communication) card-based technology, operating with the Kigali Bus Service(KBS) company. The system has onboard fare validators, GPS and speed monitoring equipment. Passengers pay the travel fare by tapping on the card readers, and can top-up the cards at mobile unit setup along the service route and through mobile money platforms (Bhan, 2015; East African Business Week, 2015).

Range and roles of stakeholders

The Tap & Go initiative was launched in Kigali in 2015 by the AC Group, a locally based technology solutions company, in partnership with the government and the KBS bus company (Bhan, 2015; East African Business Week, 2015). The system was piloted with KBS buses for eight months before the system launch (Bhan, 2015). KBS services operate largely without a schedule, but on five fixed routes, enjoying a public transport passenger market share of 18%. The dominant mode of public transport in the city is the minibus with a market share of 25%. The Tap & Go introduced to give the user the convenience and enhanced experience, the Tap & Go App comes with the comfort of facilitating upcountry travelers with the possibility of booking and paying for their tickets from home.

2.9.2 "Oyster Card" London, UK

London was one of the earlier cities to implement contactless smart cards based integrated fare collection system, which could be used across various public transport modes. The smart card "Oyster" was launched in the year 2003 and became hugely successful among transit users as well as the public transport operators. This smart ticketing system helped the Transport for London (TfL) to reduce the cost of revenue collection from 14.3% in 2005/06 to 8.8% in 2012/13. The automated fare collection has a tremendous event on London transport both financial and socially. One of the most important advantages was its reduction of revenue loss or fraud. A UK department of transport study shows that since the introduction of Oyster Cards the percentage of irregular travel (Journey made with either no ticket or the wrong ticket) fell by approximately 2.5% to 1.5% of the total journeys made. It was estimated that this reduction in fraud represented cost savings of up to 40 million euros per year.

Sl. No.	Parameter	Description
1.	Major public transport	Public Buses, Light Railway, London Tram
2.	Ticketing system	Automatic Fare Collection System (AFCS) for all modes
3.	Ticketing media	**Contactless smart cards**, **Contactless bank cards** **Paper magnetic stripe tickets**, NFC enabled **mobile phones**
4.	Fare integration	Common payment media **(Oyster Card)** across all transport modes
5.	Responsibility of setting fares	Mayor of London
6.	Fare structure	For Buses – Flat fares; no single ticket/cash payment option; free transfer from another bus/tram within one hour.
7.	Exploitation of data	Bus Operators (Transport for London) uses ticketing data to plan the operations and improve the services

Table 2. London Integrated Fare Collection System

2.9.3 "Octopus Card" Hong Kong, China

Hong Kong has one of the most successful integrated fare collection system commonly known as Octopus system, based on the name of the Smart Card "Octopus". The Octopus is a rechargeable and contactless smart card used on most means of public transport modes/ agencies in Hong Kong such as bus, minibus, ferry, tram & MTR Trains, as well as making payments at all major retail stores such as 7-Eleven, fast food restaurants, supermarkets, self-service vending machines, personal care stores, major photo service outlets, etc.

Key Statistics–At a Glance Source: http://www.octopus.com.hk

- Over 33 million Octopus cards in circulation
- Over 14 million transactions a day
- Daily transactions value over HK $189million
- More than 20,000 retail outlets from over 9,000 service providers accept Octopus

- More than 76,000 Octopus readers all over Hong Kong

Sl. No.	Parameter	Description
1.	Major public transport modes	Light Rail, Buses, Trams, Major Transit
2.	Ticketing system	Automatic Fare Collection System (AFCS) for all modes
3.	Ticketing media	**Contactless smart cards** Cash (in buses and trams) for single journey
4.	Fare integration	Common payment media (**Octopus Card**) across all transport modes Free/discounted transfers among modes
5.	Responsibility of setting fares	Government of Hong Kong Annual fare adjustment based on consumer price index, wage index and productivity increase factor
6.	Fare structure	Distance based, Zone based, Discount for children, senior citizens, students and persons with disabilities Higher fare for single journey tickets, Tourist day passes Monthly passes (with limited number of rides)
7	Exploitation of data	Transit operators use ticketing data to plan and improve their services

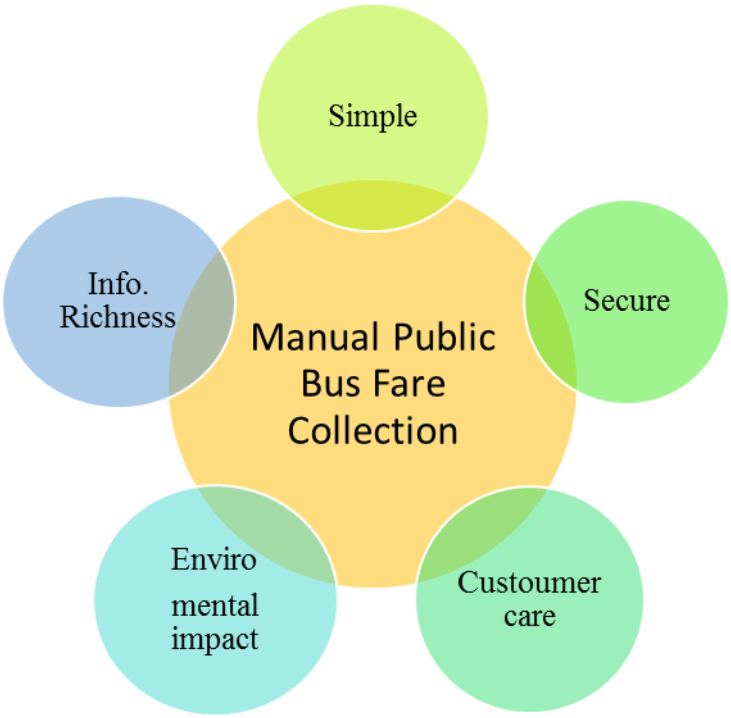
Table 3. Hong Kong Integrated Fare Collection System

2.10. Conceptual frame work

A conceptual framework is a product of a researcher's reasoning or tentative conclusion, The concepts arrived at are based on a literature review where evidence is still incomplete, or theories arrived at are inadequate (Regoniel, 2021). It is a synthesis of interlinked concepts that provide a comprehensive understanding of a phenomenon.

This conceptual frame work is developed by reviewing different literatures and intended to show the relationship between the dependent variable (manual fare collection system) and the five

independent variable's (simple, secure, quickness, reliable and information richness). This dimensions of service quality for fare collection management for government owned public buses adapted from attributes of service quality as defined by EN 13816.



Source: Adapted from EN 13816 Public Transport Service Quality Standards

Figure 7. Conceptual Frame Work

CHAPTER THREE: RSEARCH METHODOLOGY

3.1. Introduction

This chapter discusses on the background information of the study area such as the location, transportation characteristics, and major routes that originates &ends in the terminal and the chapter also discussed the methodology utilized, the philological consideration, the research approach, the research design, techniques used for data collection, and sampling techniques explained thoroughly.

3.2. Background of the study area

The area of the study will focus on one of the busiest, congested and very dense in population in the country Addis Ababa city, Ethiopia. Addis Ababa, home to 17 percent of Ethiopia's urban population, is at a pivotal moment in its modern history (UN-Habitat, 2017). The city is undergoing a wave of rapid population and economic growth. The number of private vehicles in the city is rapidly increasing, contributing to the worsening congestion, loss of the public realm, air pollution, and traffic fatalities. As the city continues to modernize and motorize major investments and strategic decisions required to keep the economy humming and avoid the negative impacts generated by private motorized mobility and traffic congestion (ITDP, TPMO, AARTB, & UN-HABITAT, 2019).

One of the approach that the negative impact of private vehicles addressed with an introduction and supply of public bus transport by making the service operation at the expected quality level and the required service standards. To this regard, fare collection management of public bus transport has a strong tie-up with service quality rendered by the bus operators. The operational service that has been given to passengers usually generated at bus terminals across the Addis Ababa city. Bus terminal is a transport infrastructure at which the point where bus route starts or ends, where the buses stop, reverse, and wait before departing on the journey. It has different facilities in handling of passengers to board and alight with interchange between large volume of bus and passenger. This bus terminals signposted at the city master plan at different location. The terminals either ideally exist or as physical present with a certain "facilities".

The study area focuses on three bus terminals namely; Piassa, Mexico, and Megenagna, terminals of Anbessa and Sheger which is intended to assess the physical features inside and outside the buses and to consider the general operation how public transport fares are collected, organized, managed and sent to the corporate bus operator office. All the three major hubs were

important for mobility of buses as well as passengers and the characteristics of each location discussed below.

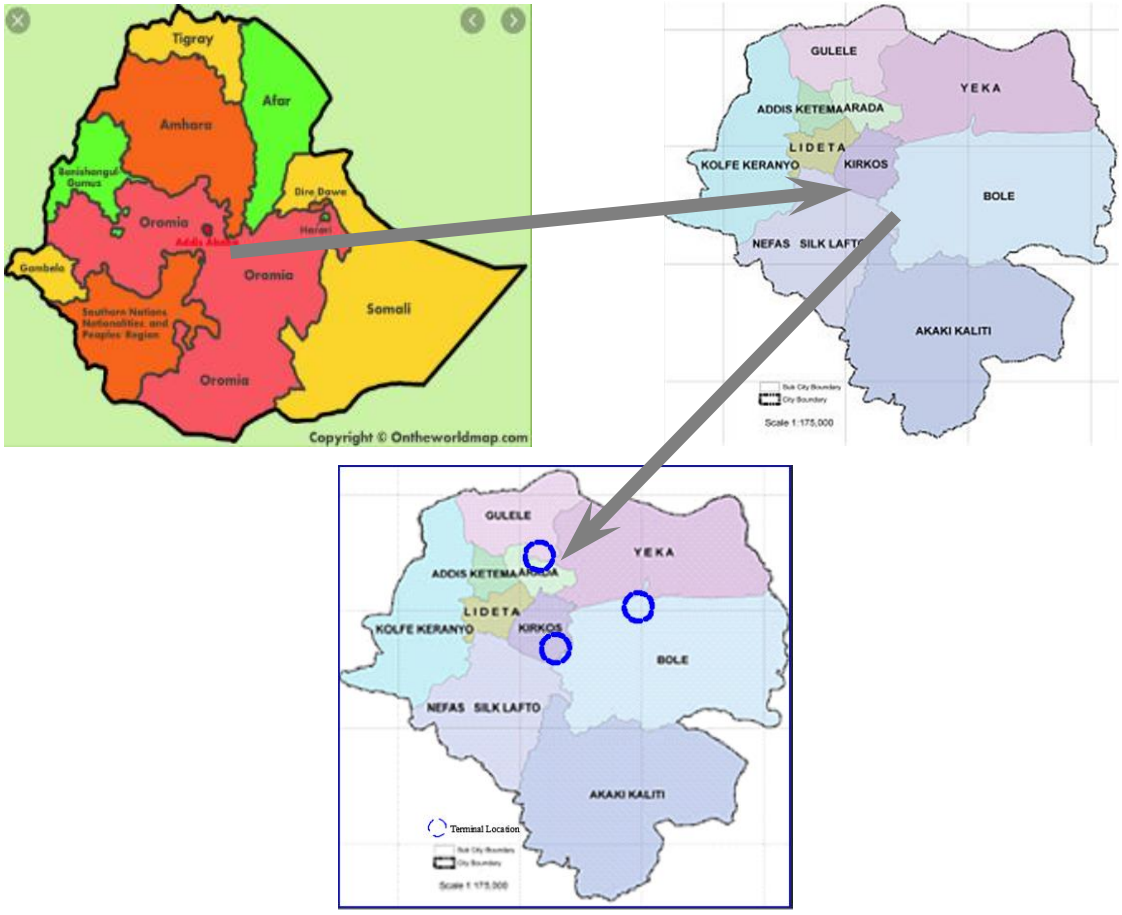


Figure 8. Geographical Location of Piassa, Mexico and Megenagna Terminals

3.3. Research Methodology

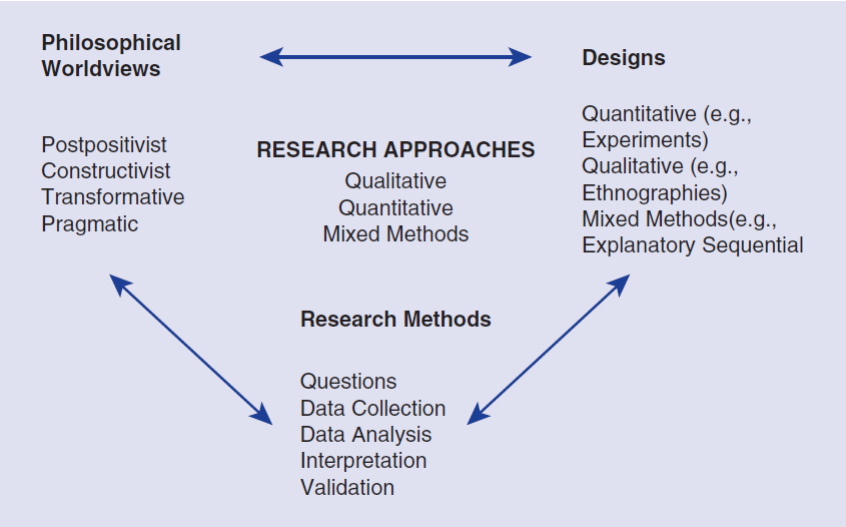
Appropriate utilization of the methodology for any research work helps to get better and reliable results and achieving the specified objectives and answers to the research questions. It is usually stated in most studies that research methods and methodology words stated and used interchangeably; perhaps using methodology as more verbal way of saying method. However, the two words have different meaning. Research Method simply to mean that techniques and procedures used to obtain and analyze data. This includes usually questionnaires, observations, and interviews. In the other way research methodology refers the theory of how research shall be under taken. So the methodology utilized to conduct this thesis is both quantitative and qualitative research approaches.

The research mechanism used to collect data was both primary and secondary data. Primary data will be obtained through field observations to assess the existing fare collection process, challenges and how it is managed. The questioner survey distributed to passengers, at selected Sheger and Anbessa city Bus Terminals as well as at randomly selected road sections (bus stations) of the route, while the semi-structured interview were addressed to the concerned ticket conductors, dispatchers, bus supervisors, and higher officials of the Public Transport Agencies. Secondary data were acquired from pertinent works of literature available by different government stakeholder institutions, transport company publications, reports and from relevant websites. At the same time, the fare collection process reviewed based on international best practices and experiences. Analysis tool utilized to analyze the collected data and to reach some results.

Questionnaires, financial statements, and international practices/standards utilized to analyze the quantitative research approach and field observations, semi-structured interviews, reports, publications, standards, etc, used to analyze qualitative research approach.

3.4. Research Approach

According to (Cresewel, 2018), there are three basic components of a research approach: philosophical world view, research design, and methods of the research.Philosophical world view originates from epistemology considerations, which determines aparadigm as per the philosophical orientation of a research approach. Research design refers to the overall strategythat one chooses to face the problem which requires integration of different components of the study in a coherentand logical way, thereby, ensuring to solve the problem in efficient way. Research methods are ways to get information from the sample(Grover, 2015).Figure 8 explains the interconnection between the three elements and indetail explained in separate sub-sections of the chapter.



Source: (Cresewel, 2018)

Figure 9: Research Approaches: Philosophical Worldviews, Designs, and Research Methods

3.4.1 Philosophical Consideration of research

Research philosophy relates to the development of knowledge and the nature of that knowledge. It contains different important assumptions about the way in which the world viewed and interms of ways of thinking the research philosophy can be viewed i) epistimology ii) ontology and iii) Axiology (Saunders, Lewis, & Thornhill, 2009). Epistimology concerns what constitutes aceptable knowledge in the field of study. Ontology is a branch philoshophy which is concerned with the nature of social phenomena as entites. It concerned with nature of reality wheras axiology is a branch of philosophy that studies jujements about value.According to the research onion theory of (Saunders et al, 2012) there are four research philosophies; these are pragmatism, postivisim, interpertisim and relalisim.Pragmatism holds that the most important determinant of the epistemology, ontology and axiology adopted is the research question and hyphotesis.

Therefore the philosophy that was followed in this study was pragmatism. From the philosophical consideration standpoint, pragmatism recognizes that there are many different ways of viewing the world and undertaking research, operational excellence for service sector not common like the operational service of transportation industry which is rare as compared to the manufacturing industry.That is why in this study both qualitative and quantitative methods were employed in the process of data collection and analysis.

3.4.2 Research design

Whatever the type of research is, the research design is a mechanism to answer the research question or illustrates how to collect the necessary data to the poof of the hypothesis, indicate how many and in what way the target groups are involved in the study, it also point out in the way that data collected, analyzed, and create a platform for deciding the research layout and strategy. As a result, the research design determines when, by whom, and under what circumstances, and suggests ways of analyzing the necessary information.

The below table illustrates the methods, the sample size and the target groups.

Data Type	Methods	To See What?	Instrument used	Sample Size				Target Groups
				Sheger Bus	Number	Anbessa Bus	Number	Organizations/Individuals
Primary Data	Field Survey	Existing fare Collection Process, challenges, and systems the Buses currently utilizing	Photo Camera/ Researcher Observation	Selected Terminal (Megenagna, Mexico and Piassa Terminal)	3	Selected Corridor (Megenagna, Mexico and Piassa Terminal)	3	Sheger and Anbessa Bus Terminal Locations
	Questioner	Challenges faced while using the existing public transport fare collection (Service Quality)	Paper-based Structured Questioner	Selected Terminal (Megenagna, Mexico and Piassa Terminal)	192	Selected Corridor (Megenagna, Mexico and Piassa Terminal)	192	Passengers
	Semi-Structured Interview	How the process of ticketing media utilized, reconciled and challenges usually exhibited and management system implemented	Paper-based Interview	Transit Office/Depot	10	Transit Office/Depot	10	Transit Officers, Bus Schedulers and Cash/Ticket reconcilers

Data Type	Methods	To See What?	Instrument used	Sample Size				Target Groups
				Sheger Bus	Number	Anbessa Bus	Number	Organizations/Individuals
Secondary Data	Financial Statements	How much cost incurred for ticket printing as compared to other expenses.	Financial Reports	Transit office/Depot	At least two year financial statement	Transit office/Depot	At least two year financial statement	The report will be accessed from the Finance Department of the transit service provider
	Organizational Reports, company publications, and relevant websites.	To get the overall picture of the transit organization, the plan viz fare collection system and any issue or projects related to the research topic	Company Monthly & Yearly Reports, publications	Transit office/Depot	At least one yearly report	Transit office/Depot	At least one yearly report	The report will be accessed from plan and budget department of the transit service provider
	Books, Similar research papers, etc.	To meet the research Objective	Browsing Internet, Library Catalogue	NA	NA	NA	NA	NA
	International Standards (if any)	To meet the research Objective	Browsing the Internet,	NA	NA	NA	NA	NA

Table 4: Research Methods, Sample Size and Target Groups

NA-Not Applicable

3.5. Population and Sampling

As most researchers agreed a population is a group of individuals who have the same characteristic. This population may be small or large in number mainly depends on in what are the study is going to be conduct. In this study since the number of population is high the researcher is going to take a representative population or target population.

A research population is generally a large collection of individuals or objects that is the main focus of a scientific query also a research population known as a well-defined collection of individuals or objects known to have similar characteristics (Research Population, 2009).

According to (Creswell, 2016) a target population (or the sampling frame) is a group of individuals (or a group of organizations) with some common defining characteristic that the researcher can identify and study.

3.5.1. Target Population

According to (Creswell, 2016) a target population (or the sampling frame) is a group of individuals (or a group of organizations) with some common defining characteristic that the researcher can identify and study.

Target population is an individual for whom the researcher wants the research results to apply to. Therefore, the target populations for the study will be passengers and staffs of the two public buses, which are located in Addis Ababa city. The study was undertaken to examine and assess the manual fare collection system on sheger and anbessa bus transportation. Due to the constraints of money and time the sampling frame was restricted to only buses operate in Addis Ababa.

3.5.2. Sampling Technique

The process of identifying target population is known as sampling. Sampling is the process of selecting a statistically representative sample of individuals from the population of interest the researcher will use (Kamangar F, 2013).

To conduct the research three bus stations namely Mexico, Megenagna, and Piassa were selected. On this research stratified sampling methods were used to select the sample from the available population. The reason behind using this technique is as the elements of samples are chosen from some specific strata; the accuracy of statistical results is higher than that of simple

random sampling. Also since it is difficult to contact/access all the sample population, this method is best as samples are easily involved in research with this method.

Source: Own survey 2021

Figure 10. Data Collection at typical station (Piassa) and inside the bus

3.5.3. Sampling size

As per the information gathered from the bus operators more than 222,000 and 70,000 passengers carried daily by Anbessa and Sheger respectively. This is a huge number passenger or population. It will be a challenging with such large proportion of population to take a reasonable the sample data. However, the researcher assumed the population be an infinite population and for infinite population a formula developed for a reasonable sample size by considering the critical table value, the population variability, and the maximum allowable error (Cochran, 1963). An optimum sample is the one which fulfills the requirements of efficiency, representativeness, and reliability.

According to (Cochran, 1963) the following formula gives the size of the sample in case of infinite population and utilized for this particular study.

$$n = \frac{z^2 * p * q}{e^2}$$

Where

n =the total number of sample required

Z=the critical table value of the confidence level (z=1.96)

p=the population variability (p=0.5)

q=the probability of the population not to be occur (q=1 -p=0.5)

e =the maximum allowed error i.e. (e =0.05)

Therefore, the researcher will take the maximum allowed error as 5% at a confidence interval level of 95% and the moderate population variability interval is 0.5(p=0.5) because this shall allow the researcher a largest sample size and the minimum error(q=0.5).

n= $(1.96^2*.5*.5)/0.05^2$ which is approximated to 385

So, the researcher distributed 385 questionnaires to have a better sample size.

3.5.4. Data collection procedure

Even though different data collection ways are available we can collect data depending on its data primary or secondary or qualitative or quantitative data.

The followings are common procedure we used,

A. Primary data collection:

   I) Survey questionnaires (demographic profile of customer by using descriptive Statistics, Inferential Statistics questions with five point likert scale format)

   II) Semi-structured Interview Questions

   III) Observation

B. Secondary data collection, the secondary data collection is basically data from internet, document, records, and reports of other related materials.

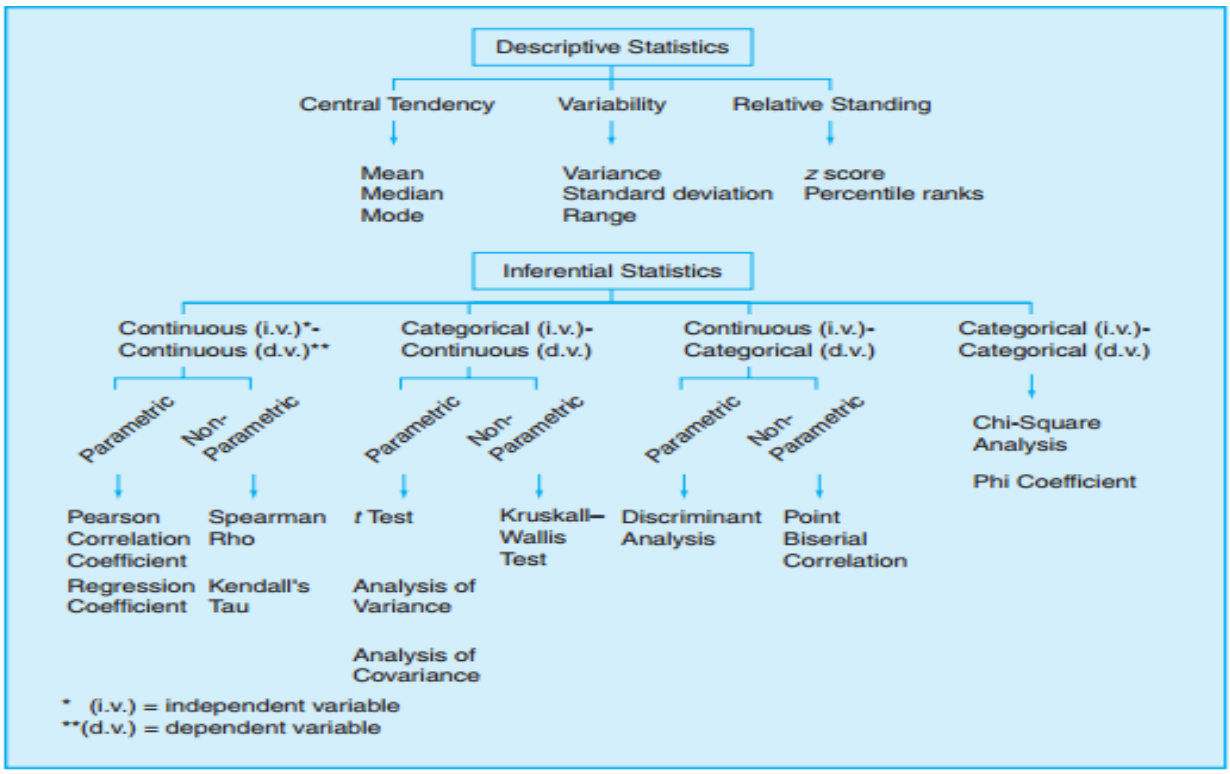
Forms of Data Collection	Type of Data	Definition of Type of Data
Observations	Fieldnotes and drawings	Unstructured text data and pictures taken during observations by the researcher
Interviews and questionnaires	Transcriptions of open-ended interviews or open-ended questions on questionnaires	Unstructured text data obtained from transcribing audiotapes of interviews or by transcribing open-ended responses to questions on questionnaires
Documents	Hand-recorded notes about documents or optically scanned documents	Public (e.g., notes from meetings) and private (e.g., journals) records available to the researcher
Audiovisual materials	Pictures, photographs, videotapes, objects, sounds	Audiovisual materials consisting of images or sounds of people or places recorded by the researcher or someone else

Source (Creswell, 2016)

Figure 11. Forms of Data Collection

3.6. Data Analysis

In statistics the next step after the quantitative data is collected will be analyzing it. Analysis involves preparing data for analysis, running the analysis, reporting results, and discussing them. After the quantitative data is collected through questioners it will entered into **SPSS version 23** and analyzed. The researcher is going to use both descriptive and inferential statistics in the analysis process. From descriptive statistics mean, median, mode, variance and standard deviation shall be used in this study. In this study, descriptive analysis is chosen because of its simplicity and clarity. While person correlation, chi square, T-test, analysis of variance and covariance shall be used from inferential statistics. In addition linear multiple regressions also be used as inferential statistics. The detail about family of Statistics in Educational Research is presented in the figure below.



Source (Creswell, 2016)

Figure 12. Family of Statistics in Educational Research

On the same way to quantitative data the qualitative data collected through interviews and other sources will be analyzed. Analyzing qualitative data requires understanding how to make sense of text and images so that it can form answers to your research questions. This analysis initially consists of developing a general sense of the data, and then coding description and themes about the central phenomenon, it is inductive in form, going from the particular or the detailed data

(e.g., transcriptions or typed notes from interviews) to the general codes and themes (Creswell, 2016). Analyzing qualitative data involve a simultaneous process of analyzing while you are collecting the required data.

When the data is collected, the researcher will be analyzing other information previously collected, looking for major ideas. In the quantitative data collection, the researcher might collect information from individuals and return for more information to fill in gaps in their provided information as the researcher's analysis of their information proceeds. Finally since qualitative research is interpretive research in nature, the researcher will make a personal assessment as to an explanation that will fit the themes that capture the major categories of information.

3.7. Validity and Reliability

Validity is defined as how much any measuring instrument measures what it is intended to measure. Establishing the validity of the scores in a survey helps to identify whether an instrument might be a good one to use in survey research (Creswell, 2016)

Before using the questionnaire for the study it is always advisable to conduct pilot study or pilot survey for testing the questionnaires. In a big enquiry the significance of pilot survey is felt very much. Pilot survey is in fact the replica and rehearsal of the main survey. Such a survey, being conducted by experts, brings to see the weaknesses (if any) of questionnaires and also of the survey techniques. From the experience gained in this way, improvement can be effected (Cochran, 1963). In order to keep the validity of the instrument, the researcher will develop questionnaires with some modifications to comply with the current study as well as conducted a pilot test on the questionnaires that developed for the study. An opinion and advice taken on the proposed questionnaires from the advisor as well as from the staffs of the operators.

Reliability is the degree to which the measure of a construct is consistent or dependable it implies consistency, but not accuracy. The level of reliability of the instrument that is the consistency of the variables is will checked with the Cronbach's alpha statistics. Cronbach's alpha is an index of reliability associated with the variation accounted for by the true score of the underlying construct. Cronbach's Alpha can only be measured for variables which have more than one measurement question. 0.5 is a sufficient value, while 0.7 is a more reasonable Cronbach's alpha. The result of this test will be presented in chapter four.

3.8. Ethical Consideration

The researcher attempts to maintain scientific objectivity throughout out the study, recognizing the limitations of the competence. Every person involved in the study will entitled to keep their right of privacy and dignity of treatment, and no personal harm caused due to the subject in the research. Information obtained held with a strict confidentiality and all assistance, collaboration of others and sources from which information was drawn is acknowledged.

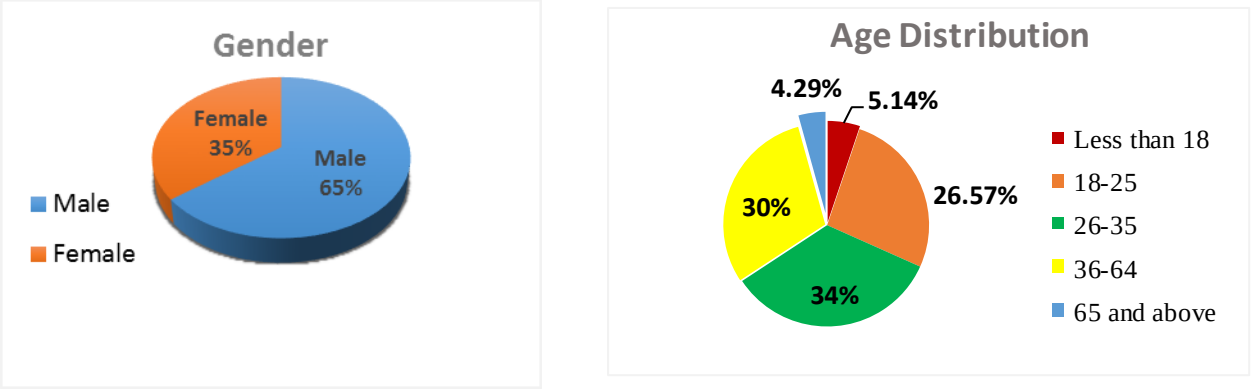
CHAPTER FOUR: DATA ANALYSIS AND FINDINGS

4.1 Introduction

In this chapter findings of the research and the data analyzed were presented. The analysis include respondent's basic information like their demography, and transport service information of passengers explained. Furthermore, descriptive analysis, Pearson correlation, and linear regression analysis.

4.2 Demographic Variable Analysis

Three Hundred eighty-four questionnaires were distributed to the respondents and out of the 384 questionnaires 368 of them were collected with a response rate of 96.0 percent. However, 350 responses were valid with complete answers. The demographic characteristics include: gender, age, level of education, and frequency of usage of bus by the respondent and other variables utilized in the analysis. This aspect of the analysis deals with the personal data on the respondents of the questionnaires given to them. The figure below shows the details of background information of the respondents.



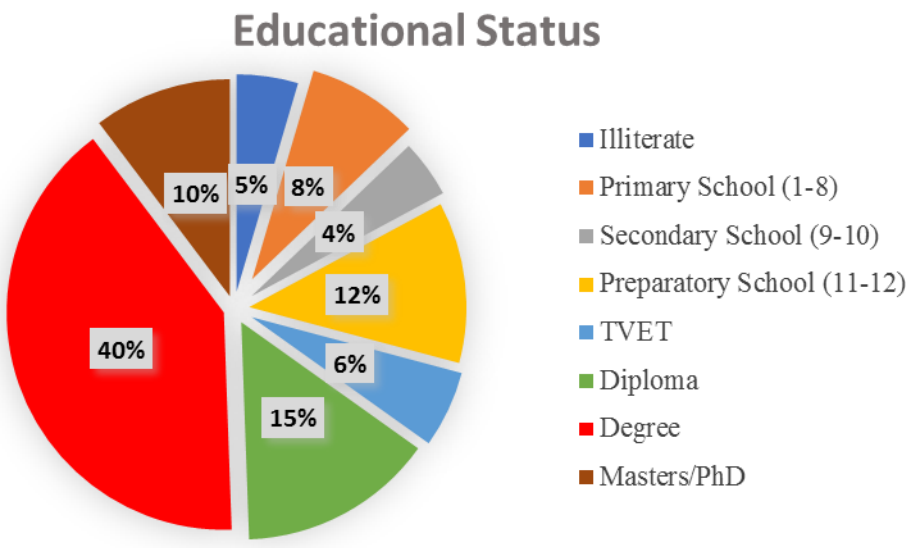
Source: Own survey 2021

Figure 13 Gender and Age Distribution of Passengers

Out of the 350 respondents, 64.57% were male and 35.43% were female. This shows the number of male passengers is more than the female passengers in this research.

As shown in the above figure most of the passengers were in the age between 26 and 35 which accounts 34% of the passengers. Next to this 30% of the passengers were on between 36 and 64.

On the other hand 26.57% of the respondents are on the age of 18-25. 4.29% of passengers were below 18 years old.



Source: Own survey 2021

Figure 14. Educational Status

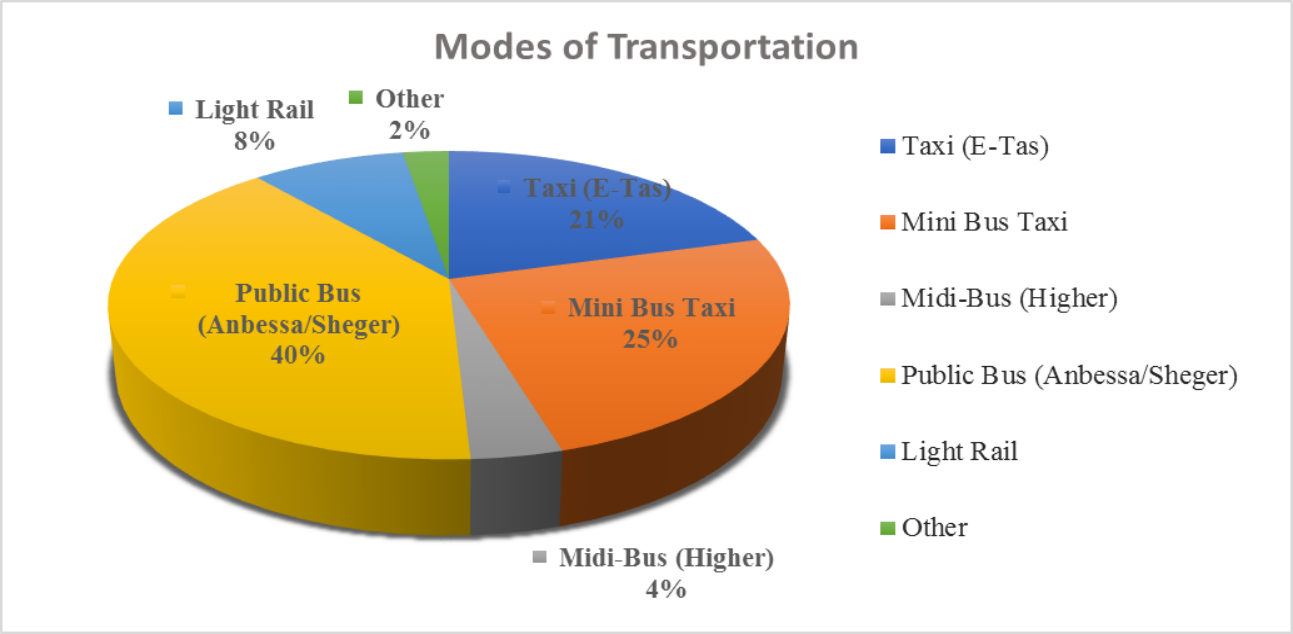
Similarly, the above figure shows the educational level of interviewed passengers. 40.29% of passengers have first degree, the next highest percentage accounts for 14.57% for diploma holders. Passengers who have completed their preparatory education accounts 12% of passengers. On the other hand master's degree holders, passengers who has completed their primary school and passenger who has completed TVET education accounts 10.29%, 8.25% and 5.71% respectively. The remaining 4.57% are Illiterate and other 4.29% are secondary school complete.

4.3 Transportation Service Information of passengers

Transport Modes means a type transportation that a certain passenger usually selects like Min-bus, Public bus, Taxi, mid bus, Light rail, Walking, Bike or Bicycle for transport. Usually the transport mode can be classified as Motorized or Non-Motorized Transport (NMT). The difference is based on the existence of an engine on certain mode. Bicycle, walking, and cart driven transports are categorized as NMT, and the rest are Motorized transport.

These query was presented to passengers which modes of transport they usually use for their day to day activities. According the figure below, since most of the data were collected at bus terminals, bus stations and inside the bus, majority of them (40%) answered they use public buses; Anbessa and sheger, 25% Mini-bus Taxi, 21 % Taxi (E-tas), 8% Light rail, 4% Midi bus,

and others (2%) like as explained as above either they use NMT walking and bicycling or they use their personal car.

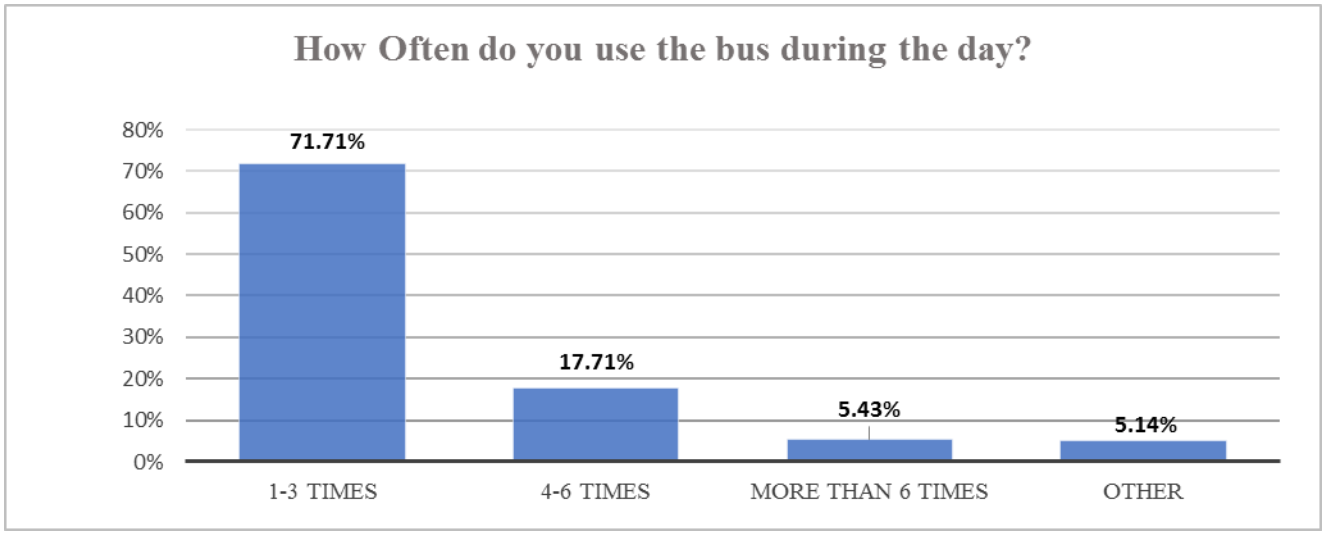


Source: Own survey 2021

Figure 15. Modes of Transportation

*E-Tas is an application-assisted taxi transport service.

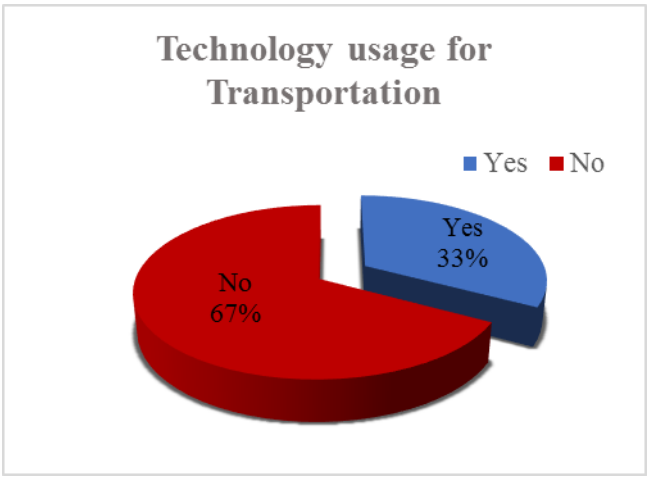
Form graphical presentation in the above figure one can realize that the predominant mode of transportation for the passengers (more than 70%) is a Public transport as a mode of transportation to go from one place to another.

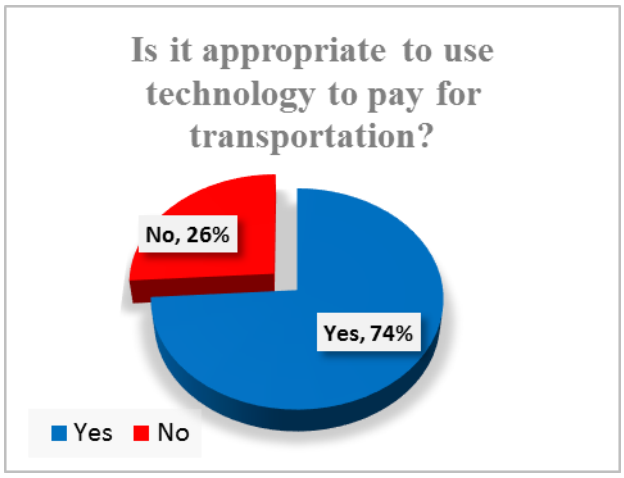


Source: Own survey 2021

Figure 16. Frequency of bus use in a day

According to the above figure, in terms of frequency of using the bus service the highest (71.71%) of passengers use the service 1-3 times per day. On the other hand, 17.71% of passengers use 4-6 times per day. Passengers who have said more than 6 times per day accounts 5.43%. From the figure most of the passengers use the bus service usually for Home to Work purpose.



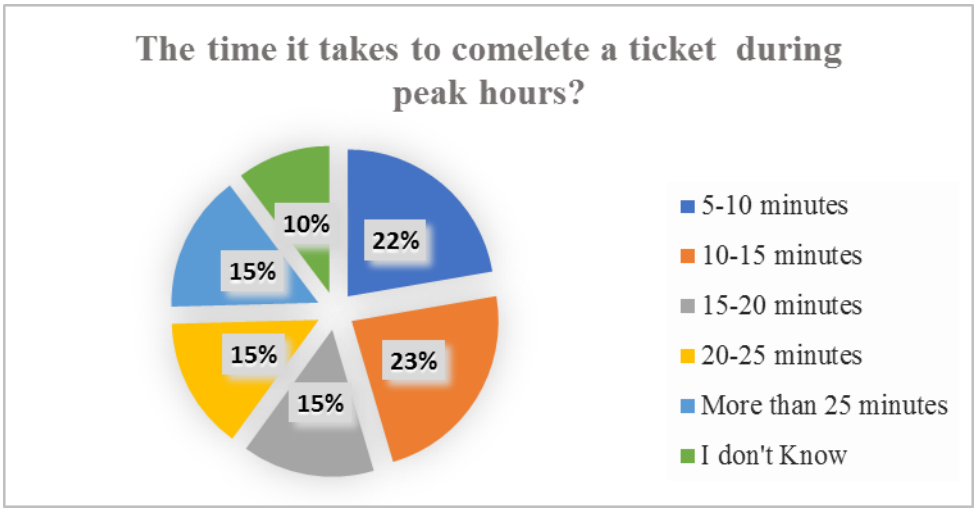


Source: Own survey 2021

Figure 17. Technology usage for transport and its appropriateness

The other query was more related with technology. The question is intended to know the interaction of passengers with technology and their experience towards the paying the fare using the technology. The query was “have you ever tried to get transportation by using technology”? and 67.14% of passengers said no for this question. The remaining 32.86% of passengers said yes. This result shows that most of the passengers were not interested with use of technology for transportation.

The other query in the above figure result also shows that 74% of the respondents said that using technology to pay transportation fee is appropriate. On the other hand, 26.00% of the respondents said it is not appropriate to use technology for transportation fee. Customers usually require user friendly, safe, secure and easily accessible service payment options for transportation.



Source: Own survey 2021

Figure 18. Time it takes to complete the ticket issuance

The other question for collecting transportation service information of passengers was ‘‘how long does it take to complete a ticket to pick up bus passengers during peak hour?’’. For this question the researcher has been prepared six options to be chosen by the passengers. The highest number of passengers said it takes 10-15 minutes, this is 23.14% of passengers. On the other hand, 22.29% of passengers said it takes 5-10 minutes to complete a ticket to pick up bus passengers during pick time. The remaining 15.14%, 14.57% and 10.29% of passengers said more than 25 minutes, 20-25 minutes and I don’t know respectively. The higher the time consumed the more the dwell time and has a greater impact on the travel time as well as the number of trips that the bus should cover in a day. It also related with adherence of the bus to schedule which can be expressed in terms of punctuality and regularity.

4.4 Descriptive Analysis of Respondents

If the researcher knows about the measurement scale and the distribution of the variables in the data set, the researcher can decide on how to best describe variables. For exploratory data analysis, we use a set of tables and graphs as well as measures of central tendency and variation.

In terms of tables the researcher is going to use frequency table. With regard to graphs the researcher have used pie chart on the above section. For the measures of central tendency the researcher will show results of the collected data by using the mean (average) measurement. While for the measures of variation standard deviation were used in this study.

Passenger Care		SD	D	N	A	SA
PC1	Frequency	64	85	75	87	39
	%	18.3	24.3	21.4	24.9	11.1
PC2	Frequency	53	113	85	93	6
	%	15.1	32.3	24.3	26.6	1.7
PC3	Frequency	98	104	49	69	30
	%	28.0	29.7	14.0	19.7	8.6
PC4	Frequency	92	121	77	57	3
	%	26.3	34.6	22.0	16.3	0.9
PC5	Frequency	42	93	80	93	42
	%	12.0	26.6	22.9	26.6	10.4
PC6	Frequency	45	67	67	132	39
	%	12.9	19.1	19.1	37.7	11.1

Source: Own survey 2021

Table 5 passengers' perception towards passenger care

Passenger care, findings indicated that 18.3% of the passengers strongly disagree to the question that, one of the values of the public bus fare system is passenger/Customer first, while 24.3% disagree. 21.4% and 24.9% of the respondents respond neutral and agree respectively. On the other hand, 11.1% of the respondents strongly agree. The second question for passenger care variable were ‘‘the current bus fare collection system creates a sense of self confidence to fare collectors and ticket controllers’’. For this question 26.6% passengers agree, 32.3% disagree and 24.3% neutral.

Information Richness		SD	D	N	A	SA
IR1	Frequency	70	67	91	90	32
	%	20%	19.1%	26%	25.7%	9.1%
IR2	Frequency	74	77	103	66	30
	%	21.1%	22%	29.4%	18.9%	8.6%
IR3	Frequency	102	86	81	66	15
	%	29.1%	24.6%	23.1%	18.9%	4.3%
IR4	Frequency	109	92	80	51	18
	%	31.1%	26.3%	22.9%	14.6%	5.1%

Source: Own survey 2021

Table 6 Passengers' perception towards Information richness

The second independent variable is information richness. The first question on this variable were with regard to sufficiency of available information's on the bus ticket about the journey and 26% of passengers were neutral, 25.7% were agree, 20.0% were strongly disagree while 19.1% were disagree and the remaining 9.1% of passengers were strongly agree. The second question was about availability of all necessary information's on the current fare media (paper ticket). For this question 21.1% of passengers strongly disagree, 22% disagree, 29.4% were neutral, 18.9% agree and the remaining 8.6% of passengers were strongly agree. When we come to the third question of this variable (information richness) it was about integration of the current fare media with other transportation mode i.e taxi, rail transit. 29.1% of the respondents strongly disagree, 24.6% disagree, 23.1% were neutral and the remaining 18.9% and 4.3% of passengers were agree and strongly agree respectively.

When we come to the last question of this variable it was about suitability of the current fare media for impaired vision passengers and 31.1%, 26.3% and 22.9% of the passengers were strongly disagree, agree and were neutral respectively for this question. As depicted on the last row of the above table the remaining 14.6% and 5.1% of passengers agree and were strongly agree for this question.

Comfort		SD	D	N	A	SA
C1	Frequency	84	65	81	84	36
	%	24%	18.6%	23.1%	24%	10.3%
C2	Frequency	93	86	78	66	27
	%	26.6%	24.6%	22.3%	18.9%	7.7%
C3	Frequency	87	106	53	78	26
	%	24.9%	30.3%	15.1%	22.3%	7.4%
C4	Frequency	72	94	62	84	38
	%	20.6%	26.9%	17.7%	24%	10.9%
C5	Frequency	51	82	71	113	33
	%	14.6%	23.4%	20.3%	32.3%	9.4%
C6	Frequency	51	96	79	79	45
	%	14.6%	27.4%	22.6%	22.6%	12.9%

Source: Own survey 2021

Table 7 Passengers' perception towards comfort

Comfort was the third independent variable with six questions with in it. The first question was about fare media handling and comfortbility after payment has done. For this question strongly disagree and agree passengers were 24% for each. On the other hand, 18.6% and 23.1% of passengers were disagree and neutral respectively. When we see the second question it trys to assess passenger's perception on easiness and user friendly of the fare collection system, results with 26.6% of strongly disagree, 24.6% disagree, 22.3% of neutral, 18.9% of agree and 18.8% of passengers were agree.

On the third question passengers asked "Are you confidence to give positive word of mouth about the fare collection?". Results 30.3% disagree and 24.9% strongly disagree, while 22.3% of passengers were agree and 7.4% were strongly agree. On the other hand, 26.6% of passengers disagree to pay fare on bus window at bus station and terminal, while 10.9% of them are strongly agree to pay on windows. But 17.7% of passengers were neutral for this question.

Security		SD	D	N	A	SA
S1	Frequency	79	96	49	96	30
	%	22.6%	27.4%	14%	27.4%	8.6%
S2	Frequency	**118**	**95**	37	66	34
	%	33.7%	27.1%	10.6%	18.9%	9.7%
S3	Frequency	72	101	55	77	45
	%	20.6%	28.9%	15.7%	22%	12.9%
S4	Frequency	82	69	72	64	62
	%	23.4%	19.7%	20.6%	18.3%	17.7%

Source: Own survey 2021

Table 8 Passengers' perception towards security

Security is a critical issue that is to be addressed by any service giving organization. Because of this the researcher used it as one independent variable to measure its impact on service equality. In this study four questions have been prepared to collect the passenger's perception towards service security. The first question was about the bus fare collection system security in the whole journey, and 22.6% of users of the bus strongly disagree while 27.4% agree. 14% of them were neutral on the issue. Secondly the passengers were asked whether or not a system is available to prevent them from robbery while in fare payment and 33.7% of the passengers were strongly disagree, 27.1% disagree, 18.9% agree. But 10.6% of passengers were neutral for this question.

On this variable the passengers were asked thirdly whether or not safety is one of the first value for the buses fare collection system. Results with 28.9% of disagree, 22% agree, 15.7% neutral, 20.6% of strongly agree and the remaining were strongly agreed. Those of 23.4% of passengers strongly disagree, 19.7% were disagree, 18.3% agree and the remaining passengers were neutral as shown on the above figure on the issue of recommending the buses fare collection system to their friends in terms of security.

Environmental impact		SD	D	N	A	SA
Ei1	Frequency	33	42	63	23	89
	%	9.4%	12%	18%	35.1%	25.4%
Ei2	Frequency	**21**	**58**	56	114	101
	%	6%	16.6%	16%	32.6%	28.9%
Ei3	Frequency	25	46	66	133	80
	%	7.1%	13.1%	18.9%	38%	22.9%
Ei4	Frequency	28	35	60	126	101
	%	8%	10%	17.1%	36%	28.9%

Source: own survey 2021

Table 9 Passengers' perception towards environmental impact

The last independent variable the researcher used was environmental impact. Similar to the variables mentioned above the researcher also developed four questions to collect information with regard to this. Firstly, passengers were asked whether or not the current fare collection system has many wastes and pollutes inside the bus results with 35.1% agree and 25.4% strongly agree. While 18% of passengers were neutral, 12% disagree and the remaining passengers are strongly disagreed. Secondly, paper ticket is main cause of waste and trash? asked the passenger. 32.6% of them agree, 28.9% was strongly agree and 16% of passengers were neutral.

The third question on this variable was "natural resources highly consumed in the current ticketing media or paper ticket?". Results with 36% of passengers agree, 28.9% strongly agree, 17.1% of them was neutral. The remaining passengers were disagreed and strongly disagree as shown on the table above.

4.5 Descriptive Statistics of Fare Collection Service Quality Dimensions

To measure the descriptive statistics of service quality dimensions, the researcher use mean from central tendency and standard deviation for measure of variation.

Public Bus Fare Collection Service Quality Dimensions	Range	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Passanger_Care	3.33	2.7629	.79633	.634	-.036	.130	-.613	.260
Information_Richness	3.50	2.5936	.86850	.754	.044	.130	-.674	.260
Comfort	3.33	2.7662	.73342	.538	-.114	.130	-.395	.260
Security	4.00	2.7069	1.06300	1.130	.290	.130	-1.013	.260
Enviormental_Impact	4.00	3.6021	.97153	.944	-.607	.130	-.160	.260
Service Quality	4.00	2.9629	1.26731	1.606	-.057	.130	-.980	.260
Valid N (listwise)								

Source: Own survey and Analysis 2021

Table 10. Descriptive Statistics of Independent variables

4.6 Normality Test

Before analyzing the questioner likert scales, the collected data coded and inserted to the statistical software, SPSS 23 and then the raw data's, specifically the mean of the variables has to be transformed to check all the necessary tests. The first test that the data has to be checked with the normality test. The test is used to check that the collected data is normally distributed or not. This can be done either graphically or numeric values. Kolmogorov-smimov and Shapiro wilk were the most common tests for normality and these sig. values has to be greater than 0.05.

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Passanger_Care	.068	350	.065	.982	350	.061
Information_Richness	.089	350	.064	.975	350	.052
Comfort	.072	350	.078	.985	350	.068
Security	.127	350	.077	.952	350	.071
Enviormental_Impact	.145	350	.057	.949	350	.046

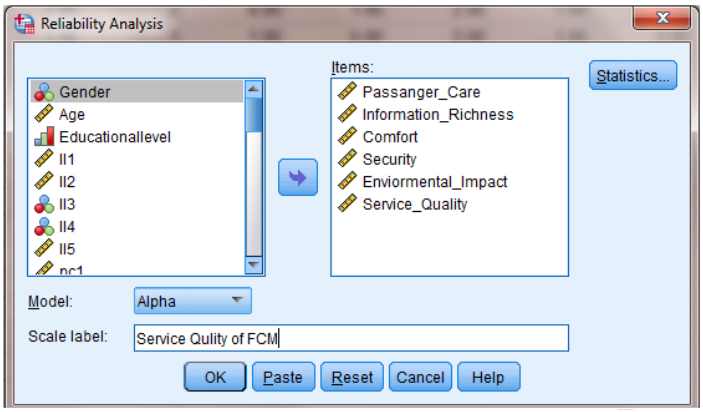
a. Lilliefors Significance Correction

Source: Own survey & Analysis 2021

Table 11. Normality Test

4.7 Reliability Test

The other important test before directly go to the analysis of the variables is reliability test. The test measures internal consistency between items in the scale and shows the reliability of the data. Cronbach's Alpha commonly used in statistic utilized for testing the reliability and consistency. The output values of alpha usually less than one and the nearer to one the higher the reliability and consistency is. The most acceptable out values cronbach's alpha is more than 0.7 (≥0.7) although some literatures also recommend the minimum acceptable values of alpha is ≥0.6. The Cronbach's Alpha output value for these particular study is 0.713 and it is therefore, one can conclude that the data were reliable and consistent.



Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.713	.734	6

Source: Own survey & Analysis 2021

Table 12. Reliability Analysis

4.8 Correlation Analysis

Correlation analysis is a statistical method used to evaluate the strength of relationship between two quantitative variables. A high correlation means that two or more variables have a strong relationship with each other, while a weak correlation means that the variables are hardly related. In other words, it is the process of studying the strength of that relationship with available statistical data (Franzese & luliano, 2019). It is usually used to quantify the degree to which the variables are related. In computing a correlation analysis, the correlation coefficients shall be evaluated and this tells that how one variable change with a change of the other.

The correlation coefficient is calculated by dividing the covariance by the product of the two variables standard deviation. As it is obvious standard deviation is a measure of the dispersion of the given data from its mean.

It is obvious as the best method of measuring the association between variables of interest because it is based on the method of covariance. This gives to the researcher detail information regarding the magnitude of the association and direction of this association or relationship. For this purpose, the Pearson's correlation coefficient used to measure the statistical association between two continuous variables.

Correlations							
Fare collection service quality dimensions		Passanger _Care	Information Richness	Comfort	Security	Enviormenta lImpact	Service Quality
Passanger_Care	Pearson Correlation	1	.540**	.482**	.118*	.002	.315**
	Sig. (2-tailed)		.000	.000	.027	.976	.000
	N	350	350	350	350	350	350
Information Richness	Pearson Correlation	.540**	1	.547**	.262**	.142**	.658**
	Sig. (2-tailed)	.000		.000	.000	.008	.000
	N	350	350	350	350	350	350
Comfort	Pearson Correlation	.482**	.547**	1	.453**	.192**	.307**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	350	350	350	350	350	350
Security	Pearson Correlation	.118*	.262**	.453**	1	.374**	.144**
	Sig. (2-tailed)	.027	.000	.000		.000	.007
	N	350	350	350	350	350	350
Enviormental_Impact	Pearson Correlation	.002	.142**	.192**	.374**	1	.191**
	Sig. (2-tailed)	.976	.008	.000	.000		.000
	N	350	350	350	350	350	350
Service Quality	Pearson Correlation	.315**	.658**	.307**	.144**	.191**	1
	Sig. (2-tailed)	.000	.000	.000	.007	.000	
	N	350	350	350	350	350	350
**. Correlation is significant at the 0.01 level (2-tailed).							
*. Correlation is significant at the 0.05 level (2-tailed).							

Source: Own survey and Analysis 2021

Table 13. Correlation Analysis

In terms of the strength of the relationship the value of correlation coefficients varies between +1 and -1. A value of +/-1 indicates that a perfect degree of association, while if the coefficients

goes towards zero the relationship between the variables become weaker. When we come to the direction of the relationship it is shown by the sign of the coefficients. A + sign shows that a positive relationship and a – sign indicates the opposite relationship. In statistics four type of correlation is available. The first one is Pearson correlation, Kendal rank correlation, spearman correlation and point bi-serial correlation. The following formula is used to determine Pearson's correlation:

$$Rxy = \frac{n\sum xiyi - \sum xi \sum yi}{\sqrt{n\sum xi^2 - (\sum xi)^2}\sqrt{n\sum yi^2 - (\sum yi)^2}}$$

Equation 1. Pearson correlation formula

Where

Rxy= Pearson r correlation coefficient between x and y

n= number of observations

xi= value of x (for ith observation)

yi=value of y(for ith observation)

SPSS version 23 used for determining the Pearson correlation between the dependent and independent variables and the output is as shown below with an assumption that both variables are normally distributed with bell shaped curve. The other assumption is linearity and homoscedasticity, meaning data is equally distributed about the regression line.

As shown on the above table the correlation between five independent variables and one dependent variable (service quality) is presented. Note that the table is matrix and it can be read it from left to right or from top to bottom.

Sig. (1-tailed) shows the p-value for the correlation. A p-value smaller than 0.05 suggests that the correlation is statistically significant (at the 5 % level). SPSS also includes a significance test at the 1 % level, indicated by the asterisks (**) presented next to the correlation coefficient.

Let us see the correlation of each variables one by one.

Passenger care has positive (r=0.315) and significant relationship ($p<0.05$, which is p=0.00) with service quality.

Information richness has positive(r=0.658) and significant relationship (p<0.05, which is p=0.00) with service quality.

Comfort variable has positive (r=0.307) and significant relationship (p<0.05, which is p=0.00) with service quality.

Also, security has positive (r=0.144) and significant relationship (p<0.05, which is p=0.01) with service quality.

The last but not the least variable was about environmental impact. This variable also has positive (r=0.191) and significant relationship (p<0.05, which is p=0.031) with service quality.

4.9 Regression Analysis

After checking the correlation nature of the variables and the necessary tests, the next recommended analysis is regression analysis. The main difference between the two analyses is that correlation analysis only show us the relationship of the variables. It tell us the positive or negative relationship of the variables. However; Regression analysis is an analysis that depict not only the relationship of the dependent variables but also the effect of the independent variable to dependent variable. It shows to what extent that the independent variables influence the dependent variable. Three conditions has to be full filled to run the regression analysis; the data shall be continuous, linear, and correlated and absence of outliers. This conditions were met in the previous statistical analysis and the regression analysis performed in the SPSS. The model summary and ANOVA table presented in the following section.

4.9.1 Model Summary

Model Summary [b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.672[a]	.558	.548	.94579

a. Predictors: (Constant), Enviormental_Impact, Passanger_Care, Security, Information_Richness, Comfort

b. Dependent Variable: Service_Quality

Source: Own survey and Analysis 2021

Variables Entered/Removed [a]

Model	Variables Entered	Variables Removed	Method
1	Enviormental_Impact, Passanger_Care, Security, Information_Richness, Comfort[b]	.	Enter

a. Dependent Variable: Service_Quality
b. All requested variables entered.

Table 14. Model Summary table in regression analysis

R indicates the correlation between the observed and predicted values of dependent variable. R-Square is the proportion of variance in the dependent variable (Service quality) which can be predicted from the independent variables (Passenger Care, Information richness, Security, Comfort and Environmental Impact). This value indicates more than 55% of the variance in service quality can be predicted from the variables Passenger Care, Information richness, Security, Comfort and Environmental Impact. Note that this is an overall measure of the strength of association, and does not reflect the extent to which any particular independent variable is associated with the dependent variable.

As predictors are added to the model, each predictor will explain some of the variance in the dependent variable simply due to chance. One could continue to add predictors to the model which would continue to improve the ability of the predictors to explain the dependent variable, although some of this increase in R-square would be simply due to chance variation in that particular sample. The adjusted R-square attempts to yield a more honest value to estimate the R-squared for the population (Bruin j., 2011). The value of R-square was .558, while the value of Adjusted R-square was .548

4.9.2 Analysis of Variance (ANOVA) and Coefficients

The ANOVA table tests the acceptability of the model from a statistical perspective. The Regression row displays information about the variation accounted for by the model. The Residual row displays information about the variation that is not accounted for by the model (IBM, 2016). The regression sum of squares is larger than the residual sum of squares, which indicates that most of the variation in the proportion of the dependent variable is explained by the model. The significance value of the F statistic is less than 0.05, which means that the variation explained by the model is not due to chance.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	452.800	5	50.560	56.522	.000[b]
	Residual	307.717	344	.895		
	Total	760.517	349			

a. Dependent Variable: Service_Quality

b. Predictors: (Constant), Enviormental_Impact, Passanger_Care, Security, Information_Richness, Comfort

Source: Own survey and Analysis 2021

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.061	0.381		0.160	0.873
	Passanger_Care	-0.130	0.057	-0.103	-2.270	0.024
	Information_Richness	0.877	0.078	0.508	11.232	0.000
	Comfort	-0.097	0.074	-0.059	-1.319	0.038
	Security	0.174	0.076	0.102	2.296	0.022
	Enviormental_Impact	0.160	0.069	0.104	2.311	0.021

a. Dependent Variable: Service_Quality

Table 15. ANOVA Table and Regression Coefficients

4.10 Findings of the Study

4.10.1 Fare Collection Management Process cycle and Fare Setting

- **Fare Collection Management Process Cycle**

The existing flow of collecting and managing the bus fare ranges from the request of the printing up to the reconciliation of the cash against the issued ticket. The required amount and quantity of ticket is ordered to the printing companies which often have a long customer relationship with Berhanena Selam Printing Enterprise. In accordance with the order and the terms of the contract, the printing companies print the tickets and present them to the operators. After the required counting, checking and acceptance of the printed tickets, it will be delivered and distributed to the branch depots and terminals offices up on the physical presence of the ticket sellers and then as per their work shift they conduct and issue the tickets to the passengers on board up on the transit service. The casher will go back and reconcile the received ticket against the collected cash in the offices. As per the gathered information, the collected cash stay at hand with ticket sellers some times a week. The main reason behind is the time it takes for reconciliation of cash against tickets.

In the entire process cycle, there is a huge amount of resource waste for the two government owned bus operator; it consumes much time and recurring costs to get the ticket from the initial order for printing up to the reconciling back to the office. Some information shows that, in addition to unnecessary waste of resources, there is a revenue loss. Some ticket sellers missed together with the collected cash.

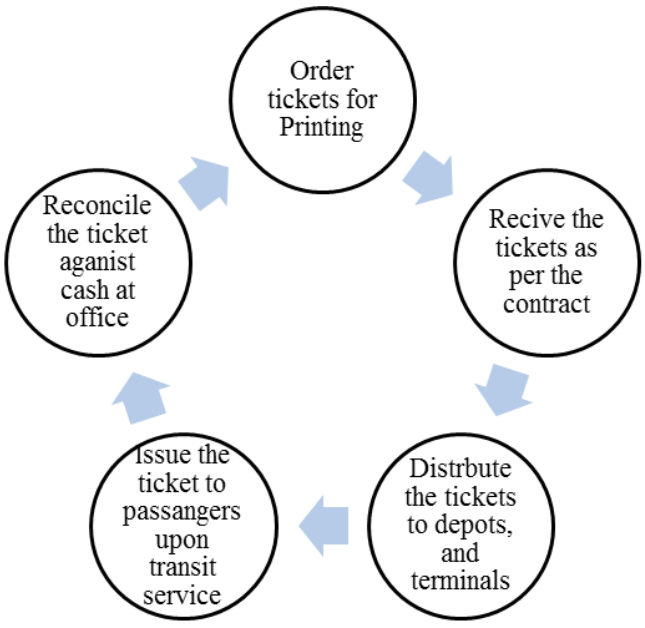


Figure 19. Existing General Public bus fare Collection Management Process Cycle

❖ **Fare Setting**

There is no separate government fare policy for public transport in Addis Ababa. The fare revision for various public transit systems such as Anbessa buses, Sheger buses, mini buses and metered taxis are approved and notified by the Federal Transport Authority. This is being done in consultation and discussion with regional authorities and bureaus with close recommendation of the city transport authority and bureau.

There is no fixed frequency for changes in fares. Change in fuel prices is a key factor leading to fare revision. Fare revisions are normally announced over radio and in newspapers.

❖ **Fare/Ticket Handling at Anbessa**

A huge amount of cash is required to be handled and managed by Anbessa in the existing fare collection system. Conductors have to be issued cash and coins at the start of their shifts. The cash deposited by conductors at the end of the shift has to be reconciled, stored, transferred from respective depots to Yeka depot and deposited in bank. Also, since the fares are in decimals of Birr and it is very challenging for the passengers as well as conductors to transact the exact fare amount.

❖ **Fare/Ticket Handling at Sheger**

In order to optimize the tickets distribution process, Sheger has adopted a centralized approach of stocking and distribution of tickets. The ticket stocks are received from printing press at Sheger head office. The tickets are then directly distributed from the Sheger head office to the conductors. The conductors are issued tickets for up to 7 days of the operations. The conductors deposit the cash directly in Sheger bank account at various branches of the specified bank. Through this centralized system of tickets stocking and distribution, Sheger has been able to optimize significantly on the number of staff required for this activity. The entire process of tickets stock keeping and reconciliation is manual and no software is being used for the same.

4.10.2 Challenges Associated with collecting a bus fare

A number of challenges faced in the existing fare collection systems in public transport operations in the city. These challenges can be majorly attributed to the manual paper based ticketing system which prevails in all means of public transport in the city and the institutional setup responsible for managing and operating public transport.

The ticketing system in public transport viz. Anbessa, and Sheger, is pre-printed paper based. The management of paper-based ticketing system and cash reconciliation are quite tedious and involve significant resources. In addition, the costs and time required for distributing tickets

inventory between offices and for returning unsold tickets are very high. High volume of tickets that must be printed, stored, distributed and tracked entails high recurring costs for the transport operators. Without any automated process in place, paperwork becomes enormous resulting in low operational efficiency and high resources requirement. Paper-based fare collection systems are easy to manipulate and prone to revenue pilferage both on the part of staff as well as passengers. The pre-printed paper tickets do not allow data for each ticket/ passenger to be captured which makes revenue reconciliation, reporting and analysis a difficult task.

The public transport in the city is managed and operated by a number of different agencies which include federal and city government agencies. There is no coordination among these agencies resulting in lack of a unified approach for integrated fare collection system for various public transport modes.

The other challenge is related with the operational impacts of the operator. With the introduction of paper ticket on transit buses, it is inevitable that there is an additional boarding delay. This delay is predominately related to fare payment itself, but can also be caused by questions and dialogue related to fare payment between the ticket seller and the passenger. Stop by stop, these small delays may seem insignificant. However, over the course of a full route, they can aggregate and create noticeable issues with on-time performance and schedule adherence. Pictorial presentation of service quality of public bus fare collection during field observation presented below

Passenger Care **Security** **Comfort**


(A)


(B)


(C)


(D)

(A)- Although buses are onboard, passengers make long queue to receive the tickets
(B)- No Fare Structure Modality, Patriots use the same tickets as others
(C)- All hands of passengers pointed towards the window of the bus (No attention about their Pockets)
(D)- Paper tickets placed at floor due to absence of ticket booth for cashiers

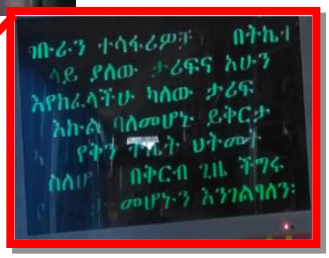


Figure 20. Service Quality of FCM during Field Observation

4.10.3 Institutional Arrangements

As per the Addis Ababa city Government Executive Organs Re-Establishment, Proclamation No. 64/2019, the government owned bus operators accountable to the not-related Institution the city Manager Office.

According to the proclamation, the following executive organs and public development enterprises are accountable to the Manager of the city:

a. Solid Waste Management Agency;

b. Addis Zoo Park;

c. Abattoir Enterprise;

d. Kenema Pharmacies Enterprise;

e. Sheger Mass Transport Service Enterprise;

f. Exhibition Center and Market Development Enterprise.

g. Anbessa City Bus Service Enterprise

Whereas the following executive organs are accountable to the Transport Bureau:

a. Transport Authority;

b. Drivers' and Vehicles Licensing and Controlling Authority (DVLCA);

c. Traffic Management Agency.

As one can see from the proclamation above, there is a wide gap in the institutional structure. This will inevitably create a gap in the interaction of works between the bus operators and the unrelated institutions. For instance; Abattoir Enterprise main concern is how many cattle are slaughtered, and presented to the community and also if we take the solid waste management agency, their main concern is how the solid waste properly disposed and managed in the city. It is understood that the other agencies under Managers office in the same way have nothing to do with Transport.

However, according to the Transport Bureau organizational structure, all three institutions under the bureau are concerning about all matters related to transportation and working towards to the same goal. For example, if we take the Traffic Management Agency, it mainly deals with traffic safety and traffic flow. In relation to the improvement of public traffic flow, the agency supports the performance and efficiency of the buses by clearing one lane during the peak hours and enforcing the flow by assigning supervisors at the required interval along the corridor. In the same way the transport authority main mandate is provide an appropriate support, in

collaboration with the concerned organs, for the organization and strengthening of operators, associations, and individuals that are involved in the mass and freight transport sector; ensure that they are working towards the effectiveness and safety of the city's transport. It has branches in all ten sub-cities with different experienced experts and necessary resources. There are problems with bus drivers and cashers not willing to cooperate with authority staff due to the institutional arrangement. This has hampered the improvement of the bus fare collection management and by the lack of proper professional support.

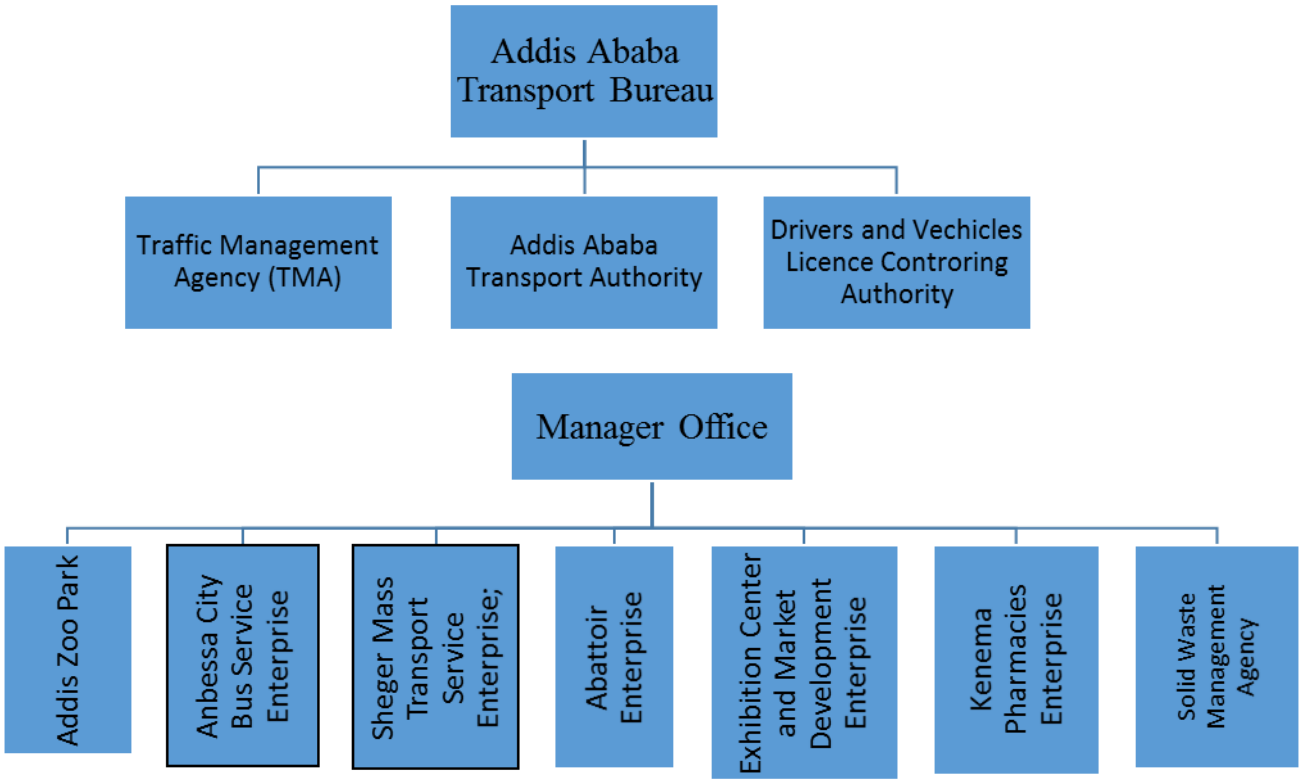


Figure 21. General Existing Institutional Structure Transport Bureau Vs Manager Office

4.10.4 Filed Observation

Along with the collection of data on the fare collection and management of government owned public buses, field assessments were conducted at selected bus stops, bus stations, bus terminals, and inside the buses. In addition, various mass transport infrastructure projects which are under construction and planned to be constructed have been obtained from relevant institutions. Those projects related with the subject study were selected and explained in the report. Some photos have been attached to this report for those people and institutions that have given permission. The findings are presented below.

❖ The General Physical Feature of busses

In the city of Addis Ababa, the two operators, Anbessa City Bus Service Enterprise (ACBSE) and Sheger Mass Transit Service Enterprise (SMTSE) public buses which are currently giving service are modern and recent model buses. The type of buses found in both ACBSE and SMTSE are standard bus (12m) and Double Decker buses. In addition an articulated bus in ACBSE and Student bus in SMTSE also give service to the community. The buses are purchased with the intention of solving major problems that may have been observed in the past. For instance the engine of the buses was located in the front section in the past but now it is designed at the rear end and this makes the driver and the passenger more comfortable because of the absence of unnecessary noise and emission heat from the engine. Similarly provision of ramps for disabled users, lowering of bus floor, and changing the bus gear transmission form manual to automatic makes easier for drivers. Overall, the provision of new and enhanced features are introduced in the newer buses.

Source: Operators Website & Own survey 2021

Figure 22. Sheger and Anbessa Bus

❖ Fare Collection System inside the bus

When we look at the internal condition of the buses, there are CCTV Cameras, TV Screens, special place reserved for disabilities and bus stop calls, passenger counters and other systems can be found. Among the facilities that are found in the bus related to this study are, GPS Device, the card validators which are found at the entrance and exit of the bus and also accessories for fare collection (Coin box/tokens) also installed as part of the bus. However, despite these payment devices and systems being considered and installed, Passengers still charged for the journey the same as before; paper tickets. At present these equipment are not being used, as there is no supporting system for their use. These modern payment systems have been taken into account in the purchase of the buses, making it difficult for ticket collectors to

have adequate storage space; at the same time, they are exposed to theft. In the past, there was a glass ticket office inside the bus for ticket collectors, and it was better to accommodate the paper tickets and control passengers properly. Had it been a glass partitioned cashier office like the previous old buses, it would make the ticket collectors less vulnerable to the current Pandemic as well as play a key role in preventing theft.

Source: Operators Website & Own survey 2021

Figure 23. Internal Features of the buses

Source: Own survey 2021

Figure 24. Ticket Booth in the old and new (existing) buses

❖ **Major Infrastructures developed for Mass Transit Services**

It can be seen that the city administration is making great efforts to gradually solve the problem of the ever- increasing supply of transport infrastructure. Of these, one or the other it understood that there are mass transit transport projects related with fare collection management.

It is understood that there are mass transport projects in these areas related to the management of bus bill collection. Among this major transport infrastructure projects and related initiatives are listed below.

- **Bus Depots and Terminals**

➢ **Bus Depots**

Different types of mass transit infrastructures are constructed in the city of Addis Ababa. Some are completed and some are under construction. The two giant modern bus depot project; shegole and kality bus depots built at a cost of more than 1.3 billion birr and the projects completed by the year 2020. The depots covers an area of 5.35 hectares for each and provides parking for 212 and 244 buses respectively. The depot has different facilities like, bus washers, fuel dispensers, bus body paint facilities, garages, administrative buildings, etc. There is also a good facility of ticket reconciler offices and stock rooms. This kind of facilities are important for improving the service quality of bus fare collection in particular and the whole bus service in general.

Source: AATB 2021

Figure 25. Shegole and Kality Modern Bus Depots

- **Bus Terminals**

ercato bus terminal is a terminal under construction which is constructed at the busiest center of the market area at merkao with a cost of 174 million birr. The terminal covers an area of 4,125 square meters. It accommodates up to 20 buses at a time through its two floors. It provide services to more than 6,000 public transport passengers per hour. The project includes bus passenger

waiting areas, ticket sales centers, passenger loading and unloading stations, state-of-the-art service delivery centers, bus schedule notification system, security cameras and administration offices. The current status of the construction of the project as of February 2021 is 96% and planned to be completed end of May 2021.

- **Dedicated Bus Lanes (DBL)**

The dedicated bus is an important traffic management for the flow of buses by dedicating one side lane at peak hour of the day; 6:00 A.M-10:00A.M morning and 4:00 P.M – 7:00 P.M afternoon. . In Addis Ababa city usually there are three traffic lanes and one lane is left for public transport. This traffic flow controlled and managed by Addis Ababa traffic management agency by deploying controllers at each stations along the corridors. Other than the public buses other vehicles not allowed to pass the solid marking line on the road. This traffic flow management helps for good efficiency and performance of buses to archive the planned number of trips in a day. However dedicating one lane for public buses by itself will not be the solution. In addition it is important to improve the existing fare collection management to minimize the dwell time as well as the travel time. It also block the traffic flow of the dedicated lane during in issuance of the paper ticket to passengers.

Source: AATB 2021 and Own Survey

Figure 26. Dedicated Bus Lane

- **Bus Rapid Transit (BRT) Project**

The other important project which will solve the problem of the transport demand to the large extent is development of BRT project. It is identified that there are 15 BRT corridor routes, out of which 7 routes are prioritized and two corridors are currently active and the construction is underway. The concept of the BRT is the same as DBL. However, the main difference is the dedicated lane will be in the middle of the lane with a permanent barrier to avoid entrance other vehicle in the route and it utilize technologies like ITS, bus priority at junctions, its own terminal, stations and modern depot facilities. It is expected that the project will utilize a technology based fare collection management system.

Source: AATB 2021

Figure 27. Bus Rapid Transit

Initiative by private sector

There are some initiatives private financial institution by forecasting the future financial transaction system. Some banks already produced and prepare a platform for cashless services including the public bus transport.

Source: own Field Survey 2021

Figure 28. Contactless Card Platform in ATM Machine

CHAPTER FIVE: SUMMARY OF RESEARCH FINDING, CONCLUSION AND RECOMENDATION

5.1 Introduction

The preceding chapter presented the preparation of data for the analysis, statistical analysis of the data and major findings were presented, while this chapter dealt with the summary of the finding, major conclusion and recommendation based on the result and findings of the study.

Therefore this chapter is organized in to three sub sections, the summary of findings, the conclusion and the recommendation section. On the first sub section the summarized findings were presented, and then major conclusions of the study were discussed and finally the recommendations drawn from the study was presented.

5.2 Summary of Findings

The following are the summarized findings and challenges in the existing fare collection management of buses.

- **Institutional Set Up of the public transport operators, offices, authorities and bureau**

The current general institutional set up of the operators, the bureau and the authority shall go hand in hand to ease the work flow and to give the necessary technical and administrative support. Many literatures and international experience reveal that bus operators are under the control of Transport Authority. The transport authority is the one which balances the passengers needs and expectations and the bus operators demand in maximizing the profit. The existing situation didn't reflect this situation. As per the Addis Ababa city Government Executive Organs Re-Establishment, Proclamation No. 64/2019, the bus operators; Anbessa City Bus Service Enterprise and Sheger Mass Transport Service Enterprise are accountable to the not-related Institution the city Manager Office. The Authority has no mandate to control and administer the bus operators, its only main mandate is to look after the private transport associations and to implement minor transport projects and initiatives. This has a huge negative impact not only to the fare collection management but also the whole transport system. Bus Schedulers, Supervisors and dispatchers were working only with private associations, and a continuous claim is raised by them for unfair and unbalanced administrative and control issues.

❖ **Unsatisfied Transit user/Customer**

Based on the collected data from the passengers, the rendered service quality on fare collection to the passengers were not to the desired level. The following are some of the summarized points:

- ✓ Most passengers prone to theft while paying (taking the printed paper tickets) especially at mid-block stations. At this section usually the cashers sell the tickets on the window.
- ✓ The current paper based ticket system has a negative impact on the travel time and number of trip to cover in a day. According to the survey more than 65% of the respondent say it takes more than ten minutes at peak hour to complete the whole passenger in a single bus. (N.B not considering the issuance of ticket at stations.)
- ✓ As per the collected data and in terms of the fare collection service quality dimensions customer care, comfort, Safety and security, passengers reacted the service rendered by operators were not to the expected service quality level and require user friendly, safe, secure, simple and more reliable fare media for transport services other than the current printed paper tickets.
- ✓ The ticket conductors has a continuous interaction with passengers and the operation is tedious and challenging especially at peak hours this make them aggressive and has a negative impact in the service delivery even some times lead to serious conflict with the transit users.

❖ **No Integration with other Modes of Transport**

The current fare system of both Sheger and Anbessa buses were not integrated with other public transport systems in the city. Also, the paper based manual fare collection does not provide flexibility to introduce passenger-friendly fare products such as multi-modal, multi-operator tickets and passes.

❖ **Revenue Loss**

The existing ticketing system is based on cash and pre-printed paper tickets. The system is prone to fare evasion by passengers and revenue theft by the staff crew. The public buses as well as passengers usually very crowded during peak hours and quite challenging to manage the ticket issuance process on board. This make a possibility of passengers travelling without purchasing tickets, or purchasing lower value ticket and traveling a longer distance. In addition, there are possibilities of revenue pilferage by conductors through means such as collection of money but

not issuing tickets or reselling used tickets in subsequent trips. Also, there is a possibility of fake tickets and passes being used in the system.

- **Challenging Management of Tickets**

The management of paper tickets is very tedious and resource-intensive for Anbessa. The ticket stocks have to be managed right from receipt from printing press to distribution to depots and issuance to conductors. Proper records of ticket stocks have to be kept at each stage, since tickets are just like cash. A high number of workforce is engaged in the process of tickets stock management.

- **High Dwell Time at Bus Stops**

The buses faced high dwell time at bus stops due to manual ticketing process, and change back of cash which results in poor efficiency of bus operations and an impact on travel time.

- **Undesirable Operational Excellence in the Organization**

Although there are some initiatives to be encouraged in enhancing the fare collection management in the government owned public bus, the operators need to look and think outside the box. They are very tight and busy in the operational activities. It is clear that the fare collected from the transit users is very crucial for the operators and act as an engine for the company. The two companies always subsidized in multi-millions of birr by city administration every year and should seek for operationally excellent company in terms of service delivery and profit.

- **Environmental Impact and Limited Data**

Ethiopia in general and Addis Ababa in particular has exerting efforts towards the green environment initiatives and various activities are underway with cooperation of NGO's and partners. However the existing fare media consume large amount of paper and this would a conflict situation with country/city environmental strategies and goals.

Limited data available with the existing manual pre-printed paper ticketing system. As such, detailed analysis and reporting is not possible, which is otherwise easily available with electronic ticketing systems.

5.3 Conclusion

The main objective of this study was to study the existing manual fare collection system and propose possible strategies and approaches to improve the fare collection management of government-owned public bus transport of Addis Ababa; Anbessa City Bus Service Enterprise (ACBSE) and Sheger Mass Transport Service Enterprise (SMTSE).

To address this objective the researcher have been used both primary and secondary data so as to collect enough information about the existing fare collection system. This information was further used to propose other possible strategies and approaches to improve the fare collection management of the selected public buses. Also the collected data was analyzed based on their type. If the information (data) is qualitative the researcher analyze it qualitatively. This type of data includes passengers' comment, information that was gotten by open ended interview questions and other related information got from secondary sources.

When we come to quantitative data (mainly obtained by questioners), this type of data has been analyzed quantitatively on SPSS, by using descriptive statistics and correlation analysis.

The result of this study confirmed that, all the five independent variables or service quality dimensions has a positive and significant relationship with the dependent variable.

The first independent variable was passenger care and it results a positive ($r=0.292$) and significant relationship ($p<0.05$, which is $p=0.00$) with service quality. The positive correlation means as the organization give more care for the passengers this implies the service quality is increased. The probability or p values for this variable is less than 5%. Which means 95% confidence interval. So a p value of less than five percent means statistical significant relationship between the two variables.

When we see relationship between information richness and service quality they have positive relationship ($r=0.658$) and significant relationship ($p<0.05$, which is $p=0.00$). The positive correlation means as enough information is available on the fare media in turn there is a

probability of achieving service quality. The probability or p values for this variable is less than 5%. Which means 95% confidence interval. So a p value of less than five percent means statistical significant relationship between the two variables.

The third variable was passenger comfort and its relationship with service quality results positive ($r=0.307$) and significant relationship ($p<0.05$, which is $p=0.00$). the same as stated above as the passengers are more comfortable with the transportation fare media this implies an improvement on service quality. The probability or p values for this variable is less than 5%. Which means 95% confidence interval. So a p value of less than five percent means statistical significant relationship between the two variables.

Also, the fourth independent variable which is security has positive ($r=0.144$) and significant relationship ($p<0.05$, which is $p=0.01$) with service quality. The implication of this statement is that as passengers feel more secure throughout their journey, the organization is really work a great job on improving service quality. Similarly, the probability or p values for this variable is less than 5%. Which means 95% confidence interval. So a p value of less than five percent means statistical significant relationship between the two variables.

The last independent variable (Environmental impact) also has positive ($r=0.191$) and significant impact on service quality.

Form this the researcher is going to draw this conclusion. All the independent variables has positive and significant relationship with service quality. But as the researcher founded it is possible to conclude that service quality of fare collection in public transportation is unfortunate and a huge job is expected to be done on those service quality dimensions so as to become organizationally excellent and quality service provider.

5.4 Recommendation

The results of the study have revealed many issues concerning fare collection management in government owned public bus of Addis Ababa. Based on the findings of the study, the following recommendations were made.

1. **The current bus fare collection management system needs improvement**

At this moment the world is moving closer to one village. By improving and updating the management system of an organization, it increases the revenue and provide the intended perceived quality of service to the customers. The transportation problem can be solved step by step by gaining various experiences from others and customizing the ideas to the local situation. Of these, a revenue that acts as a "blood vessel" for a bus operator is a fare collected from passengers. This fare is a major source of income for bus operator to perform various tasks and to improve the services. The current fare collection management service didn't provide satisfaction to the customers, more convenient for some passengers to cheat, uncomfortable to hold and not integrated with other modes of transport. From the operator view the fare collection management process is exposed to revenue loss, resource-intensive and tedious. Along with this the government owned bus operators have not been profitable and the service they rendered were not expanded and not to the desired quality level, they have been subsidized by the city administration every year. Therefore, a step by step changing of the current bus fare collection management to a technology based fare collection management system should not be delayed.

The recommended Public bus fare structure and fare collection media is tabulated in the following table.

No.	State owned Transit Mode/ Operator	Recommended Primary Fare Media	Recommended Secondary Fare Media	Recommended Fare Structure
1	Anbessa City Buses Enterprise	**Contactless Smart Card/Bank Cards**	Paper tickets printed at the point of issue(POS Machine)	Graduated distance-based
2	Sheger Mass Transit Service Enterprise			Graduated distance-based

Table 16. Recommended Fare Media and Fare Structure

Considering and relating this recommendation with operational excellence model, Juran Model suits with the study. The way of collecting bus fare from passengers need to do differently particularly by the use of technologies and management practices so that the operators deliver an improved service to its customers. The usage of technology as an instrument facilitate to engage good leadership and the workforce to drive operator's performance.

2. **The organizational structure in the transport sector needs to be adjusted or improved**

As stated in the previous chapters and the findings of the study, the institutional structure of Addis Ababa transport sector in general needs to be improved. Consistent and non-rapid radical change of institutional organization, of course, plays an important role in improving the quality of a service. It is also important that the rules, regulations and laws shall be reviewed by appropriate experts, stakeholders and the community before they get approved and implemented. Following this process will help to prevent institutions from unnecessary waste of resources and avoid to go backward. Related to this study the two bus operators are accountable to the city manager's office instead of the city transport authority. This mangers office is not well organized with the necessary transport experts and facilities. This arrangement has hampered the implementation of the required activities, tasks, projects and works in general. It becomes one of the challenge to perform a sequential improvement of service quality in fare collection management and professional viewing. As a result, the city's key bus service companies and future private and public transport companies shall be accountable to the city administration transport bureau or to the transport authority. In addition to this, it is recommended that an independent government institution shall be established to manage, coordinate, lead, and implement an integrated fare collection management.

3. **Work closely with international financial institutions and non-governmental transport organizations to implement a better bus fare system**

Giving priority to public mass transport through policies and strategies is crucial for climate change, economic, political and social development. Following this, international financial institutions and humanitarian organizations can assist in a variety of financial frameworks and technical support. It is necessary to work closely with international organizations as it will require significant financial and capacity building activities to improve the existing bus fare collection management system and also the existing cooperation with them shall be strengthened.

4. **Revise existing transport policies and implement formulated strategies**

A transport policy that could improve the transportation situation in Addis Ababa was developed ten years ago. Since then, however, economic, political, and social issues have been changed rapidly, and the transport policy has not been updated and no start-ups have been made. However, the development of national and city-wide transport strategies is being carried out extensively. In the Addis Ababa, there is a Transport Strategy, which is in the process of being approved by the council of Addis Ababa, addresses a wide range of issues, it is expected that it will solve the problem of transport issues step by step, including improving the existing fare collection system of the transport.

5. **Planned and started mass transport projects and study works should be strengthened.**

Efforts are being made to implement various mass transport projects in the city, which will not only improve transportation supply but also create knowledge and technology transfer to the local professionals and institutions. It can also lead to the creation of indigenous problem-solving ideas and projects. The ongoing construction of bus depots, terminals, stations, bus shelters, bus purchases, bus rapid transit (BRT) projects and studies should be strengthened and given special attention and support by the concerned bodies.

6. **Develop of Fare Policy and/or Fare Strategies**

Variety of studies and efforts has been done in relation to the improvement of fare collection in diverse sector at different organizations in fragmented manner from the federal level to the regional bureaus and agencies. This fragmented works needs to come together, complied and integrated at one responsible institution so that the necessary user requirements of the sectors will be addressed and the financial flow for the services can easily be controlled. This issue is not an easy task, it requires various resources, but at least some initiatives has to be started. Some of the important milestone is the development of a fare policy and/or strategy. In this particular study a transit operator fare policy establishes the principles and goals underlying and guiding the operator's fare-related decisions. The decisions might be made in relation to the technology usage, the fare structure, legal requirements, the system size and the existing fare structure. The development of the fare strategy will have various benefits in terms of increasing ridership, minimize revenue loss, initiates a modal integration, improves data collection and increase repayment and reduce use of cash. Reducing cash can improve revenue control while increased prepayment can improve operator's finance by allowing to obtain revenue sooner. The development of fare policy and structure and technology decision-making process stipulated in

APENDIX-2 of this paper adapted from Transit Cooperative Research Program (TCRP 10, 1996).

7. **Continuous Awareness shall be created for internal and external customers of the organization and to the stakeholders in order to enhance the service delivery.**

Policy makers, mangers and the experts at all level of the institution who has a direct or an indirect relation to the transport sector shall be aware of the current bus fare collection challenges and shall take their part for contribution for the solution. Some of the major the regional and federal stakeholders related to the institutions are ethio-telecom, National Banks, local government and private banks, insurance agencies, ministry of transport, Information Network Security Agency and Public Procurement Agency. This institution has a direct or an indirect impact in the improvement of the current public bus fare collections system in particular and integrating the fare to other modes of transport and commercials in general. So a continuous awareness and discussion platforms shall be created to make a smooth improvement of the fare collection management in the transport sector.

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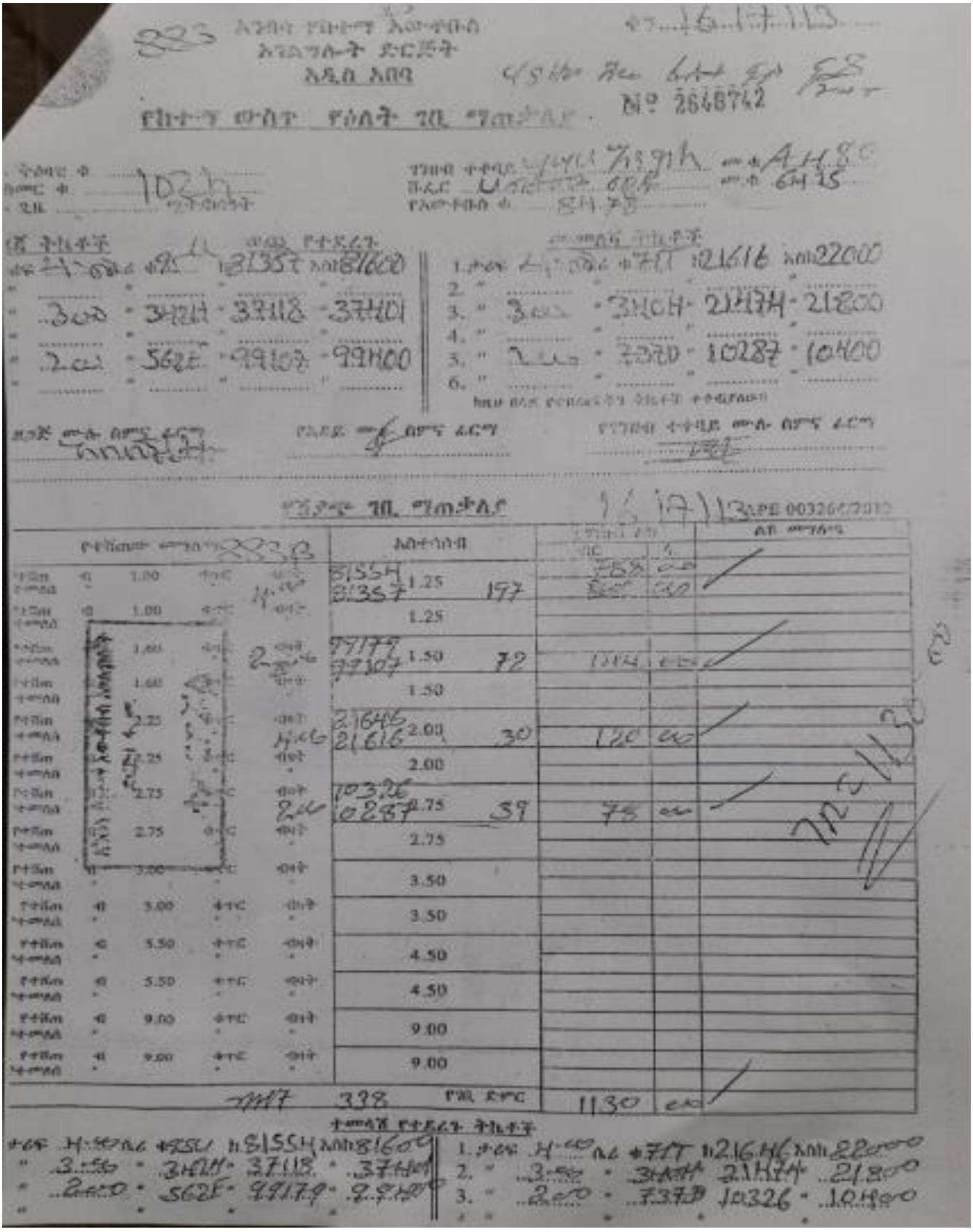
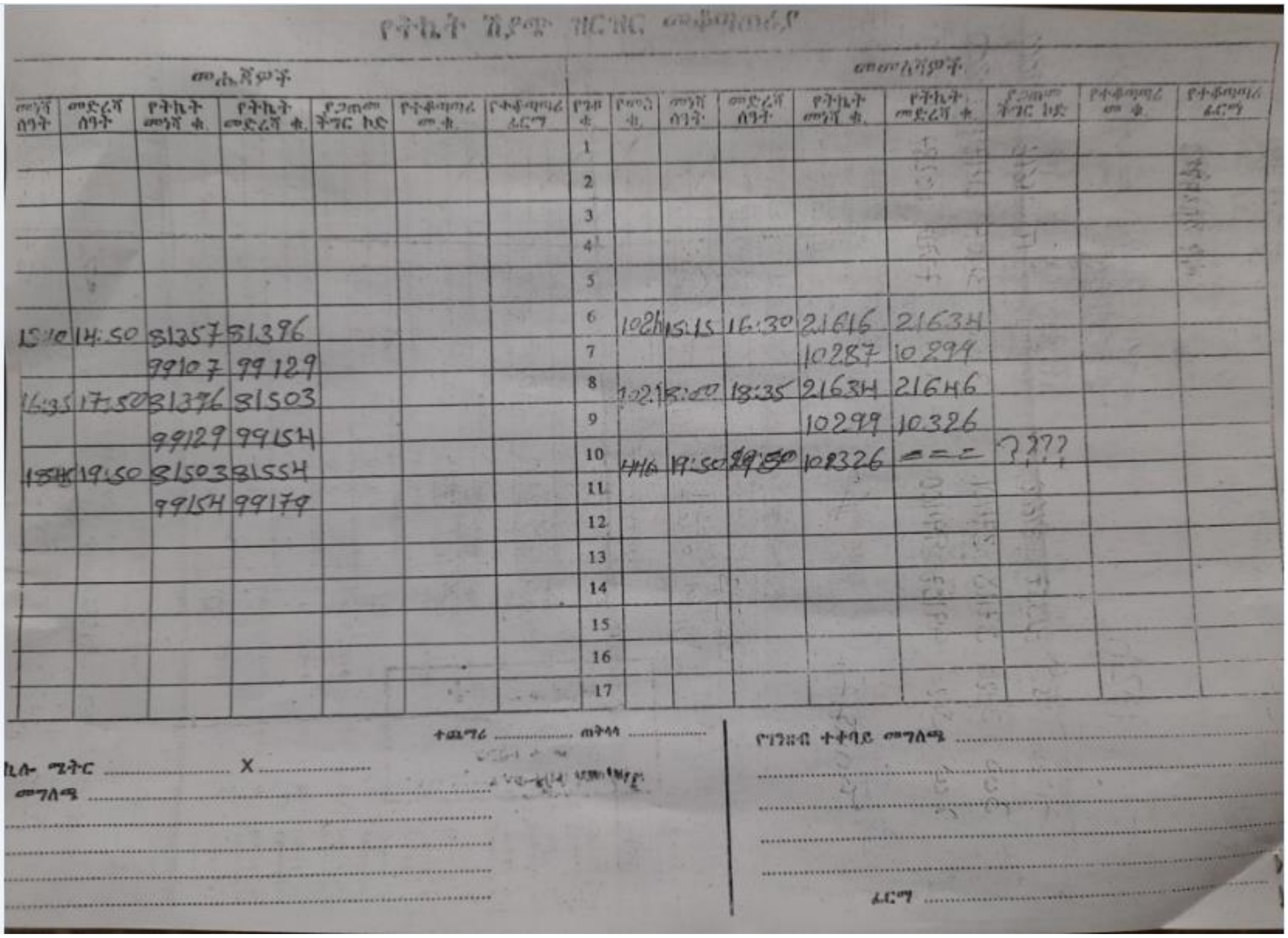
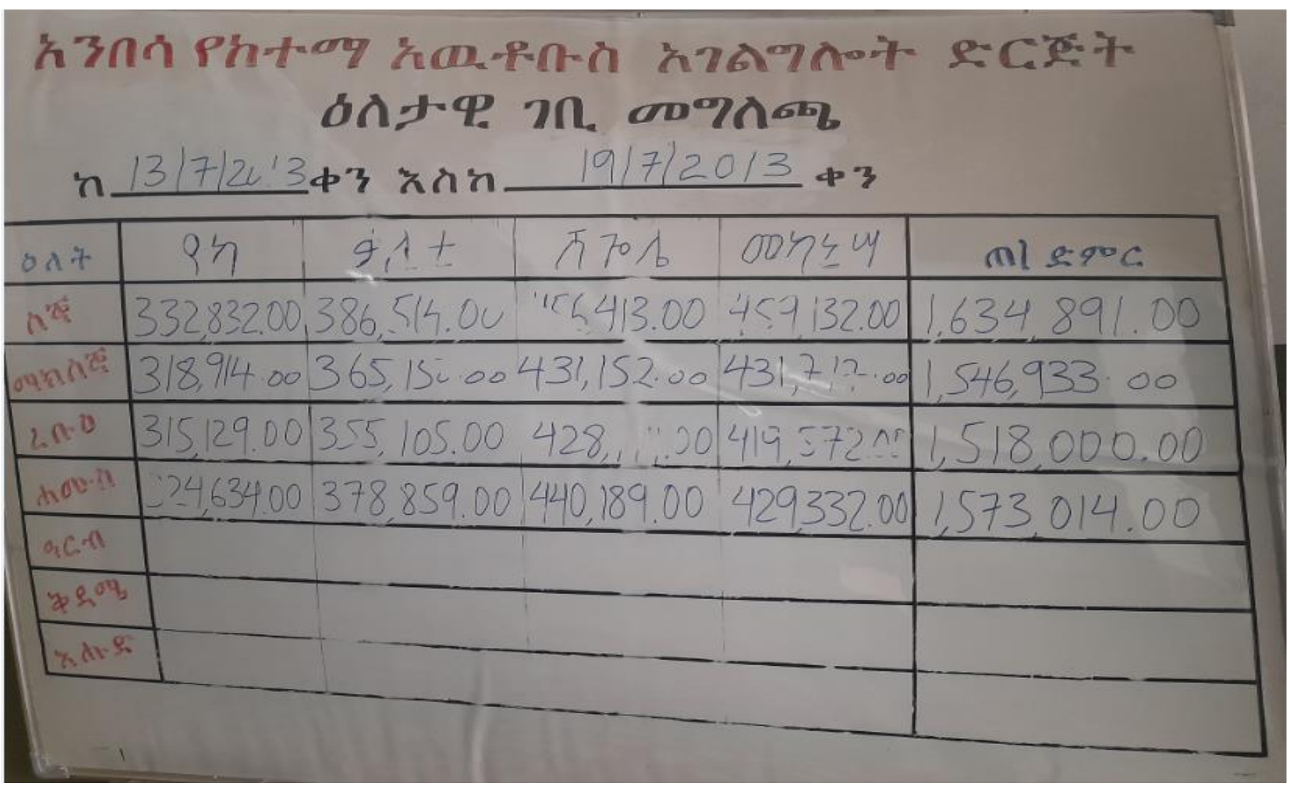
APENDIX-1

Anbessa TDS and daily fare collection summary display





15:10	14:50	81357	81396		6	1028	15:15	16:30	21616	21634			
		99107	99129		7				10287	10299			
16:35	17:50	81396	81503		8	1021	18:00	18:35	21634	21646			
		99129	99154		9				10299	10326			
18:46	19:50	81503	81554		10	446	19:50	19:50	10326	===	????		
		99154	99179		11								



አንበሳ የከተማ አውቶቡስ አገልግሎት ድርጅት

ዕለታዊ ገቢ መግለጫ

ከ 13/7/2013 ቀን እስከ 19/7/2013 ቀን

ዕለት	የካ	ቃሊቲ	ሾጎሌ	መካኒሳ	ጠ| ድምር
ሰኞ	332,832.00	386,514.00	[illegible]5,413.00	459,132.00	1,634,891.00
ማክሰኞ	318,914.00	365,15[illegible].00	431,152.00	431,7[illegible].00	1,546,933.00
ረቡዕ	315,129.00	355,105.00	428,[illegible].00	419,572.00	1,518,000.00
ሐሙስ	[illegible]24,634.00	378,859.00	440,189.00	429,332.00	1,573,014.00
ዓርብ					
ቅዳሜ					
እሁድ					

ሸገር የብዙሃን ትራንስፖርት አገልግሎት ድርጅት የዕለት ትኬት ሽያጭ ማጠቃለያ

ዴፖ ------ሳሚት---------- የስምሪት መስመር ከ ---መገናኛ----- እስከ -አረብሳ----ሰሌዳ ቁ. ----34023---- ቀን -- 25/05/2013

ታሪፍ	መ ሄ ጃ					መ መ ለ ሻ					
	የትኬት መነሻ ቁ	የትኬት መድረሻ ቁ	የትኬት ብዛት	መነሻ ሰዓት	መድረሻ ሰዓት	ታሪፍ	የትኬት መነሻ ቁ	የትኬት መድረሻ ቁ	የትኬት ብዛት	መነሻ ሰዓት	መድረሻ ሰዓት
2	13070	13100	30			2	13101	13120	19		
3	14651	14690	39			3	14691	14735	44		
4						4					
5						5					
6						6					
7						7					
8						8					
9						9					
ድምር			69						63		
2						2					
3						3					
4						4					
5						5					
6						6					
7						7					
8						8					
9						9					
ድምር						ድምር					
2						2					

ሸገር የብዙሃን ትራንስፖርት አገልግሎት ድርጅት የዕለት ትኬት ሽያጭ ማጠቃለያ

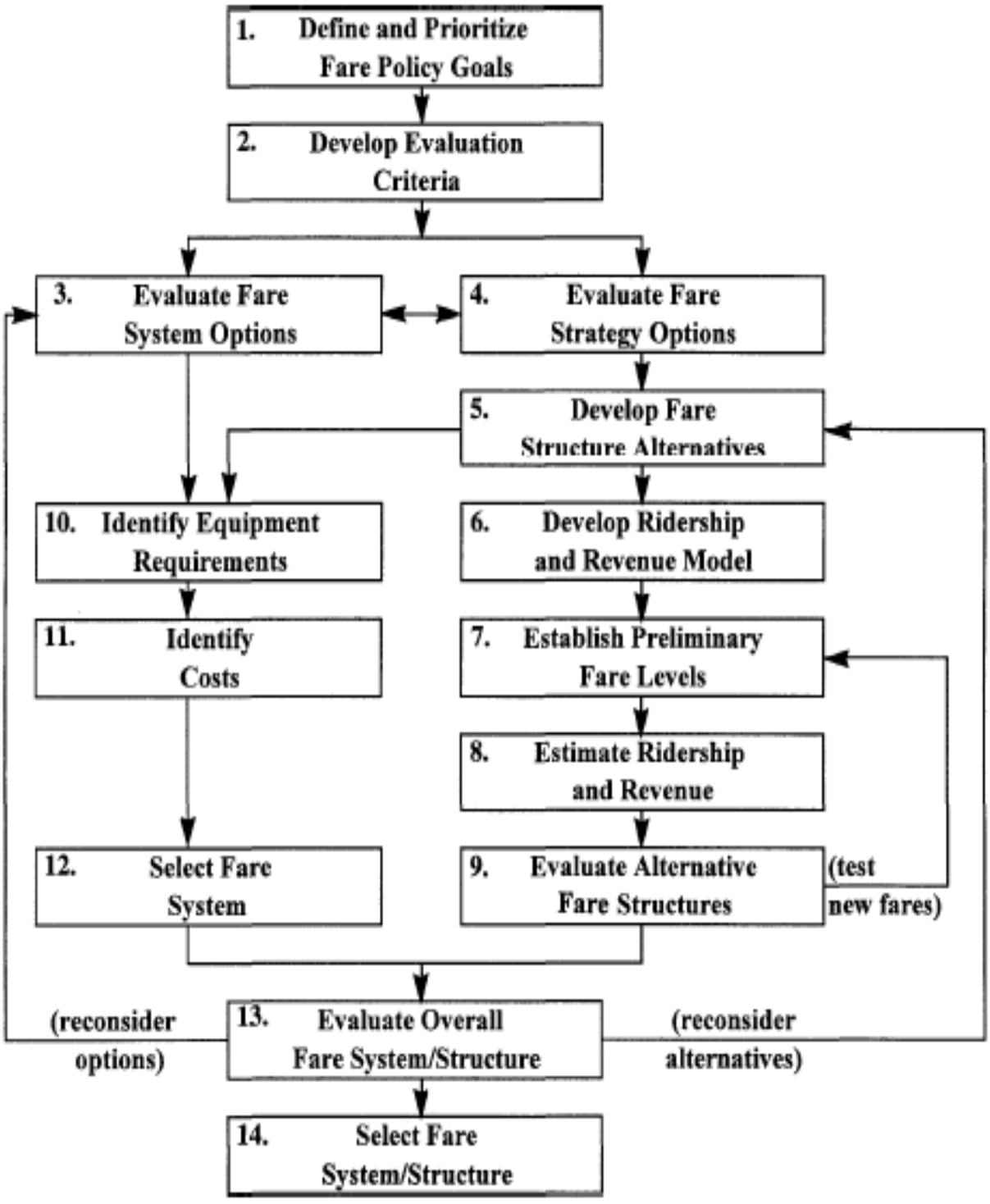
ዴፖ ------ሳሚት---------- የስምሪት መስመር ከ ---መገናኛ----- እስከ -አረብሳ----ሰሌዳ ቁ. ----34023---- ቀን -- 25/05/2013

ታሪፍ	መ ሄ ጃ					መ መ ለ ሻ					
	የትኬት መነሻ ቁ	የትኬት መድረሻ ቁ	የትኬት ብዛት	መነሻ ሰዓት	መድረሻ ሰዓት	ታሪፍ	የትኬት መነሻ ቁ	የትኬት መድረሻ ቁ	የትኬት ብዛት	መነሻ ሰዓት	መድረሻ ሰዓት
3						3					
4						4					
5						5					
6						6					
7						7					
8						8					
9						9					
ድምር						ድምር					

የድንገተኛ ቁጥጥር አስተያየትና ፊርማ	የሰዉሃይል / ድጋፍና ክትትል /ስምሪት አስተያየትና ፊርማ	የትኬተር ዕደላ /ምርመራ አስተያየትና ፊርማ

ማ ጣ ቃ ል ያ (የቀን)

ትኬት (ሀ)	የተሸጠ ትኬት ብዛት(ለ)	ትኬት (ሀ)	የተሸጠ ትኬት ብዛት(ለ)	ገቢ(ሀ*ለ)	9) ስራ ሲጀምር የነበረ ኪ/ሜ
1) የ2.00 ብር	**49**	5) የ6.00 ብር		**49*2=98**	10) ስራ ሲጨርስ የነበረ ኪ/ም
2) የ3.00 ብር	**83**	6) የ7.00 ብር		**83*3=249**	11) ጠቅላላ የተሸፈነ ኪ/ሜ……. **2* 12= 24 ኪ.ሜ**
3) የ4.00 ብር		7) የ8.00 ብር			12) ድምር ነጠላ ምልልስ……**2**
4) የ5.00 ብር		8) የ9.00 ብር			13) የሹፌር ስምና ፊርማ
		ጠ/ድምር	**132**	**347.0**	14) የትኬተር ስምና ፊርማ



Source- **(TCRP 10, 1996)**

Figure 30. Fare policy and structure and decision-making process.

Fare Policy Goals

Policy Goal	Goal Applies to	
	Strategy	System/Technology
Customer-related		
increase ridership/ minimize revenue loss	X	
maximize social equity	X	
increase ease of use (i.e., convenience)	X	X
increase fare options	X	X
reduce complexity	X	X
Financial		
increase revenue/ minimize ridership loss	X	
reduce fare abuse and evasion	X	X
improve revenue control		X
reduce fare collection costs (administrative/operating)	X	X
increase prepayment/ reduce use of cash	X	X
Management-related		
improve data collection		X
improve modal integration	X	X
increase pricing flexibility	X	X
maximize ease of implementation	X	X
improve fleet/demand management	X	X
improve reliability of fare equipment		X
improve operations (i.e., maximize throughput)	X	X
Political		
maximize political acceptability	X	
achieve recovery ratio goal/requirement	X	

Source- (TCRP 10, 1996)

Table 17. Fare Policy Goals

APENDIX-3

ADDIS ABABA UNIVERSITY SCHOOL OF GRADUATE STUDIES COLLEDGE OF BUSINESS AND ECONOMICS DEPARTEMENT OF MANAGEMENT		TO BE FILLED BY PASSANGERS BUS TERMINAL/ROUTE/ STATION NAME _____

STUDY ON FARE COLLECTION MANAGEMENT IN GOVERNEMENT OWNED PUBLIC BUS TRANSPORT OF ADDIS ABABA AND TO BE FILLED BY PASSENGER

Dear Respondent:

I am currently pursuing the degree of Masters of Science in Management specialization in Total quality management and organizational excellence at Addis Ababa University, College of Business and Economics. As partial fulfillment towards the completion of my graduate degree, this research titled as a comprehensive study of "**Fare collection management in government owned public bus transport of Addis Ababa"** is undertaken. Hence, I kindly request you to fill this questionnaire while assuring you that the information that you provide will be treated with confidentiality and shall only be used for academic research. Your fair and impartial feedback will make this research a very successful one. No need of writing your name and in all cases where answer options are available please tick mark "☑" in the appropriate box. If you need any clarification and information, you can use my e-mail ermibelach2021@gmail.com and mobile number +251-0977-39-92-14. Thank you for your time, cooperation and assistance. Stay Safe!!!

PART I: DEMOGRAPHIC OR GENERAL INFORMATION

1. Sex ❑ Male ❑ Female
2. Age (in years) ❑ Less than 18 ❑18-25 ❑ 26-35 ❑36 -64 ❑ 65 and above
3. Educational Status ❑ Illiterate ❑ Primary school (1-8) ❑ Secondary school (9-10)
   ❑ Preparatory school (11-12) ❑ TVET ❑ Diploma ❑ Degree ❑ Masters/ PhD

PART II: TRANSPORTATION SERVICE INFORMATION

1. Which mode of transportation do you usually use?

   ❑ Taxi (E-Tas) ❑ Mini Bus Taxi ❑ Mid-Bus (Higher) ❑ Public Bus (Anbessa/Sheger/)
   ❑ Addis Ababa Light Rail ❑ Other _____
2. How often do you use the bus during the day?

   ❑ 1-3 times ❑ 4-6 times ❑ More than 6 times ❑ Other _____

3. Have you ever tried to get transportation using technology? ❑ Yes ❑ Never
4. Do you think it is appropriate to use technologies to pay for transportation? ❑ Yes ❑ No
5. How long does it take to complete a ticket to pick up bus passengers during Peak hours?

   ❑ 5-10 Minutes ❑ 10-15 Minutes ❑ 15-20 Minutes ❑ 20-25 Minutes ❑ More than 25 Minutes ❑ I don't know

PART III: FARE COLLECTION MANAGEMENT AND SERVICE QUALITY INFORMATION

The agreement alternative has been indicated using likert scale. Please rate the extent you agree or disagree on the issues of Fare collection management in government owned public bus transport of Addis Ababa related to service quality. Use 5 scale of rating as **Strongly Disagree (SD)=1, Disagree (D)=2, Neutral (N)=3, Agree (A)=4, Strongly Agree (SA)=5,** and put **tick** "☑" **mark** in front of each statement of agreement alternative.

*	SN	Particulars	SD 1	D 2	N 3	A 4	SA 5
Customer Care (CC)	1	One of the values of the Public bus fare system is customer (passenger) first and give respect to customers.					
	2	The current bus fare collection system creates a sense of self- confidence and sense of server to fare collectors and ticket controllers.					
	3	The bus operator has a special fare arrangement for needy commuters like patriots, students, disabled customers					
	4	Fare collectors of the bus operator devote time to reply to any of your questions related to bus fare					
	5	The issued bus ticket amount and the effected bus fare are always the same.					
	6	Ticket cashiers return cash on time without any uncertainties during extra payments.					

*	SN	Particulars	SD 1	D 2	N 3	A 4	SA 5
Information Richness (IR)	7	All the necessary information provided on the bus ticket is sufficient to assist the journey					
	8	All the necessary information you require is available in the current fare media (paper ticket)					
	9	There is an integration or interface of the current fare media with other transportation modes like taxi, rail transit, etc					
	10	The current fare media is suitable for impaired vision passengers					
Comfort (C)	11	It is comfortable/convenient to handle the current fare media in the bus after payment has done.					
	12	The current bus fare collection is easy and user friendly and no need of improvement					
	13	I am confident of giving positive word of mouth about the current bus fare collection system.					
	14	I am comfortable in paying the fare on bus window at bus stations and terminals					
	15	It takes small duration (dwell time) to issue the paper bus tickets at bus terminal and stations.					
	16	The current paper tickets has an impact on the reliability and travel time of the public bus service.					
Security (S)	17	The bus fare collection system is secure in the whole journey					
	18	There is a system prevent me from robbery while in fare payment					
	19	Safety is one of the first value for the buses fare collection system					
	20	I sure to recommend the buses fare collection system to my friend in terms of security					

*	SN	Particulars	SD 1	D 2	N 3	A 4	SA 5
Environmental Impact (EI)	21	The current fare collection system has many wastes and pollute inside the bus.					
	22	At bus stations, terminals, and the surrounding area, the main causes of waste is being a paper ticket.					
	23	Natural resources highly consumed in the current ticketing media (paper ticketing)					
	24	In one-way or the other paper tickets has a negative impact with the surrounding environment.					
Service Quality (SQ)	25	At each stage of fare collection process, the bus operator supervisors provide support in achieving major service quality issues.					
	26	The bus cashiers at the time of issuing the ticket exerts their effort in maximizing service quality					
	27	I am generally happy with the current service quality of fare collection rendered by operators					

28. Any suggestions and problems encountered in the current bus fare collection system of the Public bus transport (Anbessa and Sheger) in Addis Ababa:

* Summarized Evaluation Criteria

አዲስ አበባ ዩኒቨርስቲየቢዝነስና ኢኮኖሚክስ ፋካልቲ የማኔጅመንት ትምህርት ክፍል		በአውቶብስ ትራንስፖርት ተጠቃሚ የሚሞላ መጠይቅ የአውቶቢስ ተርሚናል/የአውቶብስ

<u>በመንግስት አውቶብስ ትራንስፖርት አገልግሎት የክፍያ አሰባሰብ አስተዳደር ላይ የተዘጋጀ መጠይቅ</u>

ውድ የብዙኃን አውቶብስ ትራንሰፖርት ተጠቃሚ:

ይህ መጠይቅ **በመንግስት አውቶብስ ትራንስፖርት አገልግሎት የክፍያ አሰባሰብ አስተዳደር** ላይ የሚታዩ ችግሮች እና ከአገልግሎቱ ጥራት ጋር የተያያዙ መረጃዎች ለመሰብበሰብ የተዘጋጀ መጠይቅ ነው፡፡ የሚሰበሰበው መረጃ በአዲስ አበባ ዩኒቨርስቲ ቢዝነስና ኢኮኖሚክስ ፋካልቲ በማኔጅመንት ትምህርት ክፍል ለሁለተኛ ዲግሪ መመረቂያ ጥናት ጽሁፍ ተግባር ብቻ የሚውል ሲሆን እርሶ የሚሰጡን መረጃ ሚስጥራዊነቱ የተጠበቀ ነው፡፡ ምላሻዎን በተዘጋጀው ሳጥን ውስጥ "☑" ምልክት በማድረግ እንዲመርጡ በማክበር እጠይቃለሁ፡፡ ተጨማሪ አስተያየት ካልዎት በ ኢሜል አድራሻ ermibelach2021@gmail.com ወይም በሞባይል ቁጥር +251-977-39-92-14 ሊያሳውቁኝ ይችላሉ፡፡ ውድ ጊዜዎትን ወስደው መጠይቁን ስለሞሉ እና ትብብር ስላደረጉ ከልብ አመሰግናለሁ!!! ጤናዎን ይጠብቁ!

---

1. **ክፍል አንድ- አጠቃላይ መረጃ**

1.1 ፆታ ❑ ወንድ ❑ ሴት

1.2 ዕድሜ ❑ ከ18 ዓመት በታች ❑ 18-25 ዓመት ❑ 26-35 ዓመት ❑ 36-64 ዓመት ❑ ከ65 ዓመት በላይ

1.3 የትምህርት ደረጃ ❑ማንበብና መፃፍ ❑ አንደኛ ደረጃ (1-8) ❑ ሁለተኛ ደረጃ (9-10) ❑ መሰናዶ ደረጃ (11-12) ❑ ቴክኒክና ሙያ ❑ ዲፕሎማ ❑ ዲግሪ ❑ ማስተርስ/ ዶክትሬት

2. **ክፍል ሁለት- የትራንስፖርት አገልግሎት መረጃ**

2.1 በአብዛኛው የትኛውን የትራንስፖርት አገልግሎት ዘዴ ይጠቀማሉ?

❑ ታክሲ (ኢ-ታስ*) ❑ ሚዲባስ ታክሲ ❑ ሚዲባስ (ሃይገር) ❑ አውቶብስ (ሸገር/አንበሳ)

❑ ባቡር ❑ ሌላ_____

2.2 በቀን ውስጥ በአብዛኛው ለምን ያህል ጊዜ አውቶብስ ይጠቀማሉ?

❑ ከ1-3 ጊዜ ❑ ከ4-6 ጊዜ ❑ ከ6 ጊዜ በላይ ❑ ሌላ_____

2.3 ቴክኖሎጂ በመጠቀም የትራንስፖርት አገልግሎት ለማግኘት ሞክረው ያውቃሉ?

❑ አዎ ❑ አላውቅም

2.4 የትራንስፖርት አገልግሎት ክፍያን ለመክፈል አመቺ የሆኑ ቴክኖሎጂዎችን መጠቀም ተገቢ ነው ብለው ያስባሉ? ❑ አዎ ❑ አይደለም ❑ አላውቅም

2.5 በስራ ሰዓት መውጪያና መግቢያ ሰዓት ሸገርና አንበሳ አውቶብሶች ተጓጉችን ለመጫን ትኬት ቆርጠው ለመጨረስ ምን ያህል ግዜ ይወስዳል?

❑ 5-10 ደቂቃ ❑ 10-15 ደቂቃ ❑ 15-20 ደቂቃ ❑ 20- 25 ደቂቃ ❑ ከ25 ደቂቃ በላይ ❑ አላውቅም

3. ክፍል ሶስት - ከአውቶብስ ትራንስፖርት አገልግሎት ክፍያ አሰባሰብ አስተዳደር የተያያዙ መጠይቆች

ይህ ክፍል ከመንግስት አውቶብስ ትራንስፖርት(ሸገር እና አንበሳ) ክፍያ አሰባሰብ አስተዳደር ከአገልግሎት አሰጣጥ ጥራት ጉዳዮች ጋር በተያያዘ የሚሞላ መጠይቅ ሲሆን ምርጫዎት እስማማለሁ ወይም አልስማማም በማለት በተቀመጠው በ 5 ደረጃ የመለኪያ መስፈርት መሰረት ማለትም **በጣም አልስማማም (በአል)=1፣ አልስማማም (አል)= 2 ፣ ገለልተኛ (ገለ)= 3 ፣ እስማማለሁ (እስማ)=4 እና በጣም እስማማለሁ (በእስማ)=5** በማለት ከጥያቄው ጎን **“☑”** ምልክት በማድረግ እንዲመርጡ አንጠይቆታለን::

*	ተ.ቁ	ዝርዝር መግለጫ	በአል 1	አል 2	ገለ 3	እስማ 4	በእስማ 5
የተጓጉች እንክብካቤ	1.	የአውቶብስ ክፍያ መርህ ከሆኑት ዉስጥ ተጓጉችን ማስቀደምና ተገቢውን የደንበኛ ክብር የአውቶብስ ሰራተኞች ይሰጣሉ፤					
	2.	አሁን ያለው የአውቶብስ የክፍያ አሰባሰብ ስርዓት ለትኬት ቆራጮችና ተቆጣጣሪዎች በራስ መተማመንና የአገልጋይነት ስሜት የሚፈጥር ነው ፤					
	3.	የክፍያ ስርአቱ ለለልዩ ፍላጎት ተጠቃሚዎች ልዩ የሆነ የክፍያ አሰራር አላቸው፤ (ለምሳሌ፤ለአካል ጉዳተኞች፣ ለአርበኞች፣ ለተማሪዎች)					
	4.	ትኬት ቆራጮችና ተቆጣጣሪዎች ከአውቶብስ ክፍያ ጋር የተያያዙ ማንኛውንም ጥያቄ ለመመለስ በቂ ጊዜ ይሰጣሉ፤					
	5.	የከፈሉት የአውቶብስ ትራንስፖርት ክፍያ እና የወሰዱት ትኬት ሁል ጊዜ ተመሳሳይ ነው፤					

*	ተ.ቁ	ዝርዝር መግለጫ	በአል 1	አል 2	ገለ 3	እስማ 4	በእስማ 5
	6.	የትኬት ገንዘብ ተቀባዮች ከሚከፈለው የአውቶብስ የጉዞ ክፍያ ላይ የሚመለስ ገንዘብ ካለ ያለ ስህተት በወቅቱ ይመልሳሉ፤					
በቂ መረጃ	7.	በአውቶብስ ቲኬቱ ላይ የሰፈሩ መረጃዎች ጉዞውን የተሳካ ለማድረግ በቂ ናቸው					
	8.	ሁሉም አስፈላጊ የአውቶብስ ጉዞ መረጃወች በወረቀት ትኬቱ ላይ ተሟልተው ይገኛሉ፤					
	9.	አሁን በስራ ላይ ያለዉ የአውቶብስ ክፍያ ስርአት ከሌሎች የትራንስፖርት አማራጮች ማለትም እንደ ታክሲ እና ቀላል ባቡር ጋር የተዋሀደ ነው፤					
	10.	አሁን በስራ ላይ ያለዉ የክፍያ ስርአትን ማየት ለተሳናቸው ተጓጉች አገልግሎትን ለመጠቀም አይቸገሩም፤					
ችግር	11.	ክፍያ ከፈጸሙ በኋላ ትኬቱን በአውቶብስ ውስጥ ለመያዝ አመቺ ነው፤					
	12.	አሁን ያለው የአውቶብስ የክፍያ ስርአት ቀላል እና ለተጠቃሚ ምቹ በመሆኑ መሻሻል አያስፈልገውም፤					
	13.	በአውቶብስ መስኮት የሚካሄደው የአውቶብስ የክፍያ አሰባሰብ ስርአት ይመቸኛል፤					
	14.	በአውቶብስ መስኮት የሚካሄደው የክፍያ ስርአት የሚወስደው ጊዜ ትንሽ ነው፤					
	15.	አሁን በስራ ላይ ያለዉ የክፍያ አሰባሰብ ስርአት በአውቶብሱ አገልግሎት አስተማማኝነት እንዲሁም ጉዞው በሚፈጀው ጊዜ ላይ ተጽእኖ አለው፤					
	16.	በአውቶብስ መጫኛና ማውረጃ መናሃሪያዎችና ጣቢያዎች ላይ ትኬት ቆርጦ ለመጓዝ የሚወስደው ጊዜ አነስተኛ ነው፤					

*	ተ.ቁ	ዝርዝር መግለጫ	በአል 1	አል 2	ገለ 3	እስማ 4	በእስማ 5
ደህንነት	17.	የአውቶብሱ የክፍያ አሰባሰብ ስርአት በጉዞው ወቅት ደህንነቱ አስተማማኝ ነው፤					
	18.	የአውቶብስ ክፍያ በምፈጽምበት ጊዜ ራሴን ከስርቆት የሚከላከል የአከፋፈል ስርአት አለ፤					
	19.	የተጓጉዥን ደህንነት መጠበቅ የአውቶብስ ክፍያ ስርአቱ ተቀዳሚ መርህ ነው፤					
	20.	የአውቶብሱን የክፍያ ስርአት ደንነት አስተማማኝ መሆኑን ለጓደኞቸ ስናገር በልበ ሙሉነት ነው፤					
አከባቢያዊ ተጽእኖ	21.	አሁን በስራ ላይ ያለዉ የአውቶብስ ክፍያ አሰባሰብ ስርአት በአውቶብስ ውስጥ ብዙ ቆሻሻዎች እና ብክለቶች አሉት፤					
	22.	በአውቶብስ መነሃሪያ፤መጫኛና ማዉረጃ ቦታወች እና በአካባቢ ቦታወች ለቆሻሻ መፈጠር ዋናው ምክንያት የወረቀት ትኬት ክፍያ መጠቀም ነው፤					
	23.	የወረቀት ትኬት መጠቀም ለተፈጥሮ ሃብት ብክነት ይዳርጋል፤					
	24.	በአንድም ይሁን በሌላ መንገድ የወረቀት ትኬት መጠቀም ከባቢ አየር ላይ አሉታዊ ተጽዕኖ ያስከትላል፤					
የአገልግሎት እርካታ	25.	በአውቶብስ ክፍያ አሰባሰብ ሂደት ወቅት አስተባባሪዎች የአገልግሎቱ ጥራት አንዲሳካ ተገቢውን ድጋፍ ያደርጋሉ					
	26.	የአውቶብስ ትኬት ቆራጮች አገልግሎት በሚሰጡበት ወቅት የአገልግሎት ጥራቱ እንዲሻሻል ጥረት ያደርጋሉ					
	27.	በአጠቃላይ አሁን ላይ ያለው የመንግስት አውቶብስ ክፍያ አሰባሰብ የአገልግሎት ጥራት ደስተኛ ነኝ					

28. ከመንግስት አውቶብስ (ሽገር እና አንበሳ) የክፍያ አሰባሰብ ጋር በተያያዘ ያጋጠሙ ችግሮችና ምክረ ሀሳብ ካለ ቢዘረዝሩልን?

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* የተጠቃለለ መመዘኛ መስፈርት

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
COLLEDGE OF BUSINESS AND ECONOMICS
DEPARTEMENT OF MANAGEMENT

TO BE DISCUSS WITH TRANSIT OFFICERS, CASHARIES, BUS SCHEDULERS AND CASH/TICKET RECONCILERS

SEMI-STRUCTURED INTERVIEW QUESTIONS

1. How do you discuss the current bus fare collection management process in the government owned public bus transport in general? Please rate the status and its relationship with the service quality and to what extent it satisfies the customer?
2. Are there any special efforts that your organization makes in relation to bus fare management, and are there a clearly defined policies and procedures to come up with better bus fare management system?
3. Is there any change that you want to see in the organization regarding bus fare management system and customer service that you want to address in the near future?
4. In general, what problems encountered in the current bus fare collection management strategy and possible addressing options with regard to service quality activities like customer comfort, security, customer care and environmental impact?
5. Would you tell me any strength and weakness of the organization related to maintaining best bus fare collection management, and providing a quality service and anything you think important to enhance fare management of your organization in terms of the above mentioned fare management system.
6. According to your opinion, what importance fare collection management system has created good relationship with the passengers, and maximizes the profitability of the operator, and to what extent does good relationship with the customer is important for service quality?

Thank You for Your Time!!!