ANALYZE FACTORS INFLUENCING PASSENGERS' SATISFACTION IN ADDIS ABABA CITY LIGHT RAIL TRANSIT SERVICE

ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS MBA PROGRAM

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Letter of Certificate

This is to certify that the research entitled "Analyze factors influencing passengers' satisfaction in Addis Ababa city light rail transit service", has been the independent work done by Habtamu Gebeyehu (ID No. GSR/2978/08) under my supervision as a University research advisor and submitted to Addis Ababa University, College of Business and Economics, MBA program in the partial fulfillment of the award of Master of Business Administration Degree.

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Statement of declaration

I declare that this thesis has been composed and presented for the degree of Master of Business Administration by me and it has not been submitted for any degree or professional qualification at Addis Ababa University or in any other University and the work which found in this thesis are my own except the contributions of others who were acknowledged and clearly cited.

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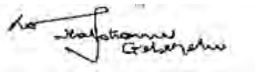
Signature: 

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List of acronyms and abbreviations

- AAC-BSE----------Addis Ababa City Bus service enterprise
- AAC-LRTS----------Addis Ababa City light rail transit service
- AAC-LRTSO----------Addis Ababa City light rail transit service office
- BLUE----------Best linear unbiased estimator
- DF----------Degree of freedom
- ECX----------Ethiopian commodity exchange
- GLRM----------General linear regression model
- LRT----------Light rail transit
- LRTS----------Light rail transit service
- SPSS----------Statistical package for social science
- VIF----------Variance inflation factor

Abstract

The main purpose of this study was to analyze factors influencing passengers' satisfaction in AAC-LRTS. The researcher has taken 365 passengers' for survey questionnaire using convinces sampling technique. Additionally, 20 informants were selected for semi- structured interview questions through random sampling technique from the 5 selected stations. The data collected by survey method were analyzed using SPSS version 20. The results of Spearman's correlation analysis of the study indicated that there was a significant positive correlation of all independent variables; safety and security, reliability, comfort, ticket payment system, affordability, staff behavior, accessibility and availability with passengers' satisfaction. The multiple regression analysis of the study depicted that, all the independent variables contributed only 56.8% of variances on passengers' satisfaction and the remaining 43.2% explained by other variables which were not included in the model. Based on the findings of this research, the LRTS management should sustain and continue the better provisions of the light rail transit services primarily to satisfy passengers and secondly to attain organizational goals.

Key words**: **Light rail transit, Passengers' Satisfaction, Service quality dimensions, Ticket payment system

CHAPTER ONE: INTRODUCTION

1.1. Background of the study

These days, due to the innovations of modern vehicles' in the city, passengers' need better transportation from the service provider company in order to make their life easy than ever and consequently to increase their satisfaction level (Ovuezireie et al, 2014). In Addis Ababa city, from time to time, the demand for high capacity and speed transportation system has become a severe question (Abadi, 2014).

Passengers' satisfaction for the public transport in Addis Ababa city affected by road accidents, inadequate road infrastructure, poor vehicle conditions and poor infrastructure for non-motorized modes (Private sector development Hub, 2009). These problems happened due to the increasing population number, migration, accessibility of jobs, foreign direct investment in the city and others' (PSDH, 2009). Also, economically the majorities of passengers' in the city are low and middle - income generator groups, given that they use public transport (Abadi, 2014).

In all, these problems forced the needs of the modern and reliable railway system that can accommodate and enhance passengers' satisfaction. To tackle public transportation challenge, the government introduced the first light rail transit transport in the city since September 2015. A number of studies argued that the railway transit service should have to be affordable, accessible, reliable and attractive to all passengers (Peng, et al,2008). However, the LRT service provision in the city is far from this reality. This might cause to affect passengers' satisfaction initially and meanwhile, it might go ahead to limit the overall service provision capacity of AAC-LRTS. Therefore, this study was proposed to analyze factors influencing passenger satisfaction in AAC-LRTS.

1.2. Statement of the problem

In Addis Ababa city public transportation is the most critical problem for passengers. Because public cars are old, unsafe, poor ventilation and high exposure to road traffic accidents (PSDH, 2009). To enhance passengers satisfaction, the LRT service was started its operations before two years ago. Introducing such service would help passengers to reduce their transport costs, (Olesen, 2014), diminish vehicle dependence and emissions (Hurst and West, 2014); cut traffic congestion (Sutapa, 2012) and generating urban development as a whole (Mills, 2001). Despite these, the AAC-LRTS practiced with many bottleneck, such as long queuing and waiting time, over capacity loading, access difficulty for old and people with disability, poor ticket payment system, pitiable safety and security and availability of inconvenience stations.

Also, the light rail transit actual service provisions far from passengers' expectation. A previous study by Akpoyomare et al (2014) have shown that customer satisfaction was influenced by age, income, gender, perceived quality and perceived value but not by pre-purchasing expectation. Contrary to this, according to the Consistency Theory and SERVQUAL model, customer satisfaction is influenced by pre-purchasing expectation. To cover this gap the researcher analyzes the effects of pre-purchasing expectation of passengers' satisfaction using qualitative analysis.

Besides, the results of a study by Khalid et al (2014) in Malaysia on commuter perceptions for rail service reported that passengers' spent 25% of their time for queuing and waiting to purchase a ticket. Such problem arose, because of the poor ticketing payment system. This showed that there was given a little attention to investigating ticket payment system as an independent variable which affects passengers' satisfaction. Hence, to fill this gap ticket payment system was incorporated as an independent variable. Additionally, in order to fill the above gaps the researcher was conducted descriptive and explanatory research. Overall, in this study, the researcher intended to analyze factors influencing passengers' satisfaction in AAC-LRTS.

1.3. Research questions

This study aimed to address the following research questions:

- ❖ What are the factors that affect passengers' satisfaction in AAC-LRTS?
- ❖ How service quality dimensions influence passengers' satisfaction in AAC-LRTS?
- ❖ What is the overall level of passengers' satisfaction in AAC-LRTS?

1.4. Theoretical framework

This study designed the following theoretical framework to measure passengers' satisfaction in AAC-LRTS as research hypotheses.

$H_{1=}$Safety and security have a positive significant influence on passengers' satisfaction.

$H_{2=}$ Affordability has a positive significant influence on passengers' satisfaction.

$H_{3=}$Comfort has a positive significant influence on passengers' satisfaction.

$H_{4=}$Reliability has a positive significant influence on passengers' satisfaction.

$H_{5=}$ Accessibility and availability have a positive significant influence on passengers' satisfaction.

$H_{6=}$ Staff behavior (drivers and ticket sellers) has a positive significant influence on passenger satisfaction.

$H_{7=}$Ticket payment system has a positive significant influence on passengers' satisfaction.

1.5. Objectives of the study

1.5.1. General objective

The main objective of this study is to analyze factors influencing passenger satisfaction in AAC-LRTS.

1.5.2. Specific objectives

Based on the above general objective, the following were specific objectives:

- ❖ To identify the factors that affect passengers' satisfaction in AAC-LRTS.
- ❖ To examine how service quality dimensions influence passengers' satisfaction in AAC-LRTS
- ❖ To analyze the overall levels of passengers' satisfaction in AAC-LRTS.

1.6 .Significance of the study

The significance of the study was to analyze factors influencing passengers' satisfaction in AAC-LRTS. This study might help the management of light railway transit to identify the influencing factors for passengers' while they use transit services. The inquiry probably provides knowledge and understanding insight for investors who compete in the public transportation service provisions. Additionally, the research may support the government to take further action to expand the light railway service in the other cities of the country in order to enhance better public transportation service stipulation. Moreover, the investigation could be an input for other future interested researchers in the area of study.

1.7. Scope of the study

From the entire mode of public transportation generally operating in Ethiopia and particularly in Addis Ababa city, the research was undertaken to analyze merely factors that influence passengers' satisfaction in AAC-LRTS for the year 2017. The study used 365 passengers' for questionnaire survey using convince sampling and 20 informants for semi-structured interview questions using simple random sampling.

1.8. Limitations of the study

The selected sample for this investigation might not be the true representative for the entire passengers' of the light rail transit. This may lead to obscurity to generalize the study. Additionally, the information which was collected through questionnaire may not be filled by the respondents heartily, properly and accurately.

1.9. Delimitations of the study

The study only focused on passengers' satisfaction on the light railway transit than another mode of transportation in the city like Buses (Express, Alliance and Anbessa) and taxis. Additionally, the study did not include passengers' aged below 15 years old. Because according to Robin, Malise and Anuja (2005) argued that children below 15 years old cannot able to access the rail when stations were distances over 200 meters from their houses. Finally, the researcher assumed that they were not relatively capable enough to understand and answer the research questionnaire accurately.

1.10. Organization of the paper

The paper has been divided into five chapters; the first chapter was an introduction and which contains the background of the study, statement of the problem, research questions, research hypotheses, general and specific objectives, significance, scope, limitations and delimitations of the study. The second chapter deals with previous theoretical and empirical studies that are related to the research topic have been reviewed. The third chapter was concerned with the methodology used for the study. The fourth chapter was presented with data analysis, interpretation and presentation of the result. The final chapter outlined summary of findings, conclusions, recommendations, managerial implications and suggestions for future studies would have been addressed.

CHAPTER TWO: LITERATURE REVIEW

This chapter discussed with literature related to the theoretical and empirical review, customer satisfaction, service quality, light rail transit and conceptual framework for the study has been discussed.

2.1. Theoretical reviews

In recent years, there has been an increasing interest in identifying and analyzing, customer satisfaction factors. Service providers and scholars have recognized the importance of customer satisfaction as contributing to the market share and the return on investment for companies. Various scholars' outlined several definitions, theories and models of customer satisfaction (SERVQUAL, KANO, SERVPERF, and RECSA). Theories could be Expectancy theory, Consistency theory, Disconfirmation theory, Equity theory and Hypothesis testing theory (Adee, 2004).

2.1.1. Expectancy theory

The most widely accepted theory of customer satisfaction is the expectancy disconfirmation theory (Basky, 1992). The theory was developed by Oliver (1980), who proposed that satisfaction level is the result of the difference between expected and perceived performance. Satisfaction (positive disconfirmation) occurs when product or service is better than expected.

2.1.2. Consistency theories

Consistency theories suggest that when the expectations and the actual product performance do not match the consumer will feel some degree of tension. In order to reduce this tension, the consumer will make adjustments either in expectations or in the perceptions of the product's actual performance. Four theoretical approaches have been advanced under the umbrella of consistency theory: Assimilation theory, Contrast theory, Assimilation-Contrast theory and Negativity theory (Peyton et al, 2003).

2.1.2.1. Assimilation Theory

Assimilation theory is based on Festinger's (1957) dissonance theory. Dissonance theory posits that consumers make some kind of cognitive evaluation between expectations about the product and the perceived product performance (Peyton et.al 2003). This view of the consumer post-usage evaluation was introduced into the satisfaction literature in the form of assimilation theory (Aderson, 1973).

Consumers seek to avoid dissonance by adjusting perceptions about a given product to bring it more in line with expectations (Peyton et.al, 2003). Consumers can also reduce the tension resulting from a discrepancy between expectations and product performance either by distorting expectations so that they coincide with a perceived product performance or by raising the level of satisfaction by minimizing the relative importance of the disconfirmation experienced (Olson and Dover, 1979).

2.1.2.2. Contrast theory

Contrast theory was first introduced by Hovland et al (1957). Also, Dawes et al (1972) define contrast theory as the tendency to magnify the discrepancy between one's own attitudes and the attitudes represented by opinion statements. Contrast theory presents an alternative view of the consumer post-usage evaluation process than was presented in assimilation theory in that post-usage evaluations lead to results in opposite predictions for the effects of expectations on satisfaction (Cardozo, 1965). While assimilation theory posits that consumers will seek to minimize the discrepancy between expectation and performance, contrast theory holds that a surprise effect occurs, leading to the discrepancy being magnified or exaggerated (Peyton et al, 2003). According to the contrast theory, any discrepancy of experience from expectations will be exaggerated in the direction of the discrepancy. If the firm raises expectations in his advertising, and then a customer's experience is only slightly less than that promised, the product/service would be rejected as totally un-satisfactory. Conversely, under-promising in advertising and over-delivering will cause positive and also be exaggerated (Vavra, 1997).

2.1.2.3. Assimilation –Contrast Theory

Assimilation-contrast theory was introduced by Anderson (1973) in the context of post-exposure product performance based on Sherif and Hovland's (1961) discussion of assimilation and contrast effect (Yau and You, 1994). Assimilation-contrast theory suggests that if performance is within a customer's latitude (range) of acceptance, even though it may fall short of expectation, the discrepancy will be disregarded – assimilation will operate and the performance will be deemed as acceptable. If performance falls within the latitude of rejection, contrast will prevail and the difference will be exaggerated, the product /service deemed unacceptable (Vavra, 1997).

2.1.2.4. Negative Theory

This theory developed by Carlsmith and Aronson (1963) suggested that any discrepancy of performance from expectations will disrupt the individual, producing 'negative energy' (Vavra, 1997).The negative theory states that when expectations are strongly held, consumers will respond negatively to any disconfirmation. Accordingly, dissatisfaction will occur if perceived performance is less than expectations or if perceived performance exceeds (Carlsmith and Aronson, 1963).

2.1.3. Disconfirmation Theory

As Mattila et al (2003) discussed that amongst the most popular satisfaction theories is the disconfirmation theory and he argues that satisfaction is related to the size and direction of the disconfirmation experience that occurs as a result of comparing service performance against expectations. Research also indicates that how the service was delivered is more important than the outcome of the service process, and dissatisfaction towards the service often simply occurs when guests' perceptions do not meet their expectations (Mattila and Neill, 2003).

2.1.4. Equity Theory

This theory is built upon the argument that a person's reward in an exchange with others should be proportional to his/her investments (R.L and Swan, 1989a). In other words, the equity concept suggests that the ratio of outcomes to inputs should be constant across participants in an exchange (Yau and You, 1994). As applied to customer satisfaction research, satisfaction is thought to exist when the customer believes that his outcomes to input ratio are equal to that of the exchange person (Adee, 2004).

2.1.5. Hypothesis Testing Theory

A two-step model for satisfaction generation was suggested by Deighton (1983). First, Deighton hypothesizes, pre-purchase information (largely advertising) plays a substantial role in creating expectations about the products customers will acquire and use. Customers use their experience with product/service to test their expectations. Second, Deighton believes, customers will tend to attempt to confirm (rather than disconfirm) their expectations.

2.1.6. SERVQUAL Model

The most widely used models to light up theories of customer satisfaction into management practices is SERVQUAL model (Soutar, 2001). As Parasuraman et al (1988) built a 22-item instrument called SERVQUAL for measuring consumer perceptions of service quality. SERVQUAL addresses many elements of service quality divided into the dimensions of Tangibles: the physical characteristics associated with the service encounter (Asad and Chris, 2005). Reliability: providing accurate and consistence services (Mammo, 2010). Responsiveness: the willingness that employees exhibit promptly and efficiently solve customer requests and problems. Assurance: providing confidence to customers (such as the firm's specific service, knowledge, polite and trustworthy behavior from employees) (Peyton, Kamery, & Pitts, 2003). And Empathy: The service firm's readiness to provide each customer with personal service (Nadiri and Hussain, 2005).

2.1.7. Kano Model

The Kano model is a theory developed in 1980's by Professor Noriaki Kano and his colleagues of the Tokyo Rika University. The Kano model measures satisfaction against customer perceptions of performance attributes (Gustafsson and Edvardesson, 2000). The underlying assumption behind Kano's method is that customer satisfaction is not always proportional to how fully functional the product or service. In another word, the higher quality does not necessarily lead to higher satisfaction for all product attributes or service requirements (Bilgili and Unal, 2008).

The Kano et al (1996) model of customer satisfaction classifies attributes based on how they are perceived by customers and their effect on customer satisfaction. The model is based on three types of attributes; (1) Basic or expected attributes, (2) performance or spoken attributes, and (3) surprise and delight attributes. The basic or expected attributes are as the meaning implies the basic attributes without any major significance of worth mentioning. The performance or spoken attributes are the expressed expectations of the customer. The third one, the surprise and delight attributes are those, which are beyond the customers' expectations.

In his model, Kano (1984) distinguishes between three types of basic requirements, which influence customer satisfaction. These are: (1) must be requirement – If these requirements are not fulfilled, the customer will be extremely dissatisfied. On the other hand, as the customer takes these requirements for granted, their fulfillment will not increase his/her satisfaction; (2) one-dimensional requirement is usually, explicitly demanded by the customer – the higher the level of fulfillment, the higher the customer's satisfaction and vice versa. (3) attractive requirement – These requirements are the product/service criteria which have the greatest influence on how satisfied a customer will be with a given product" (Bilgili and Unal, 2008).

2.1.8. SERVPERF

The performance-based service quality (SERVPERF) was identified by Cronin and Taylor (1992). Cronin and Taylor proposed the SERVPERF instrument, which is a more concise performance-based scale; an alternative to the SERVQUAL model. The perceived quality model postulates that an individual's perception of the quality is only a function of its performance and continued to debate between the effectiveness of SERVQUAL and SERVPERF for assessing service quality (Cronin & Taylor, 1994). The authors remained unconvinced of both, that including customer expectations in measures of service quality is a position to be supported, and that SERVPERF scale provides a useful tool for measuring overall service quality. Moreover, Lee et al, (2000) empirically compare SERVQUAL (performance minus expectations) with the performance-only model (SERVPERF). The author also concluded that the results from the latter appeared to be superior to the former.

2.1.9. RECSA model

McKnight et al (1986) proposed that RECSA model, an acronym derived from reliability, the extent of service, comfort, safety, and affordability. Even though the nature of service is difficult to define and judge (Kotler et al 2003), a number of studies have contributed immensely to the understanding and measurement of service quality. For instance, service quality measurement tool SERVPERF has been argued to be more appropriate for the measurement of effective service quality than SERVQUAL (Boulding et al, 1993).

No matter how, the RECSA model may be an effective tool for measuring service quality in transport services; it ignores the contribution of the driver and crew, ticket services and auxiliary services rendered by service providers. However, according to Kotler and Armstrong (2003), foremost attribute of services is service inseparability; meaning services are created and possessed at the same time and cannot be alienated from their providers, whether the providers are people or machines.

Besides, as Emmanuel and Solomon (2015) suggest that drivers are the main service providers in transportation and as a result, they have an effect on passenger satisfaction. For that reason, they modified the RECSA model by adding drivers' behaviors as one dimension. Moreover, in public transportation industry customer satisfaction influenced by many factors other than the above variables such as ticket services or payment systems, trusts of the customer for the service provider and others (Soutar, 2001).

2.2. Empirical reviews

Here empirical reviews on factors influencing customer satisfaction were addressed. The study of the relationship between service quality and customer satisfaction in public transport system by Morfoulaki, Tyrinopoulos, and Aifadopoulou (2007) reported that service quality and customer satisfaction had a direct relationship. In the study, they suggested that improving waiting time, a circumstance on board vehicles, frequency and on- time performance, ticketing policy and terminal safety would change customer perception and customer satisfaction.

Also, Peng, et al (2008) discussed that the levels of passenger satisfaction using KANO model on LRT in Malaysia and the results of the paper outlined that passengers' were ranged on at a satisfactory level with facility, comfort, information delivery and prices of the service provision. However, commuters were dissatisfied with efficiency, services of staff and safety. Due to this reason, the investigator claimed that further improvements need to be taken to improve the service of the light rail transit and to increase the level of customer satisfaction.

In an investigation of customer satisfaction and perception in public bus transport on travelers' in Indonesia, Budiono (2009) found that customers are not satisfied yet with public transport service. The results of the study summarized that frequency, comfort, on board security and travel time were the top four factors that positively correlate with overall satisfaction. The study also divided all the sixteen factors into functional and soft factors. Both the functional quality factor and soft quality factor demonstrated a significant effect on overall customer satisfaction. The functional quality factors consist frequency, price, punctuality and travel time, plays a stronger influence on overall customer satisfaction than soft factors such as comfort and safety.

A survey that conducted on measuring customer satisfaction in public transportation by Kostakis (2009) showed that passengers satisfied at medium levels for the service provided and factors were varied and it depends on the line of the road the bus provided the service. Service dimensions such as route safety, service of personnel and service inside the bus constituted the strong points of the company. The study also outlined that waiting time and availability has a direct effect on customer satisfaction and thus, critical consideration and immediate improvement was necessary.

In the same vein, the study of Nandan, (2010); Agunioye and Oduwaye, (2010) observed that passenger satisfaction at the railway transit service influenced by safety, information system, security, availability, time schedule, and cleaning.

A recent study by Mammo (2010) involved in the assessment of customer satisfaction in transportation service delivery: the case of three terminals of Anbassa City Bus Service Enterprise**.** The study showed that buses were very old and limited supply of buses. This implies that the service was not reliable and safe. Excessive waiting time and long walking distance to reach the service make it inconvenient. Moreover, overcrowding and theft make it uncomfortable and unsecured. Generally, in this investigation; reliability, safety, accessibility, security, excessive waiting time and overcrowding were considered as factors that influence customer satisfaction. In line with this, the findings of the study concluded that passengers' were not satisfied with the service provision of ACBSE.

According to the study of Irfan, Kee, and Shahbaz (2012) examined service quality in rail transport from the passengers' perspective, using a modified SERVQUAL instrument, including eight service quality constructs: empathy, assurance, tangibles, timeliness, responsiveness, information system, food, safety, and security were employed to measure the passengers' perceptions about the service quality of railways. The results of the study contend that commuters perceive the quality of services offered to them were not satisfactory. Finally, the study identified based on descending order like responsiveness, catering, tangibility, assurance, safety, information and punctuality as the main determinants that influence commuter satisfaction to the train.

An investigation on customer satisfaction towards service quality of public transportation by Jun (2012); SERVQUAL models of five dimensions were applied as an indicator to influence customer satisfaction. The Pearson correlation analysis of the study showed that there was a positive relationship between the five dimensions. Finally, the study proposed that tangibility had more significance and dominate impact on customer satisfaction.

In another major study on the effects of service quality, customer satisfaction and customer loyalty by Esmaeili, Manesh, and Golshan (2013**)** found that passengers of the rail service were satisfied with employee interest in solving the problems of passengers, the employees' tendency toward helping out passengers, modest treatment of employees toward passengers and feelings of safety in passengers when dealing with employees and those variables had the highest impact on service quality. The study also identified, presenting correct reports (i.e. Issuing correct tickets), properly-organized documents, (i.e. Sufficient information placed on tickets), delivering services in due time (i.e. The on-time movement of trains), accomplishing the promised tasks or services within due time (i.e. timely arrival of trains at destinations), and accurate notification of the service scheduled (i.e. the trains timetable) as a variable and which had a lowest effect on service quality.

Moreover, in the study, the most effective customer satisfaction indices included the procedure of handling complaints, customer service (welfare services provided during the travel on the train), general feeling of satisfaction, reasonable prices, and fixed places for ticket sales. The final results of the study also suggested that there was a positive relationship between service quality and customer satisfaction, between service quality and customer loyalty, and between customer satisfaction and customer loyalty.

Das et al. (2013), in their paper assessed customer satisfaction on public transport in Malaysia. The inquiry had taken environmental and cleanliness in the station, ticket counter and reasonable ticket price, waiting area and escalator down, board information, punctuality of train arrival, seats provided in the train, cleanliness in the train, comfort when boarding train, security, additional coach and routes to other places, parking and public transport in the surrounding area, reduce traffic congestion and environmental friendly as an indicator variable.

In this study, the investigator found that passengers' were satisfied with the public transportation system. Despite this, the evidence from this study suggested that improvements in waiting area, escalator, quality and quantity of seats in the train, comfort, and convenience of parking and public transportation to the surrounding areas had to be made in order to enlarge the earning powers of the company.

To identify the influence of service quality on customer satisfaction; the case study of Dar Express Bus service in Tanzania, Mushi (2013) assessed service quality dimensions and the result of the study indicated that passengers were satisfied with the transport services provided by the Dar Express Bus Company. Besides this, the study depicted that responsiveness, assurance and tangible dimensions of service quality had a significant effect on passenger satisfaction. This implies that those service quality dimensions were predictors of customer satisfaction. Finally, the researcher proposed that giving personal attention to passengers, visual appealing facilities and willingness to help passengers, timetables, posters and brochures, website and email were the areas that need to be improved.

Similarly, with an investigation of rail service on the above empirical literature, Buluma (2014) also studied on service quality and passenger satisfaction in Rift Valley Railways corporation-Kenya. The study aimed to found out what service quality attributes passenger value and how much they were satisfied. The investigator prepared a questionnaire consisting of 36 statements that were grouped and related to one of the eight service quality dimensions of the SERVQUAL model. In this study, the researcher found that passengers were dissatisfied with seating space, comfort, on-time delivery, and frequency of trains as scheduled. Besides, the results of this research supported the idea that the concerned body of the company would establish continuous customer satisfaction evaluation strategy. Finally, the researcher concluded that service quality was significantly related to passenger satisfaction and therefore service quality dimensions implementation leads to passenger satisfaction.

The study of Govender (2014) on public transport; case study on bus and minibus service commuter's perceptions in South Africa, Johannesburg by using RECSA model. The investigator argued that commuters were influenced by the extent of service; accessibility and availability of bus, driver friendliness, and comfort like seat availability, safety and affordability were the most important factors which influence customer satisfactions and perceptions accordingly their list of sequences.

As Islam (2014) examined factors measuring customer satisfaction, especially the impacts of service quality on commuter's satisfaction in the public transportation sector of Malaysia. The study indicated that a customer satisfaction level depends on the service quality dimensions. The behavior of personnel and behavior of a bus driver, the frequency of services, the reliability of services as well as time and particularly waiting time seemed to be the most crucial factors affecting customer satisfaction.

In contrast to the above literature which has been reviewed on the transportation industry, Tesfaye (2013) analyzed factors which influence customer satisfaction for the service provided in the telecommunication sector. The findings of the researcher summarized that customers were dissatisfied with the service provision of the company due to reliability, courtesy, quick response, apology ,compensation for service failures, employees communication, poor customer handling ,information, service consistent and standardized were the main.

According to Meaza (2013) investigated on customer satisfaction levels in Ethiopian Airlines services, the case of bole international airport flight physical, time, employee responsiveness, complaint handling, safety and price on passengers' satisfaction were assessed as a variable that determines passengers' satisfaction. The finding of the study indicated that passengers' of Ethiopian Airlines are not satisfied with three dimensions which were time, price and complaint handling. However, the remaining three dimensions passengers were satisfied.

The study of Shammout and Haddad (2014) identified the most important impacts of complaints handling on customers' satisfaction in commercial banks' in Jordan. In this study complaint handling was the main domains of the investigations as the independent variable and consists of six dimensions which were considered to be the sub independent variables for the purpose of the study (service recovery, service quality, switching cost, service failure, service guarantee and perceived value) on customer satisfaction. Finally, the study showed that the six dimensions had an impact on customer satisfaction.

Additionally, the study of Meron (2015) analyzed the impact of service quality on customer satisfaction set out to examine the impact of service quality on customer satisfaction in the Bank of Abyssinia S.C. She employed SERVPERF model to identify the relationship between the service quality dimensions. The results of her study indicated that all the service quality dimensions (tangibility, reliability, responsiveness, empathy and assurance) had a positive and significant relationship with customer satisfaction. Also, the finding of this study concluded that customers were most satisfied with the assurance dimensions of service quality followed by responsiveness.

Moreover, Brehanu and Temesgen (2015) assessed service quality and customer satisfaction in the case area of the Ethiopian Commodity Exchange (ECX). The study aimed to examine factors affecting service quality and its effect on customer satisfaction in the Ethiopian commodity exchange market. The researcher administered SERVQUAL's five-dimensions model service attributes in the study. The finding of the study indicated that all the five service quality dimensions had a direct relation to customer satisfaction. Among the five service quality dimensions, responsiveness and assurance had high gap score, whereas reliability, empathy, and tangibility dimensions had a relatively low gap. The study summarized that overall levels of customer satisfaction were not satisfied and the study concluded by recommending that the company had to be improving the service quality dimensions to satisfy customer needs.

2.3. Literature discussions and argumentation

In this study, the researcher was reviewing a lot of theory, model and empirical articles that were related to the study area. The qualitative part of the study has been addressed and supported by using Consistence theory, SERVQUAL and KANO model to fill the qualitative gap. Additionally, those theories were used for comparisons and interpretations of the collected qualitative data. This investigation different from other studies because of the development of model based on literature reviews of variables like reliability, comfort, safety and security, affordability, staff behavior, comfort and ticket payment system. Besides, except the ticket payment variable, other variables were studied by other researchers in different sectors (Banks, Telecommunication, Airline, Transportation and others.), during different time and countries. Moreover, the reasons why the researcher assessed and reviewed such studies were in order to assure and identified variables that are going to be influenced passengers' satisfaction in Addis Ababa city light rail transit services. On the whole, the literature discussion summarized as follows:-

Table 2.1:Empirical review summary

References	**Country**	**Study Area**	**Results of the study on : Factors of customer satisfaction**
Morfoulaki, Tyrinopoulos, and Aifadopoulou (2007)	Greece	Public Transport	Waiting time, frequency, ticket police and safety.
Peng, et al (2008)	Malaysia	Rail	Facility, comfort, information, delivery, price, cleanliness, efficiency, service of staff and safety.
Budiono (2009)	Indonesia	Bus	Functional quality factors (frequency, price, punctuality and travel time) and soft quality factors (comfort, service and information)
Kostakis (2009)	Greece	Bus	Safety, service of personnel, service , waiting time and availability
Nandan (2010)	India	Rail	Availability and quality of refreshments, information systems, staff, safety and security

Agunioye and Oduwaye (2010)	Nigeria	Rail	Time schedules, departure time and cleaning
Mammo (2010)	Ethiopia	Bus	Reliability, safety, accessibility, security, excessive waiting time and overcrowding
Irfan, Kee, and Shahbaz (2012)	Pakistan	Rail	Empathy, assurance, tangibles, security and timeliness, Responsiveness, information system, food and safety
Jun (2012)	Malaysia	Public Transport	SERVQUAL models of five dimensions
Esmaeili, Manesh, and Golshan (2013)	Iran	Rail	Modest treatment of employees, issuing correct tickets, delivering services in due time, accurate notification of the service
Das et.al (2013)	Malyasia	Public transport	Service waiting area, escalator, quality and quantity seats in the train and comfort.
Mushi (2013)	Tanzania	Bus	Responsiveness, assurance, tangibles dimensions of service, visual appealing facilities, employee willingness, timetables, posters, brochures, website and email.
Tesfaye (2013)	Ethiopia	Ethio-telecom	Reliability ,information, courtesy, quick response, compensation for service failure, employees communication, poor customer handling , Service consistent and standardized
Meaza (2013)	Ethiopia	Airline	Physical, time, employee responsiveness, complaint handling, safety and price
Sandhu (2013)	Pakistan	Telecom	Service quality dimensions
Govender (2014)	South Africa	Public transport	Extent of service, accessibility , availability of bus , driver friendliness, comfort like seat availability, safety and affordability
Buluma (2014)	Kenya	Rail	Eight service quality dimensions of the SERVQUAL model
Shammout and Haddad (2014)	Jordan	Bank	Service recovery, service quality, switching cost, service failure, service guarantee and perceived value
Islam (2014)	Malaysia	Bus	Behavior of a bus driver, frequency of services, reliability of services as well as

			time /waiting time
(Emmanuel and Solomon, 2015)	Ghana	Minibus taxi	Comfort, reliability, safety and driver behavior, continuous service and affordability
Hundal and Kumar (2015)	Indian	Railway	Facility, safety, security, punctuality and employee behaviors
Meron (2015)	Ethiopia	Bank	Tangibility, reliability, responsiveness, empathy and assurance
Brehanu and Temesgen (2015)	Ethiopia	ECX	SERVQUAL's five-dimension model

Source: (Empirical reviewed summary, 2017)

2.4. Customer satisfaction versus Service quality

As Sureshchandar et al (2002) proposed that customer satisfaction as a multi-dimensional construct just as service quality, but they argued that customer satisfaction should be operationalized along the same factors on which service quality is operational ized. Based on this approach, the link between service quality and customer satisfaction has been investigated. The results indicated that the two constructs are indeed independent, but are closely related, implying that an increase in one is likely to lead to an increase in another.

Customer satisfaction is a key to the future development of public transport, both in theory and practice (Mcknight et al, 1986). Customer satisfaction has the potential to highlight and explain the link between what the government and the company do (in terms of the products and services it offers) and the customer reactions to that (Boulding et al, 1993). Customer satisfaction relates to how passengers respond to the quality of service that the operator gives to them. Customer satisfaction is a condition that the customer feels that the product features is based on his or her expectations (Philip and Keller, 2006).

Dissatisfaction is a manner in which deficiencies and disadvantages of the product, inconvenience, cause customer complaints and criticism (Kotler et al, 2003). Researchers all over the globe claim that offering quality services give a sustainable competitive advantage to any business (Parasuraman et al, 1985).

It enables them to fulfill not only the present needs of their customers but also to anticipate their future needs. This ability to anticipate the future needs of customers allows them to delight their customers through quality services on a consistent basis. Subsequently, it enhances customer satisfaction and customer loyalty level towards the organizations (Wisniewski, 2001).

Quality is one of the key parameters in the transportation sector in order to measure the performance of the products or services and even it is one primary indicator of organizational performance (Emmanuel and Solomon, 2015). It is also meant to ensure that the organizational goals are met with efficiency. Earlier quality was considered only in the manufacturing sector, but during the last couple decades there was a tremendous growth in service sector around the globe and the concept of quality has arisen in this sector (Pakdil and Harwood, 2005).

It is evident from the literature that now service sector has become one of the fastest - growing sectors in the global economy and the major reason is that now even American economy has become a service economy (Pakdil and Harwood, 2005). Manufacturing and construction sector in the United States employed 19.1% of the labor force which had been reduced from 26.1% in 1979, whereas service sector had employed 70% of the U.S labor in 1992 (Biema and Greenwald, 1997). The service sector is growing in almost all the economies of the world and a similar growth trend can also be seen in Ethiopia.

The service sector has realized that service quality is the main source of gaining competitiveness and remains successful in the market (Raghuram and Gangwar, 2008). The service quality theory is based on the literature on customer satisfaction and product quality (Brandy and Cronin, 2001). And many other researchers had emphasized that quality initiatives in the service sector had resulted in gaining sustainable competitive advantages (Hadikoemoro, 2002).

During the past few years, service quality has become a major area of academic investigation. There are many researchers' analysis and define the term service quality. The important factor of service quality is the word "SERVICE''. That is "S" stands for "satisfaction", "E" stands for "expectation", "R" is "readiness", "V" is "value", "I" is "Interest", "C" is "courtesy" and "E" is "efficiency (Proomprow, 2003).

Service quality can be described as a rationale for differences between expectation and competence along the important quality dimensions. A study on service quality evaluation by Sachdev and Verma (2004), identified ten requirements useful for passengers' evaluation of the quality of services: reliability, responsiveness, tangibles, information, assurance, empathy, food plazas, timeliness, understanding the passengers and service accessibility. Additionally, according to Parasuraman et al (1985) proposed a service quality scale (SERVQUAL), a generic instrument that has 5 dimensions of service quality: reliability, responsiveness, assurance, empathy and tangibility.

2.5. Theoretical framework

2.5.1. Reliability

In the railway network reliability is one of the biggest problems in the daily operations of a railway system (Berger et al, 2011). It refers to the consistencies of the service delivered to passengers. A study presented by Van and Van (2010), the reliability of transport influenced by the rail quality and efficiency. Reliability is a very important factor when choosing any mode of transport used. A research which was conducted by Emmanuel and Solomon (2015) on the influence of service quality on customer satisfaction reliability had a positive significant influence on passengers' satisfaction. Therefore, the researcher develop the hypothesis of :

H_1= Reliability has a positive significant influence on passengers' satisfaction.

2.5.2. Safety and security

Many people agree that safety and security aspect of the public transportation operation is very important, as public transportation closely relates to human lives on a larger scale or in greater numbers as many passengers happen to be riding in one car (Joewono, 2006).

The study of Hundal and Kumar (2015): assessing the service quality of Northern Railway by using SERVQUAL Model. The main objective of the study was to evaluate determinants of passengers' satisfaction with service quality of Indian railway. In this study facility, safety, security, punctuality and employee behaviors were considered as the factors which affect passengers' satisfaction. The researcher tested the following hypothesis:

H_2= Safety and security have a positive significant influence on passengers' satisfaction.

2.5.3. Accessibility and availability

Generally speaking, most passengers choose the mode of transportation that can offer more connections between road-rail, rail-maritime, rail-waterway, and rail-air. Accessibility could be improved through different actions: the construction of new infrastructure that makes possible new connections and planning of transport services (Govender, 2014; Mammo, 2010). Even though, the service or the product is easily accessible; the availability of the service without any interruption affect customer satisfaction. The availabilities of the services explained that almost all passengers would prefer to get the transit service easily at any time (Hokanson, 1995; Carruthers, Dick and Saurkar, 2005). As researchers depicted that, one of the most decisive challenges in the transportation sector, particularly in developing country is the availability of vehicles when they are looked-for by commuters (Mammo, 2010). Because extents of service are the one major factor which influences commuters' satisfaction (Emmanuel and Solomon, 2015).

H_3= Accessibility and availability have a positive significant influence on passengers' satisfaction.

2.5.4. Staff behavior (ticket sellers and drivers)

In public transportation sector ticket sellers or fare collectors and drivers are the most important factors which influence commuters' satisfaction for the service provided (Hokanson, 1995).

However, due to the existence of environmental, vehicle and personal factors determine the behaviors of drivers and ticket sellers and as result it affects the passengers' interests (Buhari & Rohani, 2013). Ticket sellers and drivers provide information, communications equipment, information on the position and status of the trains or the rail to commuters (Peng, et al., 2008 and Govender, 2014). Similarly, according to Gandhi and Kang (2009), found that customer satisfaction and employee famous role to foster customer satisfaction which drives firm's profitability.

H_4= Staff behavior has a significant influence on passengers' satisfaction.

2.5.5. Affordability

For any service industry affordability could be explained as the capacity of the consumer to pay for what they consumed or used (Saurkar, 2005 and Kundi, 2013). In transportation sector; affordability means that the ability of the passengers' to pay for their transit service (Carruthers and Dick, 2014). Many researchers outlined that affordability is defined as the capability of the households to incur a cost for transport service (Govender, 2014). Holding other factors constant, as affordability increase; passenger capacity to pay for their transit also increase.

H_5= Affordability has a positive significant influence on passengers' satisfaction.

2.5.6. Comfort

Comfort refers to the extent to which the passengers will be saved from dissatisfaction during their trip (Emmanuel and Solomon, 2015; Mammo, 2010). Other researchers also argued that comfort is the overall cleanliness of the train (Hundal and Kumar, 2015).

When a passenger gets on the train, looking for a seat, litters and junks left behind by other customers' raises dissatisfaction. Nobody wants to be in a dirty atmosphere.
The cleanliness of stations and trains are aspects that are considered necessary and mandatory for passengers. It is usual to have a periodic cleaning of the area open to the public transport (Parasuraman et al, 2004; Hundal and Kumar, 2015). *Hence;*
H6= Comfort has a positive significance influence on passengers' satisfaction.

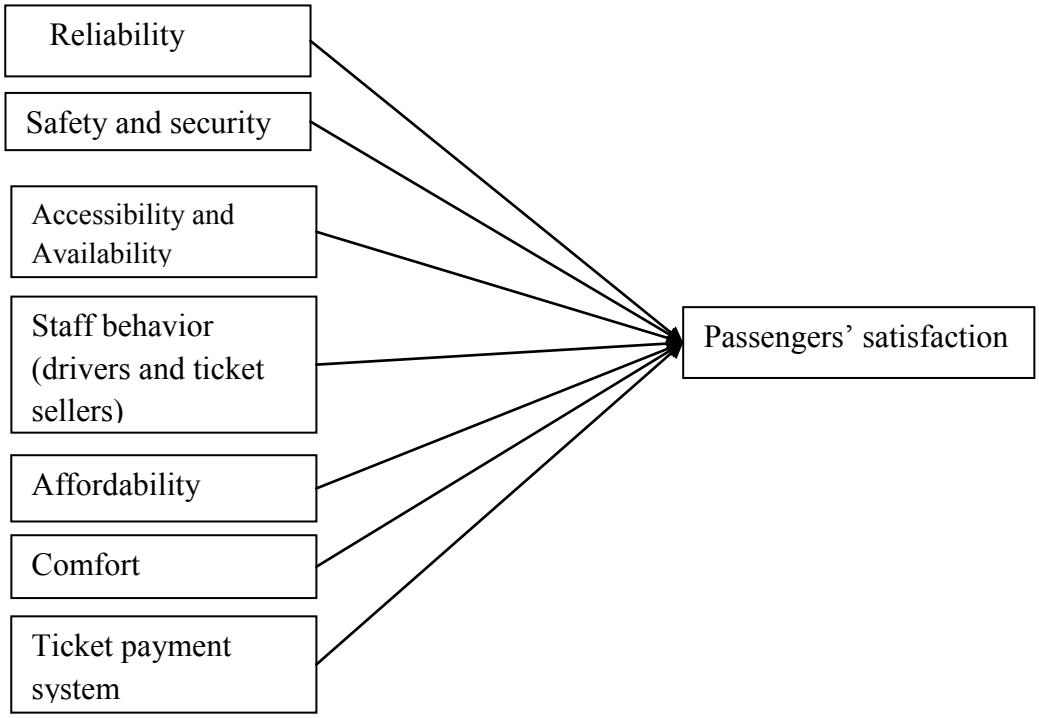
2.5.7. Ticket payment system

Unlike European country, they build e-ticket and integrated payment system for public transportation in their capital city (Edelmann, Reichenbach, and Puhe, 2014), developing countries like Ethiopia suffer from problems of public transportation fare collection system. Information communication technology advancement has a lion share role in the adoption of the integrated and e-payment system in public transportation. Numbers of researchers proposed that an electronic payment system has numerous benefits than ticket payment system because it leaves passengers to the station to pay the fare, more secured, time saver, and easy accessibility for older and people with disability **(**Peng, et al., 2008**).**

H_7=Ticket payment system has a positive significance influence on passengers' satisfaction.

2.6. Theoretical model

The researcher developed a theoretical model based on the reviewed literature to analyze factors influencing passengers' satisfaction in Addis Ababa city light rail transit service.



Source :(Reviewed literature, 2017)

CHAPTER THREE: RESEARCH METHODOLOGY

This chapter presented with the rationalization of the research and method that were employed in order to assure objectives of the study.

3.1. Study area

These days, Addis Ababa found in the lines of development due to rural to urban migration, foreign direct investment, accessibility of jobs and infrastructure and the sum effects of these creates challenges in transportation in the city like a traffic accident, collusion, long waiting times, high fare and congestion. To solve this problem, the government builds a light rail transit line which extended from North-South and East-West direction.

The light rail transit has a total length of 34.25 km. The East-West line covers 17.35km (from Ahyat to Toreayloch) and opened in September 2015. Similarly, the North-South line tautens 16.9 km (from Kality to Menelik) and started its operation in November 2015. The two lines run parallel for 2.7 km (Ethiopian railway gazette, 2015). The rail transit has a total of 39 stations' and the passenger can buy tickets from all stations with the exception of Lideta. All stations are listed below in the following table (3.1) based on their direction, meaning North –South, and East –West route. The North –South route started from NS6, which means that there are five stations left over and it will be opened in the future**.**

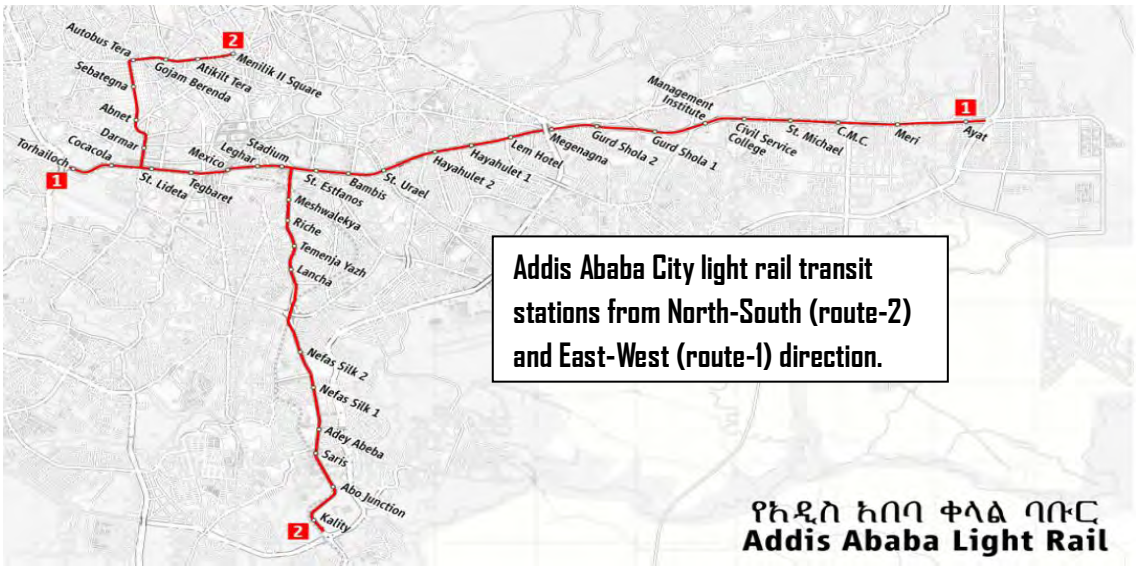
Table 3.1: List of 39 stations of AAC-LRTS

No	Direction	Station Area	No	Direction	Station Area
6	NS6	Kality	28	EW1	Ayat
7	NS7	Abo	29	EW2	Meri
8	NS8	Saris	30	EW3	Cmc
9	NS9	Adey Abeba	31	EW4	Micaeal
10	NS10	Nefasi selk 1	32	EW5	Civil service
11	NS11	Nefasi selk 2	33	EW6	Sera amerar
12	NS12	Lancha	34	EW7	Gurd shola 1
13	NS13	Temenja Yazi	35	EW8	Gurd shola 2
14	NS14	Riche	36	EW9	Megengna
15	NS15	Mesholkiya	37	EW10	Leme hotel
16	NS16	Stadium	38	EW11	Hayhulet 1
17	NS17	Laghar	39	EW12	Hayhulet 2
18	NS18	Mexico	40	EW13	Urael
19	NS19	Tagibare eid	41	EW14	Bambise
20	NS20	Lideta	42	EW15	Estifanos
21	NS21	Darma	43	EW21	Coca
22	NS22	Abinet	44	EW22	Torayeloch
23	NS23	Sebategna			
24	NS24	Autobis tera			
25	NS25	Gojam Berenda			
26	NS26	Atikilt tera			
27	NS27	Menelik			

Source: (AAC-LRTS Office, 2017)

- ❖ NS…..North-South, Ew……East-West.
- ❖ NS20: Station is not workable (excluded from the study).
- ❖ From: NS16-NS20 are **Common stations**.

Figure 2.1: Addis Ababa City light rail transit route photo



Source: (Camera snap shot, 2017)

According to AAC-LRTS project General Manager, Engineer Behailu Sintayehu, during the first operational time of the rail service, 41 rails were ready to provide the service (Ethiopian Railway Gazette, 2015). However, currently, the numbers of rails decreased to 22 due to operational, maintenance and other problems. The total carrying capacity for each single rail reached approximately from 300-317 passengers and it has 68 seating places. The length of a single rail and furgo (when two rails joined together) is 14 meters and 24 meters respectively. There are also two colored rails; Green color rails for Hayat-Torhayloch route and Blue/Semayawe color rails for Kality–Menelik route. Commuters of the light rail transits are expected to pay based on the numbers of stations they traveled. A passenger who traveled 8-stations required to pay 2 Birr (0.09US$), for 16-stations required to pay 4 Birr (0.18 US$), for 24 stations required to pay 6- Birr (0.27US $) and the like.

Table 3.2: Addis Ababa City light rail transit service characteristics

AAC-LRTS	
Direction/Coverage	Both North-South and East -West
Total length	34.25km
Number of total stations	39
Number of workable stations	38
Passengers' estimates/hr	60,000
Frequency	10 minutes during peak hours and 20 minutes during off-peak hours.
An operating speed	70 km/hr
Each rail carrying capacity	300-317
The first and second operation date opened for the line	September and November /2015 respectively

Source: (Ethiopian Railway Gazette, 2015)

3.2. Research approach

In this study the researcher has been used mixed research approach for the purposes of triangulations of data and analysis methods. The researcher also used the sequential transformative method which helps to collect and analysis either quantitative or qualitative data first and next integrating results into the interpretation phase.

3.3. Data collection instruments and data types

The researcher has been carried out survey questionnaire to collect data from the research sample respondents instead of the whole population for quantitative data gathering. Additionally, the researcher used semi structured interview in order to have had qualitative data. The researcher taken in to account semi-structured interview and survey research (questionnaire survey) as a primary source and journals, article, website and related text book on the research topic as secondary sources.

3.4.Research time horizon

This study was an academic research and it applied a cross-sectional study; the collections of data for a particular phenomenon at a particular time.

3.5. Unit of Analysis

The study analyzed factors influencing passengers' satisfaction in AAC-LRTS. Data were collected from the selected passenger and his or her response was taken as a sample. Therefore, individual level has been the unit of analysis for the study.

3.6. Target Population

For this study passengers aged 15 and $15^{+}$of the city light railway in the two routes were the target population of the study. Meaning, children below 15 years old were not included in the study.

3.7. Sampling technique and sample size

Respondents for survey questionnaire selected using convince sampling technique from stations and also informants for semi-structured interview questions were selected using simple random sampling technique. The light rail transit in Addis Ababa city has two lines which stretched from North-South and East-West direction. The two lines have a total number of 39 stations. From these stations, 22 stations stretched from North-South and the remaining 17 stations (all are workable) prostrated in the second line. All stations in the North –South direction are currently working with the exception of station Lideta.

The researcher estimated passengers' who traveled per hour in each line of stations based on the number of tickets sold. For instance, the North-South line has 21 working stations and all tickets sold per hour at each station and adding all those sold tickets gave total numbers of tickets which were sold in the North-South line in an hour and the same is true for East-West line. The study used Cochran (1963) sample size determination formula for unknown or large sample size and consequently adjusted sample size formula was applied to reach the total number of sample units.

Table 3.3: Estimated average passengers per hour in each line

North-South stations	Estimated-average passengers per hour	East-West stations	Estimated-average passengers per hour
Kality	256	Ayat	300
Abo	150	Meri	165
Saris	198	Cmc	165
Adey Abeba	150	Micaeal	170
Nefasi selk 1	189	Civil service	175
Nefasi selk 2	187	Sera amerar	170
Lancha	150	Gurd shola 1	180
Temenja Yazi	150	Gurd shola 2	180
Riche	150	Megengna	295
Mesholkiya	150	Leme hotel	190
Stadium	250	Hayhulet 1	245
Laghar	230	Hayhulet 2	245
Mexico	200	Urael	187
Tagibare eid	190	Bambise	175
Darma	150	Estifanos	175
Abinet	150	Coca	175
Sebategna	190	Torayeloch	308
Autobis tera	255		
Gojjam Berenda	210		
Atikilt tera	190		
Menelik	255		
Total	**4,000(53%)**	**Total**	**3,500(47%)**
Grand total	**7,500(100%)**		
Cochran sample size-calculation results	**365(100%)**		
	Sample from the respective line of stations		
	193(53%)	**172(47%)**	

Source: (Stations of AAC-LRTS, 2017)

$$n = \frac{z^2 \times p(1-p)}{e^2}$$

$$n = \frac{(1.96)^2 \times 0.5(1-0.5)}{(0.05)^2} = 384$$

Adjusted sample size formula:

$$n = \frac{n}{1+\frac{n-1}{N}} = \frac{384}{1+\frac{384-1}{7500}} = 365$$

- **Note:-**
- **N----**Populations of the study
- **n-----**sample sizes of the study
- **Z----**Z-score
- **e----**error
- **P----**probability

Therefore, the study used 365 sample units; 193 (53%) respondents from the North-South line stations and 172 (47%) respondents from the East –West line stations. The questionnaire distributed randomly for 7 consecutive days from [Friday/February 17 up to Thursday/February 23/2017]. Respondents were asked during peak, off and weekend time. Right after the completions of survey data collection, the researcher took only the North-South line stations to select informants for semi-structured questions. Because this line served large numbers of passengers due to the fact that it has many stations. Computer list randomized generator software was applied as a procedure to select stations from the North-South line. First, all stations of the North-South line written in alphabetic and then copied and randomized at once in the software; after that, the software generated the randomly listed stations and consequently, the first five stations have taken namely; Autobis tera, Stadium, Adey Abeba, Meshulkia and Menelik, (see annex 3A). Then after, 20 informants from the five stations selected by using simple random sampling technique.

3.8. Survey and semi-structured administration

The questionnaire survey distributed to the selected respondents at the peak, off and weekend time for the purpose of the consistencies of respondent response. Whereas, semi structured questions conducted in 2 days (9:00am-4:00pm) from February 24-25/2017.

3.9. Conceptualization, Operationalization and Measurement

As Senese (1997) argues that conceptualization is the process of refinements of research ideas into specific terms and the beginning of your own interpretation and approach to the study. Others like, Babbie (1989) outlines that conceptualization as the mental process whereby fuzzy and imprecise notions (concepts) are made more specific and detailed, the process through which we specify precisely what we mean when we use a particular term. He further notes that the end product of conceptualization is a set of dimensions and finally indicators. Scholars have proposed that we can consider and take dimensions and indicators as variables. Additionally, the process of defining variables that represent specific concepts or portions thereof is called Operationalization (Senese, 1997). According to Burns and Bush (2002) and Hair et al (2003) operationalization refers to a specific question that will be used in a survey to measure the meaning of a construct.

Generally, in this study service quality and satisfaction has been taken as a concept and from these concepts, seven independent dimensions and one dependent dimension were developed based on the reviewed literature. Both independent and dependent dimensions or variables and its numbers of indicators were written as follows; Safety and security (5-indicator), Comfort (7-indicators), Affordability (3-indicators), Staff behavior (ticket seller and driver,7-indicators), Reliability (6-indicators), Accessibility and Availability (8-indicators), Ticket payment system (4-indicators) and Passengers satisfaction (8-indicators). Hence, the study had 48 indicators and all indicators or operationalized items measured using ordinal five-points Likert scale from 1-5 scales (1=Highly dissatisfied, 2=Dissatisfied, 3=Somewhat satisfied, 4=Satisfied and 5=Highly satisfied). Finally, definition, measurement and expected sign of the independent variables on passengers' satisfaction were described in the table below.

Table 3.4. Variable definition, Measurement and Expected sign

No	Variables	Concepts	Measurement	Expected sign effect
1	Affordability	The ability of the passengers' to pay for their transit.	1=Highly dissatisfied, 5=Highly satisfied	+
2	Comfort	The extent to which the passengers being saved from dissatisfaction during their trip.	1=Highly dissatisfied, 5=Highly satisfied	+
3	Reliability	The consistencies of the service delivery to the passengers.	1=Highly dissatisfied, 5=Highly satisfied	+
4	Safety and security	The extents of the service free from danger and injuries of commuters.	1=Highly dissatisfied, 5=Highly satisfied	+
5	Ticket payment system	The ways of payment system in public transportation using white paper.	1=Highly dissatisfied, 5=Highly satisfied	+
6	Staff behavior (driver & ticket seller)	The personal traits of service provider (drivers and ticket sellers).	1=Highly dissatisfied, 5=Highly satisfied	+
7	Accessibility and Availability	The easy accessibility of the service without any interruption.	1=Highly dissatisfied, 5=Highly satisfied	+

Source: (Research literature reviewed, 2017)

3.10. Designing questionnaire and semi-structured interview

Participants chose their level of satisfaction ranged from Highly dissatisfied (1) to Highly satisfied (5). The questionnaire and semi-structure questions were prepared using the English language. To well understand by the respondents and to ensure accuracy in translation, both questions converted into Amharic by the official language translator, Tibebu Goshu and he is found in Addis Ababa City, close to stadium in Yiha city center in the 1st floor office number 3 and he has had more than 13 years experience of doing this job. For that matter, the researcher preferred him as a translator from others.

3.11. Procedure

The target respondent in the study was the passengers of AAC-LRTS, who were aged 15 and $15^{+\ years}$ old. The questionnaire was distributed at the stations. The researcher prepared 10 pencils and each respondent has taken one pencil and one questionnaire (had 4 pages) at a time. The researcher primarily tested 20 questionnaires coped; 10 of them by English language and the rest 10 by using Amharic language and the researcher, distributed the questionnaire in the common stations for both lines (except station Lideta); then all Amharic questionnaires were filled out by the respondents and 2 English language version questionnaires were responded. Because of this, the researcher decided to print 290 questionnaires by Amharic language and the remaining 55 by English language. Therefore, including the tested questionnaires, 300 Amharic, and 65 English language questionnaires were copied and distributed for 7 consecutive days from Friday/ February 17 to Thursday /February 23/2017. Following this, informants were asked semi-structured interview questions for two consecutive days from the selected stations.

3.12. Instrument reliability

One of the major requirements of any research process is the consistence of the data and the results of the research finding (Kothari, 2004). A measuring instrument is reliable if it provides consistent results (Creswell, 2014). Correspondingly, to Cohen and his colleague (2003:117), reliability is the replicability and consistency of the instruments over a group of respondents. By the same token, Kumar (1999) and Perry (2005) proposed that reliability is the issue of consistency, stability, predictability and accuracy of the research instrument. Finally, to make sure the reliability of this study, triangulation (using via survey and interview) and Cronbach alpha test has been employed.

The Cronbach alpha coefficient is the most common method used for assessing the reliability of a measurement scale (Hayes & Bob, 1998). The coefficient, which reflects homogeneity among a set of items, varies from 0 to 1.

The literature regarding test and scale construction suggests that an acceptable level of reliability is a function of the intended use of the test results. Nunnally (1967) suggests that when a test or scale is used to make decisions about individuals, the reliability coefficients should be at least 0.90. However, it is impossible to achieve this number, especially assessing personality and feelings. Others are somewhat less conservative, suggesting that a reliability coefficient of 0.80 is acceptable for a test or scale that will be used for making decisions about an individual (Batjelsmit, 1977). Moreover, Saad, et al (1999) argues the following interpretations: 0.90 or higher = excellent, 0.80 to 0.89 = good, 0.70 to 0.79 = adequate and 0.69 and below = may have limited applicability. Initially, this study had a total of 48 items and 8 variables (one dependent and seven independent variables).

However, due to the low values of Cronbachs' alpha, two items from safety and security (Item code SS1 and SS5; see what the code represent in the research questionnaire; appendix-1) were deleted based on inter-item deletion technique which is found in SPSS software. Therefore, the reliability test for the study was assessed based on only 46 item questions within the same numbers of variables. The alpha values of the dependent and independent variables of the study depicted in the following table corresponding with their item numbers. Additionally, in this research, the reliability tests of the variables interpreted based on Saad, et al (1999) arguments.

Table 3.5: Reliability test of the variable by Cronbach's Alpha

Variable	No of items proposed	No of inter items deleted	No of items retained	Cronbach's alpha
Safety and security	5	2	3	0.657
Affordability	3	-	3	0.896
Reliability	6	-	6	0.743
Comfort	7	-	7	0.727
Accessibility and availability	8	-	8	0.810
Ticket payment system	4	-	4	0.786
Staff behavior (driver and ticket seller)	7	-	7	0.792
Passengers' satisfaction	8	-	8	0.728
Total Items	**48**	**2**	**46**	**0.824**

Source: (SPSS reliability statistics, 2017)

As the table above 3.5 shows that, affordability, accessibility and availability has a Cronbach's alpha values of, 0.896 and 0.810 respectively and interpreted as good. Similarly, variables like, comfort (0.727), passengers' satisfaction (dependent variable: 0.728), reliability (0.743), ticket payment system (0.786) and staff behavior (0.792) interpreted as adequate. Only safety and security (0.657) may have limited applicability. By the conclusion, the overall Cronbachs' alpha value of the study was **0.824**, which indicates that there was a good internal consistency in the scale (Saad et al,1999).

3.13. Instrument validity

Validity is the most critical criterion and indicates the degree to which an instrument measures what it is supposed to measure. To assure the quality and the acceptability of the research evaluating validating is the most imperative task for the researcher (Burns, 1999). As Fraenkel and Wallen (2003) claimed that it is unquestionable to deal with the issues of validity of the instrument. Because researchers draw a conclusion from the study based on the instrument they design to collect data from the respondent. In the present study content validity, internal validity and external validity have been assessed to achieve the overall objectives of the study.

3.13.1. Content validity

Scholars have argued that content validity does not have an exact meaning. Despite the fact that, most of them outlined content validity as the degree to which the elements of an evaluation instrument are representative of the dimensions or the variables of the investigation (Hayness, Richard, & Kubany, 1995). Along the same line, Polit & Beck (2006) claim that content validity as the extent to which an evaluation instrument contains an adequate sample of items for the construct assessed. Similarly, others determine the content validity as the levels of the instrument for a study has enough samples (Wynd, Schmidt, & Schaefer, 2003). Generally, therefore in this study content validity understood as the adequate items for each variable and to what extent that items measured the constructs or the variables (Polit & Beck 2006). To this end, the adequacies of items for this investigation were checked by the researcher advisor of the study.

3.13.2. Internal validity

As Cook (1976) and Campbell (1979) proposed that, internal validity assessed whether or not an observation covariation should be considered causal relationships. Internal validity is the extent that an experimental variable is truly responsible for any variance in the dependent variable (Kothari, 2004). In line with this other researchers argued that internal validity is the degree to which a study establishes the cause-and-effect relationship between the treatment and the observed outcome (Marion & Jolaine, 2001). Internal validity also defined as a logical rather than statistical issue (Campbell & Stanley, 1963). The logical framework of the research is provided by the report's structure of the study. The method section describes how the study was designed and what procedures were followed to reduce or eliminate specific threats to internal validity (Campbell & Stanley, 1963). The results section reports the data relevant to establishing the internal validity and the discussion section provides the investigators' assessment of the influence of bias. In all, in this study, the researcher made internal validity using a logical process in each part of the research design, results, and discussions.

3.13. 3. External validity

External validity is the accuracy with which experimental results can be generalized beyond the scope of the study (Creswell, 2014). External validity examines whether or not an observed causal relationship should be generalized to and across different measures, persons, settings and times (Campbell & Stanley, 1963).

3.14. Data analysis method

To meet the objective of the study, the researcher was undertaken qualitative analysis, descriptive analysis, correlation and multiple linear regression analysis.

3.14.1. Qualitative data analysis

The researcher collected qualitative data using semi-structured questionnaire from the selected informants of Addis Ababa city light rail transit service passengers.' The responses of informants were analyzed using the narrative method.

3. 14. 2. Descriptive Analysis

Descriptive analysis refers to the transformation of raw data into a form that would provide information to describe a set of factors in a situation that will make them easy to understand and interpret (Kassim, 2001; Sekaran, 2000 &Zikmund, 2000). This analysis in this study gave a meaning to data through frequency distribution, mean and standard deviation.

3.14.3. Correlation Analysis

The correlation between variables can be measured with the use of different indices (coefficients) (Hauke &Kossowski, 2011). The three most popular are Pearson's coefficient (r), Spearman's rho coefficient (rs), and Kendall's tau coefficient (τ). Kendall's tau, introduced by Kendall (1938), is a correlation coefficient that can be used as an alternative to Spearman's rho for data in the form of ranks. To apply the pearson correlation analysis the study should meet linearity assumption, interval or ratio data and finally the assumptions of normality.

If these assumptions not fulfilled it is better to use Spearman rho. In this study, because of the data were ordinal, the researcher was performed Spearman's correlation analysis to identify the association between variables and to test the research hypothesis (Hogan, and Agnello, 2004). Correlation shows the degree of linear association between variables. The strength of the relationship varies between 0 (no relationship) and + or -1 (perfect relationship). The Spearman's r will either positive or negative, which indicate the directions of the relationship. If Spearman's values of -1 indicate that, as one variable increase the other decrease and if the value is +1 shows that, as one variable increase the other also increase.

Table 3.6: Spearman correlation

Correlations									
Spearman's rho		Passengers' satisfaction	staff behavior	Ticket payment	Accessibility & availability	Security & safety	Affordability	Reliability	Comfort
Passengers' satisfaction	Correlation Coefficient	1.000	.554**	.395**	.610**	.381**	.332**	.549**	.565**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000
	N	263	263	261	262	261	263	262	263
**. Correlation is significant at the 0.01 level (2-tailed).									
*. Correlation is significant at the 0.05 level (2-tailed).									

Source: (SPSS output, 2017)

As it can be seen from the above table 3.6, the correlation between staff behavior (ticket seller and driver behavior), ticket payment system, availability and accessibility, security and safety, affordability, comfort and reliability with passengers' satisfaction. The Spearman's correlation analysis result set out that availability and accessibility has the highest positive correlation (r=*0.610, p=.000*) with the dependent variable passengers' satisfaction followed by comfort (*r=0.565, p=.000*), staff behavior *(r=0.554,p=.000),* reliability *(r=0.549,p=.000),* ticket payment system (*r=0.395, p=.000*), safety and security *(r=0.381, p=.000)* and affordability (*r=0.332, p=.000*). This implies that all variables have a positive and significant relationship with passengers' satisfaction, despite this will further check by regression analysis in the preceding section.

3.14.4. Multiple linear regression analysis

Regression allows us to investigate the effect between variables (Fabozzi et al, 2014). It also aims to bring out relationships between variables, especially between variables whose relationship is subject to chance variation and to the influence of unforeseen events. The researcher was employed multiple linear regression analysis to investigate the effects of seven independent variables on the dependent variable of passengers' satisfaction.

$$y_t = \beta_0 + \beta_1 x_{1t} + \beta_{2x_{2t}} + \beta_{3x_{3t}} + \beta_{4x_{4t}} + \beta_{5x_{5t}} + \beta_{6x_{6t}} + \beta_{7x_{7t}} + \mu_t$$

Model Description

- $y = Passengers' satisfaction$
- $\beta = Constant\ term$
- $x_1 = safety\ and\ security$
- $x_2 = Reliability$
- $x_3 = Affordability$
- $x_4 = Accessibility\ and\ availability$
- $x_5 = Comfort$
- $x_6 = Staff\ behavior(Driver\ \&\ ticket\ seller)$
- $x_7 = Ticket\ payment\ system$
- $\mu = error\ term$
- $t = time$

3.14.4.1. Response rate

Response bias is the effect of nonresponses on survey estimates (Flowers, 2001). Bias means that if nonrespondents have responded, their responses would change substantially the overall results. The number of sample size for this study was 365 respondents. Hence, the researcher prepared and distributed 365 structured questionnaires to the sampled passengers inside the rail. Five passengers escaped from the rail without returning the questionnaires. This shows that the study has a better response rate of 98.6%. The researcher checked the returned 360 questionnaires for excessive missed data. According to Yiran & Chao-Ying (2013), missing data occur at the unit level and at the item level. A unit-level and an item non-response occur when no information is collected from a respondent for the former and when the incomplete information collected from a respondent for the later. In this study, problems of an item non response happened.

Statistics scholars suggested that there is no established cutoff regarding an acceptable percentage of missing data in a data set of valid statistical inferences (Yiran & Chao-Ying, 2013). Despite this, others like Schafer (1999) asserted that a missing rate of 5% or less is unimportant. Bennett (2001) also outlined that statistical analysis is likely to be biased when more than 10% of data are missing.

As Enders and Bandalos (2001) posited that a missing rate of 15% to 20% is common in educational and psychological studies. The researcher in this study excluded cases which had 20% missing data. Because of this reason 59 cases were removed from the analysis. Finally, the remaining 301 cases were ready for the next statistical analysis.

3.14.4.2. Outlier Detection

Unlike univariate analysis, outlier detection is difficult in the case of multivariate analysis. The exact definition of an outlier based on the hidden assumptions regarding the data structure and the method used to detect outliers. However, some definitions are regarded general enough to cope with various types of data and methods. According to Hawkins (1980) explained that an outlier is a data or observations that deviate so much from the other observations. Barnett & Lewis (1994) also outlined that an outlying observation, or outlier, is one that appears far from other members of the sample in which it occurs.

Similarly, Johnson (1992) defined an outlier as an observation in a data set which appears to be inconsistent with the remainder of that set of data. The existences of an outlier in the given study affect the regression model and excluding the outlier data cause the standard errors of regression coefficient to be smaller than before they are removed. Therefore, to remove 36 outliers in this study, the researcher used both Mahalanobis distance and box plots method. The Mahalanobis distance is a powerful criterion which depends on estimated parameters of the multivariate distribution. Accordingly, those observations with a large Mahalanobis distance are indicated as an outlier. Observations considered as an outlier in the case of Mahalanobis distance based on the critical value within a given degree of freedom. When the Mahalanobis distance greater than the chi-square critical value, then; it is assumed that there is an outlier in the data. This study has seven independent variables; this implies that it has seven degrees of freedom (DF (7) =24. 32 at $p<0.001$).

Additionally, when data arranged in a straight line manner over the graphs of Mahalanobis distance (see annex 3B), then it is possible to be concluded that the absence of outlier. As shown in the (see annex 3B), the value of Mahalanobis distance was less than 24.32 and data were arranged in a straight line manner. Due to this reason, there is no outlier problem for the remaining 265 observations. Moreover, box plots are a useful graphical display for describing the behavior of the data. Any data which exist outside the box considered as an outlier. As shown in (see Annex 3C), there were no data outside the box. Therefore, this shows that no outliers are found both in the response and predictor variables.

3.14.4.3. Multiple regression assumptions

Unlike simple regression, multiple linear regression models are used to explain the linear relationship between several independent variables and some dependent variable we observed. To do this the model should be **BLUE** by fulfilling the following assumptions of the classical linear regression model.

3.14.4.3.1. Linearity Assumption

Testing nonlinearity is important because of the fact that correlation, regression and other members of the GLRM assume linearity (Boneau, 1960). To test the linearity assumption for this study, the researcher carried out scatter plots. All variables were taken and drawn on the SPSS graph board template. As shown in the (see annex 3D) graph, there were no a nonlinear relation like a parabola or curve between the variables. The pattern looks like a linear and random. This shows that the absence of non linearity. Therefore, it is possible to be concluded that in this study the assumption of linearity was fulfilled.

3.14.4.3.2. Multivariate normality assumption

The most fundamental assumption in multivariate analysis is normality, referring to the shape of the data distribution to an individual metric variable and its correspondence to normally distribute of the benchmark for statistical methods (Anderson, 2010). If the variation of non-normality large compares to normality, all statistical tests are biased because normality required using F and t-statistics.

According to the literature on normality, there are three common procedures to assess the normality of the selected sample n from the population is normally distributed are; graphical methods (Histogram), numerical method (Kurtosis and Skewness) and formal normality test (such as; Shapiro-wilk (SW test) (Nornadiah, 2011).

Researchers argue that performing only one of the above methods to test normality is not enough to say the data are normally distributed or not (Anderson, 2010). Therefore, in this study, the researcher employed all the above three methods to conclude the normal distribution of the data. As we have seen (annex 3E) using histogram graph, the distribution was bell-shaped to the origin and approximately normally distributed. Additionally, the descriptive methods of kurtosis and skewness applied to check the distribution. Kurtosis refers to the "peakedness" or "flatness" of the distribution compared with the normal distribution. Simply, kurtosis mean that the height of the distribution. Whereas, skewness is the balance of the distribution to the left and to the right of the mean (Anderson, 2010). As a common rule of thumb test for normality is to run descriptive statistics to get skewness and kurtosis, then divide this by standard errors. Skew should be between +2 to -2 range when the data are normally distributed. Some authors use +1 to -1 as a more stringent criterion when normally critical. For this study, the researcher used +2 to -2 range to detect both kurtosis and skewness. A descriptive statistics were computed and attached in the (see annex 3F) and found within the ranges of -2 and +2.

The third method of normality test was the Shapiro-Wilk (SW test), which is the most influential and recommended method for sample sizes below 2000 (Nornadiah, 2011). The null hypotheses (H_0) test of normality assumes the sample data are not significantly different than a normal population. If the p-values of the Shapiro wilk test are less than the significant levels of the study, then we reject the null hypotheses of normality. In this study the P-value of Shapiro –wilk test is 24.2% as shown in the (annex 3G), which was greater than the significance level of the study. Hence, the null hypothesis test of normality was failed to reject; which states that the sample data are not significantly different than a normal population. All in all, in this study, data distributed based on the assumption of multivariate normality.

3.14.4.3.3. Multicollinearity assumption

Multicollinearity is unacceptable high level of inter correlation among the independents, such that the effects of the independents cannot be separated (Jacob, 1969). Under multicollinearity, estimates are unbiased, but assessments of the relative strength of the explanatory variables and their joint effect are unreliable. So that beta weights and R-squares cannot be interpreted reliably even though predicted values are still the best estimates using the given independents (Boneau, 1960). In this study, the multicollinearity of the independent variables were assessed based on the correlation matrix, tolerance and variance inflation factor (VIF) index. As a rule of thumb, inter correlation among independents above 0.7 signals a possible problem of multicollinearity.

Tolerance is expressed as $1\text{-}R^2$, where R^2 is the multiple R of a given independent regressed on all other explanatory variables. If the tolerance value is less than some cutoff value, usually 0.2, the independent should be dropped from the analysis due to multicollienarity (Menard, 1995). This is better than just using simple $r > 0.7$ since tolerance looks at the independent variable in relation to all other independents and thus takes interaction effects into account as well as simple correlations (Jacob, 1969). The VIF is the reciprocal of tolerance and when the values of VIF >10, then there is a problem of multicollinearity. In all cases as depicted in the (annex 3H) the tolerance value for all variables is above 0.2 and the VIF value for all regressors below the cutoff point.

Additionally, using 0.8 as a cutoff point in the spearman's correlation matrix (annex 3I), provided that there was no multicollinearity problem because the spearman correlation coefficient for all explanatory variables is below the cutoff point. Therefore, due to these reasons in this study no multicollienrity problem.

3.14.4.3.4. Homoscedasticity assumption

The assumption of homoscedasticity literally means that same variance and it is central to linear regression models. Homoscedasticity describes a situation in which the error term that is the "noise" or random disturbance in the relationship between the independent variables and the dependent variable is the same across all values of the independent variables (Menard, 1995). The violation of this assumption called heteroscedasticity. The researcher employed scatter plots of residuals plotted against fitted values to detect heteroscedasticity. As shown in (annex 3J), data distributed randomly and the variance was relatively the same across the values of the independent variables. Therefore, in this study, the assumption of homoscedasticity was not violated.

3.15. Research ethical consideration

For any social science research ethical issues can really arise in all phases of the research process: data gathering, data analysis, and interpretation, conclusions and recommendations (Merriam, 1998). Mainly, issues of ethics focus on establishing safeguards that will protect the rights of respondents' and include informed consent, protect participants from harm, and ensure confidentiality. Ethics related to the protection of the participants' right are a vital concern (Marshall & Rossman, 2006). A researcher is responsible for both informing and for protecting respondents. As a researcher, the investigator in this study was morally bound to conduct the research in a manner that avoids potential damages to those involved participants in the study. Besides, the researcher performed the following safeguards to ensure protection and rights of participants when the data were collected inside the rail.

Firstly, the researcher has gotten temporary camera shooting and reporting permit letter (see annex 3K) from a public relations manager, Ato Awoke Mulu, Addis Abab light rail transit service, Kality, Addis Ababa, Ethiopia. Secondly, the researcher started his questionnaire distribution and collection inside the rail from voluntary passengers by introducing himself and the purpose of the study for the participants, including their response will be kept confidential and used only for academic purpose.

At last, the investigator considered the proper conduct of the remaining data analysis, interpretations, conclusions and recommendations tasks for the survey and users (stake holders) of the study.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION AND PRESENTATION

In this chapter, the gathered data from the participants via a structured questionnaire using a Likert scale and semi-structured interviews were presented, analyzed and interpreted accordingly. The main objective of the study is to analysis factors which influence passengers' satisfaction in AAC-LRTS. Data were analyzed in four steps using SPSS version 20 software. The correlation analysis has already undertaken in the third chapter to identify the positive or negative relationships of the variables to the passengers' satisfaction. Here, the rest three analyses were performed; firstly, descriptive analysis, which conducted to assess the respondent demographic characteristics, their usage experience and levels of passengers' satisfaction to each independent variable based on their items; secondly, the qualitative analysis also performed to narrate semi- structured interview questions. Finally, a multiple regression analysis conducted to investigate the contributions of independent variable coefficients to passengers' satisfaction.

4.1. Demographic characteristics of respondents

In this portion sex, age, educational status or level, occupation, income level and passengers' using frequency in AAC-LRTS are given in table 4.1 below.

Table 4.1: Respondents' personal information and experience

	Category	Frequency	Percentage	Cummulative %
Sex	Male	213	80.4	80.4
	Female	52	19.6	100
	Total	**265**	**100**	
Age	15-25	87	32.8	32.8
	26-35	111	41.9	74.7
	36-45	45	17	91.7
	46-55	15	5.7	97.4
	>55	7	2.6	100
	Total	**265**	**100**	
Educational level	Certificate	28	10.6	11
	Diploma	55	20.8	32.5
	Degree	136	51.3	85.9
	> Master	22	8.3	94.5
	Other	14	5.3	100

	Total	255	96.2	
	Missing(999)	10	3.8	
	Total	**265**	**100**	
Occupation	Salaried	149	56.2	56.9
	Self-employed	68	25.7	82.8
	Labor worker	8	3	85.9
	Job seeker	21	7.9	93.9
	Other	16	6	100
	Total	262	98.9	
	Missing(999)	3	1.1	
	Total	**265**	**100**	
Average monthly income level in Birr?	Below 2000	51	19.2	20.5
	2001-3000	46	17.4	39
	3001-4000	39	14.7	54.6
	4001-5000	35	13.2	68.7
	Above 5000	78	29.4	100
	Total	249	94	
	Missing (999)	16	6	
	Total	**265**	**100**	
How often do you travel by light rail transit?	Daily	63	23.8	24.3
	3-4 days	79	29.8	54.8
	1 or 2 a week	57	21.5	76.8
	Fortnightly	26	9.8	86.9
	Other	34	12.8	100
	Total	259	97.7	
	Missing (999)	6	2.3	
	Total	**265**	**100**	

Source: (Questionnaire analysis, 2017)

As the above table (4.1) shows that, from the total respondents 213 (80.4%) are males and the remaining 52 (19.6%) are females. This indicates that the service consumption/usage/ proportion of males are larger than females. Of the total participants, 87 (32.8%) passengers' aged between [15-25], 111 (41.9%) passengers' aged between [26-35], 45 (17%) passengers' aged between [36-45], 15 (5.7%) passengers' aged between [46-55] and the remaining 7 (2.6%) passengers' aged above 55 years old. This infers that about half users of the rail transit service are adults followed by young and old aged passengers'.

The educational levels of respondents counted that, 28(10.6%) have Certificate, 55(20.8%) have Diploma, 136(51.3%) have Degree, 22(8.3%) have Masters and above degree and the remaining 14(5.3%) passengers' are others (below grade 8 students). Additionally, 10 (3.8%) passengers' are missing their educational level responses. This implies that most of the passengers' are degree holders. It may be assumed that the better educational level, the better the opportunity to salaried. Passengers' of Addis Ababa light rail transit asked the job type what they have. Accordingly, 149(56.2%) passengers' are salaried either in the governmental or non -governmental organizations; 68(25.7%) are self-employed or entrepreneur; 8(3%) passengers' are labor workers; 21(7.9%) passengers' are job seekers ;16(6%) passengers' are others (students) and the remaining 3(1.1%) passengers' missed to respond this question. This shows that the light rail transit service provides more service for salaried employees and the least services for labor workers and others (students). Of the total respondents the average monthly income level for passengers'; 51(19.2%) generates below 2000 Birr, 46(17.4%) earns between [2001-3000] Birr, 39(14.7%) earns between [3001-4000], 35(13.2%) makes between [4001-5000], 78 (29.4%) generates above 5000 Birr per month and the remaining 16 (6%) passengers missed to respond this question. The majority of respondents; 29.4% and 17.4% earns above 5000Birr (227$) and below 2000 Birr (90$) average income per month respectively. This indicates that the respondent income generation level found in the two extremes (high and low). The last question from the above table reflects that passengers' frequency to use rail transport. 63 (23.8%) of passengers are traveled daily, 79 (29.8%) of passengers' traveled 3-4 days, 57 (21.5%) of passengers' traveled once or twice a week and 26(9.8%) of passengers traveled fortnightly. Also, 34(12.8%) passengers' of the light rail transit traveled on the other days (like monthly once). Finally, 6(2.3%) of passengers' missed responding this question. This reflected that the rail transit service has almost a pivotal role in 3-4 days followed by the day to day transits of passengers.'

4.2. Descriptive Analysis

Data were collected from the samples of the population and summarized via measures of central tendency (mean; the average of a data set) and measures of variation (standard deviation; do the data values cluster around the mean, or are they spread more evenly throughout the distribution) have been undertaken in the study.

To measure the levels of passengers' satisfaction in AAC-LRTS, a 5 point Likert scale which was categorized 1 for highly dissatisfied, 2 for dissatisfied, 3 for somewhat satisfied, 4 for satisfied and 5 for highly satisfied. A Likert scale data can be analyzed as interval data, that means the mean and standard deviations are the best measure of central tendency and dispersions respectively (Kerlinger, 1986). Both the independent and dependent variables with their corresponding items of the study are summarized in the table below (table 4.2 and 4.3 respectively).

Table 4.2: Levels of passengers' satisfaction for the independent variables

Independent variables	Mean	S.D
Affordability	3.56	1.29
Safety and security	2.71	1.31
Comfort	3.10	1.21
Accessibility and availability	3.48	1.10
Ticket payment system	3.83	1.01
Reliability	2.87	1.27
Staff behavior	3.78	1.04

Source: (SPSS output, 2017)

As it is depicted from the data in table 4.2, the mean score and standard deviation values of affordability($\mu = 3.56, \sigma = 1.29$), safety and security($\mu = 2.71, \sigma = 1.31$), comfort($\mu = 3.10, \sigma = 1.21$), accessibility and availability($\mu = 3.48, \sigma = 1.10$), ticket payment system($\mu = 3.83, \sigma = 1.01$), reliability($\mu = 2.87, \sigma = 1.27$) and staff behavior($\mu = 3.78, \sigma = 1.04$). Ticket payment system has the highest mean score value (3.83) followed by staff behavior (3.78), affordability (3.56), accessibility and availability (3.48), comfort (3.10), reliability (2.87) and safety and security (2.71).

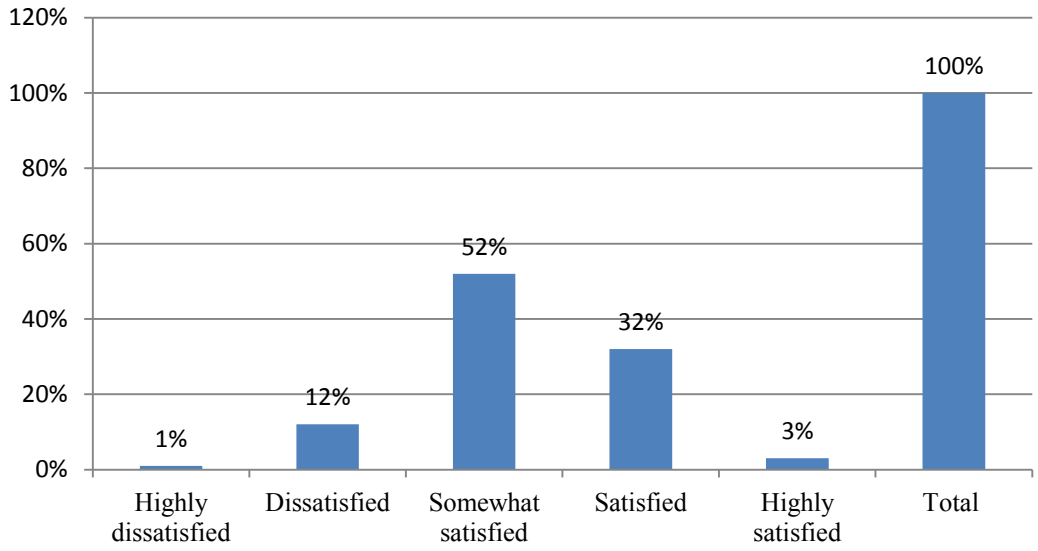
The first three variables mean score rounded to 4 and it represents the satisfied categories on a Likert scale. Hence, passengers' are satisfied with ticket payment system, staff behavior and affordability of the LRTS. The mean score of the remaining four variables rounded to 3 (somewhat satisfied). This indicates that passengers' are somewhat satisfied with accessibility and availability, comfort, reliability, safety and security. Additionally, safety and security, affordability, reliability and comfort variables have the highest standard deviation values of 1.31, 1.29, 1.27 and 1.21 respectively, which depicts that there is highest data variability in the variable.

Whereas, staff behavior, ticket payment system, accessibility and availability are approximately equal numbers of data varying.

4.2.1. Overall passengers' satisfaction

The third objective of the research which measured the overall levels of passengers' satisfaction for the service provided in AAC-LRTS would have been answered here.

Figure 4.1: Frequency of passengers' satisfaction level



Source: (SPSS output, 2017)

As figure 4.1 shows that the overall level of passengers' satisfaction, 52% of passengers' are somewhat satisfied, 32 % of passengers' are satisfied, 12 % of passengers' are dissatisfied, 3% of passengers' are highly satisfied and the remaining 1% of passengers are highly dissatisfied in AAC-LRTS. This implies that the majority of respondents are somewhat satisfied with the provided service followed by satisfied, dissatisfied, highly satisfied and highly dissatisfied.

Table 4.3: Mean of overall passengers' satisfaction

N	Valid	266
	Missing	0
Mean		3.3022
Std. Deviation		0.66433

Source: (SPSS output, 2017)

Additionally, as depicted in the above table the overall mean of passengers' satisfaction are 3.3022 ≈ 3 (somewhat satisfied) and a standard deviation of 0.66433. Almost nearly 54% (150) of passengers are somewhat satisfied in AAC-LRTS.

4.3. Qualitative Analysis

This study carried out both qualitative and quantitative data. Semi-structured interview and survey questionnaire methods conducted accordingly. Both interview and survey questionnaire attached in the (see appendix-1). The quantitative data were analyzed using SPSS version 20 software; whereas the qualitative data were analyzed via a narrative method. Now, only the qualitative data are analyzed as follows. Semi-structured interviews have 4 main questions and allotted 5-10 minutes to complete the questions. For each station 4 informants has taken randomly. Each informant was asked four main questions and his /her idea was summarized with other interviewed people.

The first question was how do you expect the services of light rail transit?

A clearly speaking light rail transit service is new to Addis Ababa city, Ethiopia and the majority of the interviewed people said that we see the rail through television and films before, but these days we have the chance to see in our city at the first time. Besides, obviously the informants look forward that the light rail transit would fix the most challenging transportation problems in Addis Ababa city and despite this; the actual result is far from their expectation. This implies that public transportation problems are ongoing even after the operations of the light rail transit service.

The second question was why do you prefer to a journey using light rail transit?

Similarly, almost all interviewed person states that specially for long distance trip; for instance from Menelik to Kality and form Torhayiloch to Hayat , the light rail is more preferable by speed, price (fare), accident and traffic congestion problem than Bus, Haiger ,Minibus taxi and other public transports. One interviewed man said that he spent 20 Birr per day or 600 Birr per month before the rail transit service started; however, today he spent only 12 Birr per day or 360 Birr per month. Look, in terms of price, there was a significant difference of 240 Birr.

Therefore, finally, this informant concluded as he was satisfied with the light rail transit service. This shows that the light rail transit service provides better service interims of price, speed, traffic congestion, and accident.

The third question was what factors influence you while you are using light rail transit? (Access the station, inside the rail and others).

Informants said that we have had a challenge when we accessing the station. The first challenge is the distance between the fare collector location and the light rail service stations (for instance, we look at Meshualkia and Saris stations). This is one of the cause passengers have traveled without paying transportation cost. The second challenge to access the rail is the absences of elevator or lift. Especially for old and people with disability, the light rail transit is not as such conducive to use it as a mode of transport compared to Bus, Haiger, Minibus taxi and other public transport. The third challenge is the absence of bridge crossing (only found one crossing at Stadium). As one interviewee further explain this problem and its consequence using the following scenario. We assume that a passenger bought a ticket and he wants to travel by the rail. Following this, the passengers must cross the road via Zebra crossing; with the exceptions of the few stations which are found far from Zebra crossing. Then passengers want to cross the road, but there is a green traffic light on the line. Simultaneously, the rail reached that station and the passenger looks the comings of the rail. If the passenger waits until the road traffic light is red; the rail was left that station and the passenger forced to be waiting until the next rail arrived in that station. As opposed to this if the passenger prefers to cross the road by running, collusion with the car might result. Moments later, death and physical damage would be the fortunes for the passenger. In like manner, the other challenge to use the light rail transit service is difficulty inside the rail. The rail is not as such good and suitable for children, patient, pregnant women, disabled person and old aged passengers. As the interviewed people reflect that such problem come due to over capacity carrying of passengers'. Consequently, suffocation, an absence of seat place, quarrel among passengers and theft of money, mobile and other materials are occurring. The informants also said that the absence of supervisors at getting on and off places are taken as one of the other factors that make the problem to be going on.

From this interview question the researcher summarized that informants are fusing to access the station because of the distance between the fare collector and the station, absence of escalator and lift, problem inside the rail and the absence of a supervisor at the gate in and gateway arena.

Finally, the informants forwarded their comment to Addis Ababa city light rail transit service in order to increase its profitability and finally to upgrade passengers' satisfaction.

Even though the rail transit has supervisors inside the rail, who are authorized to check whether the passenger has a ticket or not while they traveled; they are few in number and they could not be able to check all passengers'. By this reason a number of passengers' are free users of the rail transport service, especially at night time. If the payment system and the ways of supervision continuing in these way, the company will lose millions of Dollar or Birr in the near future. They also commented that the light rail transit to have a generator to fix any transit problem when electric power interruption happened. This implies that having a generator and enough numbers of supervisors increase the profitability's of the company and in the same token passengers would also satisfy by the service stipulation later.

4.4. Multiple regression analysis

The aim of this study is to analysis factors which influence passengers' satisfaction in Addis Ababa city light rail transit service. To analyze variables, a multiple regression technique was carried out.

4.4.1. Designing the Model

In regression analysis to design a model, we follow a general necessary step of model specification, model fitting, and diagnosis analysis (Fabozzi et al, 2014).

4.4.2. Model Specification

In the specification step, the independent and dependent variables were determined. Since, reliability, ticket payment system, affordability, comfort, staff behavior, safety and security, accessibility and availability were considered as regressors or causal variables and passengers' satisfaction is the dependent variable. Hence, the study has seven independent variables and one dependent variable.

4.4.3. Model fitting or estimating

The fitting or estimation stage consists of constructing the functional linear relationship expressed by the model and to avoid redundancy the model was found in the third chapter of the paper.

4.4. 4. Model diagnosis

Diagnosis analyze was the last stages of designing the model. Here, the coefficient of determination (R^2), the overall significances of the model and the significances of independent variables were assessed. The R^2 measures the percentage of variation in the dependent variable explained by the independent variables employed in the regression. (Fabozzi et al, 2014). As table 4.4 below shows, the R^2 and the adjusted R^2 of the study are 56.8% and 55.6% respectively.

Table 4.4: Model summary

Mode	R	R Square	Adjusted R Square	Std. Error of the Estimate	df	F-statistics	Sig.
1	.753[a]	.568	.556	.47861	7 251 258	47.093	0.000

a. Predictors: (Constant), Accessibility and availability, Affordability, Security and safety, Ticket payment, Comfort, Reliability, staff behavior

Source: (SPSS Output, 2017)

As depicted in the table above 4.4, the value of R^2 shows that, a 56.8% changes of passengers' satisfaction are explained by the seven explanatory variables of the model which are; reliability, affordability, staff behavior, comfort, safety and security, ticket payment system, accessibility and availability and the remaining 43.2% of the changes of the dependent variable passengers' satisfaction explained by variables which are not included in the model. The second diagnosis analysis is to test whether the entire model is significant or not. The null hypothesis H_0 fittest of the model states that all regression coefficients are equal to zero, which means none of the independent variables play any role. The alternative hypothesis H_1, states that at least one coefficient is different from zero. To perform this test, the researcher carried out an analysis of variance **(ANOVA)** test.

As we have seen in the above F-statistic ANOVA test, table 4.4, F= (7,251) =47.093, $P<0.01$, which revealed that the model was statistically significant at 1% because $p<0.01$ and it also depicts that the seven explanatory variables explained the dependent variable of passengers' satisfaction. Therefore, the null hypothesis H_0 of the fittest model was rejected. The final test of diagnosis analysis is the test of the significances of each independent variable. As the table below, 4.5 shows that, except affordability and ticket payment system, all variables are statistically significant at 5% significance level.

Table 4.5: The coefficients of variables

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.116	.189		.612	.541
	Safety and security	.070	.033	.101	2.111	.036
	Affordability	.008	.029	.013	.280	.779
	Reliability	.210	.046	.253	4.537	.000
	Comfort	.170	.051	.180	3.328	.001
	Staff behavior	.224	.059	.216	3.813	.000
	Ticket payment	.036	.049	.039	.733	.464
	Accessibility and availability	.214	.059	.214	3.653	.000

a. Dependent Variable: Passengers' satisfaction

Source: (SPSS Output, 2017)

Also, the above table 4.5 presents that both the standardized and unstandardized coefficients for the independent variables at 5% significance level. The unstandardized coefficient helps to find out the effects of a unit change in the independent variable over a unit change in the dependent variable and the standardized coefficient helps to identify the most important variable in the model. As table 4.5 shows that safety and security has a coefficient value of 0.07 and its p-value is 0.036. A one unit increase in safety and security will cause a 7% increase in passengers' satisfaction at 5% significant level with the other variables in the model being held constant. Affordability has 0.008 unstandardized coefficients and its p-value is 0.779.With the other factors in the model being held constant, an increase in one unit in affordability leads to a 0.8% yield increase on passengers' satisfaction and statistically insignificant at 5%. Reliability has 0.210 coefficients and p-values of 0.000. Holding all other factors constant, a one unit increase in reliability will cause to a 21% increase in passengers' satisfaction at 1% significance level. Comfort has 0.17 coefficients and p-values of 0.001. Holding all other factors constant, a one unit increase in comfort will cause a 17% increase in passengers' satisfaction at 1% significance level. Staff behavior has 0.224 coefficients and p-values < 0.01. Holding all other factors constant, a one unit increase in staff behavior will cause to a 22.4% increase in passengers' satisfaction at 1% significance level.

Additionally, ticket payment system has 0.036 unstandardized coefficients and its p-value is 0.464.With the other factors in the model being held constant, an increase in one unit in a ticket payment system leads to a 3.6% yield increase on passengers' satisfaction and statistically insignificant at 5%. Finally, accessibility and availability have 0.214 coefficients and its p-value is < 0.01. Holding all other factors constant, a one unit increase in accessibility and availability will cause to a 21.4% increase in passenger satisfaction at 1% significance level.

4.5. Hypothesis testing

Hypothesis testing allows carrying out inference about the population parameter using data from the sample. In another explanation, hypothesis testing implies making a decision, on the basis of sample data, whether to reject or accept certain restrictions are satisfied by the basic assumed model. There are two methods to test the hypothesis. The classical and the alternative approaches which based on the p-values. The former approach takes the default $\alpha(alpha)$ and the critical values. The second method was applied in this study called *p*-value (probability value), which also known as the critical or exact level of significance. It is the most precise method; that is why the researcher employed the method. More specifically, the *p*-value is defined as the lowest significance level at which a null hypothesis can be rejected. The null hypothesis is rejected for any $\alpha \geq p - value$, while the null hypothesis is not rejected when $\alpha < p \; or \; p > a/-value$.

4.6. Passengers' satisfaction theoretical framework

4.6.1. Safety and security

Public transportation becomes a serious problem in developing nations and causes a higher risk of safety and security since there happen to be more passengers in one car, lack of appropriate and integrated approaches. Researchers have been identified safety and security as a determinant factor of commuters' satisfaction in the public transportation sector (Eboli and Mazzulla, 2007). Safety and security could be explained as a mean protection of passengers' transit lives and their property while they move everywhere. It is very important to analysis passenger's safety and security because the absence of safety and security causes passengers' dissatisfaction.

In order to ensure safety and security consciousness and reduce damage in an accident, safety and security modern vehicles and training for both passengers and crew members should have to be given (Lu and Tseng, 2012).

H_0 =There is no a positive and significant influence of safety and security on passengers' satisfaction.

H_1=Safety and security have a positive and significant influence on passengers' satisfaction.

As it can be seen from the table 4.5, safety and securities have $\beta = 0.101, \rho = 0.036$.This infers that safety and security has a positive and significant influence on passengers' satisfaction at 5% significance level. Therefore, the researcher rejected the null hypothesis. The result of this test consistent with Rahaman &Rahaman (2009) on the study of service quality attributes affecting the satisfaction of railway passengers of the selective route in the southwestern part of Bangladesh. Additionally, this finding confirms with Saputra (2010) research results on the analysis of train passenger responses in providing service and he asserted that safety and security had a significant influence on passengers' satisfaction. Moreover, a study on public transport by Irfan, Kee, & Shahbaz (2012) agree with this result.

4.6.2. Affordability

According to Litman (2009b), affordability varies from household to household because affordability affected by the incomes of the individual able to pay what he /she purchase from their sources of funding. Generally speaking, affordability means that the ability of consumers to pay for what they consumed. In transportation, Litman (2009b) argued affordability as the financial burden of a household for their transit service. As a dozen researchers depict that in the world, especially in a developing nation the high costs of urban transport has a negative impact on poor citizen; that limits their motion for different life cases like access to employment, community resources, medical care, recreational opportunities and other situations (Oded, Turin, & Yusak, 2014).

$H_{0=}$ *There is no a positive and significant influence of affordability on passengers' satisfaction.*

$H_{1=}$ *Affordability has a positive and significant influence on passengers' satisfaction.*

As table 4.5 provides that affordability has$\beta = 0.013, \rho = 0.779$. This shows that affordability has the lowest positive insignificant effect on passengers' satisfaction. Therefore, the null hypothesis is failed to reject. However, this result contradicts with the findings of Kumar &Jitin (2015); they found that affordability had a significant effect on passengers' satisfaction.

4.6.3. Reliability

The concept of reliability in the transportation sector is the availability and adherences of services to passengers on time; without any arrival, departure and in the vehicle variability of time (Vincent, 2008). Also, according to Tim, David, & Shawn (2003) reliability outlined that as the consistence of transportation over a period.

H_0=There is no a positive and significant influence of reliability on passengers' satisfaction.

H_1=Reliability has a positive and significant influence on passengers' satisfaction.

As table 4.5 shows that reliability has $\beta = 0.253, \rho < 0.01$ and this infers that reliability has the highest positive and significant impact on passengers' satisfaction than other variables. Therefore, the null hypothesis of the study is rejected. This result has confirmed the results of Emmanuel and Solomon (2015) on customer satisfaction in Ghana mini cap transportation. Additionally, this result also consistent with a study which was conducted in china on passengers' satisfaction for train service indicated that reliability had a significant effect on commuters' satisfaction (Ovuezireie et al, 2014).

4.6.4. Comfort

Better riding quality, especially for passengers, traveling long distance needs the high level of comfort. The key for sustainable of passengers using one of public transportation is when the riding comfort parameters such as noise, vibration, design, layout and speed are acceptable to them (Nordin, 2013). Comfort refers to the extent to which the passengers will be is saved from dissatisfaction during their trip (Emmanuel & Solomon, 2015; Mammo, 2010).

H_2= There is no a positive and significant influence of comfort on passengers' satisfaction.

H_1=Comfort has a positive and significant influence on passengers' satisfaction.

As the above table 4.5, shows that comfort has $\beta = 0.180, \rho < 0.01$ and this reflects that comfort has a positive and significant influence on passengers' satisfaction. Therefore, the null hypothesis of the study is rejected. This result matches with the study on passenger rail service, comfortability in Kuala Lumpur urban transit system by Nordin, et al (2016).

Also, in accordance with the present results, previous studies by Sapura (2010) demonstrated that comfort had a significant influence on railway passengers' satisfaction. Moreover, Budiono (2009) summarized on public transportation that frequency, comfort, onboard security and travel time were the top four factors that positively correlate and influence overall passengers' satisfaction.

4.6.5. Staff behavior

Staff behavior (drivers and ticket sellers) of the light rail transit influenced by his /her individual interest/ goal, pedestrian trait, driving location, safety trip, time pressure and car driver knowledge when they cross the grade (Summala, 1997 and Fuller, 2007).

$H_{0=}$There is no a positive and significant influence of staff behavior on passenger satisfaction.

$H_{1=}$ Staff behavior has a positive and significant influence on passenger satisfaction.

Table 4.5 presents that staff behavior has $\beta = 0.216, \rho < 0.01$ and this implies that it has a positive and significant influence on passengers' satisfaction. Therefore, the null hypothesis is rejected. This result agrees with the findings of other studies, in which analysis drivers of customer satisfaction with public transport services by Mouwen (2015). On the contrary, the result also contradicted with the study of Emmanuel & Solomon (2015); the influences of service quality on mini cap customer satisfaction and they had taken staff behavior as one variable and their result outlined that staff behavior had a negative and insignificant impact on commuter satisfaction.

4.6.6. Ticket payment system

Literature show that countries used different payment system in public transportation. Thus, passengers' pays for the transit service to the operator through the smart card, paper ticket payment system, mobile payment system and other integrated systems. This makes the public transport a popular mode due to the fact that the easy accessibility and the convenient for commuters. In our context, Addis Ababa city light rail transit carries out only ticket payment system.

$H_{0=}$There is no a positive and significant influence of ticket payment system on passengers' satisfaction.

$H_{1=}$ Ticket payment system has a positive and significant influence on passengers' satisfaction.

As it can look at table 4.5 ticket payment systems $has\ \beta = 0.039, \rho = 0.464$ and this indicates that ticket payment system has a positive insignificant influence on passengers' satisfaction. Therefore, the null hypothesis is failed to reject.

4.6.7. Accessibility and availability

One of the most decisive challenges in the transportation sector, particularly in developing country is the availability and the accessibility of vehicles when they are need by the commuters (Mammo, 2010).

H_0=There is no a positive and significant influence of accessibility and availability on passengers' satisfaction.

H_1= Accessibility and availability have a positive and significant influence on passengers' satisfaction.

Table 4.5 presents that accessibility and availability have $\beta = 0.214, \rho < 0.01$.This depicts that accessibility and availability has a positive significant influence on passengers' satisfaction. Due to this reason, the null hypothesis test of the study is rejected. This finding corroborates the ideas of Nandan, (2010); Mammo, (2010); Agunioye & Oduwaye, (2010), in the assessment of customer satisfaction on public transportation service delivery and they suggested that accessibility and availability had a significant influence on commuter satisfaction. Additionally, this finding further support the idea of Govender (2014) on public transport and his study resulted that commuters were influenced by the extent of service; accessibility and availability of bus.

4.7. Research discussions

The aim of this paper was to analysis factors influencing passengers' satisfaction with the provided services in Addis Ababa city light rail transit service. The descriptive analysis of the study results; 80.4% of respondents were males and the rest, 19.6% were females. This depicts that male passengers of the rail users are outnumbered, female passengers'. 41.9% of passengers' aged between (26-35), 32.8% of passengers' aged between (15-25), 17% of passengers' aged between (36-45), 5.7% passengers' aged between (46-55) and the remaining 2.6% of passengers' aged above 55 years old. This infers that the greater numbers of users of the rail are adults followed by young and old age is the least passengers'.

The academic status of the respondents results from that; 51.3% have Degree holders, 20.8% have Diploma holders, 10.6% have Certificate, 8.3% have Masters and above degree holders and the remaining 5.3% passengers' were others (below grade 8 students). Additionally, 3.8% passengers' were missing their educational level responses. This implies that over half of passengers' have degree followed by a diploma.

Of the total respondents, 56.2% passengers' were salaried; 25.7% were self- employed; 7.9% passengers' were job seekers; 6% passengers' were others (students); 3% passengers' were labor workers and the remaining 1.1% passengers' missed to respond this question. This shows that the light rail transit service provides more service for salaried employees.

Of the total respondents; 19.2% generated below 2000 Birr, 17.4% earned between [2001-3000] Birr, 14.7% earned between [3001-4000], 13.2% made between [4001-5000], 29.4% generated above 5000 Birr per month and the remaining 6% passengers missed to respond this question. This outlines that on average substantial numbers of passengers' generates medium income per month.

Finally, 23.8% of passengers were traveled daily; 29.8% of passengers traveled 3-4 days, 21.5% of passengers' traveled once or twice a week; 9.8% of passengers traveled fortnightly; 12.8% passengers' of the light rail transit traveled on the other days (like monthly once) and 2.3% of passengers' missed to respond this question. This reflects that numerous passengers' travel in 3-4 days followed by the daily passengers'.

The qualitative data of the research which has been collected using semi-structured interviews analyzed and interpreted as follows. The theory of expectancy developed by Oliver (1980) and he proposed that satisfaction level is a result of the difference between expected and perceived performance. The informants would have high expectation to the light rail transit before its operation. Because they assume that public transportation problems could not be challenging for any more as before; nevertheless, its problems are presented even after the operations of the light rail transit service in the city. This indicates that the light rail transit in Addis Ababa City does not serve as expected.

As Kano (1984), asserts in his model three requirements; basic, one- dimensional and attractive requirements influences customer satisfaction. About half informants prefer light rail transit service over the other public transport because of the attractive requirements of speed, price (fare), traffic congestion and accident advantages. This implies that the light rail transit provides better services in price, speed, traffic congestion, and accidents. Informants were fussing to access the station because of the distance between the fare collector and the station, absence of an elevator and lift, problem inside the rail and the absence of a supervisor at the gate in and gateway arena.

Additionally, informants were dissatisfied with the service because of the problems/lack/ of the Kano basic requirements of adequate seat both inside the rail and at the station, suffocation, theft and robbery, ventilator capacity, rapid frequency, cleanness of the stations, numbers of rails and money exchange problems (Bilgili & Unal, 2008). Besides, the hypothesis testing theory of customer satisfaction argues that pre-purchase information (largely advertising) plays a substantial role in creating expectations about the products customers will acquire and use (Deighton, 1983).

However, the interviewed people respond that the light rail transit in the city experienced with poor information delivery and awareness creation problem on passengers. This shows that informants' complain the qualities of the above-aforementioned service attributes of the light rail transit. Finally, informants commented that the light rail transit has to have a generator to fix any transit problem when electric power interruption happened. Item descriptive analysis of the independent variables found that, affordability($\mu = 3.56, \sigma = 1.29$), safety and security($\mu = 2.71, \sigma = 1.31$), comfort($\mu = 3.10, \sigma = 1.21$), accessibility and availability($\mu = 3.48, \sigma = 1.10$), ticket payment system($\mu = 3.83, \sigma = 1.01$), reliability($\mu = 2.87, \sigma = 1.27$) and staff behavior($\mu = 3.78, \sigma = 1.04$). The ticket payment system had the highest mean score (3.83) followed by staff behavior (3.78), affordability (3.56), accessibility and availability (3.48), comfort (3.10), reliability (2.87) and safety and security (2.71). This indicates that, based on the Likert scale, the results of passengers' satisfaction for the independent variable items; found that respondents are satisfied with the ticket payment system, staff behavior, and affordability and somewhat satisfied with the accessibility and availability, comfort, reliability, safety and security variables.

The findings of the current study on affordability were consistent with Peng, et al. (2008) and Budiono (2009) paper and the results outlined that passengers' were ranged on at a satisfactory level on the prices of the service provision. The findings observed in the reliability of this study mirror with the previous studies that had examined by Esmaeili, Manesh and Golshan (2013**)** and contrasted with the findings of Mamo (2014) on public transport in Ethiopia.

Of the study population, 52% of passengers' were somewhat satisfied with the rail service, 32 % of passengers' were satisfied with the rail service, 3% of passengers' were highly satisfied with the rail service, 12 % of passengers' were dissatisfied with the rail service and the rest 1% of passengers were highly dissatisfied with the rail service. Additionally, the overall mean of passengers' satisfaction of the study was ($\mu = 3.3022\ , \sigma = 0.66433$) and 54% of passengers were somewhat satisfied on AAC-LRTS. This implies that the majority of respondents are somewhat satisfied with the provided service.

The Spearman's correlation analysis found that all independent variables, accessibility and availability(r=*0.610, p=.000*),comfort (*r=0.565, p=.000*), staff behavior *(r=0.554,p=.000),* reliability *(r=0.549,p=.000),* ticket payment system (*r=0.395, p=.000*), safety and security *(r=0.381, p=.000)* and affordability (*r=0.332, p=.000*) had a positive and significant relationship with passengers' satisfaction.

The multiple linear regression models analyzed using variables of accessibility and availability, reliability, staff behavior, comfort, ticket payment system, safety and security and affordability as independent variables and passengers' satisfaction as the dependent variable. R^2 -values of the model were 56.8%. This tells' that 56.8% of the variation in the passengers' satisfaction explained by all independent variables and the remaining, 43.2% of changes in the passengers' satisfaction were caused by factors which were not included in the model.

The F-statistic ANOVA test value was F= (7,251) =47.093, P<0.01. It indicates that the model is statistically significant at 1% because p=0.000 and the explanatory variables explain the response variable. The independent variables of the standardized beta coefficient results showed that safety and security had ($\beta = 0.101, t = 2.11, \rho = .036$), affordability had $\beta = 0.013, t = 0.280, \rho = 0.779$), reliability had ($\beta = 0.253, t = 4.54, \rho = .000$), comfort had $\beta = 0.180, t = 3.33, \rho = .001$), staff behavior had ($\beta = 0.216, t = 3.81, \rho = .000$), ticket payment system had ($\beta = 0.039, t = .733, \rho = .464$), accessibility and availability had $(\beta = 0.214, t = 3.65, \rho = .000)$. This indicates that safety and security, reliability, comfort, staff behavior, accessibility and availability have a positive and statistically significant effect on the response variable and affordability and ticket payment system have a positive insignificant effect on passengers' satisfaction at 5% significance level. Therefore, the null hypothesis tests of safety and security, reliability, comfort, staff behavior, accessibility and availability are rejected and whereas, affordability and ticket payment system of the study hypothesis fail to reject. Moreover, reliability variable had the highest absolute beta value and therefore it was the most important variable in explaining the variation in the dependent variable of passengers' satisfaction.

CHAPTER FIVE

5.1. SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

This chapter provided with a summary of the findings, conclusions, and recommendations based on the collected and analyzed data. Additionally, managerial implications and suggestions for future research were addressed.

5.2. Summary of findings

Based on the data gathered and analyzed, the following findings were discovered:

- Informants had high expectations to the light rail transit before they used the service.
- The light rail transit provided better services by price, speed, accidents and congestions.
- Informants' complained the qualities of some service attributes in the light rail transit.
- All independent variables of the study had a positive significant relationship with the dependent variable.
- Passengers' were satisfied with the ticket payment system, staff behavior and affordability and they are also somewhat satisfied with reliability, comfort, accessibility and availability, safety and security.
- Staff behavior, comfort, safety and security, reliability, accessibility and availability had a positive statistically significant effect on passengers' satisfaction. Whereas, affordability and ticket payment system had a positive insignificant effect on passengers' satisfaction at 5% significance level.
- Approximately, 54% of passengers were somewhat satisfied in AAC-LRTS.

5.3. Conclusions

Based on the preceding findings of the study, the following conclusions were set out according to the research questions:

What are the factors that affect passengers' satisfaction in AAC-LRTS?

- The light rail transit service offered a service below passengers' expectations. Passengers' believe that public transportation will not be problematic so long in the city, yet the difficulty still exists.
- The light rail transit provides better services by speed, fare, congestion and accident. For that reason, passengers would like to travel their trips using the rail.
- Passengers' were complained while they use the rail because of the poor qualities of service attribute provision, like the existences of insufficient seat both inside the rail and at the station, suffocation, theft and robbery, poor ventilator capacity, stumpy rail frequency, pitiable cleanness of the stations, few numbers of rails, money exchange problem, poor information delivery, awareness creation problems and absences of automatic generator. Hence, all these problems will jeopardize the future success of the light rail transit because both actual and potential customers may hesitate to use its service.

How service quality dimensions influence passengers' satisfaction in AAC-LRTS

- Passengers' had different levels of satisfaction for the service attributes of the light rail transit. Because commuters satisfied with the staff behavior, affordability, and ticket payment system and also somewhat satisfied with reliability, comfort, safety and security, accessibility and availability.
- The service quality dimensions like, safety and security, comfort, reliability, accessibility and availability and staff behavior had a positive significant effect on passengers' satisfaction at 5% significance level. Whereas, affordability and ticket payment system had an insignificant effect on passenger satisfaction at 5% significance level. Hence, there is a strong evidence which supports except affordability and ticket payment system, other variables will have an influence to increase the passengers' satisfaction of the provided service.

What is the overall levels of passengers' satisfaction in AAC-LRTS

- Only around 54% of the commuters were somewhat satisfied with the light rail transit service. This indicates that the overall service of the company has a problem to give better service to more users.

5.4. Recommendations

Based on the findings of the research the following recommendations were forwarded:

First, in order to alter passengers attitude towards the service ,the light rail transit service management should change the lower passenger expectations by increase its actual service provisions via adding new services like ,elevator or lift services, constructing toilets around stations, introducing and implementing electronic or magnetic payment systems ,arranging special seat rooms for pregnant females, disable and old passengers' and additionally the management should expands the lines of the rail to other areas to make the light rail transit more accessible and available to passengers'.

Second, the light rail transit service management should sustain and continue its better provisions by speed, fare, accident, and congestion in order to attract numerous passengers' and finally these might make the company more profitable and competence in the transportation sector.

Third, in order to improve the poor quality attributes and to facilitate the smooth transit service, the light rail transit service management should have more rail, enhance local maintenance experts, restrict carrying/loading capacities and theft using supervisor and police at the door and inside the rail in order to achieve a better comfort, safety and security, integrating more powerful ventilator or windows, assembling flexible seat inside the rails and at the stations, creating rail usage awareness when passengers' wait rails at the stations through educated and fluent staff. Besides, the management should integrate passenger assistance intercommunication devices in the vehicles and at the stations.

Because it helps passengers' to communicates with crew-members through hands-free two-way communication system when the emergency happened at both places. Moreover, the light rail transit service management should have an automatic generator in order to avoid service interruptions whenever the light is turned off and establish suggestion boxes at each station in order to get commuters complains daily like other service provider companies. e.g Banks and Insurances.

Fourth, the management should take better focus on safety and security, comfort, reliability, accessibility and availability and staff behavior because there was strong evidence which support the improvements of such variables will increase passengers' satisfaction.

Finally, the light rail transit management should have to maximize passengers' satisfaction by offering a service that is more affordable to lower income population, more reliable by delivering consistent service to commuters without speculation to the service absences and interruptions like scheduling furgo rail (two-joined rails) at peak time, using accessible and ease ticket payment systems like magnetic payment systems, teaching staff (drivers and ticket sellers) more on ethics, maintenance and driving skills and paying good salaries and creating pleasant work environments. Because all these actions directly or indirectly help the company to enhance the overall levels of passengers' satisfaction for the light rail transit service stipulations.

5.5. Managerial implications

This study might provide as a benchmark to know the attitudes of the passengers' for the service strength and weakens to take necessary actions for improvements and continuity in the LRT service provisions. Besides, the study might help the marketing departments of the LRT as insight for the customer marketing survey. Moreover, the investigation will also use as an input for Ethiopian Railway Corporation to investigate determinants of passengers' satisfaction in the National rail transit from Addis Ababa to Djibouti.

5.6. Suggestion for future studies

This type of thesis needs to be undertaken *per annum* by incorporating other variables like age, gender, income and health conditions. Because passengers' satisfaction is always changing from time to time due to such factors. In addition, it is difficult to generalize the public transportation service problems in Addis Ababa city with the investigation on only the light rail transit service stipulations. Hence, the researcher suggested future researchers to conduct a comparative study on the light rail transit with other public transportation services like Bus (Anibssa, Express and Alliance), Minibus, Hyger and Meter taxi.

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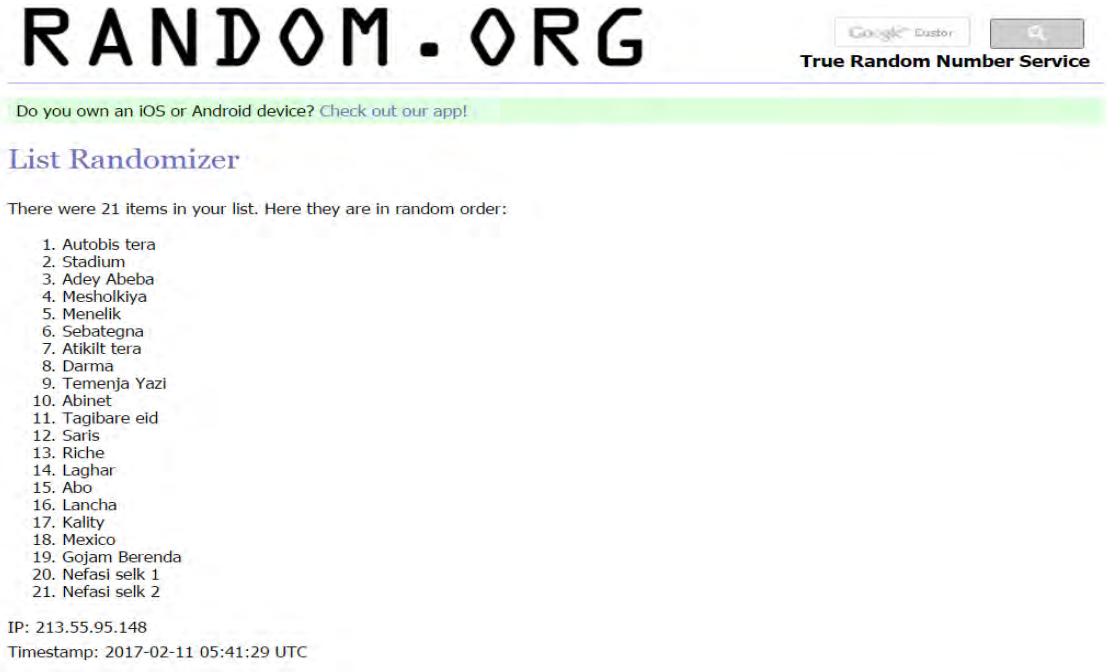
Annex

Annex 3A: List randomized software to select sample stations.



RANDOM.ORG

True Random Number Service

Do you own an iOS or Android device? Check out our app!

List Randomizer

There were 21 items in your list. Here they are in random order:

1. Autobis tera
2. Stadium
3. Adey Abeba
4. Mesholkiya
5. Menelik
6. Sebategna
7. Atikilt tera
8. Darma
9. Temenja Yazi
10. Abinet
11. Tagibare eid
12. Saris
13. Riche
14. Laghar
15. Abo
16. Lancha
17. Kality
18. Mexico
19. Gojam Berenda
20. Nefasi selk 1
21. Nefasi selk 2

IP: 213.55.95.148

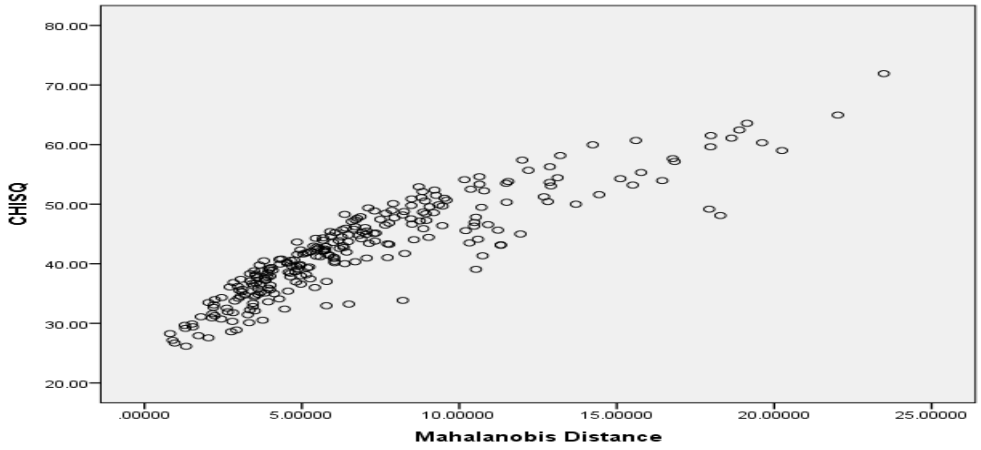
Timestamp: 2017-02-11 05:41:29 UTC

Annex 3B: Multivariate outlier test using Mahalanobis distance.

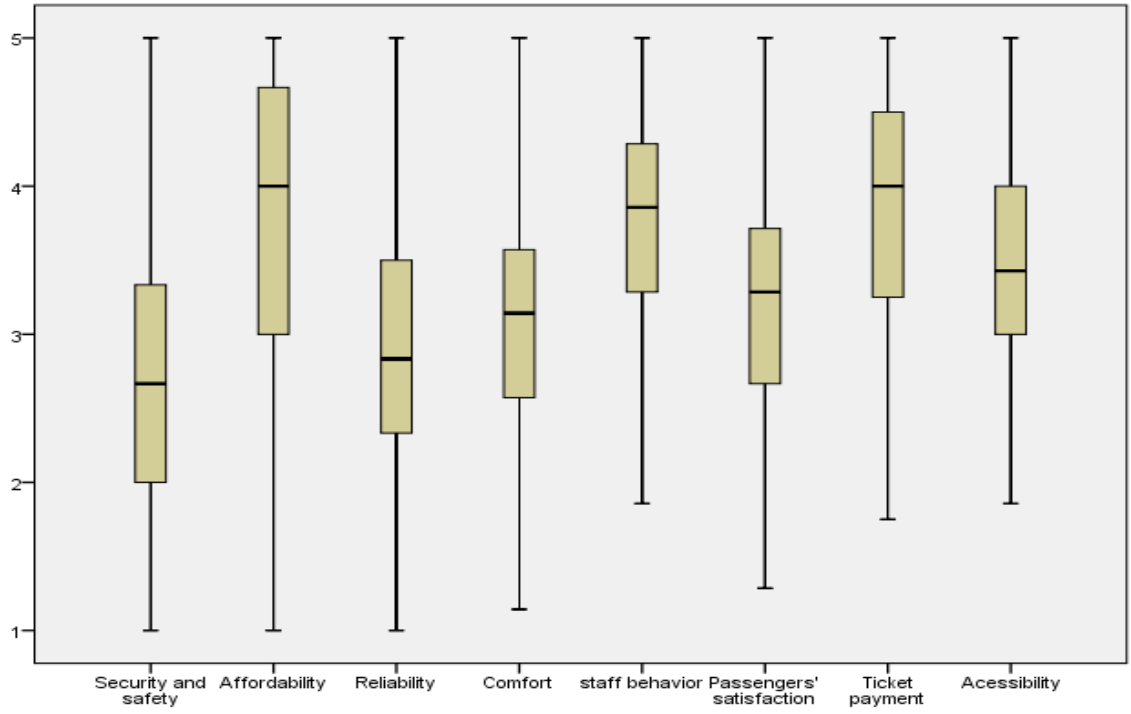
Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.8996	4.6379	3.1927	.54100	259
Std. Predicted Value	-2.390	2.671	.000	1.000	259
Standard Error of Predicted Value	.040	.147	.081	.021	259
Adjusted Predicted Value	1.8479	4.6630	3.1921	.54221	259
Residual	-1.31360	1.10039	.00000	.47207	259
Std. Residual	-2.745	2.299	.000	.986	259
Stud. Residual	-2.783	2.353	.001	1.002	259
Deleted Residual	-1.35030	1.15214	.00058	.48771	259
Stud. Deleted Residual	-2.821	2.374	.000	1.006	259
Mahal. Distance	**.813**	**23.481**	**6.973**	**4.268**	**259**
Cook's Distance	.000	.041	.004	.006	259
Centered Leverage Value	.003	.091	.027	.017	259

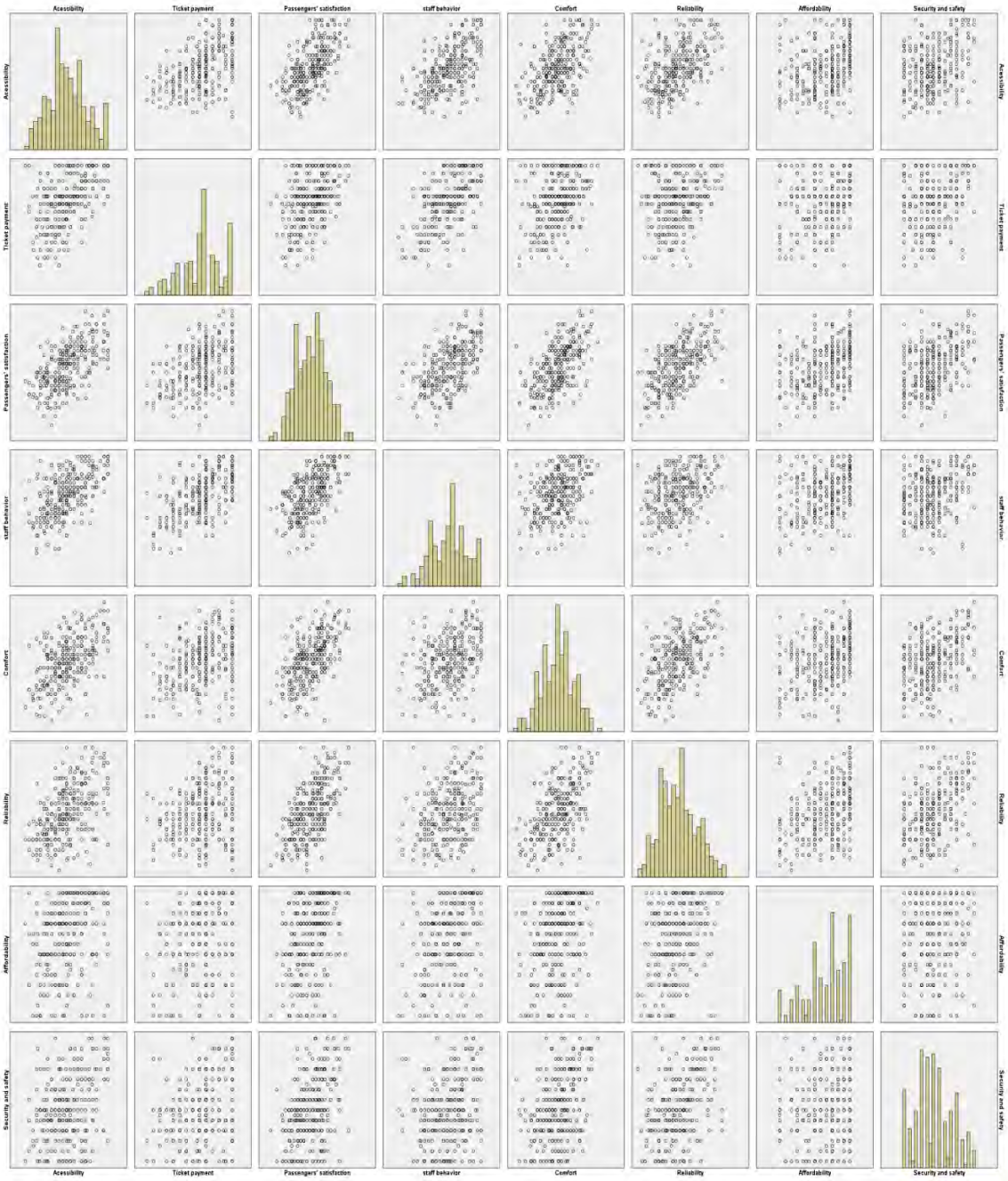
a. Dependent Variable: Passengers' satisfaction



Annex 3C: multivariate Outlier test using box plots.

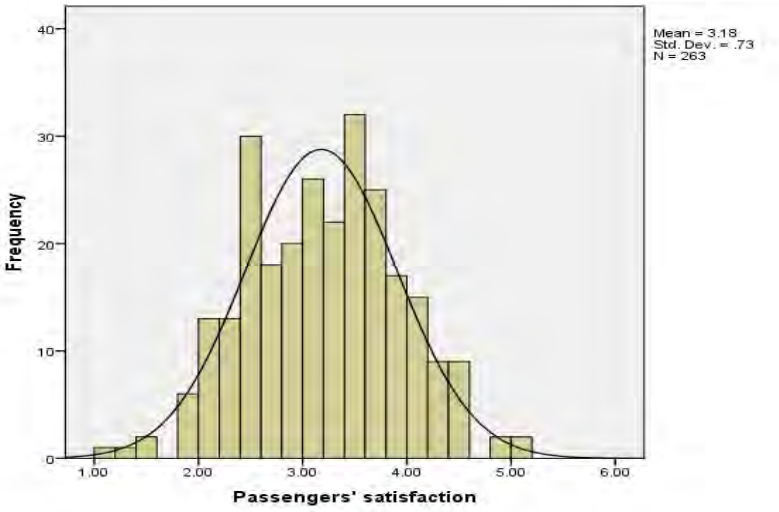


Annex 3D: Linearity assumption test



C

Annex 3E: Normality test using histogram



Annex 3F: Normality test using descriptive analysis

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Facilities for disable	250	1.00	5.00	2.4960	1.28084	.373	.154	-.989	.307
Availability of ext, light and esc	242	1.00	5.00	2.6860	1.33285	.252	.156	-1.075	.312
Availability of emerge window	246	1.00	5.00	2.9350	1.32011	-.008	.155	-1.175	.309
Cheap fears	259	1.00	5.00	3.5251	1.32154	-.588	.151	-.748	.302
Fare payment	250	1.00	5.00	3.5080	1.28082	-.567	.154	-.686	.307
Cost for LRT	259	1.00	5.00	3.6448	1.25649	-.698	.151	-.463	.302
Audio announcement	259	1.00	5.00	3.8185	1.28569	-.980	.151	-.126	.302
Information for rail	250	1.00	5.00	2.4120	1.31803	.458	.154	-1.029	.307
Punctuality and speed for rail	245	1.00	5.00	2.6449	1.22826	.210	.156	-.870	.310
Electronic display	247	1.00	5.00	2.2874	1.32608	.608	.155	-.910	.309
Travel time comparison	258	1.00	5.00	3.3527	1.22380	-.341	.152	-.665	.302
Speed for maintenance	243	1.00	5.00	2.7160	1.21867	.048	.156	-.919	.311
Availability of seat	263	1.00	5.00	2.3954	1.28834	.514	.150	-.782	.299
Smooth ride	248	1.00	5.00	3.0927	1.24502	-.253	.155	-.879	.308
Clean and good conditions	251	1.00	5.00	3.8645	1.07591	-.873	.154	.363	.306
Sheltered size and number	256	1.00	5.00	3.3398	1.19711	-.335	.152	-.713	.303
Route map	258	1.00	5.00	3.8837	1.05216	-1.018	.152	.800	.302
Ease getting and off	253	1.00	5.00	2.9447	1.32021	-.096	.153	-1.110	.305
Rail comfort	263	1.00	5.00	2.1787	1.29974	.799	.150	-.550	.299
Total hours of service	263	1.00	5.00	3.4715	1.10781	-.352	.150	-.502	.299
Service on weekends	251	1.00	5.00	3.4343	1.00730	-.268	.154	-.206	.306
Service on public holiday	253	1.00	5.00	3.6877	1.06594	-.638	.153	.011	.305
Service on weekdays	250	1.00	5.00	3.4760	1.11643	-.498	.154	-.256	.307
Service on evening	257	1.00	5.00	3.5681	1.11288	-.490	.152	-.363	.303
Easy accessibility	257	1.00	5.00	3.6576	1.06776	-.698	.152	.058	.303

Connection with other modes	247	1.00	5.00	3.5425	1.09934	-.516	.155	-.280	.309
Paths to station and crossing	254	1.00	5.00	3.0118	1.26204	-.022	.153	-.976	.304
Ticket size and color	261	1.00	5.00	3.9770	.94026	-1.017	.151	1.161	.300
queuing for ticket	252	1.00	5.00	3.6825	1.03061	-.587	.153	-.052	.306
Easy for buying ticket	256	1.00	5.00	3.7266	1.07167	-.631	.152	-.295	.303
Availability of ticket seller	256	1.00	5.00	3.9727	1.01520	-1.010	.152	.701	.303
Courtesy of ticket seller	263	1.00	5.00	3.8099	1.00475	-.748	.150	.346	.299
Trust on driver ability	248	1.00	5.00	3.7823	.95282	-.741	.155	.521	.308
Frequent stop of rail	259	1.00	5.00	4.0309	1.03008	-1.113	.151	.893	.302
Safety of driving	259	1.00	5.00	3.8687	.97157	-.909	.151	.770	.302
Need of driver to reach on time	258	1.00	5.00	3.3488	1.14784	-.465	.152	-.426	.302
Driver doing activity	233	1.00	5.00	3.6652	1.19966	-.675	.159	-.370	.318
Driver attention	253	1.00	5.00	3.9368	.96566	-.806	.153	.350	.305
Efficiency and effectiveness	259	1.00	5.00	3.4247	1.00248	-.420	.151	.110	.302
Provision of information	255	1.00	5.00	2.9725	1.11328	-.015	.153	-.640	.304
Pric,safe,sec,ass,and other	258	1.00	5.00	2.9690	1.20594	-.061	.152	-.827	.302
accidental information	251	1.00	5.00	2.9482	1.17359	-.183	.154	-.807	.306
Freedom from traffic and lighting	252	1.00	5.00	4.1389	.99428	-1.336	.153	1.715	.306
Provision of grantee	233	1.00	5.00	3.0429	1.41964	-.095	.159	-1.295	.318
Transit service at different season	248	1.00	5.00	3.4355	1.09280	-.481	.155	-.310	.308
Quality of service	254	1.00	5.00	3.4882	.95235	-.561	.153	.472	.304
Valid N (listwise)	96								

Annex 3G: Normality test using Shapiro-wilk test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Passengers' satisfaction	.065	263	.009	.993	263	.242

a. Lilliefors Significance Correction

Annex 3H: Multi-collinearity test using Tolerance and VIF

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	Affordability	.809	1.235
	Reliability	.607	1.648
	Comfort	.604	1.656
	Staff behavior	.542	1.845
	Ticket payment	.615	1.627
	Accessibility and availability	.500	2.002
a. Dependent Variable: Security and safety			

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	Reliability	.580	1.723
	Comfort	.591	1.691
	Staff behavior	.550	1.818
	Ticket payment	.611	1.636
	Accessibility	.499	2.003
	Security and safety	.752	1.330
a. Dependent Variable: Affordability			

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	Comfort	.636	1.572
	Staff behavior	.545	1.834
	Ticket payment	.622	1.607
	Accessibility and availability	.529	1.889
	Security and safety	.823	1.214
	Affordability	.848	1.179
a. Dependent Variable: Reliability			

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	Staff behavior	.542	1.846
	Ticket payment	.611	1.637
	Accessibility and availability	.536	1.865
	Security and safety	.769	1.300
	Affordability	.811	1.233
	Reliability	.597	1.675
a. Dependent Variable: Comfort			

Coefficients[a]			
Model		Collinearity Statistics	
		Tolerance	VIF
1	Ticket payment	.714	1.401
	Accessibility and availability	.551	1.814
	Security and safety	.748	1.337
	Affordability	.818	1.222
	Reliability	.555	1.803
	Comfort	.587	1.703
a. Dependent Variable: staff behavior			

Coefficients[a]			
Model		Collinearity Statistics	
		Tolerance	VIF
1	Accessibility and availability	.524	1.910
	Security and safety	.759	1.318
	Affordability	.812	1.231
	Reliability	.566	1.767
	Comfort	.592	1.690
	Staff behavior	.638	1.567
a. Dependent Variable: Ticket payment			

Coefficients[a]			
Model		Collinearity Statistics	
		Tolerance	VIF
1	Security and safety	.748	1.336
	Affordability	.805	1.241
	Reliability	.584	1.711
	Comfort	.631	1.586
	Staff behavior	.598	1.671
	Ticket payment	.636	1.573
a. Dependent Variable: Accessibility and availability			

Annex 3I: Multi-collinearity test using Spearman's correlation test

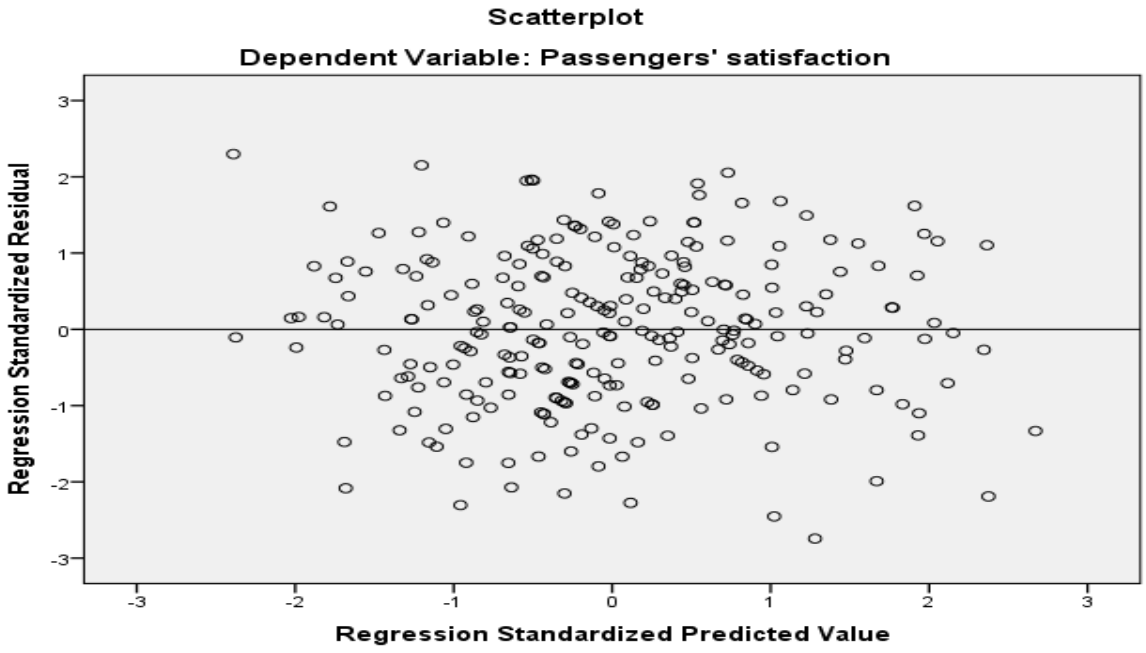
Correlations

			staff behavior	Ticket payment	Acessibility and availability	Security and safety	Affordability	Reliability	Comfort
Spearman's rho	staff behavior	Correlation Coefficient	1.000	.567**	.564**	.248**	.343**	.358**	.366**
		Sig. (2-tailed)	.	.000	.000	.000	.000	.000	.000
		N	265	263	264	263	265	264	265
	Ticket payment	Correlation Coefficient	.567**	1.000	.499**	.233**	.287**	.207**	.352**
		Sig. (2-tailed)	.000	.	.000	.000	.000	.001	.000
		N	263	263	263	261	263	263	263
	Acessibility and availability	Correlation Coefficient	.564**	.499**	1.000	.246**	.339**	.499**	.506**
		Sig. (2-tailed)	.000	.000	.	.000	.000	.000	.000
		N	264	263	264	262	264	264	264
	Security and safety	Correlation Coefficient	.248**	.233**	.246**	1.000	.144*	.442**	.366**
		Sig. (2-tailed)	.000	.000	.000	.	.019	.000	.000
		N	263	261	262	263	263	262	263
	Affordability	Correlation Coefficient	.343**	.287**	.339**	.144*	1.000	.364**	.312**
		Sig. (2-tailed)	.000	.000	.000	.019	.	.000	.000
		N	265	263	264	263	265	264	265
	Reliability	Correlation Coefficient	.358**	.207**	.499**	.442**	.364**	1.000	.506**
		Sig. (2-tailed)	.000	.001	.000	.000	.000	.	.000
		N	264	263	264	262	264	264	264
	Comfort	Correlation Coefficient	.366**	.352**	.506**	.366**	.312**	.506**	1.000
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.
		N	265	263	264	263	265	264	265

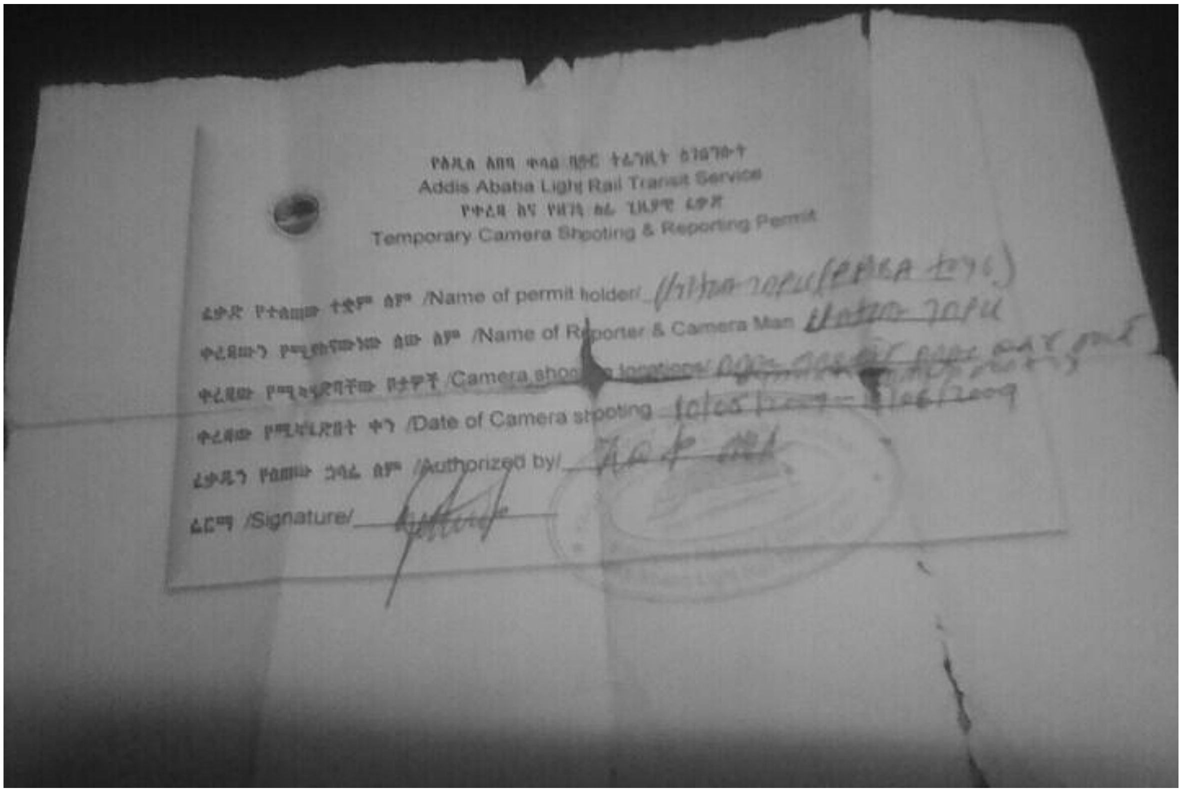
**. Correlation is significant at the 0.01 level (2-tailed).

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

Annex 3J: Homoscedacity tests of the data.



Annex 3K: License for data collection



Addis Ababa Light Rail Transit Service

Temporary Camera Shooting & Reporting Permit

/Name of permit holder/

/Name of Reporter & Camera Man

/Camera shooting locations/

/Date of Camera shooting

/Authorized by/

/Signature/

Appendix-1

Addis Ababa University

Master of Business Administration Program

Dear respondent,

This questionnaire was designed to collect information from Addis Ababa Light Rail Transit passengers' and aimed to analyze ***"Factors influencing passengers' satisfaction in Addis Ababa City light rail transit service"*** as a research subject for the partial fulfillment of the requirements of Master of Business Administration (MBA). ***Your response would have been used only for academic purpose and kept confidential.***

Thank you in advance for your co-operation.

Habtammu G
MBA student
E-mail:
HabtamuGebeyehu
0@gmail.com
Phone:09-23-00-51-74
Addis Ababa University
Addis Ababa, Ethiopia

- **Note:**
  - ❖ No need of writing your name.
  - ❖ Please put a tick (√) in the appropriate box.

Part One: Personal and service experience questions:

1. **Sex**: Male (1) ☐ Female (0) ☐
2. **Age**: l5-25 ☐ 26-35 ☐ 36-45 ☐ 46-55 ☐ Above 55 ☐
3. **Educational status:**

   Certifcate ☐ Diploma ☐ Degree ☐ Master and above ☐ Others ☐
4. **Occupation:**

   Salaried ☐ Self-employed ☐ Labor worker ☐ Job seeker ☐ Others ☐
5. **Average monthly income level in Birr:**

   Below-2000 ☐ 2001-3000 ☐ 3001-4000 ☐ 4001-5000 ☐ Above-5000 ☐

6. **How often do you travel by light rail transit?**

Daily ☐ 3-4 days a week ☐ Once or twice a week ☐ Fortnightly ☐ Others ☐

Part Two: Factors influencing passengers' satisfaction inside the rail and at the stations

Please circle and rate your level of satisfaction based on the following scale:

Highly dissatisfied ……..1
Dissatisfied ……..2
Somewhat satisfied…….....3
Satisfied…….....4
Highly satisfied ……...5

Clarification for the scale:

- ✓ A Passenger who circles 1 mean that, he/she is highly dissatisfied with the service.
- ✓ »»»»»»»»»»»»»»»» 2 mean that, he/she is dissatisfied with the service.
- ✓ »»»»»»»»»»»»»»»» 3 mean that, he/she is somewhat satisfied with the service.
- ✓ »»»»»»»»»»»»»»»» 4 mean that, he/she is satisfied with the service.
- ✓ »»»»»»»»»»»»»»»» 5 mean that, he/she is highly satisfied with the service.

Factors	**Id**	**Level of satisfaction**				
Safety and security ***How much you are satisfied with ……..***		Highly Dissatisfied	Dissatisfied	Somewhat satisfied	Satisfied	Highly Satisfied
1. The personal safety and security (eg. Theft, accidents and failing)	*SS1*	1	2	3	4	5
2. The availability of facilities for disabled	*SS2*	1	2	3	4	5
3. The availability of fire extinguisher, light and elevator/escalator	*SS3*	1	2	3	4	5
4. The availability of emergency window	*SS4*	1	2	3	4	5
5. The freedom from litter ,graffiti and vandalism	*SS5*	1	2	3	4	5
Affordability ***How much you are satisfied with……..***						
6. The cheapest fares	*A6*	1	2	3	4	5
7. The fare payment	*A7*	1	2	3	4	5
8. The cost of using the LRT compared to other forms of public transport	*A8*	1	2	3	4	5

Reliability ***How much you are satisfied with ……..***						
9. The Audio announcements at getting and off time	*R9*	1	2	3	4	5
10. The information about the rail delays	*R10*	1	2	3	4	5
11. The punctuality and speed of the rail	*R11*	1	2	3	4	5
12. The electronic display showing when the next rail is arriving	*R12*	1	2	3	4	5
13. The travel time compares to other public transport	*R13*	1	2	3	4	5
14. The speed for the provided maintenance activities to solve problems of the rail	*R14*	1	2	3	4	5
Comfort ***How much you are satisfied with ……..***						
15. The availability of enough seat	*C15*	1	2	3	4	5
16. The smooth ride of the rail	*C16*	1	2	3	4	5
17. The clean and good conditions of the rail	*C17*	1	2	3	4	5
18. Sheltered number and size of waiting area of the station	*C18*	1	2	3	4	5
19. The route map around the stations	*C19*	1	2	3	4	5
20. The ease getting on and off	*C20*	1	2	3	4	5
21. Rail comfort inside temperature/ suffocation /loading capacity/ and Ventilation	*C21*	1	2	3	4	5
Accessibility and Availability of Service ***How much you are satisfied with ……..***						
22. The total hours of the service delivered	*AS22*	1	2	3	4	5
23. The service that was given on weekends	*AS23*	1	2	3	4	5
24. The service that was given on public holiday	*AS24*	1	2	3	4	5
25. The service that was given on weekdays	*AS25*	1	2	3	4	5
26. The service that was given on evening	*AS26*	1	2	3	4	5
27. The easy accessibility of the rail station	*AS27*	1	2	3	4	5
28. The connections with other modes of public transport	*AS28*	1	2	3	4	5
29. The paths lead to the stations and pedestrian cross in the rail lines	*AS29*	1	2	3	4	5

Ticket payment system ***How much you are satisfied with ……..***						
30. The ticket size and color	*TPS30*	1	2	3	4	5
31. The queuing for a ticket	*TPS31*	1	2	3	4	5
32. The ease of buying tickets	*TPS32*	1	2	3	4	5
33. The availability of ticket sellers when you want to buy it	*TPS33*	1	2	3	4	5
Staffs behavior (ticket sellers and Drivers) ***How much you are satisfied with ……..***						
34. The courtesy of the ticket sellers	*SB34*	1	2	3	4	5
35. Your trust on driver ability	*SB35*	1	2	3	4	5
36. The frequent stops of the rail at each station without jumping	*SB36*	1	2	3	4	5
37. The safety of the driving (appropriateness of the speed, driver concentrating)	*SB37*	1	2	3	4	5
38. The needs of driver to reach on time	*SB38*	1	2	3	4	5
39. The driving doing activities such as phoning, listening music and talking	*SB39*	1	2	3	4	5
40. The driver attention to check the mirror before the journey is already started	*SB40*	1	2	3	4	5
Passengers' satisfaction ***How you are satisfied with:***						
41. The efficiency and effectiveness of this public transit in sustaining your movement	*PS41*	1	2	3	4	5
42. The provision of quick, accurate and new information to you about the service.	*PS42*	1	2	3	4	5
43. The price, safety, security, assurance, accessibility, comfort, reliability, loading capacity , responsiveness and empathy of the staffs	*PS43*	1	2	3	4	5
44. The way accidental information delivered to you during power interruption and technical problem and solution	*PS44*	1	2	3	4	5
45. The freedom of traffic jam and long lighting	*PS45*	1	2	3	4	5
46. The provisions of the guarantee for ticket to use tomorrow.	*PS46*	1	2	3	4	5
47. The transit service during different seasons like in winter (hot) and summer (rain and flood) around the level	*PS47*	1	2	3	4	5
48. The quality of service stipulated to you on the whole	*PS48*	1	2	3	4	5

Thank you for taking the time to complete this questionnaire!

Semi-structured interview questions:

1. How do you expect, the service of the light rail transit?

2. Do you prefer a journey using light rail transit?

3. What factors influence you while you are using light rail transit?

A. Factors to easily access the rail station:

B. Factors while you traveled:

C. Other factors:

4. Do you have any comments for future service improvement?

ጥበብ የትርጉም አገልግሎት
Tibel Translation Service
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"እባካችሁ ተጓጉሮች የእርካታችሁን ደረጃ በተሰጠው መስፈርት መሰረት ምርጫዎትን ያስቀምጡ"

የአዲስ አበባ ዩኒቨርስቲ
የቢዝነስ አድሚኒስትሬሽን የማስተር ፕሮግራም

ውድ መላሾች፦

ይህ መጠይቅ የተዘጋጀው በአዲስ አበባ የቀላል ባቡር ተጓጉሮች መረጃ ለማግኘት ሲሆን የመጠይቁ አላማ በአዲስ አበባ ቀላል ባቡር ትራንስፖርት ተጓጉሮች እርካታ ላይ ተጽእኖ የሚፈጥሩ ነገሮችን እንደ ጥናት ርዕስ በመውሰድ ለመገንዘብ ነው። የእርሶ መልስ ለአካዳሚ ትምህርት ብቻ የሚውል ሲሆን መልስዎንም በሚስጥር የሚጠበቅ መሆኑን ለመግለጽ እወዳለሁ።

"በቅድሚያ ስለ ትብብሮ አመሰግናለሁ"

- **ማስታወሻ:**
  - ❖ የእርሶን ስም መፃፍ አያስፈልግም .
  - ❖ ባዶ በሆነው ቦታ (√) ምልክቱን ያስቀምጡ።

ክፍል አንድ :የግል እና የአገልግሎቱ ልምድ ጥያቄዎች

1. ጾታ: ወንድ (1) ☐ ሴት (0) ☐ .
2. ዕድሜ: ከ15-25 ☐ ከ 26-35 ☐ ከ 36-45 ☐ ከ 46-55 ☐ ከ 55 በላይ ☐
3. የትምህርት ደረጃ:
   የምስክር ወረቀት ☐ ዲፕሎማ ☐ ድግሪ ☐ ሁለተኛ ድግሪ እና ከዚያ በላይ ☐ ሌሎች ☐
4. ሙያ:
   ደመወዝተኛ ☐ የግል ሰራተኛ ☐ የጉልበት ሰራተኛ ☐ ስራ ፈላጊ ☐ ሌሎች ☐
5. አማካኝ ወርሃዊ የገቢ ደረጃ በብር:
   ከ2000 በታች ☐ ከ2001-3000 ☐ ከ3001-4000 ☐ ከ4001-5000 ☐ ከ5000በላይ ☐
6. በቀላል ባቡር ተጉዘው ያውቃሉ ? አውቃለሁ ☐ አላውቅም ☐

"እባካችሁ ተጓጉሮች የእርካታችሁን ደረጃ በተሰጠው መስፈርት መሰረት ምርጫዎትን ያስቀምጡ"

ጥበብ የትርጉም አገልግሎት

Tibeb Translation Service

0911-62-39-82/0913 21-97-84 Addis Ababa, Ethiopia E-mail. tibe1960@gmail.com

"እባካችሁ ተጓዦች የእርካታችሁን ደረጃ በተሰጠው መስፈርት መሰረት ምርጫዎትን ያስቀምጡ"

ክፍል ሁለት፡ ተጓዦች በባቡር ውስጥ እና በጣቢያው ላሉ በእርካታቸው ላይ ተጽእኖ የሚያደርሱ ነገሮች፡-

ተጽእኖዎች	መታወቂያ	የእርካታ ደረጃ				
ደህንነት እና ጥበቃ *ምን ያህል ረክተዋል .....*		በከፍተኛ ሁኔታ አረካሁም	አለመርካት	በጎንሹ መርካት	ረክቻለሁ	በከፍተኛ ሁኔታ ረክቻለሁ
1. የግል ደህንነት እና ጥበቃ (ከስርቆት፣ከአደጋ እና ከውድቀት)	*ኤስኤስ1*	1	2	3	4	5
2. ለአካል ጉዳተኞች ያሉ አቅርቦቶች	*ኤስኤስ2*	1	2	3	4	5
3. የእሳት አደጋ ማጥፊያ፣መብራት እና አሳንሰር /ሊፍት/ አቅርቦት	*ኤስኤስ3*	1	2	3	4	5
4. የአደጋ ጊዜ መውጫ መስኮት አቅርቦት	*ኤስኤስ4*	1	2	3	4	5
5. ከቆሻሻ እና ካአልተገቡ የቃላት ጹሁፎች የፀዳ አገልግሎት	*ኤስኤስ5*	1	2	3	4	5
ዋጋን በተመለከተ *ምን ያህል ረክተዋል .....*						
6. ርካሽ ከመሆን አንፃር	*ኤ6*	1	2	3	4	5
7. ተገቢ እና ፍትሀዊ ክፍያ	*ኤ7*	1	2	3	4	5
8. ቀላል ባቡር ከሌሎች የህዝብ ትራንስፖርት ጋር በዋጋ ሲነፃፀር	*ኤ8*	1	2	3	4	5
አስተማማኝነት *ምን ያህል ረክተዋል .....*						
9. በመግቢያ እና መውጫ ጊዜ የድምጽ መግለጫ አለጣጥ	*አር9*	1	2	3	4	5
10. የባቡሩን መዘግየት መረጃ ማግኘት	*አር10*	1	2	3	4	5
11. የባቡሩ ፍጥነት እና በቀጠሮ በሰአቱ መገኘት	*አር11*	1	2	3	4	5
12. የሚቀጥለው ባቡር መቼ እንደሚደርስ በኤሌክትሮኒክ ዘዴ በመጠቀም ማሳየት	*አር12*	1	2	3	4	5
13. ከሌሎች የህዝብ ትራንስፖርቶች ጋር በጉዞ ሰአት ሲነፃፀር	*አር13*	1	2	3	4	5
14. ባቡሩ ችግር ሲያጋጥመው በወቅቱ የጥገና አለጣጥ ፍጥነት	*አር14*	1	2	3	4	5
ምቾት *ምን ያህል ረክተዋል.....*						
15. የበቂ መቀመጫ አቅርቦት	*ሲ15*	1	2	3	4	5
16. የባቡሩ ምቹ ጉዞ	*ሲ16*	1	2	3	4	5
17. የባቡሩ የጽዳት እና መልካም ሁኔታዎች	*ሲ17*	1	2	3	4	5
18. ባቡሩን ለመጠበቅ የተሰሩ የጣቢያ መጠለያዎች ብዛት እና መጠን	*ሲ18*	1	2	3	4	5
19. በጣቢያዎች ላይ የሚገኙ የመስመር ካርታዎች	*ሲ19*	1	2	3	4	5
20. በቀላሉ መግባት እና መውጣት	*C20*	1	2	3	4	5
21. በባቡሩ ውስጥ ያለው ምቾቶች ፣ መተፋፈግ፣ የመጫን አቅም እና ማናፈሻ	*C21*	1	2	3	4	5

"እባካችሁ ተጓዦች የእርካታችሁን ደረጃ በተሰጠው መስፈርት መሰረት ምርጫዎትን ያስቀምጡ"

ጥበብ የትርጉም አገልግሎት
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0913 21 97 84
Tibeb Translation Service

ተዘራ ጎሹ
ዋና ስራ አስኪያጅ
Tibebu Goshu
General Manager

ጥበብ የትርጉም አገልግሎት
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0911-62-39-82/0913 21-97-84 Addis Ababa, Ethiopia E-mail. tibe1960@gmail.com

የአገልግሎቱ አቅርቦት እና ተደራሽነት ምን ያክል ረክተዋል.....		በጣም ዝቅተኛ ሁኔታ አረካሁም	አለመርካት	በትንሹ መርካት	ረክቻለሁ	በጣም ከፍተኛ ሁኔታ ረክቻለሁ
22. የአገልግሎቱ የሚሰጥበት ጠቅላላ ሰዓት	ኤኤስ22	1	2	3	4	5
23. በሳምንቱ መጨረሻ ጊዜ በሚሰጡ አገልግሎት	ኤኤስ223	1	2	3	4	5
24. በህዝብ በዓላት ጊዜ በሚሰጠው አገልግሎት	ኤኤስ224	1	2	3	4	5
25. በሳምንቱ የስራ ቀናት ውስጥ የሚሰጠው አገልግሎት	ኤኤስ225	1	2	3	4	5
26. በምሽት ጊዜ የሚሰጠው አገልግሎት	ኤኤስ226	1	2	3	4	5
27. የባቡር ጣቢያውን በቀላሉ ማግኘት	ኤኤስ227	1	2	3	4	5
28. ከሌሎች የህዝብ ትራንስፖርቶች ጋር ያለው ግንኙነት	ኤኤስ228	1	2	3	4	5
29. ወደ ባቡሩ ጣቢያ የሚወስዱ መንገዶች እና በባቡር መስመሩ ላይ ያሉ የእግረኛ ማቋረጫዎች	ኤኤስ229	1	2	3	4	5
የትኬት አከፋፈል ዘዴ **ምን ያህል ረክተዋል .....**						
30. የትኬቱ ቀለም እና መጠን	TPS30	1	2	3	4	5
31. ትኬት ለመቁረጥ ያለው ሰልፍ	TPS31	1	2	3	4	5
32. ትኬቱን በቀላሉ መግዛት	TPS32	1	2	3	4	5
33. ትኬት መግዛት በሚፈልጉበት ጊዜ የትኬት ሻጮች መገኘት	TPS33	1	2	3	4	5
የሰራተኞች ባህሪ (ተኬት ሻጮች እና አሽከርካሪዎች) **ምን ያህል ረክተዋል .....**						
34. የትኬት ሻጮች መልካም እርዳታ	SB34	1	2	3	4	5
35. በአሽከርካሪዎች ችሎታ ያሎት መተማመን	SB35	1	2	3	4	5
36. ባቡሩ ጣቢያዎችን ሳይዘል በየንዳንዱ ጣቢያዎች ላይ የመቆም ሁኔታ	SB36	1	2	3	4	5
37. የአሽከርካሪው ጥንቃቄ (ተገቢው ፍጥነት መጠበቅ፣ የአሽከርካሪው አትኩሮት)	SB37	1	2	3	4	5
38. አሽከርካሪው በሰአቱ የመድረስ ፍላጐት	SB38	1	2	3	4	5
39. የባቡር አሽከርካሪ በሚያሽከረክርበት ወቅት የሚሰራቸው ስራዎች ማለትም ስልክ መደወል ፤ ሙዚቃ ማዳመጥ እና ማዋራት	SB39	1	2	3	4	5
40. አሽከርካሪው ጉዞውን ከመጀመሩ በፊት መስተዋቱን ለማየት የሚሰጠው አትኩሮት	SB40	1	2	3	4	5

"እባካችሁ ተጓጉዞች የእርካታችሁን ደረጃ በተሰጠው መስፈርት መሰረት ምርጫዎትን ያስቀምጡ"

ጥበቡ ጎሹ
ዋና ስራ አስኪያጅ
Tibebu Goshu
General Manager

ጥበብ የትርጉም አገልግሎት
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የተጓጐች እርካታ ምን ያህል ረክተዋል		በከፍተኛ ሁኔታ አረካሁም	አለመርካት	በትንሹ መርካት	ረክቻለሁ	በከፍተና ሁኔታ ረክቻለሁ
41. ይህ የህዝብ ትራንስፖርት የእርሶን እንቅስቃሴ በመጠበቅ ውጤታማነት እና ብቃት	PS41	1	2	3	4	5
42. ስለ አገልግሎቱ በተመለከተ ፈጣን፣ ትክክለኛ እና አዳዲስ መረጃዎችን ማግኘት።	PS42	1	2	3	4	5
43. የባቡሩ ዋጋ ፣ጥንቃቄ፣ ጥበቃ ፣ ዋስትና፣ተደራሽነት፣ምቾት ፣ አስተማማኝነት ፣ የመጫን አቅም፣የሰራተኞች ፍቃደኝነት እና የሰውን ችግር እንደራስ ማየት	PS43	1	2	3	4	5
44. በጉዞ ወቅት በሚያጋጥሙ የመብራት መቋረጥ እና ለቴክኒክ ችግሮች የሚሰጡ መፍትሄዎች	PS44	1	2	3	4	5
45. ከትራፊክ መጨናነቅ እና ከረጅም መብራት ነፃ መሆን	PS45	1	2	3	4	5
46. የዝኩን ትኬት በማግኘቱ ለመጠቀም ያለው ዋስትና አሰጣጥ	PS46	1	2	3	4	5
47. ትራንስፖርቱ በተለያዩ ወቅቶች ለሚሰጠው አገልግሎት ማለትም በቢጋ መቀቱ፣ በክረምት ደግሞ ዝናብ እና ጐርፍ	PS47	1	2	3	4	5
48. በአጠቃላይ የአገልግሎቱ ጥራት አሰጣጥ በተመለከተ	PS48	1	2	3	4	5

በመጨረሻም ይህንን ቃለ መጠይቅ ለመፈፀም ጊዜውን በመስጠትዎ እናመሰግናለን ::

ሀብታሙ ገ.
የቢዝነስ አድሚኒስትሬሽን የማስተርስ ፕሮግራም ተማሪ
ኢ-ሜይል:
HabtamuGebeyehu0@gmail.com
ሞባይል ፡ 09-23-00-51-74
አዲስ አበባ ዩኒቨርስቲ
አዲስ አበባ፣ ኢትዮጵያ

"አባካችሁ ተጓጐች የእርካታችሁን ደረጃ በተሰጠው መስፈርት መሰረት ምርጫዎትን ያስቀምጡ"

ጥበቡ ጎሹ
ዋና ስራ አስኪያጅ
Tibebu Goshu
General Manager

ጥበብ የትርጉም አገልግሎት
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ጥበብ የትርጉም አገልግሎት
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ከፊል ገፅ ለገፅ ቃለ-መጠይቅ

1. የቀላል ባቡር የትራንስፖርት አገልግሎት እንዴት ጠበቀውት ነበር?

2. በቀላል ባቡር ትራንስፖርት መንገዝ ለምን መረጡ?

3. የቀላል ባቡር ትራንስፖርት አገልግሎት በምትጠቀመበት ጊዜ የሚደርስቦት ተጽንኦች?
   ሀ. የባቡር ጣቢያውን በቀላሉ እንዳታገኙ የሚያደርጉ ነገሮች?

   ለ. በባቡር በምትጓዙበት ጊዜ የሚደርስባችሁ ተጽእኖዎች?

   ሐ. ሌሎች ተጽንዎች ?

4. ወደፊት አገልግሎቱ እንዲሻሻል የሚሰጡት አስተያየቶች ካለዎት?

ጥበቡ ገሹ
የዋና ስራ አስኪያጅ
Tibebu Goshu
General Manager

ጥበብ የትርጉም አገልግሎት
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