ADDIS ABABA UNIVERSITY

Assessment of the Practices and Challenges of the Implementation of Green Transportation in Addis Ababa

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ABSTRACT

The aim of this study was to assess the practices and challenges of the implementation of green transportation in Addis Ababa the independent variable is modes of transportation, reliability of public transport satisfaction, while practices of green transport was treated as a dependent variable. Accordingly, three research specific objectives were developed to address the research objectives. Explanatory research design was adopted with quantitative approach to examine the relationship between educational status and awareness of green transport the study variables. Simple random sampling procedure was applied 380 questionnaires were distributed to respondents, including AATB officers, transport providers, passengers, drawn from the whole population in Addis Ababa out of which 380 (100%) were successfully filled in and returned. Descriptive and Inferential statistics were applied were frequency, percentage, Pearson correlation analysis. The studies found that the level of green transport is very low and it also identifies a number of obstacles that may challenge the implementation of green transport in the city and the relation between academic status and awareness of green transport was positively and weakly related.

***Key Words**: Green transport, pedestrians, Public transport, Transport system*

ABBRIVIATIONS

AALRT: Addis Ababa Light Rail Transit.

BRT: Bus Rapid Transit.

GESTLE: Government Economic Situation, Social dimensions, Technology, Legal structure and Environmental dimensions.

GT: Green Transport.

HOV: High-Occupancy Vehicle.

ICT: Information and Communications Technologies.

LOS: Level of Service.

LRT: Light Rail Transit.

NAMAs: Nationally Appropriate Mitigation Actions.

NMT: Non-Motorized Transport.

PESTLE: Political, economic, social, technological, legal and environment.

SPSS-Statistical Package of Social Science

TDM: Transport Demand Management

TOD: Transit Oriented Development

UN: United Nation.

UNCRD: United Nation Center for Reginal Development

UNEP: United Nations Environment Program

UNFCCC: UN Framework Convention on Climate Change

VMT: Vehicle Miles Travel

WHO: World Health Organization.

Table of Contents

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE
INTRODUCTION

1.1. Background of the study

Transportation is an important socio-economic foundation that supports people's lives and economic development. Sparling and Salon stated that the transportation objectives are met when the mobility of travelers and goods move safely and efficiently, and with diminished negative effects on the environment and the society. Globally, the emission of carbon from transportation is increasing in alarming rate comparing with any other sector. Because of the current transport the world is suffering from enormous problems such as air pollution, green gas emission, environmental degradation, death, serious health problems (Senin, 2021)

In recent decades, the performance of economic and non-economic activities has required them to be friendly to the environment. Transport is one of the areas with considerable potential within the scope since it has significant negative impacts on the environment. This proactive approach to addressing and eliminating the negative environmental impacts from company and supply chain transport processes is called Green Transport (GT) (Lenort, 2014)

In simple terms, green transport can be defined as any means of transportation or vehicle that is eco-friendly and which may have minimal negative impacts on the immediate environment. And also, green transport refers to a sustainable transport which aims reducing the adverse impact of transport on the environment while addressing current and future transport demands based on the principles of sustainable development. Thus, it requires integrating the socio- economic growth targets with green transport plans and communities need (Murad, 2022). Green transportation is a fundamental solution to have a considerable reduction in fuel economy, and the amount of air pollutants and greenhouse gas footprint such as CO_2, which could make sustainable development in the transportation industry (Sustainable Transport, 2003). Implementing the concept of green transport can use as a ground for sustainable and integrated development in all sectors. And it is a transition from "vehicle-oriented" to "people-oriented" transport system (Zhand, Zhou, Ming, 2012).

Green Transportation stands for the reduced use of automobiles and instead the increased use of walking, bicycle and public transport and using renewable source of energy that have less impact on the environment. It is a low cost, pollution free, land resource and space saving transportation system sustainable for all kind of travels.

The city of Addis Ababa experiencing rapid expansion and development while according to United Nations population projections the current population estimated to 5228,000 people (Population Stat, 2022). Some forecasts expect it to grow to ten million by 2040. As a reflection of the population growth and increasing Economic development and wealth, the number of private car owners has been increasing in alarming rate. It results leading to sever traffic congestion, pollution, that causes for problems related to safety health and productivity.

Road traffic crashes are the leading cause of death worldwide calming over 1.3 million lives and leading 20 to 50 million serious injuries every year. But, as World Health Organization, unless immediate action taken, the problem will eventually become the fifth leading cause of death. Federal Police Commission said, 4,161 people died in traffic accidents in Ethiopia during the 2020/21 fiscal year. In addition, the city's road safety problems constitute a major burden on the social, economic and health sectors.

Besides, research by the World Health Organization (WHO) indicates that outdoor urban air pollution, mostly from vehicles and factories, accounts for premature death of 1,340,000 people annually in the world. Research revealed that car pollution is linked to cancer, cardiovascular disease and respiratory illnesses such as asthma and chronic obstructive pulmonary disease (COPD) which impairs lung function and causes lung cancer (African population and Health research center, 2021). In the case of Addis Ababa, above 2700 lose their lives every year because of diseases caused by air pollution. With no action, the figure will grow to 6000 premature deaths by 2025(Addis Ababa city Air Quality Manger plan, 2021 to 2025).

In order to provide safe and standardized transport that integrates both people mobility and environmental issues simultaneously should be the major responsibility of Addis Ababa city administration. Any policy, plan, and practice that aimed to bring development for the city and residents should consider green transport that leads to sustainable development. This thesis aimed to identify the works done in Addis Ababa city to promote the concept of green transport and search the obstacle in the implementation of sustainable transport system.

1.2 Statement of the Problem

Addis Ababa, the largest and also the capital city of Ethiopia, located at the Centre of gravity of the country. In diversified thinking, Addis Ababa is the hub for major economic, political, social, and artistic events undertaking in the nation for more than a century. Furthermore, it's also a political capital for Africa Union since its foundation and seats for ECA, UN agencies and others many international organizations. Because of these the city called as the fourth diplomatic city in the world.

Based on highly increasing flow in rural migration to Addis Ababa city, booming housing and others infrastructure construction activities, rapidly growing economic activities and mobility need for social and personal affairs have demanded high volume of freight and public transport service with exponential increase in and out of the city.

As the ministry of transport and logistics reports of July, 2022, in Ethiopia 1, 2306,251 vehicles have been registered. Addis Ababa hosts more than half of the total vehicle (640,464). On the other hand, car ownership rate is one of the lowest in the world (2 cars to 1,000 people) (Fortune, 2023) whereas the nation is known for traffic accidents that claim hundred lives and leave thousands injured and damage their properties. Besides, it causes congestion, air pollution, and environmental contamination as a result thousands are exposed for sever disease; affect the economy badly by wasting the nation's limited resource spent on fuel and time that should be spent on building the nation because of a long queue of people and vehicle.

In order to tackle the problems related to transport system, cities in the world are initiated to implement green transport system. The system avoids the negative impact of green transport on the environment and the society. It works in reduction of the number of automobiles that causes congestion, air pollution and traffic accidents. Providing accessible, comfortable, safe, low cost, and reliable public transport is one of the main strategies to satisfy the mobility need of the mass-population and to attract private car owners to use it regularly. Green transport system also encourages using of walking, bicycle, and other non-motorized vehicles that don't affect the environment and they have significant health benefits. Additionally, green transport promotes innovations vehicles and energies that have less influence on the environment and the society.

Considering multi-dimensional benefits of green transport, like other metropolitan cities of the world, Addis Ababa has to strive to implement green transportation to manage transport-related problems observed throughout the city frequently. it's high time to start the long journey of transforming from 'vehicle oriented' to 'human oriented' transport system; in other words, safe, low carbon, low cost, healthy transportation-green transportation. It aims to grantee mobility, viability and sustainability for commuters and Addis Ababa residents.

In order to make valid decision, before starting the implementation of green transportation green transport in Addis Ababa, researches should be conducted to identify the current level of development and the factors that possibly affect applying the concepts. This paper strived to assess the practices and the challenges that might face Addis Ababa in the course of implementation of green transportation. And also it documented and analyzed the initiatives have been taken so far.

1.3. Research Questions

1. What is the level of green transport practice in Addis Ababa?
2. How residents of Addis Ababa understand the concept of green transport?
3. What are the main factors affecting the implementation of green transport in Addis Ababa?
4. What are the main activities undertaken by Addis Ababa transport bureau in the implementation of green transport?
5. Is there a relationship between educational status and awareness of green transport?

1.4 Research Objectives

1.4.1. General Objective:

The major goal of the study assessed the current practices and challenges for the implementation of a sustainable transport system in Addis Ababa city.

1.4.2. Specific objectives

Specifically, the paper strived to:

1. Assess the level of green transport practice in Addis Ababa.
2. Examine how much residents in Addis Ababa understand the concept of green transport.
3. Identify the major challenges that affect the implementation of sustainable transport system in Addis Ababa.
4. Indicate the main activities undertaken by Addis Ababa transport bureau in the implementation of green transport.
5. Show the relationship between educational status and awareness of green transport

1.5. Significant of the study

Although the degree of their benefit may vary, all studies contribute a lot since they all are based on gaps that need a solution. Thus, this study is also expected to through its two cents on different aspects. Primary, it paid attention to identify the obstacles to the implementation of green transport in Addis Ababa and suggest solutions for decision-makers or the city administration. Secondly, the paper might help other researchers who have the interest to do their papers in the area. Thirdly, such investigation might lead directly to a project definition and design process for sustainable transport infrastructure and services. Last but not least, it would help the researcher to have adequate knowledge in the area and secure his MA in logistics and supply chain management.

1.6 Scope of the study

As mentioned, the study aimed to assess the level of green transport practices and recognize the factors that affect the implementation of sustainable transport in Addis Ababa. The city was chosen deliberately as it is the largest city and more than half of the nation's vehicles are found in the city. Accordingly, the city has been highly affected by various complicated mobility problems caused by the ill transport system.

The study was guided by the nine factors which are recommended in the design and implementation of green transport in metropolitans' city: road infrastructure, rail-based public transport, road- based public transport, support or non-motorized travel modes, technological

solutions, awareness rising campaigns, price mechanisms vehicle access restriction and control of land users. And it's planned to complete the research within a year time range Limitation of the study (Matiwos, 2013).

1.7 Limitations of the Study

The study was expected to have some constraints related to the wideness of the topic and the size of study location, Addis Ababa. Besides, the paper faced a lack of directly related literature in our context. Some papers done on green supply chains or green logistics are too specific focusing on a company level or single mode of transport. They were unable to show the big picture of the problem. And also time was supposed to be another difficulty.

1.8 Organization of the Study

This research paper is consisted of five chapters: chapter one or the introductory part contains back ground of the study, statement of the problem, research question, general and specific objectives, significance, scope and limitations of the study. In chapter two literatures that related to the thesis topic are discussed. The third chapter deals with the methodology which are used to select the sample, to collect the data and to analyze and presented the data. Results, discussion and data presentation are included in chapter four. The last chapter, chapter five, presents the findings, conclusion, recommendation and summary

1.9. Operational definition of key words

To define the key words in the research context the researcher used Advanced English dictionary third edition.

Transport System: - designed to facilitate the movement of passenger and fright

Green Transport: - modes of transportation that not negatively impact the environment.

Pedestrians: -a person wakes rather than traveling in vehicles.

Public Transport: -a system of transport for passengers by group travel systems available for use by the general public.

CHAPTER THREE

3. METHODOLOGY OF THE STUDY

Study is the method of replying questions and problems that are inherent in the setting to know the nature (Igwenagu.C, 2016). According to a study, research methodology is an organized and theoretic analysis practically to a field of study. Overall, research methodology is used as a parameter for a researcher in the procedure of gathering, collecting and presenting data to get the outcome of the study. It is a system of technique used in a specific area of study or activity (Dawson R, 2006).

This chapter deals with the methods that were applied for the study and basically, it includes a description of the study area, the research design, the research approach, the target population, sample and sampling techniques, data source and type, and tools/instruments of data collection, the procedure of data collection and method of data analysis.

3.1 Description of the study area

The location of study area was the capital city of Ethiopia found at almost at the midpoint of Ethiopia and it lies on a plateau in the country's geographic center at an altitude of about 2,450 meter above sea level. Addis Ababa has been serving as the capital city of Ethiopia since 1887 and it is seat for AU (Africa Union) as well as other international organizations. The city is a host for more than five million people and as the ministry of transport and logistics reports of July, 2022 more than 50% of the total vehicles which found in the country. Addis Ababa was selected purposely for this research as it took the lion share in the number of registered cars found in the nation and the problems caused by transportations are highly observed.

3.2 Research Approach

The research design of this study was both mixed: qualitative and quantitative research method was used with a grounded principle which allowed the researcher to explore the current state of green transport and the factors that may affect future performance from commuters and other stakeholders' point of view. As the study uses both numerical and non-numerical data, it's believed that using a mixed approach subsidizes better to the completeness of the exploration.

For qualitative method, this study collected data by reading various documents and conducting interview with selected officers of transport bureau. In addition, the data which can be measured in numbers were collected, presented and analyzed through quantitative approach using questionnaires.

3.3. Research design

Cooper and Schindler explain research design as a procedure of situations for the gathering and analysis of row data in a method that aims to combine significance for study/research purpose. This study was formalized as an expressive research design. A descriptive research design describes a subject, by making a profile of a set of problems, individuals, or events, through the gathering of data, arrangement of the percentage of research variables, and the analysis of their interaction (Cooper and Schindler, 2006). This research design is appropriate for this study based on the fact that the researcher proposed to gather comprehensive and info that would allow detecting and describing the present condition regarding the objective of the research. Creswell (1994) described that the descriptive method of research is a system for collecting information about the current existing situation. IBM Statistical Package for Social Sciences (SPSS) was used to analyze the data obtained from the questionnaire.

3.4. Targeted Population

The target population of this study was covered all travelers who use any mode of transportation in Addis Ababa city and transporters who are engaged in delivering transport service at different positions. From the target population 422 respondents were selected randomly because of homogeneity of the data collected. And as purposive samples, eleven officials (an officer from each sub city) who are considered as familiar for the topic of the study were invited for interview**.**

3.5. Sample size and sampling techniques

In this research, the researcher was used simple random sampling technique was used for this study to have the representations of 422 representatives of the society. The sample size was determined by using a single population proportional formula.

Therefore

n=sample size

Z ($\frac{\alpha}{2}$) =95% confidence level

$$n = \frac{z\left(\frac{\alpha}{2}\right)2 * P(1-p)}{d^2}$$

p=proportion of respondents (50%)

d= degree of accuracy desired setting (5%)

So, the value of 'n' was computed as follows.

n=$\frac{(1.96)2*0.5}{(0.5)2}$=384

Since there is no previous study to determine the proportion, the proportion (i.e., 50%) that yielded maximum sample size was taken, a margin of error of d=5% with 95% of confidence interval (z= 1.96) adding 10% for un returnable response rate the required sample size was 422.

3.6. Type of Data and Collection Method

Kothari (2007**)** states, data are categorized differently according to their sources that are primary and secondary data. In an effort for sound findings, the study tried to collect data from primary and secondary sources. As primary data, the researcher asked for responses through questionnaires from 422 respondents which consist of travelers who use different means of transport. And also, other eleven officials who have decision-making power in overall activity of the city transport from each sub-city sat for the interview. Out of 422 respondents 42 respondents was not returned the questionnaire and 380 questionnaires are analyzed. Before conducting the questionnaires and the interview the questions passed through standard tools measurement techniques to check the validity of the tools to reach acceptable and sound results. In addition to questionnaires and interviews secondary data were collected from written documents like policies, plans, legal documents, and others.

3.7. Ethical Consideration

From this research, the researcher follows to all moral and permissible matters and handles it as a researcher. The names of workers selected in the sample are not stated in the survey for privacy purposes. Again, the researcher respects the respondent's right to join or not at all and at any time.

3.7. Data Analysis

The data collected by means of a structured Likert-scale questionnaires and semi-structure interview were first coded, sorted and organized for analysis. SPSS-26 was used to analyze the data gained from the survey. The responses were organized and analyzed in the form of mean, used % to show the levels of green transport in Addis Ababa and correlation to know the relationship between academic status and green transport awareness for the descriptive analysis by using SPSS.

3.7. Validity and Reliability Test

The reliability test of the questionnaire for the Likert scale items were analyzed using Cronbach Alpha. Before the questionnaires distributed to the actual respondents some 30 questioners were issued to evaluate the validity of the tool to measure the set objectives of the research. Therefore, the reliability of the scale is above 0.7.

Table 1Validity and reliability the questionnaire preliminary test result

	Cronbach's Alpha if Item Deleted
private car owners	.800
mode of transport affect the environment positively/negatively	.800
do you use public transport	.802
walking	.802
bicycle	.805
private car	.811
shared taxi	.813
salon taxi	.795
Public transport (bus, train)	.800
shared private care	.807
Reliability	.810
Comfort	.799
Accessibility	.805
Speed	.798
Your satisfaction level	.800
Constructing more roads	.812

Encouraging private car owners to use public transport	.794
Congestion charge	.802
Limited traffic zone	.790
Using shifting mobilization motion	.791
Addis Ababa transport administration has been providing sufficient public transport service	.800
The city administration is under taking activities to reduce number of private cars	.791
The roads in Addis Ababa is comfortable for pedestrians	.789
There is adequate lean for cyclists and other non- motorized users	.801
The city administration sets various projects to create awareness among the society about green transport	.800
The residents of Addis Ababa encouraged to use public transport cycles and walking by the administration	.790
Distance of respondents travel	.792
Cost of public transport	.796
The speed of public transport	.798
comfort of public transport	.801
reliability of public transport	.797
Safety of public transport	.798
Health of respondents	.799
Building more roads and as the number of cars increased	.800
Considering the need of pedestrians and cyclist in constricting roads	.794
Forcing private car owners to use public transport	.801
Modernizing the service of public transport	.801
Providing IT supported service	.794
Encouraging the society to use non modernized vehicles in different ways	.793
Shifting the mobility of cars	.790
Creating awareness on Green Transport	.785

CHAPTER FOUR

4.1. Result

Private car ownership exhibits 333 (87.6%) of the respondents have no private cars while 47 (12.4%) possessed their own car. It shows only insignificant number of respondents have private cars comparing with the total number participate in the study. Other researches also approved that the number of people who travel using private cars in Addis Ababa are below 15%.

The highest number of respondents 141 (37.1) marked on “No idea at all” and others 111 (29.2%) said they have little knowledge whereas 35(9.2) expressed as they have some knowledge about green transport concept. In other hand a total of 93(24.7%) reported the have adequate and deep understanding. It shows that more than 75% of respondents have no adequate knowledge of green transport.

Accordingly, 89 (23.4) of the respondents said they know that influence of their transport choice on the environment 291 (76.6%) didn’t realize that the relation between the mode of transport they use and pros and cons on the environment. The data clearly show that very few numbers of respondents understands the impact of their means of transport on the immediate environment.

89 (23.4%) responses are marked on “yes” and the others 291 (76.6%) expressed that they didn’t have the habit of using public transport. It indicates only less than a quarter of the total respondents use public transport as a means of mobility at all. Recent researches by UN agencies announced 34% of the population use public transport as a major mode of transport to perform a day to day activity.

Various means of transportation: walking, bicycle, private car, shared taxies mini-buses, public transport (bus and train), and sharing private car. And the 380 respondents were asked what means of transport and how often they used it to perform their day to day activity.

As their response, only 19(5%) of the respondents always and 35(9.2%)sometimes use walking as a major means of transport to perform their day to day activity and 326 (85.8) described as they never use walking. Although a document from Addis Ababa transport bureau announced as 52% of the people of Addis Ababa use walking, this paper has found by far lower results. Similarly, the number of bicycle always users are 19(5%) when the others 251(66.1%), 74(19.5%), 17(4.5%), 19(5%) said they use bicycle never, rarely, sometimes and usually

respectively. In addition, the responses on public transport habits, a total of 30% of respondents expressed as they use public transport as always and usually and 57% respondents said they never use public transport. In relation to salon taxies(ride), a total of less than 10% use them as always and usually base while respondents who said they never and rarely use salon taxies is 180(47.4) and 111(29.2%) respectively. Besides private car users at always level are 52(13.7%). The data from the respondents implies that the main means of green transport: walking, bicycle, and public transport are used at lower stage.

Green transport service in cities is reducing the number private car ownership. The measurements that were being taken by Addis Ababa transport bureau to reduce the number of private cars. In such situations, encouraging private car owners to use public transport, constructing more roads, imposing congestion charge, setting limited traffic zone, and shifting mobilization methods are used as a management way of the increasing number of cars.

33.7% respondents believed that private car owners should be encouraged to use public transport to decrease the amount of cars in Addis Ababa despite other 33.2% didn't agree with their idea. The motion of constructing more roads as a means to reduce private cars was rejected by 47.6% of the respondents where as 37.1% expressed their agreement. The concept of congestion fee was supported by 181(47.6%) respondents and others 91(23.9) refused to agree. On limited traffic zone concept, the highest number is taken by respondents who marked on "neutral" and followed by 37.9% respondents who disagree with. And the idea of using shifting mobilization was supported and rejected by 182(47.9%) and 162(42.6%) of the respondents. One of the major challenges in the reduction of the number of cars in urban areas is the poor public transport provision service. In order to examine the public transport service, the researcher set a question that asked respondents to measure it from five perspectives: reliability, accessibility, comfort, speed, and general satisfaction level. And the table above summarizes their responses. Based on reliability on the service, a total of some 48% respondents marked "worst" and "bad" whereas a sum some 33% marked on "good" and "best".63.2% of the respondents describe Addis Ababa public transport as uncomfortable while 33% said it is comfortable. In related to accessibility, a total of some 67% described the service as "worst" and "bad" when a sum of some 23.4% of the respondents describe the service as "good" and "best". From the speed point of view, the public

transport service in Addis Ababa is evaluated as “worst” and “bad” by 73(19.2%) and 127(33.4) respondents respectively while 70 (18.4%) and (36 9.5%) judged it as “good” and “best”.

Based on the question that asked whether Addis Ababa transport bureau is providing sufficient public transport service or not, 23.4% expressed their agreement whereas 62.6% agreed. Similarly, 76.8% respondents said the city administration did nothing to reduce the number of private cars when only some 15% believed that some activities were undergone. The other question was if there is equate lean for cyclists and other non- motorized users. 71.1 % expressed their disagreement on the point and some19% agreed. For the item connected to the comfort the roads in Addis Ababa is comfortable for pedestrians, 58.4% of the participants of the research disagreed when 27.6% expressed their agreement. Besides the researcher wanted to know if the city administration set various projects to create awareness among the society about green transport, some 70% respondents said the city administration was not working in informing the society about green transport while 23.1% recognized the efforts don by the city administration to aware the community.

Relating with the activities done by Addis Ababa transport bureau to implement green transportation system, the interviewees’ responses on this question is highly varied. Five items some of them said the city administration is paying high effort to realize the implementation of green transport through various activities. Some of them are: striving to improve public transport services, constructing additional roads for cars, bicycles and pedestrians, improving traffic management systems, and creating awareness in the society by on varies events. On the other hand, half of the interviewees said the administration can’t solve the city’s transport problems and still focused on constructing more roads ignoring the principles of sustainable transport

In in order to providing a sustainable transport system, cities’ administrations should know the factors that force travelers to use one form of transportation over the other. And respondents asked to describe their agreement level on the factors like: distance, cost, comfort, safety, and health which are believed to influence their transport preference.

As the above tables 11 indicated there are different influences that affect respondents’ transport choice, out of 380 respondents a sum of 61.8% describe as the distance they travel has no impact on their transport choice whereas a total of 33% thought distance is a crucial point in their

preference. And 66.5% agreed that cost is essentially important in their transport choice when 23.7% described as they didn't consider it to travel in a form of transportation. A total of 238(62.6%) of the respondents believe that safety highly matters on their selection of transportation but only 36(9.3%) said they don't agree on it. And 207(56.1%) of the respondents expressed their health condition has greater impact on their transport choice. In general, respondents have agreed that they consider cost, comfort, safety, and health during they made decision on what type of transport they use but as collected data the majority of respondents didn't consider distance to choose transport means. Sustainable transportation planning takes in to consideration the issue of social cohesion which will be affected due to less livability. Access to people, places, goods and services 18 is important to the social and economic well-being of communities. Transportation is a key means, but not the only means, through which access could be, achieved (litman, 2011).

Based on the above tables that describe the respondents' level of agreement, the statement of building more roads as the number of cars increased has got support by a total of 201(52.9%) out of 380 respondents whereas 125(32.9%) expressed their disagreement. In related to considering the need of pedestrians and cyclists in constricting roads has got approval from 236(62.1%) respondents when only 54(14.2%) rejected the motion. The other point was the strategy of forcing private car owners to use public transport in different ways. Accordingly, 238(62.6%) and 142(37.4) expressed their agreement and disagreement respectively. A total of 308(81%) and 36(9.5%) respondents describe their agreements and disagreements on the idea of modernizing public transport services as a strategy expected from Addis Ababa transport bureau. In modern cities information technology plays important role in giving essential information about the mobility of public transport services. The other concept is encouraging the society to use non-motorized transport methods. Based on it 220 (57.9%) agreed when 160 (42.1%) disagreed. In shifting mobility of cars methods, 183(48.1%) and 143(37.6%) expressed their agreements and disagreement respectively. And 238(62.6%) agreed on creating awareness in the society about green transport The table shows even though the degree varied, respondents agreed on all expectations.

For implementing of green transport system in urban areas sufficiently, creating awareness about the issue among the society has significant role.in this context, the paper examine if there is

relationship between respondents educational qualifications and awareness level of green transportation.

Base on table 15 that demonstrates the relation between educational status and green transport awareness is a very low positive relationship between them because the correlation coefficient. r (.383) at alpha level 0.01. It implies the respondent who have privet car have very low possibility of using public transport. It is believed that the ultimate goal of green transport is to attract the private care users to use public transport and reduce the number of private cars and related problems.

Base on table 14 that demonstrates the relation between the tendencies of private car owners to use public transport, there is a very low correlation between them because the correlation coefficient. r (269) at alpha level 0.01. It implies the respondent who have privet car have very low possibility of using public transport. It is believed that the ultimate goal of green transport is to attract the private care users to use public transport and reduce the number of private cars and related problems.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

From preceding unit, the major results of the research were presented briefly. From these results, the following are conclusions.

- The level of unpretending of the concept of green transportation by residents of Addis Ababa is very low.
- The practice of green transport system in Addis Ababa is at its infancy level
- The major challenges that affect the implementation sustainable transport system, lower concentration given for the subject matter, lack of budget, poor public transport service, lack of awareness, high tendency of purchasing private car, lack of road for pedestrian and non-motorized vehicle users.
- Addis Ababa transport administration hasn't met all urban green transport measurements. road infrastructure, rail-based public transport, road- based public transport, support or non-motorized travel modes, technological solutions, awareness rising campaigns, price mechanisms vehicle access restriction and control of land users.
- There is in significant relationship between educational status and awareness of the concept of green transport.

5.2. Recommendations

Based on the results of the research, the researcher has recommended the following key points of recommendations.

- Addis Ababa transport bureau should strive to create awareness among the residents of the city.
- The bureau should work to improve the service of public transport as it is a key factor in tackling transport related problems.
- In constructing road infrastructure, it should include the need of pedestrians, cyclists, non-motorized vehicle users and other minor groups.
- The city administration should work to promote vehicles that use renewable energy.

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Appendix-1

ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

DEPARTMENT OF LOGISTIC AND SUPPLY CHINE MANAGEMENT

Hello, I am a graduate researcher at Addis Ababa University School of Commerce in the department of Logistics and Supply Chain and I am conducting a study on the practice and challenges of the implementation of green transport in Addis Ababa. The research aims to assess the current practice and identify major obstacles in implementing green transport in the city. I would like to know your experiences with the concept, practice, and challenges of implementing green transportation in the capital. Please complete this 20-minute survey. Your responses are anonymous and you can skip any questions you are not comfortable with. Thank you for your participation in advance.

Based on the information needed, the items in the questionnaire consisted of six parts:

PART 1: personal information of respondents

Instruction: The following questions are about the respondent's personal information. Kindly indicate the appropriate characteristics of the respondent profile using (√)

No	Personal information	Male	Female
1	**Your sex**		
2	Age category	Response	
2.2	12-17 years old		
2.3	18-24 years old		
2.4	25-34 years old		
2.5	35-44 years old		
2.7	45-54 years old		
2.8	55-64 years old		

3	Employment status					
3.1	Full-time employment					
3.2	Unemployed					
3.3	Home-make					
3.4	Retired					
3.5	Part-time employment					
3.6	Self-employed					
3.7	Student					
4	Your highest educational qualification					
4.1	Illiterate					
4.2	Elementary					
4.3	High school					
4.5	Diploma					
4.6	BA degree					
4.6	MA or above					
Respondents' Conceptual understanding of green transport		Yes		No		
1	Do you own a private car?					
2	level of awareness about green transport	Levels of agreement				
		1	2	3	4	5
2.1	I have no idea at all					
2.2	I have little knowledge					
2.3	I know well about it					
2.4	I have some knowledge					
2.5	I have adequate knowledge					

2. Do you know that your preference towards mode of transport affect the environment positively or negatively?

   A. Yes B. No

Part Two: Green transport practice in Addis Ababa

Instruction: The following questions are about green transport practices in Addis Ababa. Please indicate the appropriate response by using (√).

1. Do you use public transport?

   A. Yes B. No

2. Instruction: The following questions are about the type of transport that respondent use frequently. Please indicate the type of transportation and how often you use it using (√). (1=never, 2=rarely 3=sometimes, 4= usually, 5= always)

No	**Types of transport**	Levels of agreement				
		1	2	3	4	5
1	Walking					
2	Bicycle					
3	Private car					
4	Shared taxi(minibus)					
5	Salon taxi(ride)					
6	Public transport					
7	Sharing private cars					

3. **Instruction**: If you use public transport; the following questions are about the service of public transport managed by Addis Ababa transport bureau. Please indicate the level of your agreement or disagreement using (√) on the following statements based on your experience. (1=Worst, 2=Bad, 3=Neutral, 4= Good 5= Best)

No	Public transport managed by Addis Ababa transport bureau	Levels of agreement				
		1	2	3	4	5
1	Cost					
2	Reliability					
3	Comfort					
4	Accessibility					
5	Speed					
6	Your Satisfaction level					

PART FOUR: Activities being undertaken to implement green transport by the Addis Ababa city Administration

4. **Instruction**: The following question is about the actions that should be taken to reduce the crowding private car ownership. Please indicate the level of your agreement or disagreement using (√) on the following statements based on your experience. (1=strongly disagree, 2=Disagree 3=Neutral 4= Agree 5= Strongly agree)

No	Actions that should be taken to reduce the crowding private car ownership	Levels of agreement				
		1	2	3	4	5
1	Constructing more roads					
2	Encouraging private car owners to use public transport					
3	Congestion charge					
4	Limited traffic zone					
5	Using shifting mobilization motion					

5. **Instruction**: The following questions are about the actions that are expected to do by Addis Ababa transport administration. Please express your level of agreement or disagreement using (√) on the following statements based on your experience. (1=strongly disagree, 2=Disagree, 3=Neutral, 4= Agree, 5= Strongly agree)

No	actions that are expected to do by Addis Ababa transport administration	Levels of agreement				
		1	2	3	4	5
1	Addis Ababa transport administration has been providing sufficient public transport service					
2	The city administration is under taking activities to reduce number of private cars.					
3	The roads in Addis Ababa is comfortable for pedestrians					
4	There is adequate lean for cyclists and other non- motorized users					
5	The city administration sets various projects to create awareness among the society about green transport					
6	The residents of Addis Ababa encouraged to use public transport cycles and walking by the administration					

PART Five: Major factors affecting the implementation of green transport in Addis Ababa

Instruction: The following questions are about the factors that affect the choice of a type of transport over the other. Please indicate the level of your agreement or disagreement using (√) on the following statements based on your experience. (1=strongly disagree, 2=Disagree 3=Neutral 4= Agree 5= Strongly agree)

No	factors affecting the implementation of green transport	Level of agreement				
		1	2	3	4	5
1	Distance					
2	Cost					
3	Time					
4	Comfort					
5	Reliability					
6	Safety					
7	Health					

Part six: Measurements should be taken to build the foundation of green transport in Addis Ababa.

Instruction: The following questions are about the actions that should be taken to build the foundation of green transport in Addis Ababa. Please indicate the level of your agreement or disagreement using (√) on the following statements based on your experience. (1=strongly disagree, 2=Disagree 3=Neutral 4= Agree 5= strongly agree)

No	Build the foundation of green transport	Level of agreement				
		1	2	3	4	5
1	Building more roads and as the number of cars increased.					
2	Considering the need of pedestrians and cyclist in constricting roads					
3	Forcing private car owners to use public transport					
4	Modernizing the service of public transport					
5	Providing IT supported service					
6	Shifting the mobility of cars					
7	Encouraging the society to use non modernized vehicles in different ways					
8	Creating awareness on Green Transport					