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**ADDIS ABABA UNIVERSITY**

**COLLEGE OF DEVELOPMENT STUDIES**

**CENTRE FOR REGIONAL AND LOCAL DEVELOPMENT STUDIES**

**INTEGRATING URBAN TRANSPORT SYSTEM IN ADDIS ABABA AND ITS  
CHALLENGES: A CASE STUDY ON MINIBUS TAXIS**

**Atnafu Chalte**

**A Thesis Submitted to the College of Development Studies,  
Presented in Partial Fulfillment of the Requirement for the Degree of  
Master in Regional and Local Development Studies**

**Advisor: Mr. Girma Semu**

*June 2019*

*Addis Ababa, Ethiopia*

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Approved by Board of Examiners

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## *DECLARATION*

I hereby declare that this thesis entitled “Integrating Urban Transport System and its Challenges in Addis Ababa: case study on minibus taxis,” has not been presented for degree in any other university. The other books, articles, journals I have used are acknowledged at the respective place in the text.

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## **Acronyms & Abbreviations**

AACPPO	Addis Ababa City Structure Plan
AAPRTSA	Addis Ababa Public Road Transport Service
AATA	Addis Ababa Transport Authority
AATMA	Addis Ababa Traffic Management Agency
AADLA	Addis Ababa Driver and Driving Licensing Agency
ECRGE	Ethiopia Climate Resilient Green Economy
ITS	Integrated Transport System
NMT	None Motorized Transport
UNECA	United Nations Economic Commission for Africa
AAPRTS	Addis Ababa City Public Road transport System

## **Abstract**

An integrated transport system in metropolitan cities has a resilient contribution for more sustainable urban development. Nevertheless, its potential role for the cities' sustainability mainly in developing countries has not been realized. Thus, building on the notion of environmental wisdom, this study intended to explore integrating transport system in Addis Ababa and its challenges and opportunities by taking Addis Ababa City mini-bus taxi transport as a case. To this end, the study employed a concurrent mixed methods approach. The target populations of the study include experts, chief heads of the AACTA, AACTMA, AACDLA, drivers, and traffic police among others. Total of 176 experts and professionals were employed. Both probability (proportionate random sampling based on gender) and the non-probability (purposive and convenient) sampling methods were employed to select sample respondents from the study's target population groups. Pertinent data was gathered through questionnaire, deep interviews, in addition to reviewing documents such as books and journal, articles and policy manuals. Finally, data gathered from both primary and secondary sources were analyzed in conformity with the underlying principles of a concurrent mixed methods research strategy whilst also meeting ethical standards in the scientific research. Results of the study revealed that there are several physical-based transport developments in Addis Ababa, however, Addis Ababa public transport particularly taxi mode of transport lacks integration in view of environmental wisdom. To help the sector to exercise environmental friendly transport system, recommendations like respective stakeholders and publics' awareness should be promoted; short and long term trainings which focus on climate resilient green transport system should be given; private cars should be restricted- roads should not be permitted during peak hours and ticket based or e-card payment for taxi service be introduced.

***Key terms:*** *Integrated transport system, environmental wisdom perspective, climate resilient green economy*

## CHAPTER ONE

### 1. Background of the Study

#### 1.1. Introduction

It is apparent that urban transport serves as veins to accelerate developments in industry, trade, education, health and other services. Thomas (2016) noted that urbanization and urban transformation provide new opportunities for building strong and resilient food and agricultural systems that can have a transformational effect on peoples' lives and societies as a whole. To do so, there should be effective infrastructures such as effective transport and communication service doubled with institutional capacity. Hence, without this, developing countries and least developed countries cannot reduce the gap that separates them from the industrially developed ones (World Bank, 2011).

A well-developed and integrated transport system in cities plays a great role in development mainly through facilitating easy mobility of people and goods and services. Integrated transport system delivers mobility in order that people can get to work, school or other activities so as to reduce greenhouse emissions, and to facilitate economic development for both service deliveries and end users. Accordingly, an integrated transport system in metropolitan cities has been figured out as a resilient contributor for more sustainable urban development.

According to Poliakova (2013), integrated transport system can be defined as different modes of transport which agree on the feature of preparing and operating on the different transport network through which planning and other system elements are associated. Transport integration can be both physical-freight with buses, train with minibus, etc. and managerial-which refers to inter-sector and intra-sector integration. In other words, it is the agreement between the service providers and the end-users, the respective authorities in the transport sectors and the service providers, and other sectors such as water and sewage, electric, and telecommunication.

According to Tariku et al, 2017, although road transport is the prominent mode of transport mainly in the developing countries, the sector has been facing several challenges in these countries. For instance, among the major challenges of the urban transport:

- Poor access to work place, education, health and other services due to lack of public transport service
- Continuous increases in transport fare especially for low income groups
- Lack of smooth traffic flow
- Lack of infrastructure for None Motorized Transport(NMT)(for walking and bicycle)
- High rate of traffic accidents
- Increasing air and noise pollution, and
- Long line-up and/or queuing are the major ones.

According to (WHO 2018), road transport accident is the second leading cause of death among the population globally. Hence, it is increasingly aggravating as a global public health concern, especially in the developing countries.

Being a developing country, Ethiopia's road sector also faces similar challenges at even a higher level. Hence, "...Ethiopia is reported to be the country with deadliest roads in the world, indicating a road crash fatality rate of at least 114 per 10,000 vehicles per year compared to only 10 in the UK..." (Tariku et al., 2017:3).

The prevalence of road traffic fatality in Ethiopia for the year 2013 was 25.3 per 100,000 populations (WHO, 2015) and the rate is among the highest in the world (WHO, 2015; Tariku et al., 2017). Out of these crashes, the capital, Addis Ababa accounts the lion share (Tariku et al., 2017). Similarly, a report issued by the United Nations Economic Commission for Africa (UNECA, 2009) indicates that despite having a very low road network density and vehicle ownership in Ethiopia, the country has been stated as the worst example in road crash.

Last but not least, according to the (ECRGE, 2011) report, 75% of the emissions come from road transport, particularly freight and construction vehicles, and lesser extent private passenger vehicles.

Addis Ababa's road transport sector also reflects similar challenges that are observed nationally. For instance, the city's road sector has a limitation in implementing an integrated transport system which can make the transport service more efficient. The existing Addis Ababa Road

Transport service has faced several problems due to the rapid urbanization and weak planning practices with the socio-economic developments. Some of these are inefficient public transport service that is composed of mini-bus taxis which is huge gap of the demand and supply. According to the Transport Policy of Addis Ababa (2011), 80% of the Addis Ababa trips are served by minibus taxis and because of this the road is congested and polluted. In light of this, the average speed is about 10 kilometers per hour in peak hours. This is may be due to its volume is less than other mode of transport like bus and mid-bus. In fact road is congested not only by only minibus taxi service but also other mode of transport due to schooling and work-go into time. Nevertheless, due to lack of shift for other mode of transport during peak-hours and majority of the employees and students prefer minibus taxi mode of transport to other mass transport, the road is congested.

In addition to this, the majority of the city populations are pedestrians and they prefer to use mass transport, but there is no balance of this high demand on minibus taxi as compared to the available supply. That is why, it is usual to observe a large queue demanding a transportation service. The majority of the demand is of persons travelling to their working place, which is from home to work place and vice versa. It is easy to observe that there is a high demand during the peak hour (morning and evening time) and moderate demand in between these times.

The high demand on transport can be minimized by making a rearrangement on the currently available public transport network, since they were working with no communication and coordination. The available public transport systems in the city are Anbessa City Bus Enterprise, Sheger Public Transport Enterprise, Public Service and Alliance bus.

Thus, this study mainly focused on integrating Addis Ababa city transport system, therefore, the need for interaction in an attempt by relinking different modes of road transport, resolving the existing transport problems such as mitigating long lineup, congestions tariff, disruption, environmental emissions, etc. However, ITS's potential contribution mainly in the city has not been realized based on environmental wisdom perspective.

Thus, building on the notion of environmental wisdom, this study intends to assess the current state of integrated transport system and its challenges and opportunities in Ethiopia by taking Addis Ababa Public Road Transport Service (AAPRTS) as a case. More specifically, Addis

Ababa city taxi service was chosen as main focus of the study. According to scholars, environmental wisdom mean people are absolutely dependent upon the natural capital it provides and they encourage sustainable forms of economic growth and discourage environmentally degrading ones. This school of thought believes that people have ethical responsibility to take a wider view and work to prevent degradation of the earth's ecosystem, biodiversity, and the biosphere.

This school of thought further underlines the relevance of integrated development and growth in urbanization especially in expanding and upgrading urban cities to bring sustainable development in the country. This is because without adequate integrated development and growth in urban areas that provide balanced and opportunity-based spatial distribution for the people, no country can ensure genuine and sustainable development. According to this view resources are limited and we should use them wisely like without demolishing the old building, bridges and memorial heritages. Thus, according to this view, urban development should be in such a way that not demolishing the natural resources and /or not degrading the urban lands for transportation and other means.

With regard to environmental world view, we have urban trees that give oxygen for human and green the environment; should not be exploited to expand the transport infrastructure and also we expect satisfaction from the environment as well as economic growth like profit and at the same time the service giver expect satisfaction that he/she needs economic growth and do not want much release of CO<sub>2</sub> due to congestions and traffic management problems.

To mitigate such adverse effects, the Federal Democratic Republic of Ethiopia has therefore initiated to protect the country from the adverse effects of climate change and to build a green economies that will help realize its ambition of reaching middle status before 2025.

## **1.2. Statement of the Problem**

Currently, Addis Ababa city is striving to fulfill the gap between public transport demand and supply in a way that several development projects are in harmony. There are several factors that

contribute to the high rate of road traffic accident in Addis Ababa and in the country at large. For instance, drivers' behavior, lack of awareness among the pedestrians, loose traffic rules and regulations, unstable institutional policies, vehicle and road conditions are among the major ones (Tariku et al., 2017). According to Fantahun Tesfaye (2012), construction of auto-oriented road infrastructures encourages car use and ownership which intern results in congestion of the new highways or roads in a matter of time.

With the rapid expansion of the city, narrowed roads replaced with wide and roads, leaving a host of disturbed areas. It is probably no surprise that traffic management and road construction by themselves cause road congestions and disruptions. In addition to this, there are no plans to plant new trees along these roads and fill the space created by different development activities. No serious effort has been made to retrieve land in a well-planned manner to allow the city to have adequate space along with its growth. Above all, there is a lack of integrated transport system which is aggravating the prevailing crises of road transport in Addis Ababa. The existing transport service badly needs measures for improving affordability and quality of service (AA Transport Policy, 2011).

In Addis Ababa lack of consistent trip generation identification, analysis, travel demand and neglect of non-motorized transport are the major planning problems (AACTA, 2011). Moreover, lacks of better traffic management system and traffic management process have aggravated the problem of Addis Ababa land transport. In effect, the rate of car accident in the city is exacerbating more than ever due to the lack of integrated transport system.

Furthermore, lack of integrated transport system along with other factors mentioned above contribute to emission of CO<sub>2</sub> and other greenhouse gases, noise pollution, and congestion and disruption of ambulances to give emergency healthcare with an overall implications for aesthetic value of the environment.

Although several public transport infrastructures are integrated physically, public transport problems in Addis Ababa seem inevitable that it is usual to observe a large queue demanding a transportation service and congestions vulnerable to unwanted delay to work and home in peak hours and vicious car accident.

There are several scholars who tried to address the problem of transport in Ethiopia. For instance, Rahel Abebe (2017) looked at an evaluation of the transport system for disabled versus policy implementation. She found that transport system for disabled people in Addis Ababa is inaccessible and the causes for inaccessibility are lack of infrastructure provision, law enforcement and lack of public awareness, etc. Bizunesh Aimero (2016) figured out the integration of Light Rail Transit with other Public transport Modes. She tried to create an integrated network system between demand responsive vehicle and fixed route system (LRT) by using CAD software. She recommended physically integrated network along the selected LRT in Addis Ababa.

One such study was made by Mulu Eshete (2015). The study looked at public transportation system: the case of Addis Ababa. The study looked at the extent to which the public transport in Addis Ababa has an impact on the urban mobility of the city. It also assessed the possible strategies and approaches that can be devised to enable the mode.

Similarly, Pojani & Stead (2014) studied sustainable urban transport in the developing world: beyond megacities. The authors argued the potential role and impact of nine commonly considered options for sustainable urban transport in cities in developing countries: road infrastructure, rail-based public transport; supports from non-motorized travel modes, technological solutions, awareness-rising campaigns, pricing mechanisms, vehicle access restrictions; and control of land use.

Another study by Yetinayet Ayalneh (2012) looked at evaluating transport network structure: case study in Addis Ababa. The study covered and identified the inadequate infrastructure by analyzing the spatial mismatch within the current road network and transport indicators. The overwhelming findings of this study is that there were inadequate levels of infrastructure in parts of the road network of Addis Ababa, peripheral areas suffer from lack of roads and roads in the central areas have capacity limitation. Thus it showed that a significant spatial mismatch and missing road network structure. The author recommended improving the current road network structure considering connectivity and accessibility objectives that enable the realization of the Ethiopian National Urban Transport Policy. In conclusion, Anteneh Getinet (2007) studied integrating transport and land use for sustainable development: theory and practice on the

suburbs of Addis Ababa. The researcher tried to explore the possibilities of integrating land use and transport policies to assure sustainable development of the city.

Other empirical studies (Meron 2007, Eshetie, Birhanu and Daniel 2013, Tilahun2009, Mintesnot (2007) and Takano, 2007, Wondemu (2012) and Frehiwot (2013) conducted research on transport problems in Addis Ababa. Their studies focused on bus transport in Addis Ababa and taxi service. However, none of them have carried out their research on integrated transport system from environmental perspective.

Besides, the Addis Ababa City Administration planned a statutory structure plan in the year 2017. The structure plan had provided six key urban issues to be implemented in the five years such as housing, urban road network and transport manufacturing industries, and large storage facilities, environment, and inner city renewal and upgrading (AACPPO, 2017).

In other words, empirical studies in this regard are limited in view of environmental worldviews. In addition, evidences required for decision making in this regard are also inadequate for transport related constraints. Notwithstanding the several studies, there is a need for further research to narrow that knowledge gap by assessing the current state of integrated transport system and its challenges and opportunities from environmental wisdom perspective with reference to Addis Ababa Public Road Transport Service (AAPRTS).

### **1.3. Objective of the Study**

The overall objective of the study is Integrating Urban Transport System and its Challenges in Addis Ababa: case on minibus taxi service.

#### **1.3.1. Specific Objectives**

- To explore the current practice of integrating urban transport system and challenges in the road- based public transport of Addis Ababa
- To determine the major challenges and opportunities for the effective implementation of an environmentally friendly taxi service in Addis Ababa
- To explore environmental wisdom-based integrated public road transport system

### **1.4. Research Questions**

This paper aims at answering the following key research questions:

- Is AATA been practicing integrated public transport system in view of range and quality, advantages of fare, tariff integration, no disruption of taxis in peak-hours in Addis Ababa?
- What are the major challenges and opportunities for the effective implementation of an integrated taxi transport system in Addis Ababa city?
- How much are the concerned institutions are integrated by giving effective service to manage public transport system in view of environmental wisdom?

### **1.5. Scope of the Study**

The purpose of this study is integrating urban transport system and challenges in Addis Ababa: case study on minibus taxi service. It focuses only on the city's public road transport service providing organizations, AACTM and AACTA, AACDLCA as a case. More specifically, the study is delimited to Addis Ababa public transport service and taxi service as a case of the study. It is because it could be difficult to address or manage all modalities of transport sector in a single study.

### **1.6. Limitations of the Study**

In this research it was very difficult to exhaustively treat all the challenges and prospects of integrating transport system in Addis Ababa. This is because of two reasons. First, the idea of integrated transport system is development issue that it is vast to treat development in this short and bounded-time since most issues are beyond everyday usage. The other reasons are of personal time and money constraints. What is more, the type of data obtained/required for the study may be a constraint. The major limitation of this study were unavailability of data on transport demand analysis, unavailability of up to date research concerning the study and shortage of time for detail observation as well as analysis and only the basic components of integrated transport system on Addis Ababa minibus taxis that is physically and managerially-based integrated transport system from environmental wisdom perspective have been touched upon.

### **1.7. Significance of the Study**

The result of this study may have both policy and academic merits. As it provides current empirical evidences on the road sector's limitations in adopting integrated transport system, it will support policy decision making endeavors. It can also serve as a resource for anyone who is willing to pursue further investigation in this line in the future.

## **1.8. Operational Definitions of terms**

**Integrated transport system:** the coordination and optimization of physical, operating and managerial issues to increase work efficiency of the public.

**Environmental wisdom perspective:** nature exists for all the earth's species, not just for us, and we are not in charge of the rest of nature.

**Climate resilient green economy:**

**Physically-integrated transport system:** it is multi-modal integration to link taxi stations with bus terminals, walking, cycling and train lines.

**Managerially-integrated transport system:** it is demand-capacity planning and execution by forecasting necessary transport capacities in terms of information, service, fare, quality, ticket, and utilization of resources.

## **1.9. Organization of the paper**

This research paper has five main chapters. Chapter one presents background of the study, statement of the problem, the research objectives and questions, significance of the study, the scope of the study, limitations of the study and operational definition of terms. The second chapter addresses review of related literature mainly on definition and theories of some key terms and concepts related to integrated road transport system. Chapter three presents methodological approach adopted in the study. Chapter four is discussion and results of the study. Finally, summary, conclusion and recommendations are presented in chapter five.

## **CHAPTER TWO**

### **2. REVIEW OF RELATED LITERATURE**

#### **2.1. Transport System: An overview**

##### **2.1.1 The concept of integrated transport system (ITS)**

As we know the term integration is understood from different disciplines. Thus, different scholars define integration differently. Thus, there is political integration, social integration, economic integration, etc. According to Oxford dictionary meaning, integration is the act of combining into a different system in to the whole. In this context, integration is the opposite of segregation.

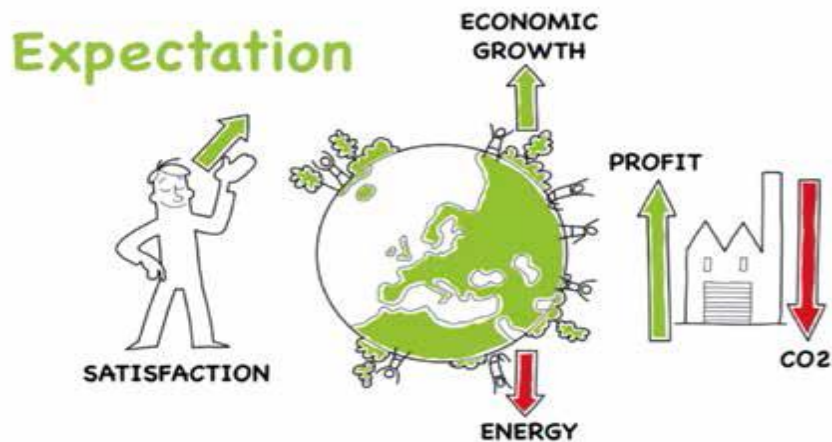
According to Poliakova (2013), integration is a system composed of several parts and elements to increase the work efficiency of these elements by their complementarily. Thus, integration can be realized as physical, operating and managerial. According to this definition integration can be within the system, between departments, or among other sectors. In our case, managerial and physical integration of transport is more helpful since urban transport system and its challenges are more of either of two.

Generally speaking, integration is the inter-connection between the provider and users, between the manager and employees within the service and among different sectors, so on. Thus, integrated transport system is not different from the definition stated above. It is the organizational process through which the planning and other system element are associated regardless of the transport mode, providers and institutions, with the aim to increase economic and social benefits, environmental benefits, Poliakova (2013).

This process of integration brings together the different subjects, their different approaches, aims, intentions and also their barriers. In other words, transport integration refers to the coordination and optimizing of timetable and line tracing between operators, building and operation of transfer terminals including the controlled follow-up of vehicles and also walking and cycling.

Well integrated transport system aims at reaching effective advances in terms of efficiency, and sustainability of public transport and creating effective service to the citizenry. As mentioned above integration is the link between and among the input, process, outcome and

environmentally sustainable development. According to the World Bank (2014), it is the consensus from the different stakeholders: users, service providers, terminals and transport mode operators has been reached on this.

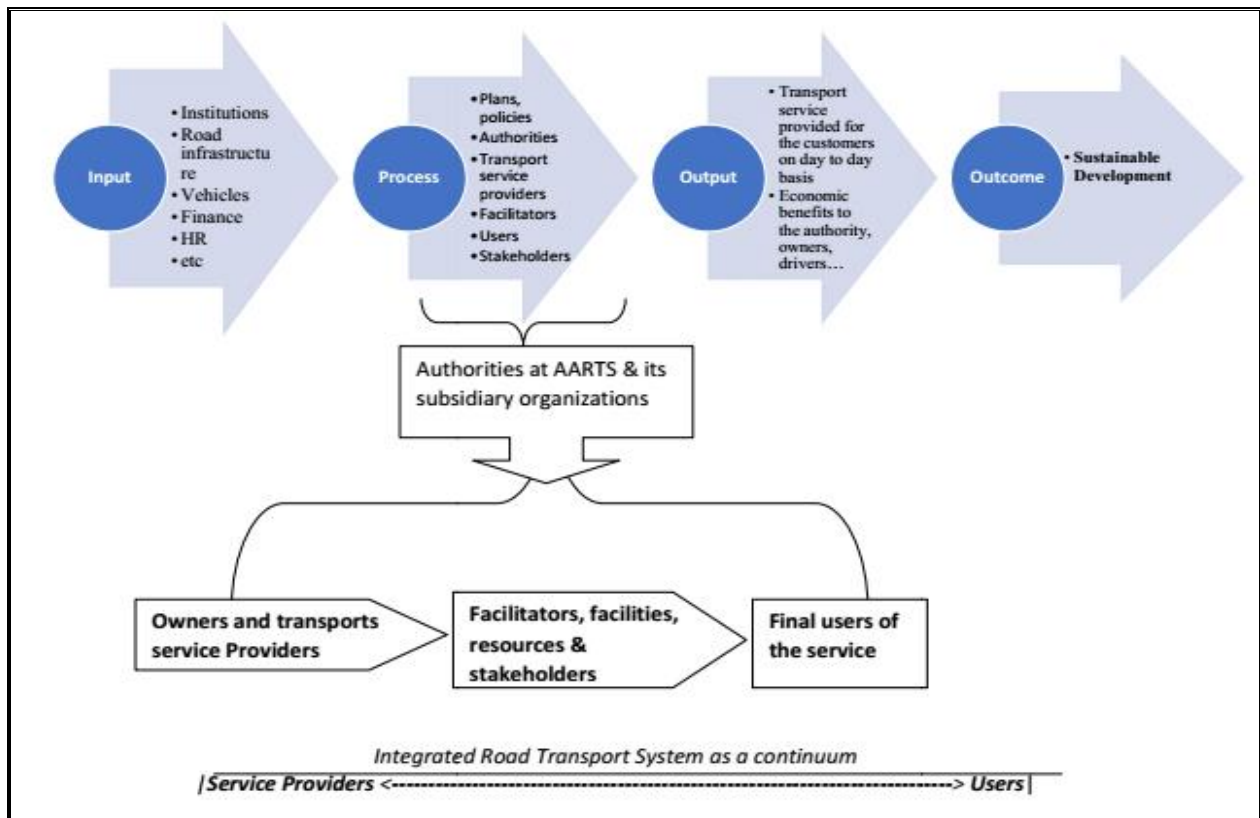


**Figure 2: shows integrated transport system for sustainable local and regional development**

Source: <http://www.ertrac>

Thus, the idea of integration is not only for the sake of government's benefit; it is not for the driver's safety to reach his/her destination on time; above all it is not only for the sake of the country's rapid economic growth; rather it is theory all health of ecosystems and biosphere. One way to make sustainable urban transport is by introducing environmentally-friendly urban transport to the society.

Likewise other systems, transport system include input, process, output and outcome. Regarding input there are several elements institutions, road infrastructure, vehicles, finance and human resources. Under process we have plans, policies, strategies, authorities, transport service providers facilitators, stakeholders and end-users. This process further expand into solidarity organizations such as vehicle owners transport authorities, facilitators and facilities and final users. The output is apparent that transport service provided for the customers on day-to-day basis, economic benefits to the authority, facilitators, owners, drivers, and other local developments.



Source: own conceptualization (2019)

## 2.2. Types of Integrated Transport System

Different scholars classified integrated transport system differently. And also the magnitude of integrated transport system from country to country is different. In developed countries the essence of an integrated public transport system is to provide door-to-door travel to passengers and make public transport easier to everyone whereas in developing and least developed countries the notion is to mitigate congestions and car accidents utmost. It should be able to link-up and facilitate the development of an efficient and accessible network for passengers. Then, passengers will be satisfied only if suitable service frequency, high reliability, simplicity and fair fare are achieved. They will feel convenient, safe and secure through better service integration. These include better coordination between modes, provision of well-developed interchange facilities and better pedestrian linking facilities. These integrations are institutional, integrated road use planning, environmentally friendly, ticket, fare, information, physical and service. Generally speaking, transport integration can be either physical or managerial and environmental.

### 2.2.1 Managerial Integration

Managerial integration can be classified into institutional integration, service, ticket, fare and information.

**Institutional Integration:** If integration involves different public transport operators, it is essential to establish partnership between them. Partnership is an effective means to ensure coherence between modes. An effective institutional framework will help achieve seamless mobility at all levels such as physical, service, fare, ticket and information. For example, there are several institutions in relation to land use like AAWSC, ELPA, AARA and ETC. If those organizations work in coordination there will not be unwanted destruction of roads now and then.

**Service Integration:** Service integration means that passengers can make door-to-door and multi-modal journeys in an uninterrupted manner. Close integration at an operational level among different transport modes should be organized. Each transport mode performs complementarily rather than competitively. Punctuality, frequency, co-ordination of timetables, synchronizing arrival and departure times, operation management, safety standard and resource allocation must be consistent, uniformed and standardized to achieve the aim. High frequencies must be supported by high reliability. Timetables of public transport must also reflect close integration so that the waiting times indicated on the timetables are achievable and acceptable during peak as well as off-peak periods.

It is important that the services of the rail network can properly be integrated with those of other modes. Although buses have to perform the role as the main carriers in certain corridors, they together with minibuses, light rail should generally perform as feeders to railway to enable passengers make convenient and frequent transfers. It is also imperative to shorten transfer times and waiting times to passengers. Routes should either have stops or terminals at or near railway stations within a short walking distance. Passengers can start their travel by rail to bus, bus to rail, road-rail and supplementary transport modes such as mini-buses if available. In particular, integration of service is important also in some low density areas where transport is insufficient. More frequent services should be provided by buses and minibuses for passengers travelling to railway stations.

**Ticket Integration:** An integrated ticket system is based on the principle of joint ticketing through fare to allow passengers to complete their journeys without any additional charge for transferring from one mode to another in an integrated public transport system.

The ticket should allow users to travel by different modes of public transport, rail, bus, minibus with a single document.

An integrated ticket will speed up boarding times, enable faster journeys and make travelling easier as well as simpler to passengers. For public transport operators, this automatic fare collection system can increase ridership because it reduces cash handling. Another advantage of having integrated ticket is that environmentally resources in issuing different tickets will be minimized. An integrated ticketing system should enable a passenger to use a travel card on all different public transport services. This is a leading step to establish an integrated fare system in future.

**Fare Integration:** Fare integration enables passengers to use a single fare card to facilitate multiple transit service with transferring between modes. An integrated fare should be kept on a reasonable cost level for comparable trips. To enable the system to succeed, the provision of fare discounts and concessions should be made, i.e. the total fare must be lower than the sum of individual fares when more than one mode is involved.

**Information Integration:** Public transport should provide a higher level of services and facilities to passengers. Passenger should be able to obtain information about all alternative forms of public transport easily and conveniently. Information must be displayed at stations, bus terminals and interchange areas. Passengers should also be able to obtain up-to-date information through customer hotlines, brochures, internets and passenger information display boards. Effort should be taken to develop a comprehensive transport information system of public transport services which should provide a table of fares, routes information, departure times and arrival times.

### **2.2.2 Physical Integration:**

It is necessary to ensure coherence through physical integration. Brian (2001) argued that there is need to interchange is one of the factors which travelers like least about public transport. He also

remarked that seamless interchange minimizes the waiting times for passengers. In substantiating this, Simpson (1994) stated that physical integration is attractive to passengers to have a bus or train waiting for passengers for departure.

There must be an interchange facility with different modes of transport such as bus stop, rail station, minibus stop or taxi stop in a public transport interchange. Public transport interchanges are therefore necessary for passengers from the origin areas through either rail or bus to their destinations.

Passengers can also have other public transport choices other than rail and bus. A network of convenient and comfortable interchange facilities must be located readily and conveniently at accessible locations such as major employment centers and district centers. It should ensure that passengers can interchange within a short walking distance.

### **2.2.3 Characteristics of Integrated Urban Transport systems**

According to (Prabhu, 2013), the components of integrated urban transport system for cities can be four. These are 1. Multimodal mobility 2. Intermodal connectivity 3. Integration of land use and transport and 4. Disincentives for private vehicle use

- 1. Multimodal Mobility:** this system of integration promotes both public and non-motorized transport. In this regard, public transport should be as wide-ranging as necessary and appropriate. All public transports such as BRT, LRT, Metro rail, city bus service and private public transport give formalized service to the citizenry. Likewise, non-motorized transport options should also be expanded by improving pedestrian environments, by providing bicycle lanes, and public bicycling schemes.
- 2. Intermodal connectivity:** Building supply through high quality public transport is not enough. Providing seamless connectivity across different mode is instrumental. Thus, different public motorized and non-motorized networks should be integrated to allow people the flexibility to make the trip patterns that are most convenient for them.
- 3. Integration of Land Use and Transport:** according to (Adamski,2013), cities need to manage their growth and development patterns to ensure the creation of urban forms that both facilitate and reinforce the advantages of sustainable transport modes. He also argued the city should adopt development control regulations that promote densifications along public transport corridors, and mixed-use neighborhoods that promote walking and

cycling for utility. Last but not least, he also warned that actors and stakeholders should adopt such policies in long-term development plans.

4. **Disincentives for private vehicle use:** concerning private vehicle use, there should be policies that regulate the growth and usage of private vehicles are needed. This is may be because private cars receive a large number of indirect subsidies particularly in developing countries by using road construction, parking, and fuel subsidies. In light of these several countries have been applying disincentives on nominal cost of private vehicles. For instance, in Stockholm and London, there is congestion charge; variable priced parking in Zurich and New York and number plate based usage restriction in Beijing and Bogota.

In general, according to (Prabhu, 2013), there are three dimensions to service integration. These are physical or spatial, service and fare integration.

From the above characteristics of urban integrated transport, one can easily understand that integrated urban transport is very important to bring about local economic development. This, in turn, helps to a large extent, to minimize congestion, disruption, long queuing, accidents and above all environmental pollution. Based up on the above characteristics of integrated urban transport service, the researcher has identified the basic requirements for effective and efficient integrated private public transport system.

## **2.3 Theories and Approaches to Urban Transport**

### **2.3.1 Environmental Wisdom Views**

According to Robert 1996, the main ingredients of an environmental ethics are about caring about the planet and all of its inhabitants, allowing unselfishness to control the immediate self-interest that harm others, day to day so as to leave the highest possible footprints on the planet. According to this school of thought, the first step to live more sustainably is to become environmentally literate, primarily by learning from the nature. It is all about the person's environmental ethics-what one believes about what is right and what is wrong in our behavior toward the environment.

As a motto, Ethiopia adopted Green-Growth Economic Development and Sustainability since February 2011. The government of Ethiopia has therefore initiated the Climate-Resilient Green Economy (CRGE) initiative to protect the country from the adverse effects of climate change and

to build green economy that will help realize its ambition of reaching middle income status before 2025.

To do so, the CRGE initiative, under the leadership of the Prime Minister's Office, the environmental protection authority, and the Ethiopian Development Research Institute, has been developing a strategy to build a green economy (FDRE, 2011). The objective is to identify green economy opportunities that could help Ethiopia reach its ambitious growth targets while keeping greenhouse gas emissions low. Granted as a responsible member of the world, Ethiopia also aware of the important role that developing countries play in fighting climate change, has consequently taken constructive role in international climate negotiations.

There are several prospects that the government of Ethiopia has taken action by making CRGE happen: exploiting the vast hydropower potential, large scale promotion of advanced rural cooking technologies, and efficiency improvements to livestock value chain and reducing emissions from deforestations.

### **2.3.2 Approaches to Urban Transport**

It is widely recognized that economic-development theory advocated a model of modernization doing away with traditional culture and replacing it with urbanization, literacy, mass media exposure and political participation (Lerner, 1963 cited in Amare Asegdom, 1998). According to Tudaro (2019), development with growth as its base is an expression of sustainable living conditions with broad choices of the means of life. According to World Bank (2011), development is about peoples' lives through economic, social political and technological change. It is the change that certainly requires incomes to grow, but it is also about reducing poverty and inequality, building individual skills, having access to social services and raising the quality of life. The institute also argued that successful developers have noticeable heterogeneity. To do so, the World Bank Institute figured out five objectives in pursuit of growth and development. One of these objectives that hint with the purpose of this study is stated as: "Managing urban systems that take the advantage of agglomeration economies and positive overflow effects to other parts of the economy."

In the surveys of urban public transport two approaches to urban public transport planning and management are distinguished<sup>9</sup> (Nielsen, 2005), demand oriented approach; and supply oriented

approach. Demand oriented approach suggests the presence of unregulated market of transport services, where transport operators are free to decide which routes to choose for operation basing on the demand volume in different parts of the city.

Supply oriented approach suggests the presence of obligatory network of routes which can be served by public transport operators. These two approaches have several crucial economical differences. Demand oriented approach used to be popular in developed countries (Vuchic, 1999), but was soon considered inappropriate mainly because of the low quality of public transport service which led to motorization growth.

There are two main spatial defects of demand oriented approach to public transport. The first one is that some urban areas are not served by public transport because of the demand volume in these areas being not of economic interest for transport operators. Communities in these areas do not have access to public transport services and are socially excluded. The second defect is the presence of competition between routes and transport modes leading to decreasing demand for the services of each transport operator which causes revenue reduction and diminishes ability to maintain and improve service quality.

Supply oriented approach suggests the introduction of so called trunk-feeder scheme regional public transport system. These means the division of public transport routes into trunk (arterial) routes, feeder routes and combined routes, transfers between which are made within the hubs. Such scheme allows using larger vehicles on trunk routes due to demand concentration hubs. It also becomes possible to organize express services on trunk routes with stops only in the largest settlements or in crucial nodes. On feeder routes stops are allowed everywhere.

## **2.4. An Overview of Addis Ababa Public Road Transport**

The recent data shows that Addis Ababa is home to 25% of the urban population in Ethiopia and is one of the fastest growing cities in Africa. It is the growth engine for Ethiopia and a major pillar in the country's vision to become a middle-income, carbon-neutral, and resilient economy by 2025. Addis Ababa's economy is growing annually by 14%. The city alone currently

contributes approximately 50% towards the national GDP, highlighting its strategic role within the overall economic development of the country.

According to World Bank 2015, despite the strong economic growth trends, Addis Ababa faces significant development challenges. For example, unemployment and poverty levels in Addis Ababa remain high, estimated at 23.5% and 22% respectively. More than one in four households report an unemployed adult compared to one in 10 households in other urban areas, and the informal sector employs about 30% of the economically active labor force in the city.

According to the organization, the local government is also struggling to deliver basic services to all its residents, providing clean water to only 44% of the population and sewerage services to less than 30%. Moreover, the physical development patterns witnessed in recent years are driving up the cost of infrastructure delivery. Addis is expanding in a extensive manner, with growth in urban extent outpacing population growth. The result of this growth is an estimated 46% of vacant or underutilized land. At the same time, the city center has extremely high density (up to 30,000 people per km), concentrating around 30% of the population on 8% of the land, generally with poor living conditions.

#### **2.4.1 The Challenges and Opportunities of Addis Ababa Road transport**

As stated by several scholars (Mathewos, Rahel, Yetnayet), the rapid urbanization of Addis Ababa coupled with socio-economic development has posed numerous challenges and opportunities. Despite the huge investments program of the government on Addis Ababa on road network and transport expansion and rehabilitation, the extent and severity of road traffic accident to road transport in Ethiopia in general and in Addis Ababa in particular has no road safety policy, strategy or program (UNECA, 2009). Some of these problems are the city transport system are road-based; lack of roads for non-motorized transport, unfinished road construction, huge gap between demand and supply on minibus taxis; absence of taxi terminals to bay and to drop passengers; the public transport service of the city is composed of Minibus taxis, Anbesa bus, sheger bus, and Higer and mid-bus and instability of the country's economy particularly depend on petroleum (AATA, 2011).

It is apparent that effective traffic management is crucial for effective utilization of existing infrastructure. Nevertheless, the prevalence traffic management practice in Addis Ababa is at a lower stage. This situation is influenced by several factors such as increase on private cars, illegal on street vending, weak traffic regulation enforcement, and lack of integrated transport system application and absence of traffic management process (Mathewos, 2012).

However there are several changes in transport sector recently. Since 2016, the condition of Addis Ababa road transport service improved and new links have been constructed. This is may be because the two giant organizations namely AARA and AATA separated and maintained their own organization. In addition to institutional development, the city's old road length width, public transport hub and non-motorized (walking) main road furniture have modernized.

#### **2.4.2.ITS and its Practice in Addis Ababa**

As scholars suggested, in a resilient city, transport system offers multiple mode of transport to its users to ensure the continuity of mobility in the event of disruptions and to ensure access to transportation groups. According to City Strength Resilient program of World Bank (2015), transport system takes a flexible approach and proactive coordination with other agencies to be able to divert user traffic to different modes of transport based on changing conditions. According to this program, in a resilient city, the planning for and investments in the transport sector are based on an assessment of past shocks and stresses and are closely aligned with other departmental and overall key priorities of the city.

The expansion of Addis Ababa along the five radial roads has posed many challenges for the city, especially in terms of increased transportation costs, congestions, and delivery of public infrastructure services. In addition, there is lack of coordination between transport investments and urban development. Indeed housing and land-use decisions are taken on the basis of where available land resources are, with almost no assessment of transport impacts, there by missing the opportunity to integrate public transport modes in terms of coverage, routes, fares, schedules and facilities. Low coverage of streets and a lack of street grid network and associated infrastructure has resulted in further inefficiency of mobility and associated issues of productivity (World Bank, 2014).

### 2.4.3 Characteristics of Resilient City

It is believed that urban planning and development should be overwhelming that can create effective social and economic linkages. As a result, the World Bank (2013) states five preconditions that are indispensable for the city. These are coordinated, inclusive, redundant, reflective and robust.

- 1. Coordinated:** The implementation of the integrated development plan will require a degree of coordination across bureaus in Addis Ababa that currently lacks. According to the organization, each sectoral bureau currently implements its infrastructure investments in segregation. It is therefore, enhanced integration with sub-city and wereda administrations that are responsible for municipal services, neighborhood improvement and building code enforcement that is needed to prepare to implement detailed local developments. It is also true for urban transport system that it needs coordination now more than ever. It is because there is loose coordination among sectoral organization as well as lack of awareness and misunderstanding between and individuals.
- 2. Inclusive:** With respect to urban transport development should be inclusive that includes communities and other agencies demand. Studies show that most investments are driven by individual organizations with limited coordination. From this one can easily understand that inclusive development is instrumental for local economic development. Conversely, working different infrastructure individually is vulnerable to each other.
- 3. Redundant:** Since there is no foreseeable plan in place and no prerequisite system to each community, most disaster response activities in Addis Ababa are ad hoc. That is why the city is receiving technical support from USAID to overwhelm these capacities (World Bank, 2015).
- 4. Reflexive:** Considering the severity of the impact of past earth quake and land-slides at Kolfe-Keraneo sub-city, and the given significant amount of urban development and many skyscrapers that have been erected, the impact of a potential future earth quake near Addis Ababa could be devastating.
- 5. Robust:** Disaster risk management capacity in Addis Ababa, including infrastructure, institutional capacity and financial resources is very weak (UNDP, 2015). The

organization also argued that Development and Resilient Management of Addis Ababa such as prevention, mitigation, preparedness, responses and recovery of resources are at low stage in the city. These lacks of early warning systems, emergency response plans, and political attribution to these issues, is a significant liability for the government and should be given more importance.

From the above qualities of resilient city of Addis Ababa studied by World Bank and the CRGE plan, Ethiopia has to achieve the green economy plan by improving the existing sectors that have been working independently, protecting and re-establishing forests for their economic and ecosystem services, including carbon stocks. Most importantly, the cities also should be leapfrogging to modern and energy-efficient technologies in transport, industrial sectors and buildings. However, this is not the case in practice.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY AND DESIGN**

#### **3.1. Research Methodology**

The study focused on assessing the current state of integrated transport system and its challenges and opportunities from environmental wisdom perspective with reference to Addis Ababa Road Public Transport Service (AARPTS). To this end, the study employed a concurrent mixed methods approach. As this approach combines quantitative and qualitative methods- the qualitative allows the triangulation of findings in the study (Creswell, 2009).

Both probability and the non-probability sampling methods were employed to select sample respondents from the study's target population. Pertinent data were gathered through observation, interviews, and focus group discussions (FGDs) in addition to reviewing documents such as books and journal articles and annual reports. Finally, data gathered from both primary and secondary sources were analyzed in conformity with the underlying principles of a concurrent mixed methods research strategy whilst also meeting ethical standards in the scientific research endeavors.

##### **3.1. 1 Description of the Study Area**

Addis Ababa was founded in 1887, located on the central highlands at the heart of the country. It is one of the fastest growing cities in Africa. Now Addis Ababa is one of the ten largest cities in Sub-Saharan Africa. Its growth has accelerated radically in the past three decades. Its population increased from 1.4 million to more than four million having the population growth rate of 3.8% which is attributed by natural growth and rural-urban migration. By 2020 the total population of Addis Ababa would reach to eight million. In addition to this the physical city also has grown extensively, more than doubling in size, since 1984, to cover an area of approximately 540 km<sup>2</sup> (Bjerkli, 2013).

The recent studies show that 85% of financial and commercial institutions and manufacturing industries are located in Addis Ababa. In light of this 80% of the total country's fleet is

registered in Addis Ababa. The city is organized into 10 sub-cities and 116 wereddas. In addition, there are international bodies such as UNECA and AU are located here. Thus, the city is the center for economic activity or interest for commerce, transportation and other events for the country. Regarding this, 4 million trips are generated on an average daily. From this 60% which is large share of trip is by walk.

### **3.1.2 Sources of Data**

To meet the intended objectives of the study, data from both primary and secondary sources were gathered, analyzed and synthesized. Accordingly, The target population of the study mainly included experts and chief heads of AACTA, AACTMA, EDRI, EPC, CRGE, city dwellers, drivers, and traffic police. On the other hand, some stakeholders who were consulted for they were involved in the integrated transport service delivery include managers and senior experts from Telecommunication, Water and sewer Authority, and Electricity Power Corporation of the city region.

To select representative samples, both probability and the non-probability sampling methods were used. Probability sampling was used for professionals and experts at AACTA and AACTMA, AACDLCA, whereas the non-probability (purposive) sampling were used to select providers, users and facilitators of the public transport. Moreover, key informants like vital professionals at AACTMA, CRGE, EDRI and EPC were interviewed. For traffic police, taxi drivers and passengers, convenient sampling was used. In addition to this, the researcher employed FGD with several passengers frequently using taxi service. As it would be difficult to obtain sampling frame for the daily transport service providers, facilitators and users of the city, convenient sampling method were used. Experts' and taxi zoning controllers sample size was computed by using SPSS: ANOVA, X2, coefficients and linear regression.

Nevertheless, before applying this as method of study, the results obtained from 176 experts and facilitators of Addis Ababa public transport were sorted out and tallied. In addition to this, in responding the questions, the positively and negatively stated items were sorted out and the negatively stated items were reverse-scored and assigned scores and frequency numbers accordingly. Then, chi-square was employed to identify the significance of differences between proportions of responses in the groups. The five-point scale was reduced to dichotomous scale, as the main objective of the study was to assess the extent to which Addis Ababa City Taxi

service practices integrated transport system such as fare integration, ticket integration, and service integration and the challenges that hinder this practice, and what should its future direction look like with respect to environmentally sustainable transport in the city. Furthermore, the level of significance, in all above cases was determined at  $P < 0.05$ .

Conversely, the data gathered using interview and FGD were not computed; because such pieces of information were used as qualitative data, and were involved in the discussions and analyses of the study.

### **3.1.3. Instruments of Data Collection**

In the study, data were gathered using four data collection instruments. These were questionnaire (with both open- and close-ended items), semi-structured interviews, FGD with the key discussants and observation methods. Before using the tools for collecting the main data, pilot study was conducted. During the pilot, the questionnaire was administered to 10 randomly selected Addis Ababa city transport management officers. Accordingly, the reliabilities of the items dealing with the sub-scales the expertise's awareness, their preferences, publics' interests, and drivers interests and guidelines were found to be alpha ( $\alpha$ ) = 0.76, 0.78, 0.81, 0.59 and 0.64 respectively. According to Gay (1980), if reliability coefficient is  $\geq 0.50$ , it can be acceptable as reliable instrument. The items were, therefore, found to have good backgrounds to be used in collecting the relevant data for the study.

Furthermore, the items of the interview and the focus-group discussion were given to two expertise in Ethiopian Development Institute and two experts in Addis Ababa Traffic Management Office. As per the feedbacks of the experts, amendments were made to some items. Some items which were found to be vague were totally discharged. For example, integration of different cars in Addis Ababa and different stakeholders were some of the items removed. Semi-structured interview was also used to collect related additional information from 10 experts and 10 purposively selected passengers. Apart from the data gathered through the interviews and questionnaire focus-group discussions were made with 4 randomly selected experts from Addis Ababa Transport Authority. Moreover, to get additional data, the researcher observed different sites of Addis Ababa during most week days in different time interval so as to see the constraints of Addis Ababa Public Transport service.

Above all, case study was used to illustrate the approach throughout this study. This case study is conducted within the AARTA, AATM, and AADLA, the main public transport organizations. The public transport services in Addis Ababa are Anbessa bus, Sheger bus, Higer bus with 27 seats, minibus (taxi) with 11 seats and metro taxi with 4-5 seats. To allow for more experts within the limited framework available to conduct the research, the focus is placed on one of the public transport modes of transport that the minibus taxi service with 11 seats:

This choice was made because of the extensive use of the road of Addis Ababa in a peak-hour as well as during a regular day; around 80% of all public transport service is carried out through minibus taxi (AATA, 2016). In addition to this, majority of the public prefer taxi to other modes of public transport because of their loading capacity. In accordance with this, the experts or policy makers would like to know how to integrate the modes of transport. The AATA in accordance with AATMA have already predefined the taxi service control strategies by assigning vans to different directions of Addis Ababa based on the proficiencies of the car. This may be because some taxis are out dated and cannot cope up with the scenery. Yet there is loose traffic management and there is long queuing and delaying to work in the city. See figure 1.

## **3.2. Research Design**

Based on the research paradigm chosen and the nature of the problem under the investigation, a combined feature of cross-sectional descriptive survey and exploratory types of research designs were adopted in the study. The rationale behind adopting descriptive research design to the purpose of this study was to mirror the current challenges and prospects for the implementation of integrated transport system in Addis Ababa city. Conversely, exploratory design was used to determine the major challenges and opportunities for the effective implementation of integrated approach in the transport sector of the country.

### **3.2.1. Procedures of Data Collection**

To collect relevant data for the study, a questionnaire consisting of relevant items was prepared. To get additional data, semi-structured interview was used. The items of the questionnaire and interview were designed to generate data related to the objectives of the study. Besides, the items of the questionnaire and interviews were made similar to crosscheck the responses of the subjects of the study. Then, the questionnaire was administered to 176 sample AATA professionals who

have been working both in the office and out of office accordingly. To make the results of the study more valid and reliable, interview and focus group discussions were held with 5 traffic management pillars and 2 CRGE experts on Hydrocarbon and emission.

### **3.2.2 Methods of Data Analysis**

Data analysis methods were both statistical methods and qualitative narration. Descriptive statistics like percent, mean, standard deviation were used. As per the research paradigm selected to this study, i.e., a concurrent mixed method strategy, the analysis of qualitative data was also be undertaken alongside the quantitative statistical analysis whilst both were complement each other to get a clear picture of the issue under the investigation.

### **3.3 Ethical consideration**

From on set, the researcher insured that this study did not pose any risk of physical or psychological harm to the respondents. To this effect, a proper introduction of the purpose of the study to all parties which were involved in the research process was made. Then, their consent to take part in the survey as well as to cooperate in its administration process was formally obtained in advance. Any sources, findings, and ideas of others were duly acknowledged. The researcher obtained a letter of support from the relevant department at Addis Ababa University and its copy was used while approaching all relevant organizations and individuals in the study area.

Overall, any decision made regarding the selection of research approach and strategy, sampling design, methods of data collection and analysis were in conformity with the underlying theories of concurrent mixed research approach; and, ethical standards in scientific research endeavors.

## CHAPTER FOUR DISCUSSIONS AND ANALYSIS

This chapter presents analysis and interpretations of the data collected from different respondents and informants. Accordingly, the data gathered from the sample experts using the questionnaire, interview, and focus group discussions are presented as follows.

### 4.1. Response Rate

The total of 176 questionnaires was distributed and the response rate was indicated in the Table 4.1 below.

**Table 4.1 Response Rate**

Items	No. of population	Percent
Sample size	195 (purposive)	100%
Responded	176	85.22%
Remained/not responded	19	14.77%

Source: own survey result, 2019

As can be seen from the above Table 4.1, out of 195 distributed questionnaires, 176(90.25%) were collected whereas 19(9.74%) were not responded. Therefore, analysis was made based on the data obtained from 176 respondents i.e. (90.25%).

### 4.2 Background Information of Respondents

The background information of the respondents include name of the organization, work experience, whether they are working in their qualification and field of study. This aspect of the analysis was dealt on the respondents of the questionnaires given to the six organizations namely AACTA, AACTMA, AACDLCA, EDRI, CRGE and EPC. The Tables below reveals the details of respondent background information.

**Table 4.2 Background Information of the Respondents**

	Category	Number	Percentage
Organization	AACTA	65	36.9
	AATMA	45	25.6
	AADLCA	30	17
	EPC	10	5.7
	EDRI	20	11.4
	CRGE	6	3.6
field of study	Transport&urbanization	23	13.06
	Engineering	44	25
	Social science & computational science	109	61.93
	Total	176	100%
Experience	1-3 year	26	14.77
	4-6 year	97	55.11
	7-10 year	35	19.88
	>10 year	18	10.22
	Total	176	100%
Edu. Status	Diploma	34	19.31
	Degree	110	62.5
	MA/MSc	30	17.05
	PhD	2	1.13
	Total	176	100%

Source: own survey, 2019

Concerning respondent organization, 65(36.9) of the respondents were from Addis Ababa City Transport Authority, 45(25.6) of Addis Ababa City Traffic Management Agency, 30(17%) of AA driver and driving Licensing and Control Authority, 10(5.7%) of Ethiopian Petroleum Corporation, 6(3.4) of Ethiopia Climate Resilient Green Economy Initiative and 20(11.4%) of Ethiopian Development and Research Institute. The rationale behind having distributed purposely is that the majority of the questionnaire, 65(39.9) to AATA is that there are several sub-sectors under this organization like AA integrated transport system vital officials, AA integrated transport system monitoring and evaluation, AA public transport system for sustainable development that are directly associated with the researcher's objective of the study. It does not mean other sectors are not helpful for the integration of transport system.

In terms of the respondents experience, majority of the respondents, 97(55.11%) have 4-6 year work experience in their current organization. 35(19.88%) of the respondents rated they have 7-10year work experience. The rest 26(14.77%) and 18(10.22)of the respondents have 1-3 and above year work experience respectively in the transport sector. In light of this, the researcher observed some of the respondents in their fieldwork while they were rounding taxi zoning, traffic congestion and drivers' license control. They informed that most of them were joined this organization since 2008 E.C.

In relation to respondents field of study, majority, 109(61.93%) of the respondents rated that their field of study is social science and computational science. 44(25%) of the respondents stated their field of study are engineering and more of related with transport sector. The rest 23(13.06%) of the respondents stated they are specialized in urban and transport sector. This shows that there is variance between the current profession and their field of specialization. Nevertheless, the interview data gathered from vital officials revealed that majority of the employees have been upgrading themselves. He added there are about 10 respective graduates in the coming year. He also argued that despite their background fields of study, almost all of them have taken short and long training how to carry out the given task.

**Table 4. 3 shows the extent of minibus taxi service integration**

No	Items	Observed frequency		X <sup>2</sup>
		Str.Disagree+ Disagree	St.Agree+ Agree	
1	There is an integrated taxi transport service practice in AA	80.7	19.3	19.68
2	There is intra-inter institutional integration to give safe and efficient taxi service in AA	80.1	19.9	14.33
3	There is physical integration: engineering,	94.9	5.1	66.14

	road-map, taxi terminals and parking			
4	There are several changes regarding taxi service from the last 5 years	48.9	51.1	76.95
5	There are fare and service integration from both the passengers and service delivers perspective	74.4	25.6	5.46
6	There is special cross-checking up like car with engine problems, lack of brake, hazard – light, etc. and avoiding them so as not to give service immediately	88.1	11.9	36.96
7	There is an integrated land use planning for all public transport in AA	84.1	15.9	45.35
8	There is a plan to kick out blue-white minibus taxi: because they are out of practice and pollute the environment	39.2	68.8	3.42
	Overall integrated minibus taxi service practices in AA	590.4	217.6	268.29

$P < 0.05$ ; df. =2; the expected frequency for agree and disagree cell frequency is 58.7

As can be seen from Table 4.3, the  $\chi^2$  value of all items is greater than the  $\chi^2$  critical value (1, 0.05) which is 3.84 except in item three. The discussion of each item is discussed as follows.

In Table 4. 3, the first item deals with if there is an integrated taxi service in Addis Ababa as expected in the policy and strategies. In relation to this, the chi-square calculated value (19.68) is greater than the chi-square critical value (1, 0.05), which is 3.84. As can be seen from the Table, the magnitude and extent of difference indicate that despite promising progress on Addis Ababa transport, Addis Ababa private public taxi transport is not practicing integrated transport service.

Table 4.3 also reveals that the extent of integration between and among institutions so as to provide safe, efficient and effective service to the public. Regarding this, the calculated  $\chi^2$  value is 14.33. When we compare to  $\chi^2$  critical value 3.84, which is greater than the p value. This

indicates that there is lack of intra-inter integration so as to facilitate integrated private public transport system.

Likewise, the Table indicates that whether there is physical integration to taxi service like engineering, road map, taxi-terminals and parking. In light of this, the calculated X2 value (66.14) is at considerable difference than the chi-square critical value (1, 0.05) that is 3.84. In relation to this, some other public transport modes such as Sheger and Anbesa public transport system have finished physical integration that they have been using automated technological support for their service. Thus, minibus taxis services have applied neither physical integration nor service integration.

The Table also indicates that if there are significant changes in Addis Ababa taxi service in the last five years. In this case the calculated X2 value 76.95 is greater than the chi-square critical value which is 3.84. Hence, the extent of difference shows that there is little change on taxi service to the community. However, the observed frequency shows that the respondents rated that there are several changes 51.1% and there is no changes the last 5 years 48.9%. This may be because actually there is change, but the service is retained.

As can be seen from the table, the fifth item states that there is fare and service integration both from passengers and service delivers perspective. Concerning this, the calculated X2 value 5.46 is greater than the chi-square critical value, 3.84. This indicates that there is no fare and service integration for both passengers and service delivers. The researcher further cross-checked to know the reason behind lack of fare and service integration that service delivers want to load over during peak-hours due to high demand of taxi service and passengers also want to go their destination in time to do their business. As a result taxi drivers do not pick passengers who queue at the beginning. For instance, if there is a long queuing at *Piazza to Asko*, taxi drivers start their journey after one stations may be from at *Petros-square or t St. Yohannes church*. Figure , shows

passengers line-up for taxi at pick-hour.



**Figure 4 shows passengers were queuing for minibus taxi service.**

Source: own conceptualization (2019)

As shown in Table 4, there is special-check up on day basis like car with engine problems, lack of brake, hazard-light, etc. and avoiding them so as not to give service. In this regard, the calculated  $X^2$  value 36.96 if by far exceeds the critical value 3.84. Therefore, the magnitude and direction of the difference show that the majority of old taxis which have been giving service to the people are not checked on day basis. However, the information researcher got from several traffic police shows that car problems like bolo, insurance and tax checked annually. Most of the time car engine problems are checked when they encounter or cause accident.

As shown in Table 4. 3, the last two statements are related to is there integrated land use planning for all public transport in Addis Ababa and is there a plan to kick out blue-white used cars: because they are out of practice and pollute the environment. Concerning these, the calculated  $X^2$  value for item 7, (45.35) is greater than the  $X^2$  table value (01, 0.05). In light of this, there is little integrated land use for all public transport that Anbessa has its own stations and for boarding passengers as well as established BRT (New Bus Rapid Transit system) despite other modes of public transport use in common. Whereas, taxi has no fixed stations in spite of there exist traffic symbols. Nevertheless, the calculated  $X^2$  value for item (4.42%) which is less than  $X^2$  table value 3.84 which is less than (10.05) by 0.42. This shows that there may be

suspicion on respondents' view that the old and used cars can cause environmental emission or may not understand the questions well. In general, as mentioned in the table, the overall practice of integrated taxi service in Addis Ababa, the calculated chi-square is 268.29 compared to the table value at 1,  $0.05=3.84$ . This indicates that there is very little integrated minibus taxi service in Addis Ababa.

In response to one of the open ended questions in the questionnaire which reads: "How do you judge different minibus taxis to make transport safe and efficient to the public?" Most of the taxi-zone controllers replied that although there is several punishments related to absenteeism, delay on peak-hours, still it is difficult to manage fare, and absenteeism, etc. they argued several contributing factors for the low practice of integrated transport system. These are congestions due to lack of auxiliary roads; lack of support from both the public as well as the government; lack of responsibility of taxi drivers, absence of traffic police on main roads and other factors.

To get additional information about the practice of taxi service integration focus-group discussions was held with five drivers and passengers at different time interval. Almost all drivers keep saying that the fare is not fair that they do not want give service as they were assigned. They further said all cars use the same road and the time of leaving home and coming home is similar. In top of public transport that the road width is limited cannot cope up all cars at the same time. Almost all passengers said that there are attempt to make integration but not continuous. They also argued that some policies and strategies started then stopped with no reason. And one of the respondents said look, by pointing to the traffic he stopped the car with no reason. This is a sign of lack of integration. The respondents argued that there are several traffic police who can easily halve the problem of transport. And yet there are several traffic police who malfunctioning transport service being negligent and not responsible.

Moreover, during an interview with vital officials of AATMA and AATA, almost all of the informants said that integrated public transport system from environmental wisdom view is a golden idea for both the community as well as for the government. It is because in either said there is satisfaction. They further argued that since it is new concept, awareness creation should be made for stakeholders

No	Items	Observed frequency		X2
		St.disagree+ disagree	St.agree+ Agree	
1	There is excess of minibus taxis during peak-hours	96	4	94.03
2	The facilitators and professionals who have been working in public transport sector have mitigated AA minibus taxi mode of transport	80.7	19.3	19.68
3	Absence of taxis during peak-hours is not serious factors to practice IPTS	80.1	19.9	14.33
4	AATA,AATMA and AADLA experts have achieved to practice Integration-safe and efficient taxi service despite low fare (price for trip).	94.9	5.1	66.14
5	There is long queuing, congestions and disruptions during most working days and peak-hours	68.8	31.3	83.87
6	In general, there are challenges to integrated minibus taxi mode of transport	74.4	25.6	5.46
	Total	494.9	105.2	283.51

$P < 0.05$ ;  $df = 2$ ; the expected cell frequency is 58.7; chi-square = X2 (1,0.05)

As can be seen from Table 4.4, the X2 calculated values of all the items are greater than the chi-square critical value (1, 0.05) that is 3.84. In item 1, whether there is excess of minibus taxis during peak-hours for the public. Regarding this, the X2 calculated value 94.03 if by far exceeds than the X2 table value 3.84. Therefore, one can understand that there is lack of minibus taxis during peak-hours that there a lot of queuing to have taxis to work place and school.

Table 4.4 also depicts that facilitators and professionals who have been working in public transport sector have mitigated AA minibus taxi mode of transport. In this regard, 80.7 percent of the respondents not agree that the problem of private public minibus taxi service has been exacerbating. In light of this, one of the interview question to drivers which reads: “why don’t you begin service in order to get more benefit?”

Most of the respondents argued that in return there is no one to come here in addition here you spend much for everyone around: for assistant, take-turner. In top of that the price of price of diesel or gasoline is sky-rocket but you give service on listed price.

Furthermore, questions related to the achievement of integrated taxi service to the community, almost 95% of the respondents rated that respective organizations have not practiced integrated- safe, efficient and effective minibus taxi transport system. Similar interview question was stated to the officials of integrated transport system that they argued there are several reasons for the failure of integrated minibus taxi service. First and for most is that minibus taxi owners as well as drivers expect benefit from their property. The government itself needs benefit from transport sector because of the petroleum import. The public also needs safe and secure transport system. As a result it was difficult to bridge each of the gaps at the same time. The data obtained during focus –group discussion also agrees with the interview data.

Table 4.4 also shows whether there is long queuing, congestions and disruptions during most working days and peak-hours. In line with this, the  $X^2$  calculated value is 66.14. This reveals that there are still problems in minibus taxis transport service. As mentioned earlier, this may be because of lack of integration such as service, land use, fare, institutional, etc.

Lastly, as can be seen from Table 4. 4, the calculated  $X^2$  value s of the overall challenges to integrated public minibus taxi transport system in Addis Ababa is 283.51 which is greater than the  $(1, 0.05 = 3.84)$ . This clearly indicates that lack of minibus taxi either plate 1 or 3, lack of institutional integration to punish taxis absenteeism during peak-hours, lack of effective service are the major factors that would not allow Addis Ababa City Transport Authority to practice integrated and environmentally friendly public transport for the city dwellers.

Table 4. 5: shows Prospects of integrated public transport

No	Items	Observed frequency		
		st.Disagree + Disagree	St.Agree + Agree	x2
1	LRT, Anbesa, sheger bus have mitigated the problem of Addis Ababa public transport system.	80.7	19.3	19.68
2	Queuing for taxi has reduced unwanted loss of properties like money, cell-phone, etc.	80.1	19.9	14.33
3	LRT alone is truly integrated transport system for sustainable local or regional development	94.9	5.1	66.14
4	There are policies and strategies to halve the existing transport problems in Addis Ababa	48.9	51.1	79.95
5	There are high stakeholders and institutional expectation for integrated transport system in Addis Ababa	74.4	25.6	5.46
6	There will be technological advancement like traffic control center, ticket, and e-commerce for taxi service here soon	88.1	11.9	46.71
Total	Overall prospects of integrated minibus taxis transport system	467.1	132.9	232.27

**Table 4. 4 Challenges to integrated taxi service in AA**

P< 0.05; df. = 2; the expected cell frequency is 58.7

As indicated in table 4. 5, the calculated X2 value of all statements related to prospects of ITS in AA is greater than the X2 critical which is 3.84 (1, 0.05).As it observed from Table 4.5, the majority of the respondents, 80. 7% don't agree that Mass transport such as Anbessa, Sheger, and Higer- mid-bus have mitigated the problem of public transport system. Similar interview question stated to the vital official at AATMA, argued that it is true because majority of the people prefer minibus taxi to other mode of public transport such as sheger and Anbessa. During the FDG held with passengers, most of them share the idea that they demand minibus taxi mode of transport to other public transport. They figured out several reasons for their preference: it is relatively safe, efficient and cost effective compared to bus mode of transport. They illustrated

that if you want to go to Arat kilo to piazza, you pay 1.5Br. for taxi whereas you pay 2.00Br. for bus without safety and efficiency.

The table also indicates that queuing for taxi has mitigated unwanted loss of money and other properties. In light of this, the calculated Chi-square value (19.68) is far exceeds the table critical value which is 3.84. This indicates that queuing for taxi has not halted the problem of material loss such as cell-phone and money.

The Table also depicts that LRT alone is truly integrated transport system. Regarding this, the calculated X2 value 66.14 is greater than the critical X2 value (1, 0.05). This reveals that majority of the respondents agree that LRT alone cannot make transportation system safe and efficient. On the other hand it creates challenges to non-motorized form of public transport as well. The researcher has observed several rail stations during peak-hours at Tor-hailoch, Atikiltera, Sebategna and Megenegna and Saris. The rationale behind visiting those stations is that there is high traffic and congestions as well as non-motorized (walking) form public transport. At the same time LRT creates an opportunity for minibus taxi mode of transport in such a way that Tor-hailoch-Megenegna- CMC route started after the establishment of it.

Furthermore the same Table reveals that there are policies and strategies to halve the existing transport problems in Addis Ababa and high stakeholders and institutional expectation for integrated transport system in Addis Ababa. In both the items, the calculated X2 values are 79.95 and 5.46 respectively. This indicates that there is lack of policies and strategies to reduce the existing transport problems with respect to minibus taxis mode of transport. The same interview question held with experts, which reads: "Are there policies and strategies to mitigate the problem of minibus taxi mode of transport? Why? The expert argued that they have ambition to make safe, effective and efficient mode of transport system. However, it needs high amount of capital and institutional capacities. He added in top of that they have been working hard to make mass public transport on Anbessa and Sheger more efficient and effective.

As can be seen from the Table, the last item is related to technological support for the sector. Concerning this, the calculated X2 value (46.71) is by far greater than the calculated table value (3.84). This shows despite having the equipment such as radial, telegram and smart cameras, the traffic problems are worsening. Hence, there is apparent lack of using technological equipment

for the aforementioned constraints. In all, as can be observed from Table 4. 5, the calculated X2 values of overall prospects to integrated minibus taxi mode of public transport system in Addis Ababa is 232.27 which is greater than the calculated table value (1, 0.05 =3.84).

**Table 4.6: shows Environmental wisdom Views**

No	Items	Observed frequency		
		st.Disagree + Disagree	St.Agree + Agree	x2
1	AACTA, AACTMA, AARA are curious on environmental protection like building smart parking, avoiding old cars, & ICT technology	68.8	31.3	83.46
2	All respective stakeholders are working in coordination to sustain public transport system and the environment	74.4	25.6	5.46
3	AATA and other organizations have been using environmentally friendly transport system.	80.7	19.3	19.68
4	Under current practices, the institutions have started implementing energy-efficient technologies in road-based sectors like avoiding obsolete cars and replacing new and electronic system cars, preferably solar cars.	80.1	19.9	14.33
5	Currently, AACA, AACTAMA, AACTA are minimizing the emission come from road-based public transport	94.9	5.1	66.14
6	There is awareness creation about environmental wisdom perspective	63.1	36.9	62.60
7	Over all practice of public road transport from environmental wisdom perspective	88.1	11.9	47.94
		550.1	169.3	299.61

$P < 0.05$ ; df. =2, the expected cell frequency is 58.7.

As shown in Tabl4. 6, the calculated chi-square values of each of items to environmental wisdom views are greater than the critical X2 value which is 3.84. Similarly, the description of each the items are presented as follows.

As indicated, the first item the respective organizations are curious on environmental protection like building smart parking, traffic control management center, avoiding old cars and using ICT

technologies to sustain the environment. Majority of the respondents 68.8% rated they disagree and strongly disagree. The rest 31.3% of the respondents replied they agree and strongly agree that they are curious on environmental protection. This shows that majority of the respondents were skeptical how to provide environmentally friendly mode of public transport. Moreover the calculated  $\chi^2$  value is by far greater than the critical  $\chi^2$  value which is (1, 0.05=3.84).

Table 4. 6 also presents, whether respective stakeholders are working in coordination to sustain public transport system. Results show that the calculated chi-square value 5.46 is greater than the critical  $\chi^2$  value 3.84. This shows that there is lack of coordination among stakeholders. In support of this, the secondary data of World Bank, 2013 states that in Addis Ababa each sectoral bureau currently implements its infrastructure investments in segregation. From this one can easily deduce that environmental protection cannot sustain individually it is rather collective contribution.

In the same Table, the 3<sup>rd</sup> item deals with, AATA and other organizations have been using environmentally friendly transport system for the betterment of climate resilient green economy of the city. In this regard, the calculated chi-square value 19.68 is greater than the  $\chi^2$  table value which is (1, 0.05=3.84). This indicates that AATA and other organizations are not accompanying so as to facilitate environmentally friendly transport system.

Moreover, the Table also depicts, whether institutions have started implementing energy-efficient technologies in road-based sectors like avoiding obsolete cars and replacing new and electronic system cars. Concerning this, the calculated  $\chi^2$  value 14.33 is by far exceeds the critical  $\chi^2$  value. This indicates that the responsible bodies have not started implementing energy-efficient technologies in road-based sectors. In relation to this, the interview questions held with EDRI (PSI) experts argued that there is an execution to perform energy-efficient technologies; but not likely on only road-based sectors and not likely on transport sector. Another expert, Ato Tilahun Mengistu at AATA, argued that the ECRGE experts have been executing a lot to accomplish in areas of industrial sectors and waste disposal, but not likely removing old cars from the city. It can be possible to deduce that there is suspicion on accomplishing the intended climate resilient green economy for the city.

As can be seen from the Table 4.6, whether AACA, AACTAMA, AACTA are minimizing the emission come from road-based public transport. To this item, the calculated value of X2 (66.14) is greater than the calculated X2 critical value (3.84). Likewise, currently respective authorities as well as agencies are not minimizing emissions that comes from obsolete cars. In light of this the researcher interviewed EPC planning and monitoring expert about petroleum consuming cars and their intention on petroleum import. The expert argued that as far as he concerned the amount of petroleum import increases from time to time. The secondary data also got from the corporation supports the idea that petroleum import exceeds now than ever. The reason for this may be because lots of private cars consume it and several micro and macro projects associated with petroleum. The other item demonstrates there is awareness creation about environmental wisdom perspective. To this the calculated X2 value is 62.60. As compared to the table value, 3.84 it is by far greater which indicates there is lack of awareness creation about environmental wisdom. The last item presents, overall practice of public road transport from environmental wisdom perspective. With respect to this, majority of the respondents 88.1% replied there is lack of integrated transport system in view of environmental world view. Thus it can be possible to deduce that there is a need to integrate both private and public mode of transport so as to sustain environmentally friendly transport.

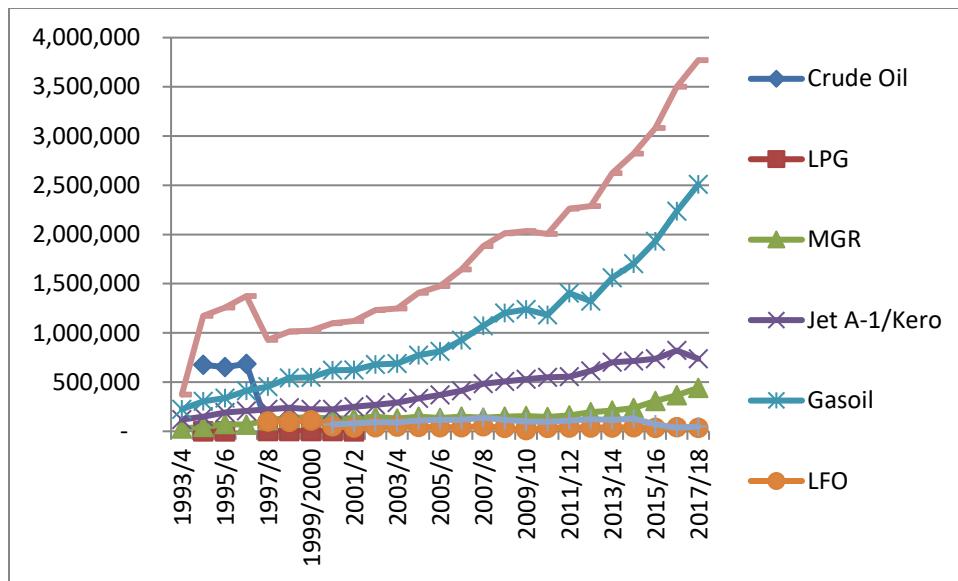
As per its commitments to the different international environmental regime, Ethiopia is currently pursuing an ambitious Climate Resilient Green Economy strategy. So, at policy and strategy level, the country has already put in place responsive development approach to the prevailing global environmental issues including climate change. But better understand the actual practice of the country as per its CRGE strategy that integrates the underlying principles of environmental wisdom, this section will use some figures on fuel import and consumption in the country for over two decades.

Thus, under this section, information on gross amount of fuel imported (like crude oil, LPG, MGR, Jet A-1/Kero, Gasoil, LFO and HFO (see in Figure 2, a)) at a national level is presented. However, it is important to note and acknowledge that this national level data may not separately indicate Addis Ababa city's fuel imports over the indicated decades. Again, it does not show the proportion of imported fuel consumed by an individual sector such as the transport sector. However, given the fact that Addis Ababa is a primate city it consumes a significant proportion

of the country's total fuel imports due to its higher industrial establishments, and higher vehicle and human populations. So, it can be taken as a site that represents the overall consumption volume of fuel in the country than any other place.

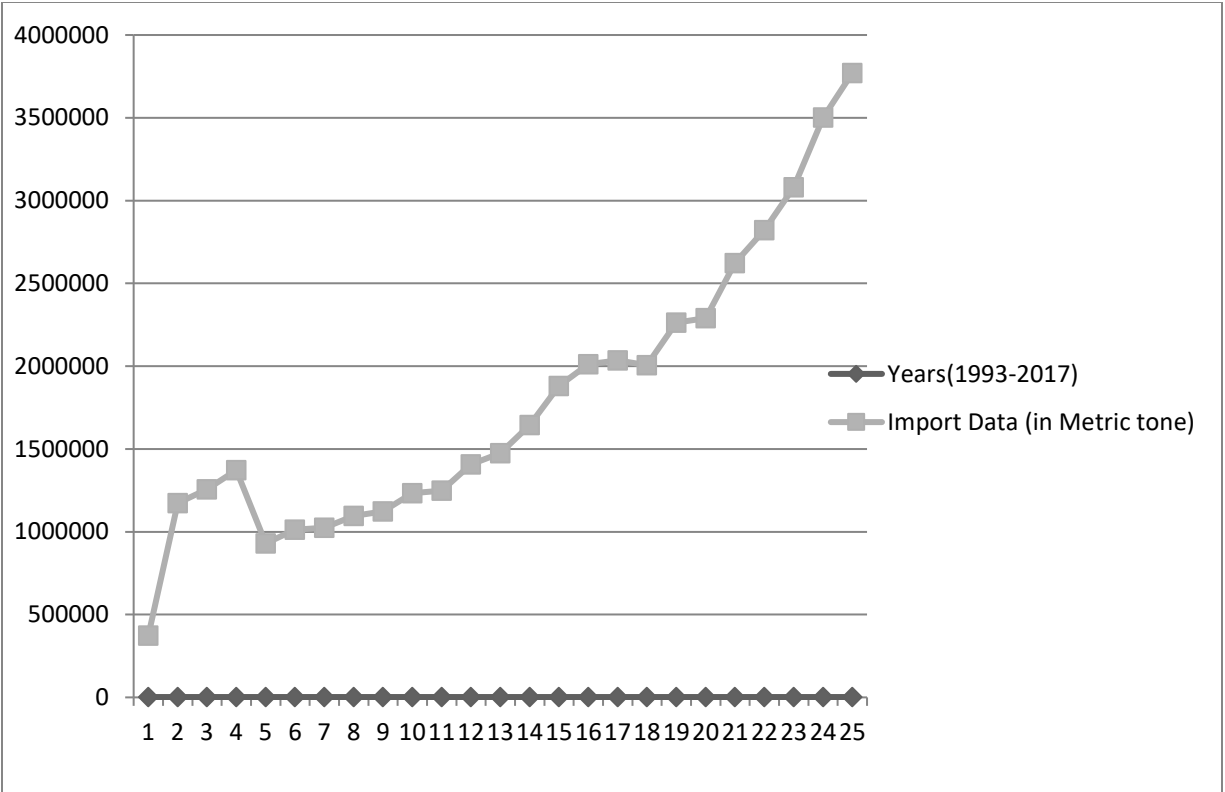
Figure 2: - Fuel import (in tones) from 1993 -2017 in Ethiopia

a):- Fuel import (in tones) by fuel type from 1993-2017 in Ethiopia



Source: - Addis Ababa University and Development Bank of Ethiopia, nd

b):- Trend of all type of fuel import (in tones) from 1993-2017 in Ethiopia



Source: - Addis Ababa University and Development Bank of Ethiopia, nd

As data in Figure 2a&b, which is prepared using data by Addis Ababa University and Development Bank of Ethiopia shows, between 1993/1994-2017/2018 fiscal years, the total volume of different petrol products imported had increased from 372,907 tons to 44,649,555 tones i.e., by about 99% within two and half decades time (see in Figure 2, b). Obviously, as the amount of fuel consumed increases, so does the overall emission level. This increasing emission trend of CO<sub>2</sub> and other greenhouse gases from some energy intensive sectors like transport is met by alternative sources; the current energy consumption pattern of the country has a direct implication for the prevailing global warming.

Furthermore, unless the country finds alternative ways of meeting its energy demand, its achievement of zero emission targets by 2025 as set out in its Climate Resilient Green Economy strategy is contestable.

## CHAPTER FIVE

### CONCLUSION AND RECOMMENDATION

#### 5.1 CONCLUSION

An integrated multi-modal environmentally clean and sustainable transport system can give quality service to all residents in an affordable manner. An integrated transport system in metropolitan cities has a resilient contribution for more sustainable urban development. Nevertheless, its potential role for the cities' sustainability mainly in Addis Ababa has not been realized. As mentioned the objectives of integrated transport system is not mobility or accessibility in itself, rather it is to provide mobility in order that people can get to work or school or other activities on time at the same time to reduce greenhouse emissions, and facilitate socio-economic development.

Although road transport is the prominent mode of transport mainly in Addis Ababa, the sector has been facing several challenges. For instance, among the major challenges some of them are poor access to work place, education, health and other services due to lack of integrated public transport service; continuous increases in transport fare especially for low income groups; lack of smooth traffic flow; Lack of infrastructure for None Motorized Transport(NMT)(for walking and bicycle); high rate of traffic accidents; increasing air and noise pollution, and long line-up and/or queuing are the major ones.

Therefore, the objective of this study was integrating transport system in Addis Ababa and its challenges: Case study on minibus taxis service. For this purpose, a questionnaire data from AATA, AATMA, AADLCA, CRGE, EDRI and EPC was collected from 176 experts and officials. The collected data was analyzed carefully using SPSS- chi-square and ANOVA.

After analyzing and interpreting the data, the following results were obtained:

1. Unlike progress on public bus transport system such as Anbessa and Sheger, AA private public minibus taxi transport service is not practicing integrated transport service. It has also been noted that the integration of institutions within, between and among lacks so as to provide safe, efficient and effective minibus mode of transport system. This may be because there is misunderstanding between service delivers and facilitators likely the government.

2. Although there are physical infrastructure developments such as LRT, BRT (being established) ring roads, cobble-stone roads-supportive roads, there is high congestions and disruptions so as not to give efficient transport in Addis Ababa.

In light of fare integration, there is argument between service delivers and end- users that the former argue the money they pay for single-trip is not fair and end-users on the other hand argue we are coerced to pay over most of the time although there is tariff-list in the van. This may happen because there is no awareness creation for the public to question their rights immediately it happened. For this and other reasons, private public transport particularly minibus taxis are absent during peak-hours.

3. With respect to challenges, there is long queuing for minibus taxis, disruptions, careless accidents, congestions, greenhouse emissions due to congestions and lack of smart parking.
4. Concerning prospects of integrated transport system in Addis Ababa, the results shows that although there are several investments and developments have been undertaken by transport sector such as introducing LRT, BRT, Sheger public transport system, Higer transport system, modernizing Anbessa transport sector, involving plate-3 minibus taxi service in addition to blue white minibus, the demand for transport is by far exceeding.
5. Regarding environmental worldview, the respective organizations are not probing on environmental protection like building smart parking, traffic control management center, avoiding old cars and using ICT technologies to sustain the environment. It has been also noted that the respective stakeholders are not working in coordination to sustain environmentally friendly public transport system.

In general, from the above result obtained it can be deduced that the status of implementation of integrated public road-based transport in view of environmental wisdom in Addis Ababa is low. The contributing factors that attribute to low practice were lack of integration among bureaus or corporations, lack of awareness creation for the public to use mass transport instead of waiting minibus taxi for half an hour, inflexible policies and strategies and guidelines.

## 5.2 RECOMMENDATIONS

Based on the results of the study, the researcher urges the following:

- i. To practice integrated public transport service particularly taxi mode of transport in Addis Ababa that stated in the policy, respective stakeholders and publics' awareness should be promoted so as to make environmentally sustainable transport system. In order to do so, short and long term trainings which focus on climate resilient green transport system should be given
- ii. To respective organizations may be the government, who has been assigning minibus taxis- they have to remove and replace old taxi with new energy efficient one. In doing so, the government should have to revise policies like kicking out old taxis from the city and replacing with new one. In this regard, responsible bodies like investors who are car importers should also take part by importing electric cars, energy efficient cars and so on.
- iii. To halve the problem of congestions and disruptions during most working days and peak-hours, private cars should be disincentive. In doing so, private car drivers, not who have been giving service, should use roads before or after peak-hours. To improve it sustainable, they have to be charged seriously.
- iv. Responsible bodies should introduce ticket based or e-card payment for taxi service in Addis Ababa and also introduce auto-cad based taxi controlling system so as to reduce passenger oriented transport problems.
- v. Last but not least, there should have a system that integrates services based on an effective community consultation, because there is preference of minibus taxis to other mode of transport.

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**Appendix 1: Questionnaire distributed to experts and officials**

**Questionnaire Distributed to AATA, AACTMA, AADLCA, ECGE, EDRI and EPC**

**Assessing the Challenges and Prospects of Integrated Transport System from Environmental Wisdom Perspective: Case Study on Addis Ababa Road- Based Public Transport Service.**

**Addis Ababa University**

**College of Development studies**

**Center for Regional and Local development Studies**

**Questionnaire to be filled by the Addis Ababa Road Authority and Transport Management Experts**

This questionnaire is aimed at assessing the challenges and prospects of integrated transport system from environmental wisdom perspective: Focus on Addis Ababa Road Public Transport Service so as to help city planners, traffic office management officers and creating by passengers oriented transport service by mitigating congestions and long queuing. Therefore, you are kindly requested to fill the questionnaire with honesty and carefully knowing that the success of this study depends up on your genuine response to the questions. The information that will be secured through this questionnaire will be used only for this research purpose. Your response will be kept confidential.

Thank you!

atnafuch@gmail.com

## Questionnaire (Individual Questionnaire Identification)

### 1. Personal data

1.2. Name of your organization \_\_\_\_\_

1.3. Place of your residence \_\_\_\_\_ Sub-city \_\_\_\_\_ Kebele: \_\_\_\_\_

1.4. Your current profession: 1. expert 2. Vital official

1.5. When did you join this organization?

1.6. How long have you been working as expert?

1-2 = 1,                  2-3 = 2                  3-5 = 3                  5-8 = 4,                  >8 years = 5

1.7. What is your educational status?

Diploma = 1,    degree = 2                  masters = 3,                  PhD = 4

### 2. Table 1: Level of Integrated Public Transport System Practices in Addis Ababa

No.	Items	Strongly disagree	disagree	agree	strongly agree	neutral
1	Extent of integrated taxi transport service practice in AA					
2	There is intra- and inter-institutional integration to give safe and efficient taxi service					
3	There are physical integration: engineering, road map, taxi terminals or parking					
4	There are several changes regarding taxi service from the last 5 years					
5	There are fare and service integration for both the passengers and service delivers perspective					
6	There is special cross-checkup on day-basis like car with engine problems, lack of brake, hazard-light, etc. and avoiding them so as not to give service.					

7	There is a an integrated land use planning for all public transport in AA					
8	There is a plan to kick out blue-white minibus taxi: because they are out of practice and pollute the environment					

### 3. Table 2: The challenges of integrated taxi transport service in AA

No	Items	Strongly disagree	disagree	agree	strongly agree	neutral
1	There is excess of minibus taxis during peak-hours					
2	The facilitators and professionals who have been working in public transport sector have mitigated AA minibus taxi mode of transport					
3	Absence of taxis during peak-hours is not serious factors to practice IPTS					
4	AATA, AATMA and AADLA experts have achieved to practice Integration- safe and efficient taxi transport service due to low fare					
5	There is long queuing, congestions and disruptions during most working days and peak-hours					
6	Overall challenges to Integrated Public Transport system in Addis Ababa					

**Table 3: Prospects of Integrated Public Transport System**

No	Items	Strongly disagree	disagree	agree	strongly agree	neutral
1	Light rail transit, Anbesa, and sheger bus have mitigated the problem of Addis Ababa public transport system					
2	Queuing for taxi has reduced unwanted loss of properties like money, cell-phone, etc.					
3	LRT alone is truly integrated transport system for sustainable local or regional development					
4	There are policies and strategies to halve the existing transport problems in Addis Ababa					
5	There are high stakeholders and institutional expectation for integrated transport system in Addis Ababa					
6	There will be technological advancement like traffic control center, ticket, and e-commerce for taxi service here soon					

**Table-4 Questions related to environmental worldviews (environmentally sustainable transport service)**

N <sup>o</sup>	Items	Strongly disagree	Disagree	Agree	Strongly agree
1	AACTA, AACTMA, AARA are curious on environmental protection like building smart parking, avoiding old cars, & ICT technology				
2	All respective stakeholders are working in coordination to sustain public transport system and the environment.				
3	AATA and other organizations have been using environmental economic development.				
4	Under current practices the institutions have started implementing energy-efficient technologies in road-based sectors like avoiding obsolete cars and replacing new and electronic system cars, preferably solar cars.				
5	Currently, AACA, AACTAMA, AACTA are minimizing the emission come from road-based public transport				

6	There is awareness creation about environmental wisdom perspective				
7	Over all practice of public road transport from environmental wisdom perspective				

### **1. Interview Questions Prepared for Taxi Drivers**

2. Would you tell me please what Challenges you encounter while you are driving taxi?
3. Do you think the fare or price for single –trip is fair? If your answer is either, would you explain please?
4. Recently several countries including Kenya banned not to import old/used cars. In addition they are kicking out old cars from their country. What is your opinion if Ethiopia is one of them?
5. What do you expect from the government so as to make taxi service safe, efficient and effective?
6. Anything to say about the current taxi service in AA?

### **2. Interview Questions Prepared for End-Users**

1. Why do you prefer Minibus Taxi service to other mode of public transport?
2. Do you think taxi service is fair, safe and efficient all the times?

If your response is no, please rate the reason. More than one is possible.

- There is no integrated controlling system that checks their specific service.
- The public themselves are negligent and don't want questioned their rights.
- There is lack of awareness that frequently given to the public
- Drivers forced the passengers to pay over by giving options to the public that they use highways in peak-hours.
- There is inadequate population of taxi during peak-hours
- Sometimes the traffic police management itself worsening the problem of taxi service.
- Other, \_\_\_\_\_.

**Importation Data (in Quantity)**

Quantity:- in Metric Tone

Year	Crude Oil	LPG	MGR	Jet A-1/Kero	Gasoil	LFO	HFO	Total Import
1993/4			29,457	119,300	224,150			<b>372,907</b>
1994/5	675,133	412	43,213	150,062	304,358			<b>1,173,178</b>
1995/6	653,070	189	75,381	192,063	336,448			<b>1,257,151</b>
1996/7	684,625		67,351	207,868	413,117			<b>1,372,961</b>
1997/8	38,440	3,483	111,520	222,435	454,024	99,489		<b>929,391</b>
1998/9		1,288	134,763	238,545	541,364	96,021		<b>1,011,981</b>
1999/2000		1,229	142,019	223,077	548,013	109,268		<b>1,023,606</b>
2000/1		875	129,588	224,536	620,186	51,852	69,410	<b>1,096,447</b>
2001/2		111	132,808	248,711	622,094	38,412	80,087	<b>1,122,223</b>
2002/3			148,354	269,210	679,747	41,698	93,370	<b>1,232,379</b>
2003/4			130,370	292,766	687,991	47,121	89,844	<b>1,248,092</b>
2004/5			147,149	333,079	771,807	45,109	109,755	<b>1,406,899</b>
2005/6			137,232	368,670	811,013	41,385	116,822	<b>1,475,122</b>
2006/7			148,368	411,357	925,389	42,406	116,435	<b>1,643,955</b>
2007/8			138,973	482,219	1,072,793	49,608	137,679	<b>1,881,272</b>
2008/9			149,953	505,700	1,202,994	36,373	116,331	<b>2,011,351</b>
2009/10			155,760	529,786	1,237,077	10,700	100,870	<b>2,034,193</b>
2010/11			143,879	548,765	1,182,725	34,281	97,102	<b>2,006,752</b>
2011/12			161,470	553,780	1,402,848	36,496	107,984	<b>2,262,578</b>
2012/13			193,032	613,735	1,322,548	37,423	122,875	<b>2,289,613</b>
2013/14			211,598	700,744	1,558,342	37,128	114,995	<b>2,622,807</b>
2014/15			237,773	712,748	1,703,263	40,638	127,669	<b>2,822,091</b>
2015/16			307,817	735,920	1,929,581	35,953	70,986	<b>3,080,258</b>
2016/17			366,659	820,605	2,235,303	41,609	37,583	<b>3,501,759</b>
2017/18			441,542	738,106	2,507,672	35,785	47,483	<b>3,770,589</b>
<b>Total</b>	<b>2,051,268</b>	<b>7,587</b>	<b>4,086,030</b>	<b>10,443,787</b>	<b>25,294,847</b>	<b>1,008,756</b>	<b>1,757,280</b>	<b>44,649,555</b>

Source: Addis Ababa Transport Authority 2016 (Annual report)