CHALLENGES AND PERSPECTIVES IN CITY LOGISTICS: THE CASE OF ADDIS ABABA CITY.

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A thesis submitted to the department of Logistics and Supply Chain Management, School of Commerce, Addis Ababa University for the Partial Fulfilment of the Requirements for the Award of the Degree of Master of Arts in Logistics and Supply Chain Management

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Approved by Board of Examiners

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STATEMENT OF DECLARATION

I, the undersigned, declare that the research entitled with 'Challenges and Perspectives in City Logistics: The Case of Addis Ababa City' is my original work and has not been presented by any other researcher on the same topic and that all sources of material used for the thesis have been duly acknowledged.

Declared by:

Name: Samson Abate Shibeshi

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Date _____

CERTIFICATION

This is to certify that Samson Abate Shibeshi has carried out this research work on the topic entitled "Challenges and Perspectives in City Logistics: The Case of Addis Ababa City" under my supervision. This work is original in nature and it can be submitted for the partial fulfilment of the requirements for the award of the degree of Masters of Art in Logistics and Supply Chain Management.

Matiwos Ensermu (PhD)

Date_____

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ABSTRACT

City logistics promotes a general view of the transport and logistics happenings within a city, considering the adverse (e.g., congestion and pollution) as well as the positive (e.g., economic, mobility, safety) impacts on the city's population. The main purpose of the research was to assess Addis Ababa city logistic challenges, how the challenges affect it and its perspectives. The study utilized mainly quantitative data analysis techniques. The research design employed in this study was descriptive, which is a theory-based strategy method which is created by gathering, analyzing, and presenting collected data. The analyses carried out depending on each specific objective. Hence, the statistical tool frequency distribution and mean was employed to see the response distributions on the 5-point Likert items. The populations of the study were 3,384,754 residents of Addis Ababa city (CSA, 2007) and 235 employees and based on a random number of table and Cochran's sample size formula (1977), the sample size was 385 and 125 respectively. Therefore, the total sample size was 510. Mean was used as a measure of central tendency. Furthermore, the data were encoded, processed and analyzed using SPSS.V23. The findings of the study revealed that emissions and pollution produced from vehicles coupled with congestion and poor road safety were perceived to be major challenges. These problems pose a threat to the economic, social, environmental and safety of the city.

Keywords: City logistics, congestion, pollution, challenges

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1. CHAPTER ONE: INTRODUCTION

1.1 Background of the study

An important element in a logistics chain is a transportation system, which joints the separated activities. One-third of the logistics costs caries transportation and the systems influence the act of logistics system enormously. Transporting is compulsory in the entire production procedures, from manufacturing to delivery to the final consumers and returns. Only good coordination between each component would bring benefits to a maximum (Hanniefuddin, et.al, 2013).

According to Hanniefuddin, et.al, (2013) as logistics developed from the 1950s, there were plentiful researches focused on this area in different applications. Due to globalization and the trend of nationalization in recent times, the importance of logistics management has been growing in various areas. Logistics help to improve the existing production and distribution processes based on the same resources through management techniques for promoting the efficiency and competitiveness of enterprises.

Crainic and Rousseau, (2008), claims that logistics focuses on the analysis, planning, and management of the incorporated and synchronized physical, informational, and decisional movements within a potentially multi-partner value network. It is from this view that the term City logistics has been begotten to accentuate the requirement for a foundational perspective on the issues identified with freight movements inside urban zones, that is, a framework portrayed by a streamlined solidification of heaps of various shippers and bearers inside similar conveyance vehicles and the coordination of cargo transportation exercises inside the city.

To comprehend the dimensions of city logistics, it is desirable to know the characteristics of logistics, transport and goods flows, as well as the systems that enable their implementation. The volume of flows is directly related to the size of the city. However, in addition to consumer goods, it is necessary to examine the flows of intermediate goods, raw materials, construction materials and other various cargos. On the other hand, the volume of the flow largely depends on the geographical and spatial characteristics, the spatial organization of urban functions, logistics infrastructure and the role of the observed area in the goods flow realization on a higher level. Therefore, the flow volumes in the cities which are important logistical nodes (gateway or hub

systems) are significantly higher as a result of the transit flows i.e. the role of logistics systems in the realization of global, regional and national flows (Tadić, Zečević and Krstić, 2015).

Allen and Browne, (2010) contended the size, population density and economic structure of the city, as well as the operational models and vehicle structure in the realization of flows, affect the extent and location of the logistics activities. Significant impact on logistics and urban areas has the strategic organization of the supply chains, i.e. spatial arrangements and locations of logistics centers and warehouse systems within the chain.

Taniguchi, (2004) added that; though; city logistics is about finding efficient and effective ways to transport goods in urban areas while taking into account the negative effects on congestion, safety, and environment. City logistics is the process of logistics and transport activities using advanced information systems in urban areas, the process for totally optimizing the logistics and transport activities by private companies, considering the traffic environment, its congestion, safety and energy savings within the framework of a market economy

In urban areas, the movement of goods forms a major conducive environment for most economic and social doings. For the urban dwellers, it provides stores and places of work and leisure, delivers mail and goods at home, provides the means to get rid of refuse, and so on. For organizations formed within a city context, forms an important link with suppliers and customers. Certainly, limited activities are happening in an urban area that does not necessitate at least some commodities being moved. However, freight movement is also a key disturbing issue to city life (Crainic and Rousseau, 2008).

According to the World Bank, (2015), 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.

Addis Ababa is both a focus for urban bus and taxi operations and urban goods distribution by road. Because of their substantially smaller size, and their lesser stage of development, only brief

references have been made to urban transport development in other cities in Ethiopia (World Bank, 2015).

1.2 Problem Statement

Transport and logistics activities within a city support a consolidated effort to be taken into account, the negative (e.g., congestion and pollution) as well as the positive (e.g., economic, mobility, safety) effects on the city's residents. The fastest growth in freight vehicles in metropolitan city paves the way to congestion, air pollution, noise and increased logistics costs, and hence the price of products. Also, an amalgamation of various types of vehicles on the road increases the risk of crashes (Afonso, Martin, Lucas and Tom, 2020).

Based on the systems approach mentioned by Taniguchi and Thompson, (2004) city logistics involves several technical processes including modelling, evaluation and the application of information technologies. Advances in Information and Communication Technology (ICT) provide opportunities for improving the performance of urban freight systems.

The objective of City logistics is to maximize the proficiency and mitigate the undesirable effects of logistics activities and at the same time enhance the sustainable development of the cities (SnežanaT. et.al**,** 2015). It seeks cost-efficient but sustainable, solutions that minimize required flows of people and goods (Afonso, Martin, et.al, 2020).

As the world population continues to grow and urbanization advances unabated, city logistics will impact the lives of more and more people, and, if not done well, will cause unnecessary congestion and greenhouse gas emissions, and hence negatively impact the quality of life (Savelsbergh and Van Woensel, 2016).

Therefore, the concept helps to bring available resources together to minimize problems caused by increasing population and ownership of vehicles in a city. According to Hanniefuddin, et.al (2013). Problems as a result of traffic congestions, environment impact, low transport efficiency, and consequently the decreased competitiveness of business have suffered many cities, like Bangkok, London, and Tokyo. So, future development, as well as the quality of life in cities, reduces.

As Debela, (2013) mentioned the Ethiopian logistics system, it is characterized by the poor logistics management system and lack of coordination of goods transport, low level of development of logistics infrastructure and inadequate fleets of freight vehicles in number and age, damage and quality deterioration of goods while handling, transporting and in storage.

The development of Addis Ababa along the five outspread streets has presented numerous difficulties for the city, particularly regarding expanded transportation costs, congestion, and conveyance of open framework administrations. Also, there is an absence of harmonization between transport speculations and urban turn of events. Without a doubt, lodging and land-use choices are taken depending on where accessible land assets are, with basically no appraisal of transport impacts, along these lines botching the chance to incorporate open vehicle modes as far as inclusion, courses, tolls, timetables and offices. Low inclusion of boulevards and absence of road matrix arrange and related foundation have brought about a further lack of portability and related issues of profitability, personal satisfaction, and social incorporation (World Bank, et.al, 2015).

However; Ethiopia is one of the least urbanized countries with only 17.3 percent of the population living in urban areas, below the Sub Sahara average at 37 percent, the transport system in Addis Ababa city is characterized by frequent congestion and delays, high rate of a road traffic accident and air pollution(Addis Ababa City Roads and Transport Bureau, 2016)

Consequently, a concerted and sustained research effort focused on improving the city logistics is needed and I hope that this article helps shape an appropriate research agenda and stimulates more researchers to enter this thrilling field of research.

Therefore, this study is intended to assess the logistical challenges and perspectives in the Addis Ababa City Administration. During the literature review, the author was not able to find research addressing the current logistical challenges in Addis Ababa and this research aims to contribute towards reducing the gap. Finally, this study will be expected to fill the empirical gap in the literature as there is a lack of empirical studies in the area.

1.3 Research Questions

- ✓ What are factors associated with challenges on city logistics of Addis Ababa?
- ✓ How these challenges affect the logistical activities of the city?
- ✓ What are the possible prospects of the city's logistical activities?

1.4 Research Objectives

1.1.1 General Objective

The general objective of the research is to assess Addis Ababa city logistic challenges and its perspectives.

1.1.2 Specific Objectives

Specific objectives of this study are:

1. To state the factors which cause challenges to the logistical activities of the city.
2. To express how the challenges, affect the city's logistics activities.
3. To find out the possible prospects of the city's logistical activities.

1.5 Significance of the study

Nowadays, supply chain management plays a great role in city logistics. Given countless theoretical and empirical supports from works of literature, studying supply chain management in urban logistics is crucially important. Therefore, the outcomes of this study will have several implications. So, it will:

- Help the policymakers and administrative bodies of the city understudy, to identify challenges in its city logistics and hence take corrective actions.
- Provide important insights into city logistics actors to better understand the nature of city logistics.
- Serve as an important springboard for researchers who want to investigate the subject further.
- Give general and specific recommendations that may help the city to improve its logistics.

1.6 Scope of the study

Even if broader research that includes city logistics would give a more holistic view; however, due to the broadness of the subject to be studied and to achieve the objectives of the study within the timeframe, certain delimitations were made by the researcher. First, the study is restricted to Addis Ababa city in a geographical sense and the administrative and operating organs. Second, even though there are lots of factors that could be touched in city logistics, the study mainly focused on the challenges and perspectives in the city logistics. Third, though major stakeholders in city logistics are public authorities, carrier, shipper and receiver, to collect primary data, the study focused on only public authorities and service users. Finally, I know that there are several factors which affect city logistics, but the theoretical framework of this study is delimited only on the efficient and effective ways to transport goods in urban areas while taking into account the negative effects on congestion, safety, and environment.

1.7 Limitation of the study

The study will assess the challenges and perspectives of Addis Ababa city logistics. However; the main actors in city logistics are shippers, receivers, carriers and local and regional authorities (Behrends, 2016), and worth important to collect primary data from all the groups, the research focused on only the employees and residents or users to get primary data for analysis and the remaining data were analyzed using secondary data found in Traffic Management Agency, Addis Ababa City Transport Bureau, Ministry of Transport and Federal Police Commission. This can be deemed as a limitation, as it could be more complete if data were collected and analyzed including other determining actors of city logistics.

1.8 Definition of Terms

Supply chain: Supply Chain is the group of manufacturers, suppliers, distributors, retailers and transportation, information and other logistics management service providers that are engaged in providing goods to consumers (Janvier-James, 2011).

Logistics: is the procedure of deliberately dealing with the acquisition, development, what's more, stockpiling of materials, parts and completed stock (and the connected information flows) through the institution and its marketing channels so that the economical satisfaction of requests improves existing and future gainfulness. (Christopher, 1998)

City logistics: Finding efficient and effective ways to transport goods in urban areas while taking into account the negative effects on congestion, safety, and environment (Taniguchi, Thompson and Yamada, 2016).

Traffic congestion: consist of incremental delay, vehicle operating costs (fuel and wear), pollution emissions and stress that result from interference among vehicles in the traffic stream, particularly as traffic volumes approach a road's capacity (CVA, 2017).

Traffic Management: deals with all operational aspects related to the traffic flow and (re)design of infrastructure. These aspects include the possibility to turn normal traffic lanes into reserved bus lanes or to define special routes to be operated only by freight transport (Amaral and Aghezzaf, 2015).

Transportation: The movement of people, animals and goods from one location to another (CVA, 2017).

1.9 Organization of the Study

The study is organized in five chapters. The first chapter covers the introduction part that addressed the background information concerning city logistics and about Addis Ababa city, the research questions, the general and specific objectives of the research, the significance and scope of the research, and finally the limitations of the research. Following this introductory chapter, the second chapter describes the basic and relevant literature related to logistics practices and challenges which were done previously by other researchers.

In the third chapter, the research report covers the type of research design used, the analysis of the data, the sampling techniques, and methods of data collection applied. The fourth chapter focuses on the descriptive data analysis and findings of the study. The last chapter provides a summary of findings, conclusion and recommendations to solve the observed gaps and to improve the city logistical operations through better logistics practices.

2. CHAPTER TWO: REVIEW OF RELATED LITERATURE

This chapter introduces and conveys a systematic literature assessment on the works of numerous scholars in the area of practices and challenges of city logistics. It includes definition and concepts such as logistics and city logistics, components of city logistic, components of city logistics, The relevance of city logistics, challenges of city logistics, decision-making in city logistics, e-commerce and logistics system, actors of city logistics, city logistics systems, characteristics of city logistics, traffic congestion, causes of traffic congestion, the impact of traffic congestion, studies in city logistics of Addis Ababa and conceptual framework. Based on the literature review, this thesis pursued to compose and evaluate those research questions and identifies measurement variables which are used for answering those research questions is designed to assess challenges of city logistics of Addis Ababa.

2.1 Logistics and City Logistics

Johnson et al. (1999) presented the definitions of logistics as that "logistics define the entire process of materials and products moving into, though, and out of a firm. However, when logistics activities take place in urban areas, they show unique characteristics making them different from the general logistics activities. Thus, to differentiate the two phenomena and to highlight the special characteristics, the transport in urban areas, and specifically, the freight flows associated with the supply of city centers with goods, is usually referred to as city logistics, urban freight distribution, or last-mile logistics.

2.1.1 Logistics

According to the Council of Supply Chain Management Professionals, logistics management can be defined as, that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption to meet customers' requirements. It can be deduced that logistics is a planning orientation that strategically manages the procurement, material and information flow through the organization and its marketing channels to meet customer satisfaction. It entails the coordination of activities to attain current and future profitability are maximized through cost-effective fulfilment of orders (Nilsson et.al, 2006).

2.1.2 City Logistics

It promotes a general view of the transport and logistics happenings in urban areas, thinking about the unfriendly(e.g., congestion and pollution) just as the positive (e.g., economic, mobility, safety) effects on the city's populace. Limiting the necessary movement of individuals and merchandise, thinking about supportable, arrangements is the point of city logistics(Crainic and Montreuil, 2016). The definition highlights the total optimization of logistics activities of private companies rather than local optimization. It also incorporates the social issues of the environment, congestion and energy savings as well as economic issues relating to urban freight transport within the framework of a market economy.

An analysis of city logistics activities, and how they are performed, results with immediate identification of their specific intrinsic characteristics. It allows for establishing substantial differences between logistics and city logistics justifying the entity of city logistics as an individual field with proper identity.

2.2 Components of City Logistics

Dablanc and Rakotonarivo, (2010) state that a city is provisioned by hundreds of supply chains servicing a wide array of economic sectors including grocery stores, retail, restaurants, office supplies, raw materials and parts (for manufacturing), construction materials and wastes. Depending on the circumstances, goods transport accounts for 10 to 15 per cent of vehicle equivalent kilometres travelled in urban areas, 2 to 5 per cent of the employed urban workforce, and 3 to 5 per cent of urban land use.

A city not only receives goods, but also ships them: some 20 to 25 per cent of truck-kilometres in urban areas are outgoing freight, 40 to 50 per cent are incoming freight, and the rest both originates from and is delivered within the city (Dablanc et.al, 2010). A logistics system is composed of several elements relating to finance, ordering, cargo, and work and land use and traffic information. Eastern Asia Society for Transportation Studies, mentions that Logistics services, information systems and infrastructure/resources are the three components of logistics and they are closely linked. Logistics services support the movement of materials and products from inputs through production to consumers, as well as associated waste disposal and reverse flows. They include

activities undertaken in-house by the users of the services (e.g. storage or inventory control of a manufacturer's plant) and the operations of external service providers.

Logistics services comprise physical activities (e.g. transport, storage) as well as non-physical activities (e.g. supply chain design, selection of contractors, freightage negotiations). Most activities of logistics services are bi-directional. Information systems include modelling and management of decision making, and more important issues are tracked and tracing. It provides essential data and consultation in each step of the interaction among logistics services and the target stations. Infrastructure comprises human resources, financial resources, packaging materials, warehouses, transport and communications. Most fixed capital is for building those infrastructures. They are concrete foundations and basements within logistics systems.

According to planning and design for sustainable urban mobility in UN-Habitat Global Report on Human Settlements GRHS, (2013) it was claimed that modes that carry the freight, the infrastructures supporting freight flows and the operations associated with their organization and management are the three key components of city logistics. The components have subparts with their features and restrictions. The interaction of the three main components in the logistics system and the subcomponents are clarified as transport terminals, roads and distribution centres which infrastructure subcomponents of city logistics. Scheduling, routing, parking and loading/unloading, are operational subcomponents. While trucks remain, the principal mode assisting city logistics.

2.3 The Relevance of City Logistics

City logistics operations consist of the set of activities related to the distribution of goods and provision of services within an urban area. There is a wide range of importance of city logistics that includes parcel delivery, material collection, goods storage, waste collection, home delivery services, or electrical appliance reparation services, among others. Current urban activities are far away from what they were a couple of decades ago. New challenges have emerged, new technologies have been developed, and urban population dynamics have changed (Cardenas et al., 2017).

2.4 Challenges of city logistics

According to UN-Habitat, (2013), good transport systems are not unique to the urban built environment. The adverse impact of high freight movements and congestion within city centers can be touched economically, socially, environmentally and from a road safety perspective.

2.4.1 Economic

The advance in the amount of freight transportation in cities has intensified traffic congestions. The economic activities involve the movement of people and goods from places to places. The economic challenges can be seen in the form of trip length, delivery time, traffic congestion, and infrastructure cost. Transportation of various consignments is an essential element supporting people's lives. UN-Habitat, (2013) mentions that in city areas, frequently, recurrent deliveries of goods are subject to smaller volumes, as inventory levels in urban stores tend to below.

Urban goods are delivered regularly from distribution centers at the periphery as a result of limited availability of storage space in the city centers. Economic growth is underpinned by productivity growth (Cardenas et al., 2017). It was further added that productivity is a national investment in logistics and transportation whiles the output is a gross domestic product. Weisbrod, Vary and Treyz, (2003) also supported that almost 5% of the GDP which is comparable to the magnitude of people transport cost and these cost increase with the size of the urban area at a higher rate than passenger transport. Therefore, an effective transportation system is key in sustaining economic growth by linking people to the job, deliver a product to markets where there is demand, drives supply chain and logistics and enabling domestic and international trade.

As suggested by Harriet et al (2013), time delays caused by congestion translates to increased travel time for the service providers, increased inventory carrying cost, lengthy lead time and higher transportation cost which can be translated into monetary value because time is money. Instead of high-time traffic congestion, steady transportation of goods should be secure, as a result, freight distribution is forced to be done in the evenings sometimes. If the products are not made available to the customer at the right time and in the right condition could lead to customer dissatisfaction.

As suggested by Koźlak, (2017), efficient and effective transportation management plays a vital role in ensuring socio-economic development. As a result, they can be the strength to use alternative routes, which might be longer and less safe, again increasing the transport cost and security risks of supplying the same goods to the same location.

Traffic congestion is a major disturbing factor that imposes a cost upon travel and business operations, thus exposing a variety of negative impact on people and business economy. It can be seen that additional cost incurred may be passed down the supply chain and transferred to the final user. It can be said that in this 21st century businesses are adopting to just-in-time production, distribution and inventory management system these challenges can make it difficult to deliver up to the task (Weisbrod et al, 2009).

2.4.2 Socially

Socially, many challenges in the cities being created as a result of people and freight interactions are related to health, safety and quality of life. Movements occur within the city to satisfy purposes such as employment, education, leisure or access to goods and services. As supported by Russo & Comi, (2010), the goods or freight transport has a significant role in the economy of urban areas as it serves as a source of income as well as employment. This is to say that each time delivery needs to be done a trip is generated. Rodrigue et.al (2009); Munuzuri et.al (2005), mentioned that in the developing countries there are so many challenges such as discomfort, travelling related stress and delays resulting from the challenges of infrastructure system i.e. ineffective and inefficient infrastructure systems.

Social impact can relate to the way the activity affects and has an effect on society. Even though demand for transportations and distribution of goods is created by residents, disturbances related to satisfying those demand are not accepted. Different types of vehicles may not only cause a nuisance but also increase the rate of accident occurrence thereby increasing demand on social service. It can be seen that living and working close to roads expose to harmful pollutant such as emission from diesel engines.

UN-Habitat, (2013) also pronounced that freight-intensive activities such as warehouses, truck depots, container storage area and others can be an aesthetic disfigurement on the urban landscape,

and are associated with lower property value. As many freight facilities operate on a 24-hour basis, light can disrupt their sleep. Noise emission from freight trucks is nosier than vehicles. Russo and Comi (2010), added that trucks or Heavy Goods Vehicles and Commercial Vehicles that engage in logistics work are usually assumed to have a different rate of flow. Heavy Goods Vehicles are less manoeuvrable and may be limited to a lower speed whiles the Commercial Vehicles make frequent stops to load and unload, often on- street. According to OECD (2003), there have been changes in urban congestion due to the movement of the use of Heavy Goods Vehicles to the use of lighter vehicles.

2.4.3 Environmental

This impact occurs as a result of large traffic volumes that begin with the high demand for fuel, thereby depleting our natural resources at a faster rate than they are replenished. They are essentially the consequences of the actions of goods movement in the city. Gonzalez, (2008), supported by saying that considering the usage of energetic assessment as an indicator for measuring these effects, it can be seen that goods movements represent 30% of the global impact of urban transports (in-vehicle km, which is equivalent for green-house gases).

The environmental issue can be seen through the energy use, emission and noise (Russo and Comi, 2010). They further said that energy use is an important indicator to determine the effect on the environment. The rate of fuel consumption can be measured by vehicle type, length of distance to be travelled and the opportunity for alternative fuel type. It can be seen that the traffic congestion, road system, driving behaviour and the delivery time will determine the fuel consumption. It went further to state that the EU was committed to reducing emissions of six greenhouse gases to the 1990 base level, less 8% by 2008-2012 to meet the Kyoto obligations in the CO2 sector. Because the same source shows by 2030 the emission will be 22% higher than the 1990 base. The pollutant from the exhaust emissions by urban freight transport can be seen as one of the major problems in the cities. The combustion of diesel fuel in an internal combustion engine of a vehicle results in the production of gaseous substances such as carbon monoxide (CO), Carbon Dioxide (CO2), Nitrogen Oxides (NOx), and Particulate Matter (PM). The incomplete combustion of diesel produces carbon monoxide which is a toxic gas can be very harmful to the health of residents. Frequent inhaling can be lethal as well as small concentration can result in cardiovascular disorder

and the corrosion of the respiratory tract. The greenhouse effect is mainly as a result of the gaseous pollutant called Carbon Dioxide.

According to Susan et.al (2004), CO2 has a continuum of the effect that ranges from physiologic (e.g. ventilator stimulation) to toxic (e.g. cardiac arrhythmias and seizures), an aesthetic and lethal. The effect of CO2 depends on the level of concentration and the duration of exposure as well as individual factors such as age, health, occupation, lifestyle and others.

The Nitrogen Oxide which is made up of Nitrogen monoxide and Nitrogen Dioxide is emitted at a rate of about 95% as NO. NOx is given in the form of smog or particles. The atmospheric reaction that occurs between oxidants like Ozone (O3) and NO produces NO2 concentration. This NO2 causes the corrosion of the respiratory tract. It can be seen that the exhaust of NOx emission will result in the souring which affects the historic building in cities. It helps form acidic rain, global warming and others. It can be said that NOx can reduce lung function, and damage our water bodies in the cities.

According to the World Health Organization (2013), Particulate Matter is a widespread air pollutant of a mixture of solid and liquid particles suspended in the air. It can be seen in the form of dust and smoke. The exposure to Particulate Matter causes respiratory and cardiovascular illness such as asthma and mortality from the cardiovascular and respiratory disease from lung cancer. It can be seen that exposure to PM may reduce the life expectancy of the population. Anderson et al (2012) cited that the world health organization estimated that Particulate Matter air pollution contributes to approximately 800,000 premature deaths each year.

Urban freight deliveries produce a significant amount of noise in a city, not only from the engine and tyre noise but also unloading and loading of goods can be very obtrusive. According to Lee (2001) as cited by Emmanuel et al (2013) it is predicted that the number of vehicles on streets will increase from 4:1 to 5:2 in the year 2020. The top five of the most congested cities in North American range between 33% for Los Angeles to 25% for Tampa (table 7). In Europe, the top five most congested cities range from 42% for Warsaw to 32% for Paris. In African cities, Johannesburg ranks top amongst South African cities with a congestion level of 32%, which represent a travel delay and traffic in the cities for 37minutes for every hour, driven in peak hour.

2.4.4 Road Safety

High accident may have a direct impact on road safety issues. Road design, vehicle design, and traffic management may not be an issue that is usually kept in the minds when deciding on a route for large vehicles. According to Taniguchi et al (2004) safety is a very important issue in urban freight transport. The issue is significant in urban areas where pedestrians might be exposed to freight vehicles. Goods vehicles are seen as hazardous entities in the urban environment. Weisbrod, Vary and Treyz, (2003) added that Road safety issues consist of four economic cost; delay cost, clean-up cost incurred the government and institutions, increased in vehicle operating cost due to high congestion traffic flow conditions caused by the accident and accident cost which includes fatality cost and others.

2.5 Decision-Making in City Logistics

The systemic view must be translated in terms of a model, suitably representing the system, which, further than providing a deep understanding on how the system works, should provide support to any type of operational decisions on the system. Two key aspects of this process are, respectively, identify and understand the main logistics operations and identify and distinguish the decision levels in the management of the city logistics system. This view is neatly aligned with the key approach of Operations Research: acquire enough knowledge about a system to understand how the system works, and formulate the system's knowledge in terms of modelling hypothesis that can be subsequently translated in terms of a formal model (usually a mathematical model) which can be used to make decisions about the system. Therefore, understanding the nature of the decisions in city logistics, which of them depend on the nature of the system, and which are conditioned by the relationships among stakeholders is part of such knowledge acquisition to build models of city logistics (Kommentar, 2000).

2.6 E-commerce and logistics system

E-commerce defined as doing business over the Internet could cover any transactions between the organizations and people in the society, although the past works of literature regarded B2B and B2C as important in terms of market size. However, the government will have a responsibility to establish new logistics policies under different ICT conditions.

Another original viewpoint is to divide Business into Shipper (e.g. suppliers, manufacturers, wholesalers, and retailers) and Logistics Service Provider (e.g. freight carriers, warehouse firms, and third-party logistics). B2B usually means the transactions between shippers (S2S). It seems effective for us to distinguish the transactions in the market of logistics services, between Shipper and Logistics service provider (S2L) and between Logistics service providers (L2L). As e-commerce becomes common practice, the more likely the shippers tend to outsource logistics services. We should recognize four major stakeholders if we want to analyze the impacts of ICT on the logistics system (Kommentar et.al, 2000).

2.7 Actors of City Logistics

Urban logistics has various actors and stakeholders, which often have conflicting stakes in it. These players include shippers and receivers, carriers and local and regional authorities (Behrends, 2016). However, these players do not have direct business dealings, they take the same space and therefore interact.

Shipper and receiver

According to Behrends, (2016), where economic activities are executed, the shipper and receiver deal with the transportation of goods on relations of a supply chain between services. A requirement for an operating economy is the accessibility of goods to the facilities where the economic activities happen.

Carrier

Shippers and receivers demand the transport services provided by the carriers. Attaining maximum resource utilization in supplying the demanded transport quality is the major issue for the carriers. The required quality of service regulates the number of transport options needed to produce the service. The carriers can be own account or third-party providers.

Public authorities

Authorities have obligations on the design of the working environment, which highly influences the way City logistics activities are carried out. They use land-use and traffic planning to improve the built and social environment of City regions. They provide land for economic facilities and transport infrastructure, e.g., roads and rail tracks on which vehicle movements take place. The goals of local authorities are twofold: First, for economic reasons they aim for high accessibility

of their city-region to the over-regional transport network and an effective intra-urban transport network to increase their attractiveness for economic activity, which is a generator for regional welfare. Second, for social and environmental reasons they aim to reduce the impacts of freight traffic as the requirements of people living and working in cities, for a high quality of life increase (Behrends, 2016).

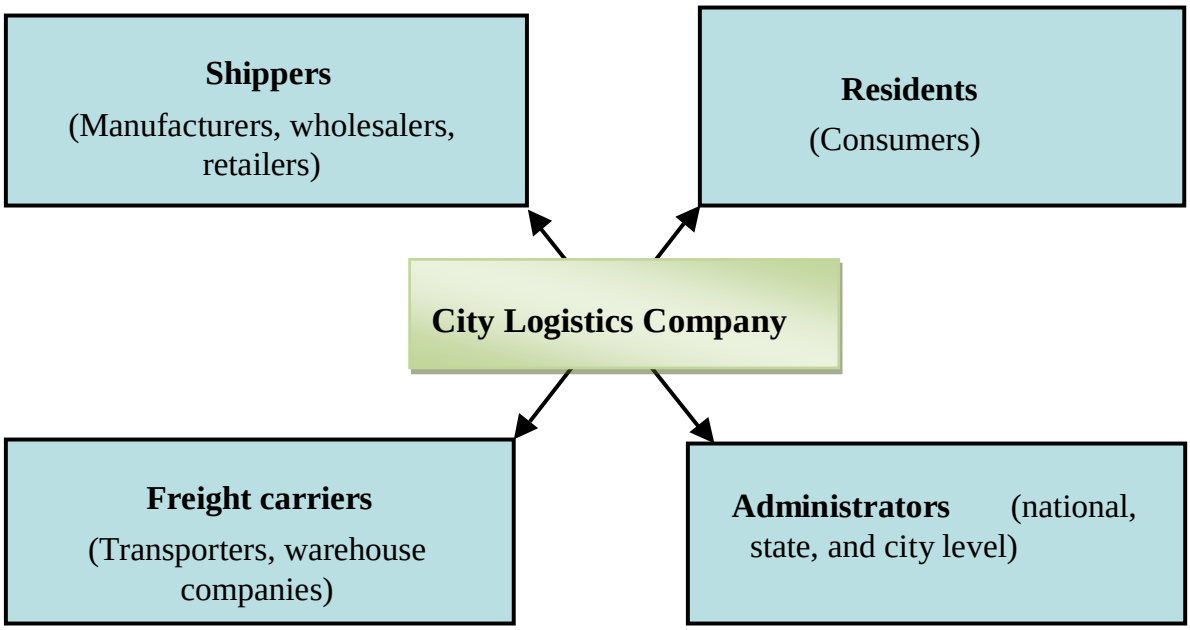


Fig. 2.1 *Actors of City logistics*

2.8 City Logistics Systems

Gakis and Pardalos, (2017) explain that the system component of city logistics is characterized by:

- the demand that is serviced determining the type of traffic that flows within the City Logistics network;
- the type and number of facilities used together with the representation of the customers of the system that make up the nodes of the network;
- the layout of the network defining how the facilities are arrayed within the city zone considered and how transportation services and routes proceed;
- the types of transport modes supporting the operations of the City Logistics network.

2.9 Elements in Promoting City Logistics

As supposed by Taniguchi, (2014), three elements are essential for promoting city logistics;

- Application of innovative technologies of ICT (Information and Communication Technology) and ITS (Intelligent Transport Systems),
- Change in mind-sets of logistics managers, and
- Public-private partnerships.

A) Intelligent transport systems

In general, the term intelligent transport system (ITS) refers to the combined application of information and communication technology. It provides a wide range of technical tools/instruments to manage transport networks for city planners and novel services for carriers from the private sector. Involving the application of advanced technology in urban freight transport, ITS has the potential to:

- Reduce the total negative effects of city logistics through:
    - Increasing the productivity of freight vehicles (increase the use of vehicles' loading capacity).
    - Increasing the reliability of city logistics services (e.g., avoid any temporary traffic jams).
    - Reducing traffic accidents and increasing safety.
- Increase the capacity of urban freight systems without building any additional infrastructure.

Due to these advantages, applying telematics to urban freight transport can be seen to have a bright outlook. Using the dimension of usage group, the application of ITS can be classified into:

- Public users (often city authorities) to enforce any urban-freight-transport-related policies;
- Private users (e.g., carriers) to improve operational efficiency; and
- Or both groups (Yanqiang).

B) Change in mind-sets of logistics managers

A Change in the mind-set of logistics managers is critical for city logistics since logistics managers are key players in urban freight transport operations. Some transport and logistics companies have obtained ISO9001 certification (quality management) and ISO14001 certification (environment management). This certification provides logistics companies with a good opportunity to educate employees about actions for developing greener logistics systems. For example, eco-driving of pickup-delivery trucks is beneficial in reducing fuel costs and crashes by milder driving manner (Taniguchi, 2014).

C) Public-private partnerships

Rahman, Miraj and Andreas, (2019) pointed out that, Public-Private Partnership (PPP) has been used by various countries worldwide as one of the tools to cope with lack of funding by the government in providing public infrastructure. Western and Central European countries use this type of partnership to gain project advantages through a division of responsibility between the public and private sectors. Private participation was also adopted in other parts of the world such as the United States and eastern countries in Asia to mitigate risks that occurred in the project development and share equal responsibility in terms of project finance and resources in the longer-term.

Cities are areas of production, distribution and consumption. The growth in global trade reflects growing levels of production and consumption taking place in City areas. While precise figures are not readily found, it can be assumed that most of the global trade originates in, transits through, or is bound to, acuity area. The associated growth in the global distribution has reinforced the role of gateway cities, nodes interfacing with global economic processes, mostly through ports and airport terminals (UN-Habitat, 2013).

The city is also increasingly transnational. Depending on the economic and geographical context, some cities (such as London, UK; New York, US; Paris, France; and Tokyo, Japan) have a pronounced tertiary function (finance, administration, culture), implying that consumption accounts for the main share of the total goods being handled, with the functions of production and distribution assuming a more marginal role. Other cities (such as Bangkok, Thailand; Busan, Republic of Korea; Guangzhou and Shanghai, China) have emerged as manufacturing centers

where production assumes the dominant share of goods flows. With the increasing use of the container and the growth of long-distance trade, several cities act as intermediaries for the goods flows bound to large market areas. For instance, gateway cities often fulfil the material requirements of whole regions by being a point of freight transit and distribution to service inland destinations (UN Habitat et.al 2013).

City logistics is essential to the functioning of modern city economies. Cities are places of consumption relying on frequent deliveries of groceries and retail goods, express deliveries to businesses, and a fast-growing home delivery market. For people, City coordinations guarantees the provision of products in the stockpile and for firms, it shapes an essential connection with providers and clients (Crainic et al., 2004). City logistics is, hence, a significant part of the economic vitality of cities. Furthermore, the function of a city as a place of production is also involving significant freight activity related to their role and function in global supply chains. In cities serving as hubs for national and international trade, City freight is essential for wholesaling, distribution, logistics, and intermodal operations (Behrends, 2016).

Logistics, as currently understood, targets the analysis, planning, and management of the integrated and coordinated physical, informational, and decisional flows within a potentially multi-partner value network. It is from this view that the term City Logistics has been coined to emphasize the need for a systemic view of the issues related to freight movements within City areas, that is, a system characterized by an optimized consolidation of loads of different shippers and carriers within the same delivery vehicles and the coordination of freight transportation activities within the city (Crainic and Rousseau, 2008).

Activities of City Logistics follow from the acknowledgement that, while necessary, traffic and parking regulations are anymore adequate and new institutional models of City freight transportation activities must be set up. The fundamental idea underlying these new models is that one must stop considering each shipment, firm, and vehicle individually. Rather, one should consider that all stakeholders and movements are components of an integrated logistics system (Crainic et.al, 2008).

2.10 Characteristics of City Logistics.

Goods and transport flow in the city are the results of the logistical decisions, i.e. the processes necessary for the organization of efficient delivery and collection of goods. Logistics decisions, according to the necessities of the manufacturing and distribution sector, based on the behaviour of economic actors, such as households and companies. On the other hand, the spatial organization of industrial, commercial and logistics systems, but also the present legal framework and regulations have a direct impact on the planning, organization and implementation of the logistics activities in the city. These interactions provide the complex characteristics of city logistics and logistics chains in the city. One of the characteristics is that the implementation of goods flows generally do not depend on the internal structure of the city, although it has a significant impact on the total number of freight vehicle-kilometres, and thus to other economic and environmental parameters (Tadić, Zečević and Krstić, 2015). Some of the main city logistics characteristics include:

• Spatial restrictions:

- Urban microstructure determined by the urban network (e.g., one-way streets, dead-end streets, etc.) causes the paths between customers, or between the depot and the customers, to differ depending on the order of the visits.
- Limited vehicle access. Most cities mandate limited access for some areas of the city for specific types of vehicles during specific time windows. – Small-quantity deliveries.
- The high density of delivery points.

• Traffic infrastructure: traffic schemes banning specific turnings, traffic lights and their associated traffic control plans, etc.

• Environmental concerns and sensitivities:

- The growing role of small specialized urban vehicles (i.e., environmentally-friendly vehicles commonly referred to as green vehicles) as a consequence of sustainable urban policies implying energy savings, reduction of emissions, noise, etc.
- Low automation and critical human role when manual deliveries are necessary.
- High operational and environmental costs, as a consequence of human involvement among other reasons.

2.11 Trends in the City Logistics

Logistics Goods and transport flows in the city are the result of the logistical decisions, i.e. the processes necessary for the organization of efficient delivery and collection of goods. The spatial organization of industrial, commercial and logistics systems, but also the present legal framework and regulations have a direct impact on the planning, organization and implementation of the logistics activities in a city (Tadić, Zečević and Krstić, 2015).

These interactions provide the complex characteristics of city logistics and logistics chains in the city. One of the characteristics is that the implementation of goods flows generally do not depend on the internal structure of the city, although it has a significant impact on the total number of freight vehicle-kilometres, and thus to other economic and environmental parameters. Each activity (trade, service, industrial, administrative, etc.) can be associated with a specific profile of generating the flow of goods, which is identical for all urban areas. From the logistics perspective, freight flow generator (trade, catering facility, pharmacy, bakery, bank, warehouse, etc.) works in the same or a similar manner regardless of whether it is in the centre of a big metropolis or the suburbs of a medium-large city. This and other characteristics of the city logistics and logistics chains are described in detail below (Tadić, et.al, 2015).

2.12 Traffic Congestion

Any network as vehicle use increases and is characterized by slower speeds, longer trip times, and increased queuing. The most widely understood instance is the physical use of roads by vehicles. When traffic demand is greater enough that the interaction between vehicles slows the speed of traffic stream, congestion is incurred. As demand approaches the capacity of a road, extreme traffic congestion occurs. When vehicles are fully stopped for periods, this is colloquially known as traffic jam (Onyeneke, 2018).

2.12.1 Causes of traffic congestion

Different researches and reports identified many interrelated factors that cause traffic congestion in developed and developing countries where the road network and road users' behaviour are different. For instance, the research by Aworemi, et.al;(2009) identified the major traffic congestion causes in the United States of America. Accordingly, the results showed that in the

United States of America the cause and their percentage share are; bottleneck (40%), traffic incidents (25%), work zone (10%), bad weather (15%), poor signal timing (5%) and special events contribute 5% of the traffic congestion.

2.12.2 Impact of traffic congestion

Congestion causes increased costs for travellers and freight movement, loss of time, accidents, and psychological strain. This is not simply congestion of transit vehicles during peak hours, congestion of pedestrian on sidewalks as well as congestion of bicycle. Congestion is neither a new phenomenon nor a role effect of an automobile (Black, 1995).

Traffic congestion has various negative impacts ranging from economic loss to adverse environmental and social impacts. Because the roads are free of charge, there will be no financial incentive that would stop drivers from overusing the roads until the point where the road begins to collapse through continuous congestion (Elisonguo, 2013).

By doing so, each driver incurs a private and public cost when they drive. The private cost includes the journey time and fuel used, whereas the public cost includes the cost imposed to the community in the form of noise, accident risk, fumes, etc (Roth, 1965).

2.13 Studies in city logistics of Addis Ababa

In the course of this research, there were no previous studies that have been studied regarding the city logistics of Addis Ababa. However, according to a master's thesis conducted by Sileshi Setito (2019), congestion is mentioned as the impact of social, economic and political problems in Addis Ababa city. Furthermore, according to the document which provides a Resettlement Policy Framework (RPF) for Ethiopian Transport Systems Improvement Project (TRANSIP), Studies indicate that the main challenges are, among others:

1. very limited traffic management, exemplified by the severely inadequate number of traffic control signals, and the lack of a central traffic control system;
2. pedestrian safety concerns and high accident rates;

3. ineffective planning, management and oversight of the city's public transport network (notwithstanding some important recent initiatives to develop a mass transport network); and
4. inadequate institutional capacity underlying the above concerns and lack of coordination among different agencies shaping the city's transport system and the land use patterns.

Yet, the distinguishing characteristic of city logistics is the explicit recognition that transporting goods in urban areas has a negative (as well as a positive) impact on the lives of people living in these urban areas (Savelsbergh and Van Woensel, 2016). The need for this research can help to predict the prospects and show the challenges affecting city logistics.

2.14 Conceptual Framework

Based on the above theoretical and empirical literature review, the following conceptual framework has been developed for this study.

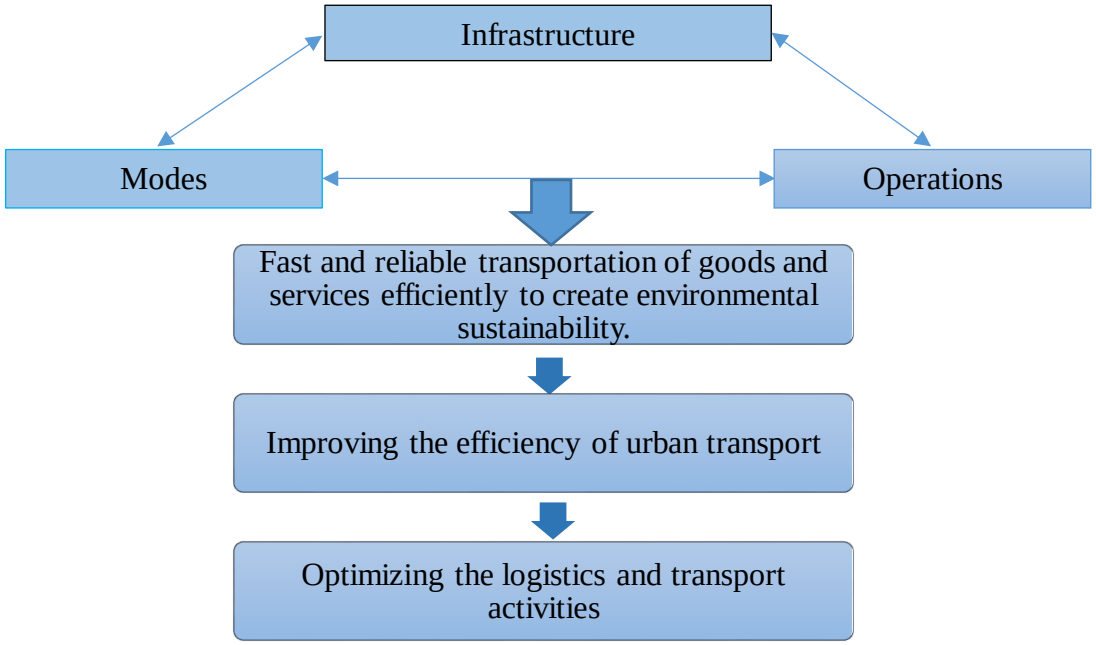


Fig. 2.2 *Conceptual framework for city logistic operations*

3. CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Description of the Study Area

This study is conducted in Addis Ababa where the government of the Federal Democratic Republic of Ethiopia (FDRE) resides. The African Union, the Economic Commission for Africa and other international organizations headquarters are also found. For administration, Addis Ababa is divided into 10 sub-cities. Hence, Addis Ababa has an important influence on the economic, social and political sector development of the country. Through the previous years, the city which is found at the center of the country, with a population of around 3 million, has shown remarkable extension in terms of size. The fast growth in city resident with an annual growth rate of 3.8 percent per year has not been provided with equal growth in urban transport provisions (AATCB, 2014).

The transport system of Addis Ababa is featured with under reserved roads, highways and walkways together with sidewalks are invaded by economic and human activities, vehicle lanes successively being used by pedestrians, for walking, mounting buses, and taxis. Overall, the city transport system suffers from many insufficiencies. Traffic on the roads is increasing while the major routes in the city are still few. The city main highways include: east-west and north-south axial, the ring road and several other roads (Meron Kassahun, 2007)

City transport in Addis Ababa is done by public and private operators mainly competitors for business with a combination of ownership pattern. Motorized and non-motorized traffic groups are the methods of the urban transport system in the city which modes of transport include public buses; minibus; taxis and the non-motorized transport while walking and animal carts dominant the periphery. Currently, taxis, city buses and private cars altogether cover 30 per cent of the urban mobility, that is, 26% bus, 72% taxis and 4 % private cars, while 70% of urban mobility is covered on foot. (AATCB, 2014)

3.1.1 Population density and growth of Addis Ababa

The population density of Addis Ababa is 5165 persons per square kilometre. As of now, the population growth rate of the city is 3.8% and this rate has been consistent for quite a while. The population growth rate is not great and it is one of the reasons why the number of people living

here has not increased by a higher number. It is estimated that the population growth of Addis Ababa city (CSA, 2007).

3.2 Research Approach

According to Silverman (2000), before conducting research it is important to establish the research approach, as well as the related concepts, theories, methodologies and methods. In social research like this study, there are two basic kinds of research approach which are linked to the methods used.

So, the study problem answered through a combination of the qualitative and quantitative approach to reduce the limitation and increase the quality and flexibility of the data (Robinson, 1998). Ivanovna, Creswell and Stick, (2006) argues that mixed methods research is more than simply collecting both qualitative and quantitative data; it implies that data are integrated, related, or mixed at some stage of the research process. So, in this study mixed method was used to assess the logistical challenges and perspectives of the Addis Ababa city.

3.3 Research Design

A research design is a master plan that specifies the methods and procedures for collecting and analyzing the needed information and provides a framework or plan of action for the research (Zikmund, 1975). It is also defined as a general framework of how the researcher aims to go about answering the research questions. Cooper and Schindler (2014) assert that research design is a blueprint for collection, measurement and analysis of data.

The research design employed in this study was descriptive, which is a theory-based strategy method which is created by gathering, analyzing, and presenting collected data. The rationale behind selection descriptive method is, to articulate portrayal of characteristics of a particular individual, situation, or group. The study involved a survey of different documents and questionnaire with diverse employees in the logistical activities of the city and residents. It is also used to describe data and characteristics about the population or phenomenon being studied, in the form of tables and charts.

According to Burns and Gorve, (1993), the quantitative approach helps researchers to check relationships between variables. Besides, it also helps in examining and describing a cause and effect interactions among those variables.

Besides, the design used to classify the challenges that affect the logistics performance of the city. Different works of literature and empirical studies were reviewed to gain more insights and background information about the factors that affect city logistics. Information was collected from this source which was helpful to better understand the problem of the study.

3.4 Research Population and Sampling

There are four major stakeholders, i.e. shippers, freight carriers, administrators, and residents who are involved in city logistics as mentioned in concepts of city logistics for sustainable and livable cities by Eiichi Taniguchi (2014). However, the total number of employees working in the Ministry of Transport, Transport and Communication Bureau of Addis Ababa and Traffic Management Agency working is more than seven hundred fifty, the study focused on employees who are directly working towards in policymaking and regulatory role on the city's logistical operational performance.

According to Garson (2012), the population, also called the universe, is the set of people or entities to which findings are to be generalized and the population must be defined explicitly before a sample is taken. In this regard, the populations of the study were 3,384,754 residents of Addis Ababa city (CSA, 2007) and 235 employees, who are directly working towards in policymaking and regulatory role on the city's logistical operational performance.

Table 3.1 Target Population

S/N	Population	Target Population
1	**Service Providers**	**235**
	• *Ministry of Transport*	*50*
	• *Addis Ababa City Transport*	*103*
	• *Traffic Management Agency*	*82*
2	**Residents of Addis Ababa**	**3,384,754**
3	**Total**	**3,384,939**

3.5 Sample Design

The nature of the study area covers different stakeholders, for that matter both probability and non-probability sampling techniques were applied where stratified and purposive sampling had been used respectively.

Stratified sampling is a way of ensuring that particular strata or categories of individuals are represented in the sampling process (Fox, et al. 2009). Accordingly, the organizations in policymaking and regulatory role on the city's logistical operational performance were taken as strata and those whose activities which does not directly contribute to the city logistics management were excluded from the sampling frame. For the random sampling techniques, a random number table was employed to randomize the selection process, whereas, purposive sampling technique was used to select residents and service users, in terms of gender composition, type of work for life and other parameters, of the city.

3.6 Sample Size

Bhattacherjee (2012) defined that sampling is related to the selection of a subset of individuals from within a population to estimate the characteristics of the whole population.

Besides, Rohatgi and Saleh, (2001) argue that the purpose of the study and population size, three criteria usually need to be specified to determine the appropriate sample size: the level of precision sometimes called sampling error, the level of confidence or risk of error, and the degree of variability in the attributes being measured.

Bhattacherjee (2012), described that the sampling error range is often expressed in percentage points usually ±5 percent. However, a 3% margin of error is acceptable for continuous data, (Krejcie & Morgan, 1970). As the study used a five-point Likert scale to measure a continuous variable its sampling error is 5%.

The study used a 95% confidence interval because it is acceptable for most research (Jamess E. Bartlett, Joe W.Kotrlik, Chadwick C. Higgins, 2001). In other words, this means that 95 out of 100 samples is the true population value within the range of precision specified. There is always a probability that the sample obtained by the researcher or investigator does not represent the true population value (Bhattacherjee, 2012).

Cochran's sample size formula for continuous data is presented as follows

$$no = \frac{(t)^2*(s)^2}{(d)^2} = \frac{(1.96)^{2*}(1.25)^2}{(0.15)^2}$$

Where ***"t"*** is the value for a determined alpha level of .025 in each tail is 1.96 (the alpha level of .05 implies the level of risk the researcher is willing to take that true margin of error may exceed the acceptable margin of error.)

Where ***"s"*** is an estimate of standard deviation in the population is 1.25 (estimate of variance deviation for 5-point scale calculated by using 5 divided by 4 [number of standard deviations that include almost all (approximately 98%) of the possible values in the range]).

Where ***"d"*** is an acceptable margin of error for mean being estimated is .15 (Number of points on primary scale * acceptable margin of error; points on the primary scale is 5; acceptable margin of error is .03

Accordingly, for a population of 235, the required sample size is 267. As the sample size is above 5% of the population (235*.05=11.75, the study used Cochran's (1977), correction formula to determine the concluding sample size. Then, the calculation is as follows:

$$\text{n} = \frac{no}{1+\frac{n}{population}} = \frac{267}{1+\frac{267}{235}} = 124.99$$

Where population size = 235

Where "no" is required return sample size according to Cochran's formula= 267.

Where "n" is required return sample size because sample < 5% of the population.

Therefore, the study required to collect information from 125 public servants. The sample was deemed a good representation of the population since the sample size was greater than 10 percent of the target population. Mugenda (2003) contends that for a sample to be a good representative of the population it should be at least 10 percent of the target population.

Since the target population among the stratum varies, the study used proportionate stratification to get sample size for each stratum. After fixing the number of samples from the strata, questionnaires were distributed to employees randomly. Accordingly, 125 respondents were randomly selected

from the Ministry of Transport, Transport and Communication Bureau and Management Agency to collect their feedback regarding challenges and perspectives in city logistics.

Table 3.2. Sample Distribution

S/N	Population	Population		proportionate stratified sample	
		Target Popn. Qty	Stratum Weight	Sample Size	Stratum weight (sampling fraction)
1	**Service Providers**	**235**	**1**	**125**	**100%**
	• *Ministry of Transport*	*50*	0.211	26	12%
	• *Addis Ababa City Transport*	*103*	0.440	55	54%
	• *Traffic Management Agency*	*82*	0.351	44	34%
2	**Addis Ababa city residents**	**3,384,754**	**1**	**385**	**100%**

Based on a random number table, for the total population 3,384,754 (as estimated by CSA, 2007), of Addis Ababa city residents, the sample size is 385. Therefore, the total sample size was 510.

3.7 Data Collection Method and Procedure

3.7.1 Data collection tool

To investigate the effect of challenges and perspectives in the city's logistics performance, both primary and secondary sources were used as a supply of data.

3.7.2 Primary data

Primary data was collected from Ministry of Transport, Transport and Communication Bureau and Management Agency employees who are directly working towards in policymaking and regulatory role on the city's logistical operational performance, also, residents/users/ by distributing two different questionnaires. The study adopted a structured questionnaire on the city logistics challenges.

3.7.3 Secondary data

The secondary data was collected from different articles, books, websites and documents. The public organizations' databases were reviewed to supplement the primary data.

3.8 Ethical Consideration

The data collected for this study was obtained from the participants after receiving their informed consent. Organization names have been made anonymous in this report and no data that can be used to identify organizations or individuals have been collected.

3.9 Data Analysis

Sullivan (2001) claimed that data analysis can be the most challenging and interesting aspect of research. It discusses to derive meaning from the data that would be collected in a study. Primary data whose nature is quantitative was collected and analyzed using data analysis techniques.

For ease of analysis, procedures within Statistical Package for Social Sciences (SPSS) used to quantitatively analyze the data collected from respondents through questionnaires which mainly involve six major activities namely, data preparation, counting, grouping, and statistical testing (descriptive statistics).

The analyses carried out depending on each specific objective. Hence, the statistical tool frequency distribution and mean was employed to see the response distributions on the 5-point Likert items.

3.10 Validity

To get valid data and confirm the validity of instruments used to collect data, two personnel from each agency were consulted and given the questionnaire to comment to customize to the agencies' context and a pre-test for the questionnaire were made. Furthermore, the measurement covers all aspects of the concept being measured.

4. CHAPTER FOUR: DATA ANALYSIS, RESULT AND DISCUSSION

4.1 Introduction

This chapter presents the analysis of the study findings on the challenges and perspectives of city logistics of Addis Ababa. The questionnaire was analyzed by conducting a pre-test and subsequently, it was vetted through pre-analytical processes which included data editing, data coding, error checking and data entering. Statistical Package for Social Science (SPSS) was extensively used to analyze the data. The statistical test such as reliability test (Malhotra, 2005) has been used to conduct a pre-test to measure the content validity.

According to Cooper and Schindler (2014), editing includes inspecting the data collection forms for oversights, errors, legibility and consistency in classification. The results of the study were presented according to the data analysis procedure outline in the methodology section. The collected data was analyzed in line with the objectives. The analysis results were presented in tables, graphs and charts.

4.2 Response Rate

Responses were gathered from two major groups: Addis Ababa city public service employees and residents. 125 questionnaires were distributed to public employees i.e. from the number of questionnaires distributed to Ministry of Transport (*50*), Addis Ababa City Transport Bureau (*103*) and Traffic Management Agency of the city Administration (*82*). From these, 109 responses were returned, yet among the returned, four more questionnaires were not complete. Thus, only 105 complete responses were employed in the analysis, which represents the response rate of 84%.

Three hundred eighty five (385) questionnaires were also, in the same way, administered to Addis Ababa city residents who are living in different parts of the city. And among these questionnaires distributed to the city residents', 15 questionnaires were not returned and among the returned, 27 were not complete, therefore three hundred forty three (343) complete responses were hired to the analysis, which represents the response rate of 89.1%. The rate is satisfactory, according to the argument of Cooper and Schindler (2014) that sets a response rate of 30% to 80% as acceptable.

Here, as there are two major responding groups, the data will be presented separately preceded by public service employees' responses.

Table 4.1 Personal Information of Public Service Employees

		Frequency	Percent	Valid Percent	Cumulative Percent
Organization	Ministry of transport	22	20.95	20.95	20.95
	Addis Ababa City Transport Bureau	43	40.95	40.95	61.9
	Traffic Management Agency	40	38.1	38.1	100.0
	Total	105	100.0	100.0	
Work Experience	Less than 1 year	5	4.8	4.8	4.8
	1 to 5 years	43	41.0	41.0	45.7
	6 to 10 years	40	38.1	38.1	83.8
	11 to 15 years	13	12.4	12.4	96.2
	More than 15 years	4	3.8	3.8	100.0
	Total	105	100.0	100.0	
Gender	Female	13	12.4	12.4	12.4
	Male	92	87.6	87.6	100.0
	Total	105	100.0	100.0	
Educational Level	Level 3	6	5.7	5.7	5.7
	Level 4	19	18.1	18.1	23.8
	BSc/BA	70	66.7	66.7	90.5
	MA/MSc	10	9.5	9.5	100.0
	Total	105	100.0	100.0	
Age	under 25 years	29	27.6	27.6	27.6
	25 to 30 years	36	34.3	34.3	61.9
	31 to 35 years	30	28.6	28.6	90.5
	36 to 40 years	4	3.8	3.8	94.3
	41 to 50 years	4	3.8	3.8	98.1
	Above 50 years	2	1.9	1.9	100.0
	Total	105	100.0	100.0	

Source: Own data, 2020

Table.4.1, from the total of 105(100%) respondents, 22(20.95%) were from Ministry of transport, 43(40.95%) were from Addis Ababa City Transport Bureau, and 40(38.1%) were from Traffic Management Agency of the city Administration.

There were five categories of work experience; less than 1 year, 1 to 5 years, 6 to 10 years, 11 to 15 years, and more than 15 years. Accordingly, the first category accounts 5(4.8%) of the respondents; the second group who had 1 to 5 years of experience was 43(41.0%) of the respondents, the third category who had 6 to 10 years of work experience was 40 (38.1%) of the respondents, the fourth group who had 11 to 15 years of work experience was 13(12.4%) of the respondents. The rest 4 (3.8%) of the respondents had more than 15 years of work experience. This implies most of the respondents had enough exposure.

Out of the respondents, 13(12.4%) were female and the rest 92(87.6%) were male. The proportion of shows the organizations were highly dominated by male.

The table also demonstrates the academic qualification of the respondents. As indicated in the Table, 6 (5.7%) and 19(18.1%) of the total respondents are qualified with Level 3 and Level 4 respectively. 70(66.7%) of them are first degree holders followed by Master's Degree holders 10 (9.5%). This implies that institutions have fairly educated employees.

Concerning the age structure, 29(27.6%) of respondents were in the age group under 25 years. 36(34.3%) of respondents were between the age group of 25-30 years. 30 (28.6%) of respondents were between the age of 31 to 35 years. 4 (3.8%) of respondents were between the age group of 36 to 40 years. 4(3.8%) of respondents were between the age group of 41-50 years. The rest 2 (1.9%) of the respondent was aged above 50 years. This implies that about 95(90.5%) of the respondents are below 40 years of age. The service providing organizations are said to be relatively filled by youngsters.

Table 4.2 Personal Information of City Residents

		Frequency	Percent	Valid Percent	Cumulative Percent
Position /title	Government Employee	110	32.1	32.1	32.1
	Self Employed	95	27.7	27.7	59.8
	Jobless	55	16.0	30.0	75.8
	Student	35	10.2	10.2	86.0
	Other	48	14.0	14.0	100.0
	Total	343	100.0	100.0	
Gender	Female	86	25.1	25.1	25.1
	Male	257	74.9	74.9	100.0
	Total	343	100.0	100.0	
Age	under 25 years	71	20.7	20.7	20.7
	25 to 30 years	103	30.0	30.0	50.7
	31 to 35 years	83	24.2	24.2	74.9
	36 to 40 years	52	15.2	15.2	90.1
	41 to 49 years	23	6.7	6.7	96.8
	above 50 years	11	3.2	3.2	100.0
	Total	343	100.0	100.0	
Duration in Addis Ababa	<1 Year	33	9.6	9.6	9.6
	1 to 2 Years	45	13.1	13.1	22.7
	3-5 Years	112	32.7	32.7	55.4
	Above 6 Years	153	44.6	44.6	100.0
	Total	343	100.0	100.0	

Source: Own data, 2020

Out of 343 (100%) respondents, 110 (32.1%) were government employees, 95 (27.7%) were self-employed, 55 (16.0%) were jobless, 35(10.2%) were students and 48(14.0%) were categorized in "other". In the group under "other" composes private company employees; yet, they were layoff. This implies that the combination of government employees and self-employed constitute 59% which implies the majority of respondents were employed.

In terms of gender, 86(25.1%) were female and the remaining 257(74.9%) were male. As the paper was intended to collect data on purposive sampling method, it was tried to balance the number of female respondents with the male. Here, the number of males is significantly greater than the number of females. However, the difference in number does not affect the reliability of the data.

Moreover, the majority of the respondents i.e. 20.7% were under 25 years of age. 103(30.0%) were between the age group of 25 to 30 years, 135(39.4%) were between 31 to 40 years of age. Whereas the number of respondents above 41 were 34(10%). This indicates the majority of respondents were among the youth age group.

33(9.6 %) of the respondents had less than one-year experience in living in the city. Whereas; 310(90.4%) had more than 1-year experience in living Addis Ababa. Therefore, the finding verifies that the respondents were qualified enough to respond to the questions concerning the challenges of city logistics.

4.3 Descriptive Data Presentation and Discussion

The data collected through the questionnaire have been analyzed, presented and discussed to give meaningful information. Data are presented in tables, graphs and charts and I have also analyzed the data with the aid of statistical tools, descriptive statistics.

The research questionnaire was designed using the 5-point Likert scale to collect suitable responses to questions related to each variable. Accordingly, the respondents indicated the extent they agree with the statements by choosing: 5-Strongly Agree, 4-Agree, 3-Neutral, 2-Disagree and 1-Strongly Disagree.

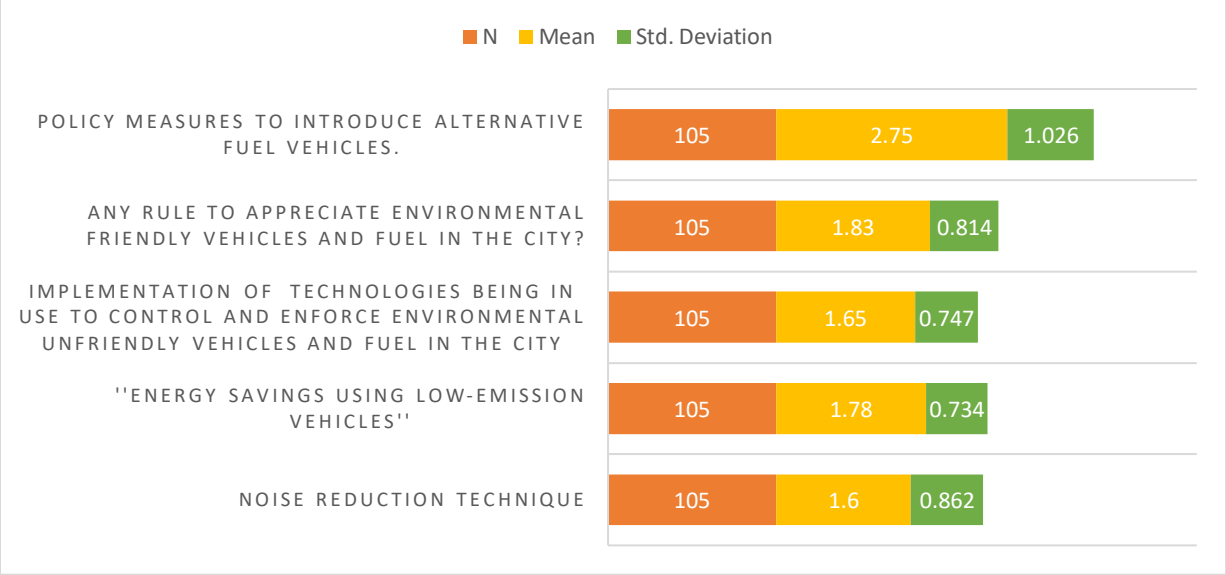
Based on the reaction of the respondents, the mean and standard deviation were calculated. For this study, a mean (M) score of 0 - 1.5 means that the respondents ranked as the questions ‘very low’, between 1.50 to 2.50 means they marked as ‘low’, 2.50 to 3.50 means the respondents were ‘neutral’, 3.50-4.50 means they labelled as ‘high’ and a mean above 4.50 means the respondents marked as ‘very high’. Based on this assumption, the descriptive analysis of variables used particularly the mean was analyzed and presented as indicated in the following sub-headings.

Quantitative data analysis method has been used to analyze the data under study. Data obtained from questionnaires and documentary sources were carefully checked to ensure completeness, accuracy and uniformity.

4.3.1 Responses according to public service providers

4.3.1.1 Challenges caused by Pollution

Chart 4.3.1 Pollution control mechanism



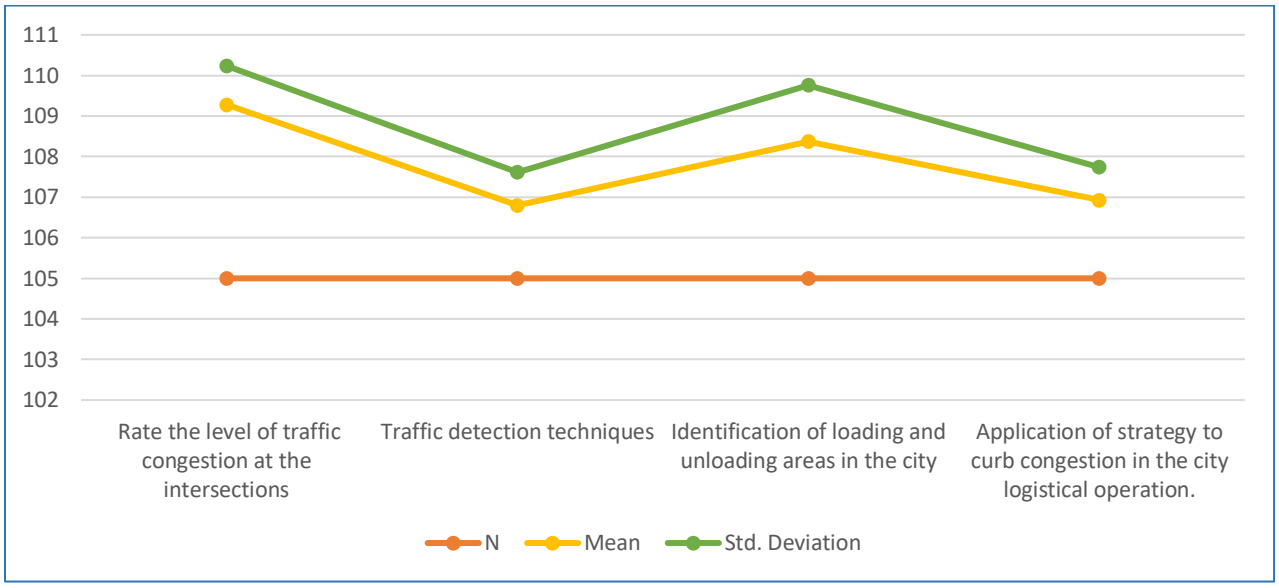
Source: Own data, 2020

According to the analysis, pollution control mechanisms were perceived differently by different groups of respondents. Though, the implementation of technologies being in use to control and enforce environmental unfriendly vehicles and fuel in the city with a mean of 1.65 is perceived to be the most serious challenge followed by energy-saving mechanisms using low-pollution vehicles with a mean of 1.78.

The mean score for noise reduction technique and equipment's financing was 1.60, which means the response of the respondents to the question was very low. This implies; however, the legal framework is there, it was not properly in place. To the existence of application of the rule to appreciate environmental friendly vehicles and fuel in the city with a mean of 1.83 and to the policy measures to introduce alternative fuel vehicles with a mean of 2.75 are perceived to be the third and fourth serious challenges perceived by the respondents.

4.3.1.2 Challenges caused by Congestion

Chart 4.3.2 Congestion



Source: Own data, 2020

Based on the mean value, as indicated in table 4.3.2, the variables for congestion varies from the highest mean score 4.28, for the level of traffic congestion at the intersections to the lowest mean score 1.80, for traffic detection techniques.

As the respondents ranked the application of strategy to curb congestion in the city with a mean of 1.93, most respondents agreed that traffic congestion at the intersection was high. This mean score is greater than 4.28. This implies that the respondents were agreed that congestion had in most parts of the city intersections. One of congestion minimization techniques in a city is the assignment of loading and unloading areas in different parts of the city, respondents rate it with 3.37 mean. This implies, however loading and unloading places are ascribed, the rate of congestion in the city is high as a result of either poor parking management or inefficient traffic detection technique.

4.3.1.3 Challenges on Cooperation and Working Procedures

Table 4.3.1 Cooperation and Working Procedures

	N	Mean	Std. Deviation
Cooperation among nearby municipalities in city logistics	105	1.80	.726
Traffic management systems	105	1.91	.822
Mechanisms of information exchange	105	2.48	1.551
Urban Consolidation Centre and distribution channels	105	1.54	.605
Rate cooperation among actors and operators in the city logistics	105	2.06	1.159
Public and private transportation network integration	105	2.43	1.231
Freight transport management systems and technologies applied	105	1.75	.769

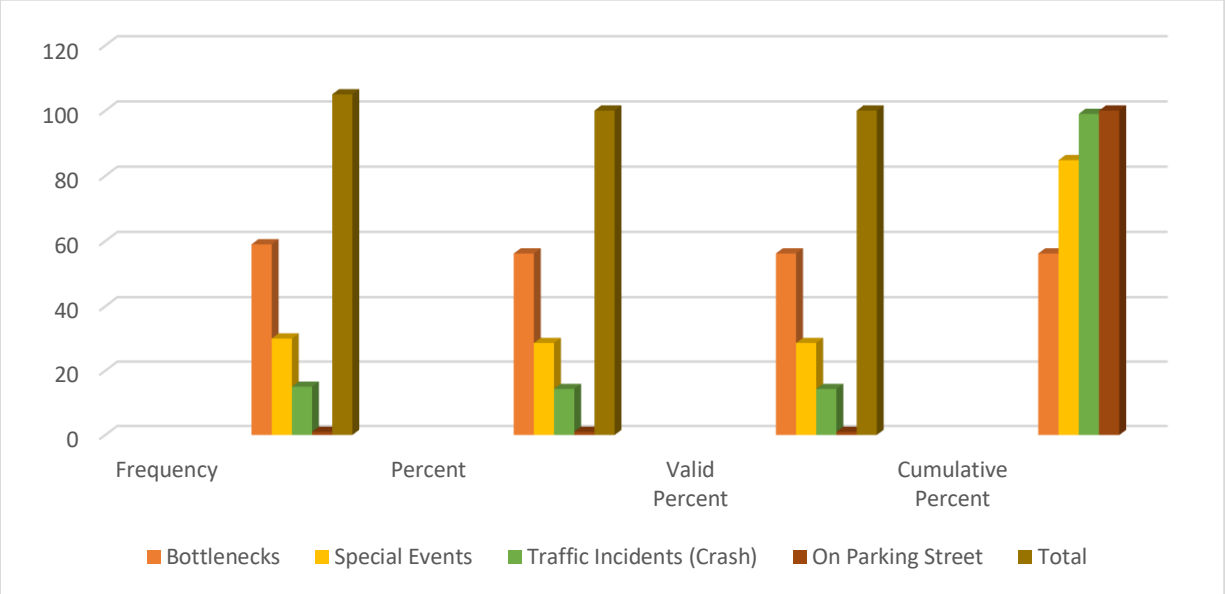
Source: Own data, 2020

The study also sought to find out the respondents how cooperation and working procedures are being in place to advance city logistics on the operational performance of the city as presented in table 4.3.1.

The maximum mean score was 2.48, for the mechanism of information exchange and the minimum mean score was 1.54, for urban consolidation centre and distribution channels for the city logistics. All variables in respect of cooperation and working procedures had a mean score of 2.06. Public and private transportation network integration, freight transport management systems and technologies applied, cooperation among nearby municipalities in city logistics and traffic management systems mean rated as 2.43, 1.75, 1.80 and 1.91. the response of all respondents to the questions was categorized from low to neutral, according to the 5-point Likert scale used in this study.

4.3.1.4 Causes of traffic congestion at the intersection

Chart 4.3.3 Causes of traffic congestion at the intersection



Source: Own data, 2020

According to the closed-ended question to propose the causes of traffic congestion at the intersection in the city the respondents cited, bottlenecks 59(56.2%), special events happening recurrently in city 30(28.6%), traffic incidents (crash) 15(14.3%) and on parking street 1%.

4.3.1.5 Suggestion to minimize congestion

Table 4.3.2 Suggestion to minimize congestion at the intersections in the city

	Frequency	Percent	Valid Percent	Cumulative Percent
Improve capacity of roads	12	11.4	11.4	11.4
Geometric improvements to roads and intersections;	18	17.1	17.1	28.6
Adding travel lanes on major freeways and streets	24	22.9	22.9	51.4
Improving public transport	9	8.6	8.6	60.0
Improve parking arrangements	10	9.5	9.5	69.5
Converting streets to one-way operations	31	29.5	29.5	99.0
Other	1	1.0	1.0	100.0
Total	105	100.0	100.0	

Source: Own data, 2020

According to the questionnaire to the public service officials to suggest a proposal to minimize the congestion at the intersections in the city, the following were the major points mentioned. Based on the data, converting streets to one-way operations, constructing major freeways and streets and geometric improvements to roads and intersections weighs 29.5%, 22.9% and 17.1% consecutively took the largest portion. The remaining proposed alternatives were improving the capacity of roads 11.1%, improving the existing public transport 8.6% and improving parking arrangements 9.5% were among the least mentioned proposals to improve congestion level in the city.

4.3.1.6 Current and anticipated city Logistics Challenges of the city

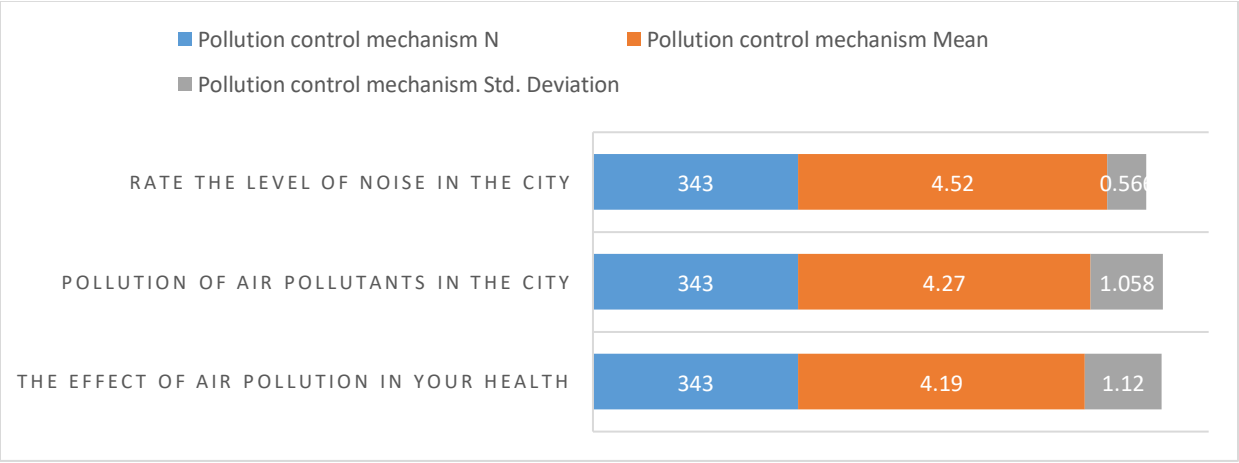
Concerning responses asked to mention challenges of the city logistics, respondents indicated:

- The drawback with the legislation of city logistics management;
- The urban environment that tends to have high congestion levels since it creates delay and unreliability for deliveries;
- Inadequate parking potential to facilitate deliveries in high-density areas indicates that parking considered as one of the city's major logistics problems;
- Land use patterns; and
- Renewed environmental challenges

4.3.2 Responses according to residents of Addis Ababa city

4.3.2.1 Challenges caused by Pollution

Chart 4.3.4 Pollution control mechanism



Source: Own data, 2020

Table 4.3.6 indicates pollution was one of the variables that are assumed to assess the challenges of the city. The respondents mean scores for the effect of air pollution in the respondents' health was with a mean score of 4.19 and the rate of air pollutants in the city mean was 4.27. Accordingly, the analysis shows that level of noise in the city was very high with a mean of 4.52.

4.3.2.2 Challenges caused by Congestion

Table 4.3.3 Congestion

	N	Mean	Std. Deviation
Rate the level of traffic congestion at the intersections	343	4.16	.755
Traffic detection techniques	343	3.28	1.426
Identification of loading and unloading areas in the city	343	3.52	1.339
Your observation on the progress to minimize congestion in the city.	343	3.42	1.359

Source: Own data, 2020

Based on the mean value, as indicated in table 4.3.7, the variables for congestion varies from the highest mean score 4.19, for traffic congestion at intersections in the city to the lowest mean score of 3.52, for identification of loading and unloading areas in the city. In this, the mean value of prevails congestion rated very high. The progress to minimize congestion in the city, the respondents' observation, with 3.42 mean. Most respondents agreed that the level of traffic congestion at the intersections was high with a mean score of 4.16. This implies that the respondents were agreed that congestion had in most parts of the city's intersections. One of congestion minimization techniques being in place in a city is traffic detection techniques in different parts of the city, respondents rate it with 3.28 mean.

4.3.2.3 Challenges on Cooperation and Working Procedures

Table 4.3.4 Procedures

	N	Mean	Std. Deviation
Cooperation among actors and operators in the city logistics	343	1.87	.767
Mechanisms of information exchange with the public	343	3.47	1.182
Public and private transportation network integration	343	2.16	1.002
Infrastructure facility for transportation	343	4.07	.775
Supply and management of public transport	343	2.61	1.116

Source: Own data, 2020

As shown in table 4.3.8, the maximum mean score was 4.07, for infrastructure facility for transportation and the minimum mean score was 1.87, for cooperation among actors and operators in the city logistics. Public and private transportation network integration mean score was 2.16. Supply and management of public transport rated with 2.61 mean value and mechanisms of information exchange, 3.47 respectively.

4.3.2.4 Causes of traffic congestion at the intersection

Table 4.3.5 Cause of traffic congestion at the intersection in the city

	Frequency	Percent	Valid Percent	Cumulative Percent
Bottlenecks	44	12.8	12.8	12.8
Special Events	59	17.2	17.2	30.0
Traffic Incidents (Crash)	14	4.1	4.1	34.1
Reduction in road capacity	31	9.0	9.0	43.1
Work Zones	26	7.6	7.6	50.7
Bad Weather	14	4.1	4.1	54.8
Road construction activities	42	12.2	12.2	67.1
Poorly Timed Traffic Signals	50	14.6	14.6	81.6
On Parking Street	27	7.9	7.9	89.5
Other	36	10.5	10.5	100.0
Total	343	100.0	100.0	

Source: Own data, 2020

According to the response of the residents of the city to the causes of traffic congestion at the intersection, the highest causes were special events, happening on the roads of Addis Ababa with a mean of 17.2%, followed with poorly timed traffic signals 14.6% and bottlenecks 12.8%. The remaining road construction activities, reduction in road capacity, On parking street and work Zones valued as 12.2%, 9.0%, 7.9%, and 7.6% respectively. Whereas, Bad Weather, Traffic Incidents (Crash) and other amounted the remaining percentage.

4.3.2.5 Suggestion to minimize congestion

Table 4.3.6 Suggestion to minimize congestion at the intersections

	Frequency	Percent	Valid Percent	Cumulative Percent
Improve capacity of roads	108	31.5	31.5	31.5
Adding travel lanes on major freeways and streets	117	34.1	34.1	65.6
Improving public transport	81	23.6	23.6	89.2
Improve parking arrangements	37	10.8	10.8	100.0
Total	343	100.0	100.0	

Source: Own data, 2020

Based on the suggestion proposed by respondents to minimize congestion at the intersections of the city roads, adding travel lanes on major freeways and streets together accounted with a mean of 31.5% and improving capacity of roads 34.1% followed with improving public transport 23.6%, and improving parking arrangements with 10.8% mean value.

4.3.2.6 Challenges caused by road safety

Table 4.3.7 Number and growth rate of road traffic accident in Ethiopia from 2007/08-2017/18

Year	Fatality	Growth rate (%)	serious injuries	Growth rate (%)	Light injuries	Growth rate (%)	Property Damage	Growth rate (%)	Total	Growth rate (%)
2007/08	1802	-	2156	-	2123	-	9005	-	15086	-
2008/09	2211	18.5	2276	5.27	2221	4.41	8987	-0.2	15695	3.88
2009/10	2600	14.96	3494	34.86	4275	48.05	7098	-26.61	17467	10.14
2010/11	2541	-2.32	3545	1.44	4570	6.46	12130	41.48	22786	23.34
2011/12	3132	18.87	4333	18.19	4932	7.34	8444	-43.65	20841	-9.33
2012/13	3362	6.84	5042	14.06	6316	21.91	9117	7.38	23837	12.57
2013/14	3331	-0.93	6039	16.51	5888	-7.27	13181	30.83	28439	16.18
2014/15	4352	23.46	5918	-2.04	6508	9.53	15639	15.72	32417	12.27
2015/16	3847	-13.13	6886	14.06	7071	7.96	17977	13.01	35781	9.4
2016/17	4500	14.51	7288	5.52	7308	3.24	19132	6.04	38228	6.4
2017/18	5118	12.08	7754	6.01	7775	6.01	20353	6	41000	6.76
Sum	36796	92.84	54731	113.87	58987	107.64	141063	49.99	291577	91.62
Average	3345	9.28	4976	11.39	5362	10.76	12824	5	26507	9.16

Source: - Ethiopian Federal Police Commission

From the above table in average annually around 26507 road traffic accident was registered in the past eleven years from 2007/08-2017/18. From those; on average yearly around 3345, 4976, and 5362 and 12824 road traffic accidents were registered as a fatality, serious injuries, light injuries and property damage respectively. Similarly; the yearly average growth rate was depicted as 9.16

percent in the study period. Concomitantly, in average yearly around 9.28%, 11.39%, 10.76% and 5% growth rate were registered as a fatality, serious injuries, light injuries and property damage respectively in past eleven years in Ethiopia. The study also claims the variation on road traffic accident between commencement of study period (2007/08) or Ethiopia millennium (2000E.C) with the end of the study period (2017/18) around 25914 road traffic accident was recorded.

4.4 Discussion and Interpretation

Based on the finding of the study, the researcher has answered the research questions and the outcomes of the findings can be summarized based on the following research questions.

4.4.1 Findings on the factors associated with challenges of city logistics of Addis Ababa

- However; environmental pollution is one of the challenges of urban areas, this problem is worse in developing cities like Addis Ababa where energy savings using low emission vehicles (mean, 1.78) is at an infant stage. Either the environmental pollution caused by freight vehicles is much more intense due to poor implementation of technologies to control and enforce environmental unfriendly vehicles or any rule that can appreciate environmentally friendly vehicles, like electric cars. But the finding depicts that there is a policy guide (mean, 2.75), and the Environmental Pollution Control Proclamation No. 300/2002 which prohibits any person from polluting the environment by violating the pertinent standard. The Federal Environmental Protection Authority (EPA), as a government body with the power to formulate policies, strategies and standards, has specified maximum tolerable noise levels based on the general requirements set by World Health Organization.
- According to the residents' mean average for the effect of air pollution on health, depicts its effect prevail on the deterioration of health.
- Emission from vehicles forms a major part of pollution in the city. Freight vehicles by nature release a large amount of emission to the environment than other vehicle types. They also cause high sound pollution especially when they are moving loaded.
- Congestion was one of the main predictors of challenges of city logistics. Nowadays, it is difficult to find a road network in Addis Ababa which is congestion-free (mean, 4.28) almost in all times of the day. This problem is worse in intersections than links of the road

networks. The researcher noticed that some parts of the centre are inaccessible by vehicles due to the poor state of access roads.

- The causes of congestion on Addis Ababa streets are so many. Yet, congestion creating due to bottleneck (mean, 56.2 %) and special events happening recurrently in the city depicts that the roads are narrow to accommodate the existing traffic.
- Based on the analysis of the overall variables of the practices on procedures, cooperation and system, the findings indicate that it had little practices concerning the application.

4.4.2 Findings on how these challenges affect the logistical activities of the city logistics

- The results obtained from the survey conducted for this study showed that traffic congestion affects people's social life as they must begin their journey earlier in the morning and reach home later than the usual time in the evening to avoid traffic. Thus, this strongly hampers the effectiveness of city logistics as fatigue and boredom born from it.
- City logistics, which focuses on the efficient and effective transportation of goods in urban areas while taking into account the negative effects, the increased usage of low capacity vehicles account for the congested roads and streets of Addis Ababa creating mobility problems to the extent that paralyses the whole traffic on the road.
- Some studies put forward that the relationship between transportation and productivity is vital as a well-established transportation system triggers economic development (Lu et al., 2009). On the contrary, Eddington (2006) argues that road congestion is costly for the country's economy due to personal and commercial motor vehicle delay.
- Based on the data collected through the questionnaires, it was found that traffic congestion induces a high level of stress and frustration in travellers, especially drivers, as they are required to be more attentive and focused while driving in challenging conditions. The results obtained from the survey also revealed that accidents endanger the safety of commuters. Likewise, the survey conducted for this study generated results that depicted that commuters suffering from asthma or other respiratory problems may be prone to more serious diseases because of polluted air caused by vehicular exhalations.
- Traffic safety, health problems (mean 4.19), and loss of public spaces and green areas are other problems that have social implication.

- Because of implementation of technologies being in use to control and enforce environmental unfriendly vehicles and fuel in the city found to be at a lower level, even for some at a very low level, congestion at the intersections (mean, 4.28), application of strategy to curb congestion in the city (mean, 1.93), has a profound effect on environmental impacts.
- The statistical analysis in this study clearly shows that the road traffic accident is at a higher risk. Although the rate varies from year to year, the cumulative is growth in the number of accidents.

4.4.3 Findings on what the possible prospects of the city's logistical activities

The data revealed that, unless efforts are maximized, considering ICT and improved structural adjustments, the existing challenges of the city would rather be intensified. Because of:

- The city environment that tends to have high congestion levels since it creates delay and unreliability for deliveries;
- Inadequate parking potential to facilitate deliveries in high-density areas indicates that parking considered as one of the city's major logistics problems;
- Land use patterns;
- Renewed environmental challenges; and
- The drawback with the legislation of city logistics management.

5. CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter presents the summary of the findings of challenges and perspectives of the city logistics of Addis Ababa city. The study aimed to evaluate the challenges and perspectives of Addis Ababa city logistics. The chapter also presents the conclusion made from the findings and the recommendations of the researcher based on the findings as well as the suggestion for further research.

5.1 Summary of Findings

- The major findings of the study revealed that however; various systemic ways, which can lubricate cooperation and working procedures, are in place to promote efficient city logistics in the city, the practices revealed that collaboration among concerned bodies evaluated to be lower.
- Congestion at the intersections multiplied with on roads special events happening recurrently is affecting people's social life, and the country's economy due to personal and commercial motor vehicle delay and road traffic accident is at a higher risk.
- Emissions and pollution produced from vehicles and poor energy saving using low emission vehicles were perceived to be the main challenges.
- The overwhelming effect of air pollution and traffic congestion affects people's social life and health status of residents.
- The logistical challenges of the city pose mobility problems to the extent that paralyses the whole traffic on the road, costly for the country's economy due to personal and commercial motor vehicle delay, environmental impacts and growth in the number of accidents.
- The existing scenario of the city logistics coupled with its geographic expansion dictates the prospect will worsen unless multiplied and concerted efforts are made.

5.2 Conclusion

The findings of the study confirmed that factors associated with challenges of city logistics of Addis Ababa based on the responses of employees which composed of four dimensions; challenges caused by pollution, congestion, cooperation and working procedures and road safety.

The study revealed that different challenges were faced the city logistics. Environmental pollution control in terms of proclamation (proclamation No, 300/2002) formulation and policy measures to introduce alternative fuel vehicles were important. Noise reduction techniques being implemented though still needs improvement, implementation of technologies being in use to control and enforce environmental unfriendly vehicles and fuel in the city, in most cases, energy savings using low-emission vehicles were matched with poor implementation of technologies in use to control and enforce environmental unfriendly vehicles and fuel in the city needs timely and proper implementation. To appreciate environmentally friendly vehicles and fuel in the city, the effort should be supported with legislation.

Concerning congestion, the study also found that the city uses different traffic detection techniques to smooth the flow of traffic and minimize human death and material damage. However; identification and usability of loading and unloading areas and application of strategy to curb congestion in the city logistical operation were underperformed. The study also found out that the level of traffic congestion at the intersections and the growth rate in the number of road traffic accident were very high.

The respondents believe that among challenges related with the cooperation and working procedures, the poor performance of cooperation among nearby municipalities in city logistics operation, traffic management system and freight transport management systems are affecting the city logistic operation. It looks like the city lacks coordination among and between concerned bodies based on the revealed result.

According to the study, the challenges are strongly affecting the city's logistics by hampering the expected performances of city logistics as environmental pollution and congestion are aggravating. Thus, economic, social and safety of the city is being deteriorated.

The possible prospects of Addis Ababa city logistic activity are very complex and remain to some extent unknown, which is a consequence of the diversity of agents. The objective of City logistics is to increase the efficiency and alleviate the negative effects of logistics performances, and also facilitates the sustainable development of the city. Yet, the findings, indicate that to resolve the rising challenges and define the workable solutions which would encourage the economic development and improve the living conditions in the city, the situation needs an inclusive analysis and active participation of the authorities and operators. Many proposals would have been suggested, especially in terms of environmental impact and service quality, to make logistics more efficient.

5.3 Recommendations

Based on the results of the study and literature review made on the subject matter, the following recommendations have been drawn.

- Traffic rules and regulations regarding parking, sound limit in the town, vehicle life sapans and mechanical indispensable should be developed and strongly implemented.
- Technologies can provide important solutions for the reduction of the environmental footprint of city logistics activities. The city government should design an incentive plan to attract creativity from private sectors to promote intelligent transport systems like vehicles with a different design, specially made for urban utilization, or use new propulsion solutions, such as hybrid or electrical and importers of such kind of technologies as well. Pollution and noise problems in urban regions, yet, they still contribute to congestion and other problems.
- Structuring of the logistics sectors to work towards a reduction in congestion and emissions, whilst safeguarding the economic and social interests of the city, as well as its surroundings.
- The government should encourage the Public-Private Partnership (PPP) 34to develop freight facilities like integrated logistics terminals.
- The city government should legislate appropriate and optimal city logistics design and planning and strictly enforce the use of environmentally friendly freight vehicles and improve the capacity of roads.

- The participation and engagement of stakeholders when implementing are positive not only because normally higher levels of efficiency it obtained, but also to promote economic development. Therefore, City logistics should be the subject of participatory strategic plans, as well as land use, transport and traffic plans.

5.4 Future Research Recommendation

This research was conducted in Addis Ababa city logistics with limited parameters. Accordingly, it is advised for future researchers to extend the study to include other cities. Moreover, to extend the research to other related dimensions of city logistics.

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Appendix

QUESTIONNAIRE FOR SERVICE USERS

ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT GRADUATE PROGRAM

QUESTIONNAIRE

Dear participants, I am MA student in Logistics and Supply Chain Management in Addis Ababa University School of Commerce and I am conducting a study on Challenges and Perspectives in City Logistics: the case of Addis Ababa city.

The objective of this project is to describe Challenges and Perspectives in City Logistics: The case of Addis Ababa city. Through your participation, I eventually hope to understand how logistics is practised and the related challenges which support for further analysis and study.

Enclosed with this letter is a brief questionnaire that asks a variety of open and close-ended questions about your experience toward Challenges and Perspectives in the City Logistics. I am asking you to look over the questionnaire and, if you choose to do so, please complete the questionnaire and call me on the phone number provided below, so that I will come and take it on any time that is convenient for you.

Please do not write your name on the questionnaire. Your responses will not be identified with your personality, nor will anyone be able to determine which company you work for. Nothing you say on the questionnaire will in any way influence your present or future employment with your organization.

I hope you will take a few minutes to complete this questionnaire. Your participation is voluntary and there is no penalty if you do not participate.

If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me at 0911346011 or samitsedi2000@gmail.com. Thank you in advance for your cooperation!

Demography of Respondents

1.Current Position/title	Government Employee (1)	Self Employed (2)	Jobless (3)	Student (4)	Other (5)
	☐	☐	☐	☐	☐

2. Gender	Male (1)	Female (2)
	☐	☐

3.Age	Under 25 (1)	25 to 30 years (2)	31 to 35 years (3)	36 to 40 years (4)	41 to 50 years (5)	Above 50 (6)
	☐	☐	☐	☐	☐	☐

4. Duration in Addis Ababa	Less than 1 year (1)	1 to 2 Years (2)	3-5 Years (3)	Above 6 Years (4)
	☐	☐	☐	☐

S/N	Questions	Possibility				
		Very low (1)	Low (2)	Neutral (3)	High (4)	Very high (5)
Pollution control mechanism						
5	Rate the level of noise in the city	☐	☐	☐	☐	☐
6	Pollution of air pollutants in the city?	☐	☐	☐	☐	☐
7	The effect of air pollution in your health?	☐	☐	☐	☐	☐
Congestions						
8	Rate the level of traffic congestion at the intersections	☐	☐	☐	☐	☐
9	Traffic detection techniques	☐	☐	☐	☐	☐
10	Identification of loading and unloading areas in the city	☐	☐	☐	☐	☐
11	Your observation on the progress to minimize congestion in the city	☐	☐	☐	☐	☐
Procedures						
12	Cooperation among actors and operators in the city logistics	☐	☐	☐	☐	☐
13	Mechanisms of information exchange with the public	☐	☐	☐	☐	☐
14	Public and private transportation network integration	☐	☐	☐	☐	☐
15	Rate the Infrastructure facility for transportation	☐	☐	☐	☐	☐
16	Supply and management of public transport	☐	☐	☐	☐	☐

17. What do you think about the cause of traffic congestion at the intersection in the city?

A) Bottlenecks	B) Special Events
C) Traffic Incidents (Crash)	D) Reduction in road capacity
E) Work Zones	F) Bad Weather
G) Road construction activities	H) vehicle breakdown
I) Poorly Timed Traffic Signals	J) On Parking Street
K) Other	

18. What do you suggest to minimize the congestion at the intersections in the city?

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QUESTIONNAIRE FOR PUBLIC SERVICE PROVIDERS

ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT GRADUATE PROGRAM

QUESTIONNAIRE

Dear participant, I am MA student in Logistics and Supply Chain Management in Addis Ababa University School of Commerce and I am conducting a study on, Challenges and Perspectives in City Logistics: The case of Addis Ababa city.

The objective of this project is to describe Challenges and Perspectives in City Logistics: The case of Addis Ababa city. Through your participation, I eventually hope to understand how logistics is practised and the related challenges which support for further analysis and study.

Enclosed with this letter is a brief questionnaire that asks a variety of open and close-ended questions about your experience toward Challenges and Perspectives in the City Logistics. I am asking you to look over the questionnaire and, if you choose to do so, please complete the questionnaire and call me on the phone number provided below, so that I will come and take it on any time that is convenient for you.

Please do not write your name on the questionnaire. Your responses will not be identified with your personality, nor will anyone be able to determine which company you work for. Nothing you say on the questionnaire will in any way influence your present or future employment with your organization.

I hope you will take a few minutes to complete this questionnaire. Your participation is voluntary and there is no penalty if you do not participate.

If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me at 0911346011 or samitsedi2000@gmail.com.Thank you in advance for your cooperation!

Demography of Respondents

1.Organization	Transport operation (1)	Traffic management (2)	Finance, Purchase and property Management (3)	Information communication technology (4)	Road safety (5)
	☐	☐	☐	☐	☐

2. Work Experience	Less than 1 year (1)	1 to 5 years (2)	6 to 10 years (3)	11 to 15 years (4)	More than 15 years (5)
	☐	☐	☐	☐	☐

3. Gender	Male	Female
	☐	☐

4.Age	Under 25 (1)	25 to 30 years (2)	31 to 35 years (3)	36 to 40 years (4)	41 to 50 years (5)	Above 50 years (6)
	☐	☐	☐	☐	☐	☐

5. Educational level	Level 3 (1)	level 4 (2)	BSc/BA (3)	MSc /MA (4)	PhD (5)	Other (6)
	☐	☐	☐	☐	☐	☐

S/N	Questions	Possibility				
		Very low (1)	Low (2)	Neutral (3)	High (4)	Very high(5)
	Pollution control mechanism					
6	Noise reduction technique	☐	☐	☐	☐	☐
7	Energy savings using low-emission vehicles	☐	☐	☐	☐	☐
8	Implementation of technologies being in use to control and enforce environmental unfriendly vehicles and fuel in the city	☐	☐	☐	☐	☐
9	Any rule to appreciate environmentally friendly vehicles and fuel in the city	☐	☐	☐	☐	☐
10	Policy measures to introduce alternative fuel vehicles	☐	☐	☐	☐	☐
	Congestions					
11	Rate the level of traffic congestion at the intersections	☐	☐	☐	☐	☐
12	Traffic detection techniques	☐	☐	☐	☐	☐
13	Identification of loading and unloading areas in the city	☐	☐	☐	☐	☐
14	Application of strategy to curb congestion in the city logistical operation	☐	☐	☐	☐	☐
	Procedures					
15	Cooperation among nearby municipalities in city logistics	☐	☐	☐	☐	☐
16	Traffic management systems	☐	☐	☐	☐	☐
17	Mechanisms of information exchange	☐	☐	☐	☐	☐
18	Urban Consolidation Centre and distribution channels	☐	☐	☐	☐	☐
19	Cooperation among actors and operators in the city logistics	☐	☐	☐	☐	☐
20	Public and private transportation network integration	☐	☐	☐	☐	☐
21	Freight transport management systems and technologies applied	☐	☐	☐	☐	☐

22. What sources do you think are the major causes of noise in the city?

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23. What do you think about the cause of traffic congestion at the intersection in the city?

A). Bottlenecks	B). Special Events
C). Traffic Incidents (Crash)	D). Reduction in road capacity
E). Work Zones	F). Bad Weather
G). Road construction activities	H). vehicle breakdown
I). Poorly Timed Traffic Signals	J). On Parking Street
K). Other	

24. What do you suggest to minimize the congestion at the intersections in the city?

A). Improve the capacity of roads	B). Geometric improvements to roads and intersections;
C). Adding travel lanes on major freeways and streets	D). improving public transport
E). Improve parking arrangements	F). Other
G). converting streets to one-way operations	

25. Please list Current and anticipated city Logistics Challenges of the city on the space provided.____

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