AAU COLLEGE OF BUSINESS & ECONOMICS

SCHOOL OF COMMERCE

DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Factors Affecting City Logistics System in Addis Ababa

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A thesis submitted to the department of Logistics and Supply chain Management graduate Studies, School of Commerce, Addis Ababa University for the partial fulfilment of the requirements of a master of art degree in logistics and supply chain management

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Addis Ababa University School of Commerce

June, 2022

ADDIS ABABA, Ethiopia

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STATEMENT OF DECLARATION

I, the undersigned, declare that the research entitled ‘factors Affecting city logistics System in Addis Ababa’ 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.

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CERTIFICATION

This is to certify that Biniyam Ketema Wondimu has carried out this research work on the topic entitled “Factors Affecting city logistics system in Addis Ababa” 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.

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Acknowledgment

First and foremost, praise to the almighty God, for His abundant blessings during my study effort, which enabled me to successfully complete the research.

I'd like to convey my heartfelt gratitude to Matiwos Ensermu (PhD), Associate Professor of Logistics and Supply Chain Management and Vice President for Administration and Student Services, for allowing me to conduct research and for providing me with vital support during this process. He showed me how to conduct research and present my findings in the clearest and most concise manner possible. Working and studying under his direction was a wonderful honour and privilege.

My parents' love, prayers, care, and sacrifices in educating and preparing me for my future are greatly appreciated. My wife (Rahel Feleke) and Baby girl (Yemariam Biniyam -*Butana*) deserve special thanks for their love, patience, prayers, and unwavering support in helping me finish this research project. I also want to thank my sisters and brother for their unwavering support and prayers. Tseday Worku, my Mentor, and my colleagues in Segon-Marill deserve special thanks.

Finally, I want to express my gratitude to everyone who has helped me complete the research work, directly or indirectly.

Thank you All!

Biniyam Ketema

Abstract

Logistics is a term that has evolved through time to encompass a wide range of activities and their contribution to society's long-term economic, social, and environmental growth. City logistics, on the other hand, is the process of transporting, storing, and delivering commodities to customers/residents of metropolitan regions. The goal of this study paper is to identify variables that influence Addis Ababa's city logistics system. Addis Ababa city's population is growing at a rapid pace, necessitating parallel economic and social development. As Ethiopia's and Africa's capital, the city requires a cutting-edge city logistics management system to meet the everyday demands and consumable commodities of its residents. The city, which spans over 540 thousand square kilometers and is divided into 11 sub-cities, is located in the geographic center of Ethiopia. The overarching purpose of this study is to evaluate the factors that influence Addis Ababa's city logistics system. This study is descriptive since it aims to investigate the situation of city logistics in Addis Ababa as well as the link between numerous factors impacting city logistics in the city. To collect and evaluate data, however, a mixed-methods approach is used. From a practical aspect, the mixed-methods approach captures both quantitative and qualitative data in the design, either sequentially or concurrently. The data was acquired using a five-point Likert scale with 35 items, an open-ended questionnaire, and a structured interview question. The information was gathered from private and public logistics professionals that work in Addis Ababa's city logistics. 73.7 percent of the responses to this survey came from experts in public and private logistics operation services. Moreover, freight association managers in the private sector and unit heads in transportation authorities, who account for 6.5 percent and 16.4 percent of the respondents, respectively, who are operationally experienced professionals are included as well. In addition, the study includes 3.4 percent of the respondents who are familiar with the issue: researchers. The operation, infrastructure, information platform, and facilitation were the criteria chosen and examined based on the literature. They are positively connected from low to moderate levels. Any change in one of these characteristics will have a favorable impact on the other; they are interconnected. These four variables affect 52.6% of the logistics practice as per the regression analysis result. In addition to these four concerns, the participants' additional variables affecting Addis Ababa's municipal logistics system included stakeholder awareness about the concept, insufficient regulatory framework, license and registration, and freight pricing. Finally, the thesis makes a viable recommendation to address these issues.

***Key words**: city logistics system, operational model, infrastructural network, information plat Form, facilitation.*

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CHAPTER ONE: INTRODUCTION

1.1. Background of the study

Logistics is a concept evolving through time to cover a wide range of activities and its contribution to the sustainable economic, social and environmental development of the society. It is a process that transports raw materials and finished goods from one place to the other by fulfilling the legal and customs requirements. The scope of logistics covers the planning, analysing, coordinating and integrated management of material and product flow in cooperation with different operators. City logistics is adopted with the same scope of activities but in a limited geographical area; urban centres.

Likewise, city logistics is a process of transportation, warehousing and delivery of goods to the customers/residents of urban areas. As coined by (Taniguchi et al, 1999a*)*, ‘‘City Logistics is the process for totally optimizing the logistics and transport activities by private companies with the support of advanced information systems in urban areas considering the traffic environment, the traffic congestion, the traffic safety and the energy savings within the framework of a market economy’’ (Taniguchi et al., 1999). The word optimisation is a key in this definition as it will cover the optimisation of resources, logistic activity and urban transport operations to obtain economic, social and environmental benefits to city dwellers. The term optimisation is not utilised well with the city logistics framework. In addition, the advancement in technology and Globalization are changing the shape of the supply and demand of goods in urban areas, which calls for the need for continuous follow-up and optimization of city logistics in urban centres.

These days, Globalization and the advancement in information technology have accelerated the need and role of urban logistics in the sustainable development of cities. The demand of urban area residents has changed: Fast, reliable and cost-effective delivery services are becoming the major criteria of the urban centres’ residents. To fulfil this growing demand, the city logistics management system, infrastructure and process have a great role and, are required to advance its operation to fulfil the expectation of the residents with the available (limited) resources. This subject is one of the major issues that shape the contemporary city logistics practice in the world and is demanding the same from Addis Ababa.

The Federal Constitution of 1995 established the federal government's authority and functions, as well as those of the country's nine autonomous states (World Bank, 2015). The cities of Addis Ababa and Dire Dawa, on the other hand, have been granted the same level of autonomy as state governments. Local structures (sub-cities) are permitted in the cities of Addis Ababa and Dire Dawa, with Kebeles serving as the smallest administrative unit. In Addis Ababa, Kebeles have recently been replaced by Woredas, and the structural structure is now created by the city administration, sub-city, and Woreda. The city is currently administrated by Eleven sub-cities and 116 woredas at the local level.

Ethiopia's total population is estimated to be around 100 million people, according to the CSA. Around 20% of the overall population lives in urban areas. Addis Ababa is home to approximately 3.2 million people or about 17% of Ethiopia's total urban population. Addis Ababa, Ethiopia's capital and largest city, is well connected to other regions of the country by road, train, and air, in addition to air connections to numerous international countries. Because Ethiopia is a landlocked country, it relies heavily on Djibouti for all of its imports and exports. A recently completed and operational (as of January 2018) train route connects Addis Ababa with Djibouti, in addition to the road network. The city is situated in the geographic middle of Ethiopia, covering an area of over 540 square kilometres and divided into 11 sub-cities.

The city is the country's largest, political, and economic hub, as well as the home of the African Union and the United Nations Economic Commission for Africa's headquarters. It also houses more than 100 embassies and several international aid and development organizations. Addis Ababa handles a considerable number of freight vehicles and also has a big number of warehouses within and around the main city centre, attracting large freight vehicles with poor service. Addis Ababa alone registers almost 83 per cent of the country's total freight vehicles (FTA, 2016). Due to a lack of logistics techniques to maximize vehicle use, freight hauling vehicles in the city-run at a low load factor. Even though freight vehicles account for a small percentage of total vehicle traffic in the city, their large bulk and difficulty of manoeuvrability induce congestion. One of the contributing factors to delays, congestion, accidents, and pollution in the city is the improper location of freight transportation facilities such as warehouses (Nebiy, 2011).

Addis Ababa is one of the world's fastest developing cities and the headquarters of the African Union. It is also Ethiopia's capital and commercial centre. According to the 2007 census, Addis Ababa is the country's most populous city, with a population of 2, 738,248 people. Even though the actual number today (2022) is different, this estimation made 14 years before is the latest formal information obtained about the population of Addis Ababa. The population of the city is increasing at the fastest rate which requires an analogous economic and social development. As the capital of Ethiopia and Africa, the city demands a highly advanced city logistics management system to fulfil the daily demand and consumables goods of its inhabitants. This research paper is done to identify factors affecting the city logistics system of Addis Ababa city.

1.2. Statement of the problem

In 2020, the city of Addis Ababa has developed a ten-year developmental policy and action plans. Unlike passenger transport, the urban development planners and policymakers have given limited attention to the role and advancement of urban freight transport in the strategic document (Addis Ababa Transport Policy, 2020). And with its limited coverage of city logistics in the policy framework, the authority focuses on the regulation to limit the mobility of freight transport within the city. Like other similar developing cities, this is one indicator of the limited attention given to city logistics in sustainable development programs.

Further, the population of Addis Ababa was estimated at 2,738,248 forty years before with an increasing rate of 3.8% per year. Migration from rural to urban areas is another element contributing to the city's continual population growth. The city spans 527 square kilometres and has a population density of 5,165 persons per square meter. This rapid population growth of Addis Ababa expands the city in all directions and calls for high mobility infrastructure and additional service requests. Unless the city development plan considers this continuous increase in demand and coverage of its resident (Yanqiang, 2014), it will be one major hindrance to the sustainable development of Addis Ababa.

Addis Ababa is a manufacturing metropolis that produces textiles, shoes, food, drinks, wood goods, plastics, and chemical products, among other things. These manufacturing and industrial companies are physically located in different parts of the city. These industries demand freight transport to mobilize their raw material to the production sites and finished goods to

their customers. Further, Addis Ababa is the third diplomatic city in the world with a large number of embassies, united nation offices and African union headquarter. In addition, there are banks and insurance companies that facilitate the financial transaction of the city's inhabitants (Matiwos, 2020). These offices also require a high number of utilities and consumables to run their daily operational activities. But likely these freight goods are transported in the city of Addis Ababa fragmentally and without collaboration among different private operators.

Road congestion during the peak and off-peak hours is also an observable indicator of the mismatch between the traffic volume and road infrastructure (Nebiy, 2011). And like other city centres, the urban city transport vehicles are older than long-distance freight transporters, the age of the truck, traffic congestion and the high dependence of city logistics on urban logistics creates a high gas emission in the city which affect the environment. The below bullet points will sum up the need to have advanced research on the city logistics of Addis Ababa:

- The population growth
- The advancement in technology and growth of E-commerce in the city
- The increasing contribution of city logistics to the sustainable development of a city,
- Thus far, limited research has been conducted in Ethiopia to see the contribution of city logistics to the sustainable development of the city.

These far, Only a few types of research had been conducted in the city logistics area in Ethiopia, especially focusing on Addis Ababa. Even though there are empirical studies related to logistics system challenges in terms of operations performed in Ethiopia, in general, and transport problems in Addis Ababa, in particular, there is no comprehensive study made to address the city logistics systemic problem in Addis Ababa (Matiwos, 2020). Based on the empirical search, there are three research conducted on city logistics of Addis Ababa city and none of them addressed the city logistics system.

Therefore, this research paper is an in-depth research to address these potential problems in Addis Ababa and Make recommendations for ways to improve the city's logistics and freight transportation capability.

1.3. Objective of the study

1.3.1 General Objectives

Every urban area devises its system that will resolve city logistics challenges considering its context, available resources, creativity and development status. The overall goal of this research is to assess factors affecting the city logistics system in Addis Ababa.

1.3.2. Specific objectives

- To determine the value of the operational Model in Addis Ababa's synchronized city logistics practice.
- To determine the value of Information platforms in Addis Ababa's synchronized city logistics practice.
- To assess the role of the public authority in supporting and facilitating the city logistics practice in Addis Ababa
- To assess the contribution of the infrastructure network in the city logistics practice.

1.4. Basic research Question

This research paper assesses how globalization, E-commerce and collaboration among stakeholders affect sustainable city logistics development in Addis Ababa. For this, the researcher has devised four research questions which can show the relationship of factors affecting city logistics in Addis Ababa:

RQ. 1. How city logistics operational Model affect the city logistics practice of Addis Ababa?

RQ. 2. How Information platform affects the city logistics practice of Addis Ababa?

RQ. 3. How the facilitation of public Authority affects the city logistics practice of Addis Ababa?

RQ. 4. How the infrastructure network affects the city logistics practice of Addis Ababa?

1.5. Significance of the study

The finding of this study has different importance for different parties in the city of Addis Ababa. Development policymakers of the federal state and Addis Ababa city transport administrators get inputs to devise a policy and legal framework workable for the urban freight distribution system. It shows some ways on the way to enhance the deployment of existing infrastructure and facilities. The residents of Addis Ababa are beneficiaries of this study as the findings are an input to improve the mobility of the freight transport by minimising its

negative impact; unavailability of cost-effective commodities, unregulated the gas emission and increased accidents in the city.

The study has shown the need and importance of cooperation among stakeholders which benefits the stakeholders in optimizing resource utilization and operation. Last, academically the study will help the researcher to have advanced expertise and knowledge in the area of city logistics and will serve as a reference document for future studies in the subject area.

1.6. Scope of the study

The subject matter to be covered by this research thesis is limited to two perspectives: a geographical and theoretical framework. This study's geographical scope is restricted to Addis Ababa, Ethiopia. As the city is a highly populated and urbanized state in the country, the major findings can be adapted to other developing urban cities in the country. And theoretically, through time the definition of city logistics is developing to cover many activities in the urban centres. So, the paper will try to delimit the coverage of the theoretical framework by providing a feasible conceptual framework for city logistics.

1.7. Limitation of the Study

The city logistics concept is new to the country where most of the experts and stakeholders are not aware of their role and contribution to the development of the city. This lack of awareness in the community and among experts was the major challenge in collecting data in questionnaires and interviews.

The second major challenge is the new restructuring of the Addis Ababa transport authority and ministry of transport and Logistics. During the data collection phases of this research, both offices were assigning employees and managers to the new posts, so it was difficult to get the responsible persons and expert feedback timely.

1.8. Organization of the research report

The paper is organized in five chapters which are structured methodically and guide the reader through the literature used, and the research carried out.

Chapter 1 – Introduction: this chapter covers the basic information about the need, objective and scope of the study. It also includes basic terminology and topics that will be used

throughout the research. The aim of the study is defined and the four research questions formulated are grouped in this part.

Chapter 2 – Literature review: in this chapter, detailed definitions and theories for the research are covered. It begins by defining the term, as well as the characteristics and elements of city logistics. This section of the research also defines the theoretical basis for city logistics and cooperation. Further, this part of the paper covers the four elements that constitute a city logistics system.

Chapter 3 – Methodology: The research technique, data collection method, study population, and sample size are all discussed in this chapter. This section also covers the research's validity, reliability, and ethical considerations.

Chapter 4 – Results: in this chapter, the research has presented the results obtained from the survey conducted and the analysis carried out. The analysis part will be organized in a way to addresses the research questions chronologically.

Chapter 5 – Discussion and conclusion: this chapter covers the summary of the findings. Following that a conclusion and recommendation based on the findings are presented. Recommendation for future studies is also included in this part of the paper.

The last pages of the paper cover the bibliography and Appendix part.

CHAPTER TWO: REVIEW OF RELATED LITERATURE

2.1. Introduction

This part of the research is composed of three major components of the research. The first part presents the conceptual framework of city logistics and followed by the theory concerning the subject matter and the last part covers the empirical part which assed related research conducted before this work.

In the first part, the theoretical aspect tries to define logistics in general which leads to the geographically limited logistics activity called city logistics. The definition of city logistics is related to major terms that define the concept which is urbanisation and sustainable development. The objective, characteristics and classification of city logistics are also covered in this part of the review to give us the conceptual framework of city logistics. Stakeholder's interest and cooperation level is also the other part of the theoretical framework which will give us an ideal urban freight logistics operation and system. The operational model and system are the core part of the literature which will give us insight into the identified Variables. In a word, this section of the study allows us to figure out how the variables are related.

The second part of the literature discusses the Cooperation theory which frames the study theoretically. It shows the cooperation level and type required in logistics activity. The last part of the literature covers prior studies in the area of city logistics in the Ethiopian context. Three pieces of research that resemble the concept and context of the subject under study are identified and analysed. The similarity and differences between the proposed study and the prior studies have been analysed and the need to do the subject study has been redefined.

2.2. Conceptual Framework

City logistics is a young concept that gets recognition after the industrial revolution when urban centres start to emerge.

The scope, function and role of the concept are increasing through time. Despite its continuous conceptual development, the study tries to frame the core aspects of city logistics in a scientific framework.

2.2.1. Logistics

Logistics is a long-lived service sector that fundamentally contributes to the industrial and economic development of many countries. But it recently (1950's) get recognition as a separate and independent function. There are two major reasons for this long delay to get recognition, these are, that its functions had many subfunctions and subsystems. As a result, logistics is a diversified and dynamic function that must be flexible and evolve in response to the numerous limits and demands placed on it, as well as the environment in which it operates. (A. Rushton, 2014).

A well-known and simple definition of logistics is Logistics = Materials Management + Distribution. (Rushton, A. 2014). The information pertains to the transportation of both raw and finished items to their final destination. And logistics is not limited to the distribution of physical goods but rather includes information flow and storage services. Furthermore, reverse logistics is a type of logistics service that involves returning used products and returnable packaging to a system.

Even though different definitions had different values to the development of the concept, the below definition describes the logistics component and process flow in a detailed manner:

'Logistics management is the component 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 the needs of customers.' (CSCMP, 2012)

It is the movement of products from their point of origin; the place prepared by the shipper, wholesaler or retailer, to the destination by fulfilling all the legal and customer requirements. The word 'controls effective and efficient' describes the cost and time quality required from logistics. Logistics is the process of delivering items at the correct location, at the right time, for the right price, and in the right condition. These performance measures of any logistics activity are explicitly and impliedly incorporated in the above definition. Also, the definition covers the major activities in logistics service and lists them as – transportation, Warehousing, Inventory, Packaging and information. City logistics is a logistic activity that incorporates all the above elements but with a different feature for the urban environment.

2.2.2. Definition of City Logistics

It is difficult to find a comprehensive definition for the term city logistics. Different scholars have attempted to define the term and below the researcher tries to present two definitions forwarded at a different times that can best express the concept. The first definition selected is:

'Logistical process planning, monitoring, and control in a cross-company logistics system that is linked with economic and environmental goals. The primary purpose of city logistics is to collaborate in the provision of logistics services to meet the needs of a metropolitan area in terms of product supply and disposal.' (Yanqiang, 2014).

This definition calls for the need for cooperation among operators and stakeholders to deliver the city logistics service. The benefit of city logistics in the economy and environment of a city is also included in the definition.

The second definition selected to clarify the concept and for the consumption of this study was forwarded by Benjelloum in 2009

'City logistics aims to eliminate the inconveniences of freight transportation while promoting the long-term development of cities.' It works by coordinating shippers, carriers, and movements, as well as consolidating loads from many clients and carriers in the same environmentally friendly vehicles.'

Sustainable development is a new addition in the context of city logistics which requires the developers and policymakers to consider the rights and interests of the future generation. It enlarges the scope of the term. As per the above two definitions, the core activities of city logistics can be summarized through the below three pillars: (a) Mobility, (b) Sustainability, and (c) Liveability.

The mobility aspect covers the transfer of goods from other sub-region or Global markets to the city, the movement within the city and the transport for the city to other parts of the country/region. The infrastructure and operating system used are important factors to enhance the connectivity and optimise delivery time. The small and frequent delivery requirements of urban freight logistics demand enough road network capacity and system that alleviate the city road congestion problem.

Sustainability is the approach to minimise the negative impact of city logistics over time. Air pollution, noise, and accidents are some of the negative effects of urban transportation on the

environment and social lives of city people. Old and heavy trucks are the major source of the negative environmental impact on city logistics. As a result, minimizing the negative environmental consequences of trucks is a significant topic to consider when planning urban freight transportation systems. To create a sustainable metropolis, it is also necessary to reduce energy usage.

Liveability in the city is related to the availability and delivery of a variety of consumables for the life of city residents. As urban residents live far from agricultural and production areas, availing the needs and requirements of the residents in a wide variety is the main objective of the urban logistics system.

2.2.3. Objective of city Logistics

The objective of city logistics can be seen from different perspectives but the below dimensions cover the major objectives. These objectives are not stand-alone, rather one impacts the other iteratively and they are interconnected. These are economic, environmental and Social.

- Economic – city logistics positively affect the market and business in the city. City logistics has the aim of reducing total logistics cost, proper utilization of all infrastructures and sustainability of urban fiscal growth.
- Environmental – city logistics has an objective to lower traffic noise, lower gas emissions and improve the city living environment of an urban centre.
- Social-city logistics aim in providing sustainable goods supply for citizens, shorten the delivery time, and alleviate traffic congestion and accident.

2.2.4. Characteristics of City logistics

Even though City logistics share many characteristics with general logistics, some features are unique for city logistics:

- Network – it is not a standalone origin or destination place for goods, rather interlinks the global and regional logistics. In addition, the city logistics system connects the network of manufacturer, whole seller and retailer to deliver goods to the final customer.
- Operate in Cities- unlike global logistics that had unlimited movement from one place to the other (cross-boundary) using different chains, in terms of logistics activity within the city, the city logistics operation is restricted in the territory of the city. But in

some cases, the operation involves nearby cities or peripheries as consolidation centres and factories are sometimes located out of the city. The origin of the consignment might be from inside the city or outside of the cities but in most cases, the destination is the city centres.

- High frequency and smaller volume- small trucks and delivery systems are preferred in the city logistics system as the city congestion and regulation is not in favour of heavy trucks. Providing a daily consumable for city residents requires a lot of trips to the retailer shop or resident's door. Especially with the increasing availability of e-commerce in city centres, the door delivery in small parcels to residents is increasing. In addition, the provision of spare parts and raw materials for industries in the city is the other frequent activity of urban freight transport.
- Road transport – even though the road transport creates congestion on the road and pollution to the environment, it is the most utilized means of goods transport in cities. Hence freight vehicles are being required to become lighter, smaller and especially more environmental-friendly.
- For City Dwellers: Despite its origin, the destination of urban freight logistics is always within the boundary of the city as it is destined to improve the lives of city residents. But there are occasions when the nearby suburb residents become a customer and benefited from the system and infrastructure of the city.

2.2.5. Classification of city logistics

The city logistics can be classified using different criteria affecting the service. But the customer-oriented classification and the classification based on the goods to be delivered are the prominent ones. The best classification selected for this study is based on the nature of the goods to be delivered. It has five major groups:

- Consumer goods: these items are products moved by city logistics that are useful for the day-to-day consumption of city residents.
- Building materials: A city requires different building materials to be transported within (from outside of) the city for the construction of roads, infrastructure, houses for residents, and different projects. This requires a large volume of freight traffic.
- Industrial goods: these days the movement of industrial goods in the city is decreasing as most industries are located outside the city. However, this group includes the delivery of raw materials and parts to city-based enterprises. Even though the sources of

the raw materials and parts are outside of the city, the supply chain requires city logistics for the last-mile delivery.

- Public products: Here, mail services and waste collection are two examples of representative industries.
- Others: this group covers the city logistics activity to fulfil the requirements of occasional events like sporting events, festivals and exhibitions. The volume of goods and transport trips required for the events vary from one to the other depending on the nature and participants of the event.

Of the above groups, the first consumer goods group covers the major part of the city logistics process due to its high demand in the size and high frequency of the other group.

2.3. Theoretical Frame Work: Cooperation theory

In today's dynamic and complex world, it is common to hear the importance of cooperation for success in both the private and public sectors. It is a voluntary act to create a relationship between individuals, departments or organisations. And, according to the theory, resolving conflict through a cooperative-constructive process can lead to beneficial outcomes including mutual benefits and satisfaction, stronger relationships, positive psychological effects, and so on (Yanqiang, 2014). Most of the cooperative benefits of organizations are expressed in non-economic terms. The below three points can summarise the major factors motivating the individual organisation to participate in cooperation:

- Scarcity of resources – these may be caused by increasing costs, scarce labour supplies or higher manpower training requirements.
- Positive Value creation – these may be activities such as cost-saving, good service, or a high level of customer satisfaction.
- Requirement of powerful external sources – in some cases it may be based on the demand of the governments or third-party organisations.

The term cooperation is defined by different scholars. For this paper's purpose, we can see the two that can give us a better scope of the term. Cooperation is defined as two or more organizations sharing the responsibility of sharing information about collaborative planning, management, execution, and performance evaluation (Min et al., 2005). Cooperation is a firm's culture of working together with other enterprises toward a common set of goals that offer reciprocal benefits to a partnering relationship, according to Min et al. (2005). In reality, the

stakeholders are working together to guarantee that the end client is happy. Companies must share information, knowledge, risk, and profits to do this.

Cooperation is a must to be competitive and cost-effective in the fast-changing market environment. Even though the concept is not new in logistics, cooperation in logistics is recognised as a strategic approach to increase efficiency. Cooperation in logistics is defined as a long-term collaboration between legal autonomous and economically interdependent companies that share common goals and objectives (Yanqiang, 2014). Companies involved in the cooperation are tied together more tightly and share more information. The degree of the information exchange between parties involved in the cooperation is a significant part of determining the level of the relationship.

Table 2.1. The benefits and drawbacks of logistics collaboration

Advantage	Disadvantage
Avoiding unnecessary duplication of effort (logistics activity)	loss of flexibility
Assist decision making process of parties involved in the channel	Higher investment for coordination between partners
Counter balance monopoly of big logistics companies	
Rationalisation of Goods flow	
Improving efficiency with the involvement of advanced information technology	

In addition to the benefits listed above, the primary goal of logistics business collaboration is to reduce costs and improve service quality. As a result, logistic costs account for a large portion of a company's total costs. As a result, logistics has attracted a lot of attention by significantly boosting the efficiency and flexibility of the entire supply chain. Cooperation has the potential to realise the ambitious goals of reducing the transaction cost of inter-organisational logistics systems/networks resulting from (indicated by the Transaction Cost Theory):

- Establish long-term agreements with suppliers to minimise transactional cost
- Establish an inter-organisational learning process not to risk product/service quality

- Establish intensively interactive information exchange not to risk product/service quality
- Facilitating communication through cross-company information systems
- Creating an adequate inter-organisational culture through confidence-building measures

Cooperation in municipal logistics gives an organizational strategy for achieving its goals. It takes persistent coordination between goods suppliers (e.g., logistics businesses) and goods receivers (e.g., merchants) to permit the consolidation of numerous minor shipments (Yanqiang, 2014). Also, the involvement of the public sector can allow for the utilisation of necessary infrastructure and provide an inducement to promote the participation of the private sector.

2.3.1. Cooperation types in logistics

Cooperation along the logistics channel can be divided into many types according to different classification criteria such as cooperation direction, integration level, and scope and intensity degree. Business collaboration can be found in both inter and intra-organizational settings, and it can range from the simplicity of a partnership to the complexity of a multinational enterprise. According to Barratt (2004), there are two basic types of potential supply chain collaboration: vertical and horizontal collaboration. But some studies add a third form which combines the benefit of both vertical and horizontal cooperation.

2.3.1.1. Vertical collaboration

Internally within the organization or outside along the supply chain, this type of collaboration would take place. Engaging more closely with trading partners to boost each other's efficiency for mutual benefit entails working with them more closely externally, along the supply chain. When two or more vertically aligned firms, such as manufacturers, distributors, carriers, and retailers, collaborate to serve similar end customers by sharing responsibilities, resources, and performance data, they are referred to as vertical cooperation (Yanqiang, 2014). It's about sharing and gaining insight into one other's processes so that everyone may improve. For example, a manufacturer can directly access their retail client's stock holding figures to determine when replenishment is required, a warehouse operator can determine when the manufacturer will be calling for a replenishment order from stock, or a raw material sup-

plier can determine when the manufacturer has depleted his stock and can make a delivery. This collaboration is driven by cost benefits such as inventory and transportation reductions, logistics facility or equipment optimization, and better information utilization. Vertical collaboration in practice is exemplified by Vendor-Managed Inventory (VMI), Efficient Customer Response (ECR), Collaborative Planning, Forecasting, and Replenishment (CPFR), and Supply Chain Management (SCM) (Yanqiang, 2014).

2.3.1.2. Horizontal Cooperation

The interaction between logistics businesses working at the same level is governed by this sort of collaboration. It is a relationship between two or more similar status logistics operators who collaborate to cut costs or increase performance by sharing a different kind of resources which is difficult or expensive to have alone. Horizontal cooperation necessitates collaboration between non-competing and even competing businesses that would not do business otherwise. Horizontal cooperation can take many forms, such as two manufacturers combining warehouse space to enable joint deliveries to retailers, or a group of small manufacturing firms pooling their shipments to purchase full vehicle loads (FTL) rather than paying higher part load rates individually (LTL).

According to Cruijssen et al. (2007a), horizontal collaboration is viewed as an exciting approach for logistics service providers to decrease costs, improve service, or protect market positions. As a result, the literature on horizontal collaboration in transportation and logistics has exploded in recent years. Cruise et al. (2007b) provide the results of a survey of a large number of logistics service providers (LSP) in Flanders to determine the benefits and drawbacks of horizontal logistics collaboration. Because of the possibility of higher cost savings, they conclude that working on core operations is better than cooperating on non-core activities (Cruijssen (2007b)).

2.3.1.3. Lateral cooperation-

One of the primary goals of lateral logistics cooperation is to increase flexibility by integrating and sharing skills both vertically and horizontally. Examples include Lean Logistics and Transport Dynamics attempting to synchronise shippers and carriers of multi-enterprise in an effective transportation network.

Even though the above three types of cooperation in city logistics exist, it is difficult to choose one over the other as the practise varies from one country to another. Also, the other challenge is that cooperation is a dynamic process that begins as limited cooperation involving a limited number of participants, featuring a narrow scope of services and low intensity. And through time or service demand this cooperation evolves into a higher level of partnership to strengthen their cooperation and expand the scope of services.

2.4. Stakeholders

There are different stakeholders in city logistics. Generally, we can classify them as private and public stakeholders. These general stakeholders are called different participants in their segment among which the below are considered major stakeholders in the city logistics system: (a) shippers, (b) Transport Operators, (c) residents and (d) public Authority. Each of the primary stakeholders in urban freight transportation has its own set of goals and tends to act uniquely.

1. Shippers - Manufacturers, wholesalers, and retailers who forward supplies to clients fall into this category. Shippers who are not based in the city sometimes send goods to other companies or individuals; as a result, they are often uninformed of urban freight transportation issues. In terms of cost and transit reliability, they tend to maximize their service levels. The reliability of product delivery has become increasingly important for Just-In-Time transportation systems. There are two types of reliability: (a) delivery without any harm to the things, and (b) delivery to the customers' location on time (Nebiy, 2011).

1. Transport operators – this group covers Freight carriers, Couriers, third-party logistics providers and freight forwarders. Transport companies typically try to cut costs by increasing the efficiency of their pick-up and delivery routes, and they are expected to give a good level of service at a reasonable price. There is a trade-off between high levels of service and freight vehicle load efficiency. This is especially crucial when couriers must arrive at clients within a certain amount of time. However, due to traffic congestion, freight carriers frequently have trouble running their vehicles on city roadways.

2. Residents – Shopkeepers, workplaces, building sites, and residents are the key participants in this group. People who live, work, and shop in the city are referred to as residents. Residents often live in metropolitan regions at the end of the logistics chain. Receivers are frequently not liable for urban freight transit because the shipper organizes and pays for shipments (so for the receiver the transport price is included within the price of the ordered goods). Receivers are frequently unaware that they may and do influence urban freight transport by, for example, setting time windows. However, because the receiver is frequently the only supply chain actor in the city, they are in a better position to understand and identify local issues that affect logistics activity than transport operators and shippers who are typically active throughout a greater geographic location. Although most trucks come to cities to load supplies for city residents, people do not welcome them because of the traffic congestion, noise, air pollution, and accidents they would cause near their homes. There is a conflicting interest between the retailers and residents, the retailers are required to have their goods at a convenient time and residents want to avoid the pick-hour freight transportation due to the traffic congestion.

1. Public authorities – Local and national governments are both included in this group. Local governments strive to create a beautiful city, and urban freight transportation can be seen as a major source of pollution and annoyance from this standpoint. On the other hand, one of the goals of the local government is to provide city accessibility and a functional and efficient transportation system. Local governments strive to improve road safety while also reducing traffic congestion and pollution. Local governments typically take into account the complete urban transportation infrastructure. Local governments try to resolve problems among stakeholders, such as supply chain actors, urban traffic, and inhabitants, from this perspective. Because urban freight transit is mostly considered a local issue, national governments are typically only moderately involved. Many urban freight transport operations, as well as local authority regulations, are influenced by national authorities' goals (such as minimizing congestion and externalities at a national or regional level) (Taniguchi, 2001). They should be unbiased and play a key role in resolving any conflicts that develop among the other key stakeholders in urban freight transportation. As a result, City Logistics activities should be coordinated and facilitated by the administrators.

When a city logistics difficulty arises that necessitates action from either public or private stakeholders, the stakeholder relationship is likely to shift, leading to one of four probable outcomes; conflict, cooperation, Competition and Coopetition. And the cooperation among stakeholders will resolve most of the actual and potential conflicts between stakeholders.

2.5. City logistics system

A system is a procedure that allows inputs to be converted into outputs. A system is an integrated whole consisting of a set of elements that are either interacting or interdependent. Storage, transportation, and handling are only a few of the components of the city logistics system (Yanqiang, 2014). The products of the suppliers, as well as the human, financial, material, and information resources in the logistics organization, are the inputs in city logistics to deliver the logistics service. The process is the logistics activity that transports and transfers the goods to the customer or User. The output of the city logistics is the economic, social and environmental benefit to the residents and other stakeholders of urban centres.

In order to mitigate the negative economic, social, and environmental repercussions of urban freight transport (UFT) and to establish more efficient operations, several initiatives have been introduced in various nations. Russo and Comi (2011) classify material infrastructure solutions that attempt to improve sustainability by implementing activities to optimize freight transportation (e.g., loading and unloading zones and building an urban transportation subnetwork) into four categories: (a) material infrastructure measures that support vehicle routing and scheduling and include policies that enable the exchange of information between stakeholders (e.g., telematics); (b) immaterial infrastructure measures, such as national or local government-imposed regulations, that support vehicle routing and scheduling and include policies that enable the exchange of information between stakeholders (e.g., new low-emission vehicles, electric engines); and (d) governance measures, such as national or local government-imposed regulations that support vehicle routing and scheduling and include policies that enable the exchange of information between stakeholders (e.g., new low-emission vehicles, electric engines); and (e.g., time window restrictions, imposing a minimum load factor, road pricing, and taxes). Stathopoulos et al. (2012) further identify (e) management measures, which foster collaboration among logistics providers through programs like freight quality partnerships. Such UFT sustainability projects have been characterized by Quak and De Koster (2014) based on the initiative's drivers and success rate (Eren, 2018). The follow-

ing sections of the research attempt to summarize various systems approach as follows: city logistics operational model, infrastructure network, information platform, and support measures.

2.5.1. Operational Model

The operational activity is the heart and soul of city logistics. Logistical activities, such as goods receiving, loading and unloading, identification, consolidation, pick and pack, storage, labelling, transportation, and distribution are realised within the operational model (Yanqiang, 2014). The operation of city logistics covers the process of how the goods are delivered to the end customer. The operational process covers the receiving of goods transported by manufacturer or trader using a large capacity transport within or outside of the city (intra city or international Transport) and unload the goods in the logistics facilitation centre and then sort out the goods in a proper way for city transport or arrange consolidation, and finally transport and deliver the goods to the end customer. And the operation model also includes the reversal of debris and damaged goods back to the consolidation centre.

The scope of logistics services is closely linked to the integration level of partners in the logistics channel. The relationship among the companies involved in the logistics process, their scope of service and the requirement for consolidation are the main differentiating factors of the below models. Based on cooperation directions in the logistics channel, two major operational models of city logistics can be accordingly classified: (Yanqiang, 2014).

1) Operational model based on horizontal cooperation between freight carriers

Freight carriers are physically responsible for arranging facilities and equipment to transport the goods from shippers to goods receivers. They decide which modes of transportation should be used in which order to reach their consumers on time (Yanqiang, 2014). Even though the origin carrier does have available resources, it is not cost-effective and technically feasible to do the door-to-door process and needs cooperation with other service providers. The benefit of cooperation in this regard will be cost reduction from the economy of scale and service quality, by assigning urban freight experts to handle the last-mile delivery into urban areas. As the goods do not require consolidation, the last-mile delivery will be carried out by this third-party logistics provider in a freight vehicle suitable for city logistics. This third-party operator can be a joint venture between all the involved freight carriers, a logistics

company dedicated to last-mile delivery that has no competition with the partners, or one of the freight carriers that has remarkable competitive advantages such as logistics facilities.

2) Operational model based on vertical cooperation among goods receivers and freight carriers

Cooperation between goods receivers and freight carriers is the basis for outsourcing city logistics services to professional logistics companies. It provides the possibility to consolidate numerous goods shipments from individual shippers/suppliers before they flow into urban areas. In terms of city logistics, several operational models can be identified:

- Consolidated delivery to all stores of the same business customers, which have a large number of suppliers such as supermarket companies (Yanqiang, 2014). Consolidated delivery to many individual businesses that are geographically congregated in specific locations such as traffic-free zones and shopping centres Within the operational model, delivery points for shippers/suppliers will be shifted outside urban areas to the consolidation centre of the subcontracted logistics company. Goods shipments will be arranged in full truckloads rather than being delivered to customers individually in smaller truckloads. As a result, total freight traffic flow can be significantly decreased, allowing goods receivers to concentrate on their main business (Yanqiang, 2014).

These models have their difficulties. In the first case, the logistics company needs to have effective communication with numerous shippers/suppliers to minimise the loss in delivery time. Besides shippers/suppliers, the logistics company needs to coordinate with individual goods receivers in the second case and takes into account their different requirements in terms of delivery time, packaging and temperature control.

2.5.2. City logistics infrastructure network

The city logistics infrastructure network, which consists of City logistics Nodes, City Distribution channels, and a City Logistics Delivery/Loading Bay, is the foundation of the complete city logistics system. Each will be examined in turn in the paragraphs that follow:

1) City logistics nodes (Urban Consolidation Centre): Interfaces connecting city logistics to intercity or worldwide logistics are known as city logistics nodes (Yanqiang, 2014). It is the location where all the logistical activities are organised and realised. City logistics nodes differ in terms of function, service scope and geographic coverage. The logistics centre, an

interface between many (at least two) freight carriers, is the main physical type of city logistics node. Its goal is to bring as many logistics companies together as possible in one area to facilitate freight carrier and operator cooperation and division of labour. A logistics centre aids in the consolidation of many types of goods in one area and helps to reduce inner-city freight traffic through a combined route scheduling and city-friendly distribution system (Yanqiang, 2014).

Urban consolidation centres (UCCs) are places where the goods to be distributed to cities will be unloaded, sorted out, unpacked, re-packed, consolidate for transport and loaded on trucks. These consolidation centres are located in cities or outside of cities based on the strategy of the operators. The urban consolidation centre (UCC) is a physical representation of the city logistics concept, intending to reduce urban freight traffic and increase operational efficiency. UCCs save money and reduce emissions by reducing the number of kilometres driven by larger, more polluting freight trucks (Nataraj, 2019). It is a logistics terminal or transhipment point that connects at least two transport modes (long distance and short distance) and offers the opportunity to long-distance transport companies to send goods destined for customers in urban areas to locations with easy access rather than congested city centres (Yanqiang, 2014).

According to Thompson and Taniguchi (2008), the building of UCCs results in a much more efficient urban logistics system, with the same service capacity but lower environmental effects than previous systems. Choosing the best location and management for UCCs would have a positive economic, environmental, and social impact (Nataraj, 2019). The following were the benefits of efficient UCC utilization:

- Reduce the freight traffic in urban areas by consolidating goods shipments
- Reduce the total delivery trips and improve operational efficiency by increasing the load factors
- Reduce or eliminate the environmental impacts by replacing large and heavy trucks with smaller and lighter ones, in particular, when in combination with EFVs
- Reduce the need for goods storage and related logistics activities in urban areas by increasing the delivery frequency
- Create more value and reduce the logistics costs by offering more value-added services such as off-site storage concerning practice, the UCC solution has attracted

plenty of attention. A huge amount of effort and resources have been invested into researching and implementing this concept due to the potential economic, social and environmental benefits (Yanqiang, 2014).

The Location Routing Problem (LRP) is employed in the UCC issue. The LRP is one of the most comprehensive problems in logistics and transportation because it covers all stages of supply chain design and management, including (I) strategic decision making for UCC location; (ii) tactical decision making for customer allocation to available UCCs; and (iii) operational decision making for assigning delivery routes to each UCC and its associated customers (Nataraj, 2019). To achieve optimal transportation in city logistics while limiting environmental implications, the location of UCCs and the related vehicle route design for deliveries in urban contexts are crucial. These two issues are resolved as part of an integrated LRP.

2) City logistics distribution channel: The city's logistics infrastructure network includes the distribution channel. It is a city's physical path through which goods and services are delivered to end customers. Intermodal transport modes such as urban rail transit and inland waterways are the favourite traffic means for city logistics because of their advantages of environment protection and energy consumption. However, as a result of the lack of sufficient infrastructure for intermodal transport modes, the urban road network is nowadays the major distribution channel for most cities.

In the city logistics of developing countries, there are formal and informal modes of transportation: formal and informal (Gabriel, 2007). In the next paragraphs, the official menses of transportation will be addressed. Informal transportation makes use of less technologically advanced technologies and management methods. It is particularly active in meeting the needs of low-income individuals. These may include motorized means such as two-wheelers, and more significantly non-motorized systems like donkeys, horses and man-pulled trollies. Unlike developed countries, the informal sector provides more crucial city logistics services in developing countries but tends to be more labour intensive, thus increasing the risk of damage, theft and/or injuries.

In formal transport, road transport is the dominant platform. Due to the infrastructure, regulatory platform and congestion, small vehicles with light load capacity are used for the last mile delivery system. In addition to broader factors shaping the condition of urban goods transport

such as geographic settings, history, level of economic development and government policies, the urban context shapes goods transport trends in specific ways: (Gabriel, 2007).

- Urban density is closely associated with patterns of goods transport
- The distribution of the density of the street layout or urban spatial structure also influences goods transport
- The urban land use structure relates to the organization of economic activities, which can be centralized, and impacts goods transport
- The city-scale in terms of population size may also influence urban goods transport trends
- Land use for urban goods transport is significant as both transport modes and terminals consume space for the setting of their respective infrastructure
- The land used for freight infrastructure can be particularly extensive in metropolitan areas that are points of convergence for global material flows and involve several stakeholders.

3) City logistics delivery/loading bays: Due to the high density of business and traffic within urban areas, especially around shopping centres and traffic-free zones, city logistics vehicles are usually not able to reach end customers. The setup of delivery/loading bays can therefore ease the last leg of goods delivery, improve the efficiency of the total operation process and minimise the negative effects on ordinary urban traffic. Otherwise, city logistics vehicles have to park on streets, which may cause traffic congestion. On-street and off-street delivery/loading bays are the two major types. Moreover, it is desirable to introduce technical solutions to plan the location, size and number of delivery/loading bays, and manage the access and stop of urban freight vehicles, to optimise the use of scarce areas of delivery/loading bays (Yanqiang, 2014).

2.5.2.1. Cooperation on city infrastructure

When it comes to city logistics development, HC is commonly regarded as an innovative option that entails collaboration among participants at various supply chain stages in metropolitan regions (Cruijssen et al., 2007a). HC is still a developing concept in the context of landside transportation and logistics, even though it is well documented for maritime and air transportation (Pomponi et al., 2013). As a result, the key motivations for applying HC practices are synergies gained through collaboration. Cruise et al. (2007b) discussed the function of HC in transportation and logistics, as well as the consequences of that role. The key crite-

ria for allocating freight carriers are the selection of the most suitable locations for the construction of each facility, as well as the solution of the relevant vehicle routing for effective delivery of goods to clients. Three scenarios for horizontal cooperation of UCCs and urban fleets are presented below:

1. **Depot Cooperation without UCCs**

In this scenario, the placement of UCCs is neglected, meaning that each corporation runs its central depot. While the main criterion is to carry out HC in terms of enterprise-wide depot sharing, the goal function is to lower total costs. Customers are only served by the company to whom they were assigned, and only by this business's vehicles, among the problem limits. That is, separate firms' trucks deliver their own customers' demands, but the vehicles can depart from different depots, even if they are not the company's depots (Nataraj, 2019).

1. **Depot and Fleet Cooperation without using UCCs**

The position of UCCs is not taken into account in this case once again. Furthermore, businesses collaborate to achieve the goal of servicing a variety of customers. We'll assume that the cooperation comprises the sharing of depot capacities as well as a vehicle fleet. Each customer must be allocated to an existing depot, and then a set of routes must be planned to meet all of the customer's requirements (Nataraj, 2019).

1. **Depot and Fleet Cooperation using UCCs**

In this entirely cooperative situation with UCCs, the degree of coordinated supply chain decisions increases. On a supply chain level, route planning can be improved by more efficient customer-depot allocation, which can be accomplished by sharing customer information, storage facilities, and vehicle capacities. This scenario also includes evaluating the most efficient quantity and location of logistics facilities, as well as establishing delivery routes together (Nataraj, 2019).

2.5.3. City logistics information platform

These days, information plays a key role in any business transaction. The process to acquire, store, share and retrieve information among stakeholders of city logistics operation is crucial as it optimizes the operation. New IT technology brings with it new capabilities for managing data flows. It has been proved that higher usage of information technology can significantly improve logistics operations efficiency by boosting capacity while lowering expenses (Yanqiang, 2014).

In terms of 1) road safety, 2) congestion reduction, 3) regulatory compliance, and 4) supply chain information, real-time information systems are a set of technologies and techniques that can help monitor and manage traffic based on real-time traffic information. RTIS is a computer system that responds to activities/facts (recorded data), creates an immediate response (information to the user), and has a direct impact on real-time decision-making for users and the management of freight transportation systems (Taniguchi, 2014). It adopts a holistic approach to the integration of the various systems of shippers outside a city, city logistics operators in logistics centres, end customers within urban areas and city administrators. Through the information collection, transmitting, storage, handling and output, the platform presents an innovative means to support information sharing, storing customer requirements, arranging vehicle scheduling and routing, and generating statistical reports. Furthermore, the platform provides functions such as monitoring the environmental impacts of city logistics operations in terms of noise, CO2 and NOx, and issuing governmental regulations.

Beyond the information technology, more automated equipment and technology, including unloading equipment, singular stations, pallets, roll cages, ULDs, identification technology, storage technology, cross-docking technology and picking technology are required as enablers of a city logistics concept to shorten the operational process from receiving products from various suppliers to deliver the consolidated shipments to final recipients in urban areas (Yanqiang, 2014).

2.5.4. City logistics facilitation (support measures)

The public sector will have a facilitation and support role in the city logistics framework. The soft environment of the city logistics system is the name given to this structure. Setting up specific regulations and policies is an important part of building an efficient city logistics system, and it plays a big impact on how well city logistics solutions are implemented. However, in many poor countries, a lack of resources frequently prevents effective policy responses (Gabriel, 2007). The main goals of the facilitation and support major are to maximize operational efficiency while minimizing negative social and environmental impacts.

Regulatory measures (also known as "command and control measures") are regulations and restrictions aimed to regulate the actions of private freight operators to protect the urban environment's liveability and ensure appropriate mobility. They are frequently easier for munici-

pal governments to adopt, and they have a better level of acceptability among all stakeholders than other types of policies. This is primarily owing to their more traditional nature and perceived equity. In order to prevent possible transgressions, these types of safeguards must be accompanied by a control/enforcement mechanism. Time access limits, parking rules, environmental restrictions, size/load access restrictions, and other types of restrictions, freight traffic-flow management are examples of these types of measures (Yetnayet, 2012).

2.6. Review of Empirical literature

Only a few types of research had been conducted in the city logistics area in Ethiopia, especially focusing on Addis Ababa. Even though there are empirical studies related to logistics system challenges in terms of operations performed in Ethiopia, in general, and transport problems in Addis Ababa, in particular, there is no comprehensive study made to address the city logistics systemic problem in Addis Ababa (Matiwos, 2020). Based on the empirical search, there is three research conducted on the city logistics of Addis Ababa city. The research will be reviewed below based on its relationship with the subject matter under study.

The first research paper was conducted by Nebyi Gebremariam in 2011 with the title of 'Optimising of freight transport and city logistics activities in Addis Ababa'. The study was carried out to fulfil the requirements for a Masters's degree in the faculty of technology's civil engineering department, which is part of the road and transport engineering stream. The objective of the study was to see how to maximise the efficiency of the urban freight transport service in Addis Ababa by minimising the negative effects of the freight transport system. As indicated in the tile the term for city logistics and urban transport was used interchangeably, but the former is a broad term that includes the urban transportation system as one element.

Further, the analysis part focus on the urban transport challenges only. The research methodology used was quantitative method even if not expressed clearly in the mythology part. But the questionnaire used to survey the routes and load volume of trucks from the four corners of the city and the survey method mentioned in the methodology part leads us to conclude the use of Quantitative methodology. Lastly, the findings of the research focus on two major points which are the volume, routes and Maps of urban transport and warehouses in Addis Ababa. The findings are a good indicator of the volume and route map of trucks coming to

the capital city of Addis Ababa. But the findings and conclusion failed to address some major research questions designed in the first part of the research.

The subject research will be different in three ways; time, coverage and mythology. The above study was conducted 11 years before and requires updated research. Also, the study covers one aspect of city logistics and failed to assess the city logistics operation, warehousing and loading and unloading bays. Further, the objective of the above study (Nebiy) is quite different from this research. The methodology used by Nebiy was only a survey method, but the subject study will deploy mixed methods of qualitative and quantitative methods.

The second empirical study to be assed is titled‘ Weak links of city logistics in Addis Ababa city. This article was researched by Matiowos Ensemur (PhD) in 2020 and published in the journal of supply chain management. The study's goal was to illustrate the variables that contributed to Addis Ababa's city logistics' weak links, Ethiopia considers issues of mobility, liability and sustainability as requirements for a metropolitan city. These factors that affect the city logistics of Addis Ababa were grouped into three interlinked multifaced factors: regulation, operation and infrastructure. The multi-dimensional factors identified by the research cover the major challenges of city logistics in Addis Ababa. But the research has given major emphasis to infrastructural problems than the other two factors: regulatory and operational challenges. Also, the research has not covered the role and factors affecting warehouse (distribution centres) operation.

The methodology deployed for the study was the Delphi method which allows the researcher to use different types of sources of information including his observation (as an expert and residents of Addis Ababa) and other experts' opinions. This makes the study well-structured and organised as it enables to analyse of the factors in quantitative and qualitative data. All the research questions and factors defined on the initial page of the article are; lack of pedestrian roads and traffic accidents, parking space, green logistics, driver’s competency, road design problems, lack of regulation and lack of synchronised city logistics schedule, which were analysed and concluded in the research.

The proposed study is different from the above research conducted by Dr Matiwos in three ways; the coverage, the depth and the methodology to be used. The coverage of the subject study will include in addition to the factors identified above, factors like operational chal-

lenges of systematic city logistics, warehouse-related problems, loading and unloading bays and cooperation among stakeholders will be covered. Further, the number of participants in the study will be more than in the above study. The last differentiating element of the proposed study is the methodology, where the latter used a mixed method of quantitative and qualitative methods.

The other empirical study related to the proposed study is the research conducted by Abel Kebede and Girma Gebresenbet in collaboration with Addis Ababa university technology institute and Swedish university. The study took place in 2016 and was published in the journal Transportation Research Proedria. The study's title was "mapping out product flow to Addis Ababa city, Ethiopia, and its environmental impact." The study's goal was to map out the benefits of the night delivery system while also identifying existing traffic congestion and exhaust emissions from freight vehicles within the city. The research methods used was a direct measurement of selected parameters to measure the emission level of Co2 and a survey from freight carrier and operators. From the analysis of the emission level and the number of kilometres covered by vehicles, the researcher suggests that night delivery is a better system than day delivery in terms of the negative impact on the environment. This study is different from the proposed study as this study focused on freight transport and its environmental impact only, whereas the proposed study will try to assess the social and economic aspects of city logistics. In addition, the objective and methodology to be used in the proposed research are different from this study.

2.7. Conceptual Framework

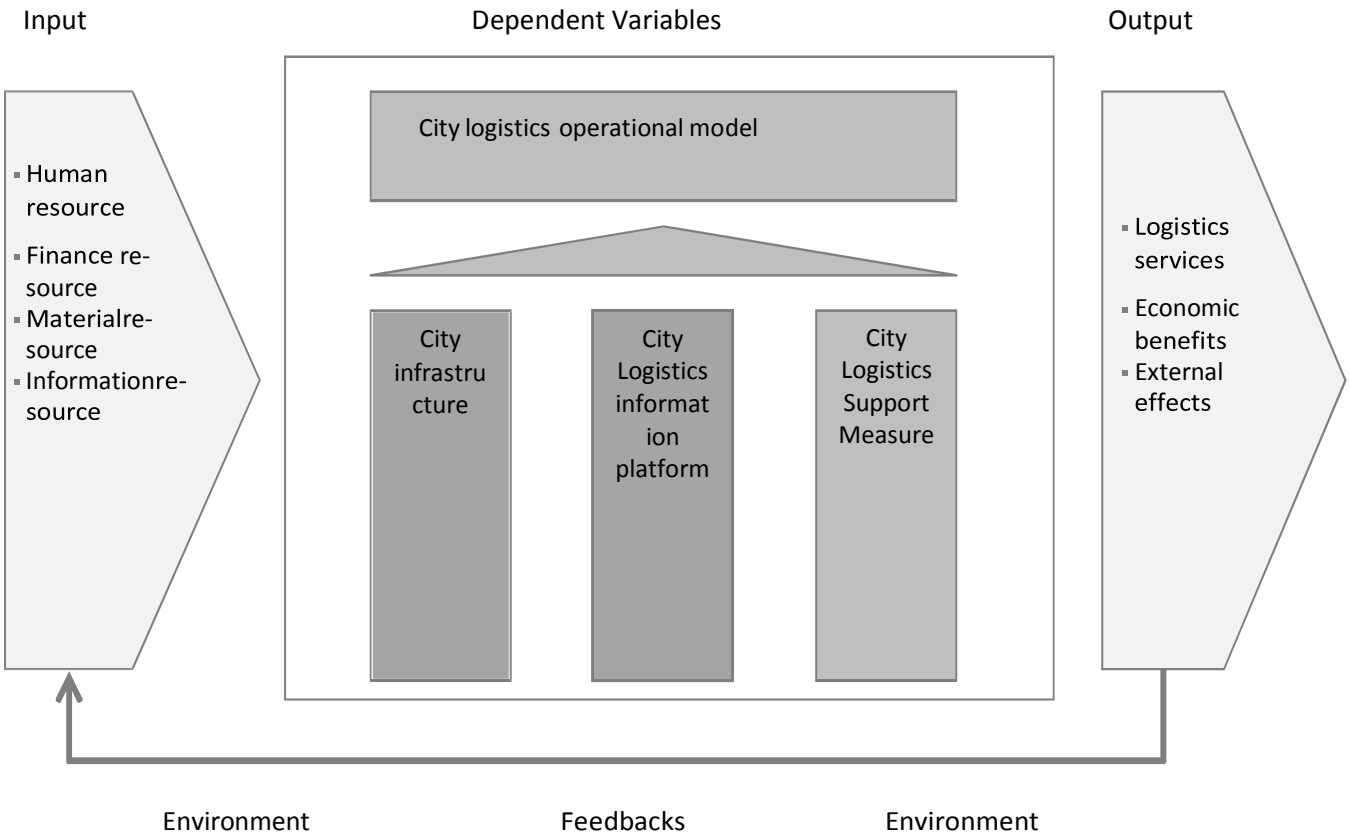


Figure 2.1: City logistics system

Source: in reference to Pfohl (2010), p.20. Translated and modified by the author.

CHAPTER THREE: RESERAC METHODOLOGY

3.1. Research Approach

This study is descriptive since it attempts to examine the state of city logistics in Addis Ababa and the relationship between various elements affecting Addis Ababa's city logistics. The research was designed with both descriptive and explanatory features of the study. Since descriptive study allows the researcher to describe those data and helps to know the event that was taken place it is used whereas explanatory study to examine the relationships between variables by employing inferential statistics. 'How' also created the study's research questions to analyse the aspects affecting municipal logistics.

The study used a descriptive research design, a scientific approach that entails watching and documenting a subject's behaviour without in any way altering it (Saunders, Lewis, & Thorn hill, 2007). Investigations that focus on describing the traits of a certain person or group are referred to as descriptive research studies. When cause-and-effect linkages are the main focus, the study can be explanatory, identifying which causes result in which outcomes (Yin, 1994). In casual analysis, we are interested in how one variable influences or is accountable for changes in another variable. According to a stricter definition of causation, an external force causes a change in the dependent variable. Another form of study goal is explanatory research, which is theoretically based and seeks to explain why and how things happen. Explanatory research tries to identify the causes of the phenomenon that the descriptive investigation could only detect. The forces that led to the occurrence of a certain phenomenon are represented by theories or hypotheses in an explanatory investigation. (Yin, 1994). In contrast to the dependent variable, which pertains to the subsequent phenomena, the independent variable refers to the antecedent phenomenon. Explanatory research studies were therefore used to explain the impact and linkages between the independent variables and the dependent variable.

3.2. Research Design

Quantitative and qualitative procedures are the most often used ways of gathering and interpreting primary data. However, a mixed-methods strategy is used in this study. The mixed-methods approach, from a practical standpoint, collects both quantitative and qualitative data in the design, either sequentially or concurrently. The researcher's premise is that gathering a variety of data kinds, rather than only quantitative or qualitative data, provides a more thor-

ough knowledge of the research subject. The study begins with a wide survey to generalize results to the surveyed sample and then shifts to qualitative, open-ended interviews in the second phase to collect detailed perspectives from individuals to assist explain the original quantitative survey (Creswell, 2014).

To exploit the opportunity to integrate the qualitative and quantitative methods of data collection sequential mixed descriptive design was used for this study. The compatibility of quantitative and qualitative methodologies is a key premise of pragmatism. As a result, both numerical and text data, collected sequentially or simultaneously, have aided in a better understanding of the research subject. According to Creswell, (2014), this is a mixed-methods strategy that involves a two-phase project in which the researcher collects quantitative data in the first phase, analyses the results, and then uses the results to plan (or built into) the second, qualitative phase. Therefore, this paper has initially collected quantitative data using a structured questionnaire and in the second phase collected data using a qualitative method: semi-structured interview. The idea behind this strategy is that quantitative data and findings provide a broad picture of the study topic, but qualitative data and analysis improve and explain those statistical results by delving deeper into participants' perspectives (Creswell, 2014).

When planning mixed research, three factors have been addressed. Priority, implementation, and integration are the three. Priority refers to whether the quantitative or qualitative methods are given more weight in the investigation. Implementation refers to the sequence in which quantitative and qualitative data are collected and evaluated, as well as whether they are done in parallel or concurrently. During the integration phase of the research process, quantitative and qualitative data are mixed or connected (Creswell, 2014). In this study priority is given to the quantitative method because the quantitative research represents the major aspect of data collection and analysis in the study, focusing on in-depth explanations of quantitative results. The two methods have been integrated while designing interview question for the qualitative method and the interview questions was designed based on the result of the quantitative findings. The findings were also integrated while the results were tested and analysed.

3.3. Sampling Design

The universe of the study population is finite. The population is a set of individuals, cases or objects for which researchers turn to study with the observation of some characteristics (Saunders et al., 2009). The study targets all private and public city logistics operators in Addis Ababa city. This population is operating in the different business sectors and the number of private and public participants in each distribution category is different. So, these characteristics of the population lead the researcher to select stratified Sampling and Deliberate/purposive sampling techniques.

Stratified sampling ensures that specific strata or categories of people are represented in the sampling process (Fox, et al. 2009). Accordingly, the organisation distribution sector was taken as strata. The researcher has selected a representative sample from both stakeholders as defined in the literature part and deploy a purposive method to select respondents from the groups as well. The factors affecting the city logistics of each business group category were generalized for all individuals and companies sampled within that business category.

The researcher has used deliberate sampling to select a sample based on their knowledge of the study and population. Further, this deliberate sampling was used for selecting experts for the interview. Purposive sampling is generally a two-stage process; first Decide what "expert" means and second select people who meet your "expert" criteria. For the study and to minimize the disadvantage of the sampling, 'expert' was defined as a person who had a minimum degree and above in any field or has more than two years of experience in logistics services.

3.3.1. Sample Size

According to Rohatgi and Saleh, to calculate the right sample size, three criteria must be specified: the level of accuracy, also known as sampling error, the level of confidence or risk of error, and the degree of variability in the qualities being assessed.

Because it is acceptable for most research, the study chose a 95 per cent confidence interval (Jamess E. Bartlett, Joe W.Kotrlik, Chadwick C. Higgins, 2001). In other words, 95 out of 100 samples represent the genuine population value within the precision range specified. There is always the possibility that the researcher's sample does not reflect the true population value (Bhattacherjee, 2012).

According to Bhattacherjee, the sample error range is commonly stated in percentage points, usually 5%. The study's sampling error is 5% since it employed a five-point Likert scale to measure a continuous variable.

The sample size of a study can be calculated using a variety of methods, the most well-known of which is the Cochran and Yemane formulas. For this study, Yemen's formula was used to calculate the sample size for both private and public sector specialists, who were divided into two strata.

n= N/1+N(e)2
n= Sample size
N=Population Size
E= Level of precision

The public sector logistics professionals are made up of people who work in operations and logistics at the federal ministry of transport and logistics, the Addis Ababa transport office, and the Addis Ababa traffic management office. These three departments are the government bodies in charge of creating, enacting, and overseeing Addis Ababa's municipal logistics activities.
n= 254/ 1+254 (0.05)2= **155**

The operators of freight logistics in the city are organized in a typical fashion in the private strata, with brokers as the leaders. In the federal and city-state of Addis Ababa, however, there are four registered municipal freight operators. These operators are freight operations associations to handle shipments over 75 quintals (50 associations), self-owned transport service providers (95 self-owned companies), freight service providers licensed under private limited company (20 private limited companies), and associations organized to provide logistics service for cargo below 75 quintals, according to information obtained from the Federal ministry and Addis Ababa transport authority (18 Associations). Each entity is expected to have a minimum of four experts as manager of the association, operation personnel, distribution experts and Quality assurance officers that had a direct relationship with the logistics operational activity.

n= 732/1+732(0.05)2= 259

Because the sample size was larger than 10% of the target population, the sample was declared a good representation of the population. According to Mugenda (2003), a sample should be at least 10% of the target population to be representative of the population. The study employed proportionate stratification to determine the sample size for each stratum because the target population differed by strata. Questionnaires were delivered to employees at random after the number of samples from the strata was determined.

Table : 3.1. Population Size

Population S/N	Proportionate Stratified	Target population	Strata Weight	Sample size	Stratum weight (Sampling Fraction)
1	**Private City Logistics Operators**	**732**	**1**	**259**	**100%**
	• Freight transport Association above 75 quintals	200	0.27	70	27%
	• Self-Owned Freight service providers	380	0.51	124	33%
	• Private limited company	80	0.11	34	13%
	• Freight transport Associations below 75 quintals	72	0.10	31	12%
2	**Public Service providers**	**254**	**1**	**155**	**100**
	• Ministry Of transport and Logistics	65	0.26	42	26%
	• Addis Ababa City Transport	110	0.43	67	43%
	• Traffic management Agency	79	0.31	48	31%

3.4. Data Collection and Analysis

3.4.1. Phase one Quantitative Data collection

Because the goal is to research how city logistics affect Addis Ababa's economic and environmental progress, a survey was an effective study method. The primary distinction between survey research and other approaches such as case studies is that survey research systematically collects data. Data were collected using interviews, questionnaires, telephone interviews, and other means. Because the survey approach was a quantitative method, the data is in a consistent format, and the data was drawn from a sample of a specific population, with the results being generalized.

Following the completion of a secondary data literature review, a questionnaire was constructed to collect primary data using a personally managed questionnaire. Following that, the data were analysed using a quantitative method for social studies SPSS. Because the questions are largely targeted at acquiring data that is relevant to the research topics, the survey design for this thesis is classified as a statistical survey. In these types of surveys, survey questionnaires were utilized to collect data from a large sample of the population. Private and public city logistics operators, managers, and researchers in commercial and public sector organizations have completed the questionnaire.

3.4.2. Phase two Qualitative Data collection

Interviews and observation were also used to acquire qualitative data in phase two. The interview was taken place in person. A semi-structured interview question was used to conduct the interview. This interview format is neither too formal nor too informal. It was a moderate method for gathering a large amount of information from the interviewee. The interview was digitally recorded and a note was written down. Warehouse locations, road infrastructure, and consolidation centres were also observed. The observation was conducted with the participation of the participants. This was because it facilitates the researcher's ability to ask inquiries and get an explanation of matters. The preparation checklist was used to keep track of important events.

3.5. Validity and Reliability

The validity and reliability of the study are checked using the methodologies listed below. The below techniques are derived directly from (Creswell, 2014)

3.5.1. Validity

A research's validity can be determined in three ways: content, internal, and external validity. External validity is the degree to which conclusions or findings may be generalized, whereas internal validity is the accuracy or quality of the research endeavour.

Content Validity: A sort of validity in which different aspects, skills, and behaviours are sufficiently and efficiently measured is referred to as content validity. For that purpose, professionals in the field of research have examined the research tools and data (Researcher at Addis Ababa transport authority and research Advisor). Some questions were amended based on the feedback obtained from these experts. These experts validated the research question and structured interview before they were used.

Internal validity: is concerned with the correspondence between the research findings and reality. It also has to do with the researcher's ability to observe and measure what is supposed to be measured. Internal validity is tested through:

1.1. Triangulation: gathering information from several sources and using a range of methodologies helps validate findings, according to certain research books. Certainly, the researcher has obtained qualitative and quantitative data through triangulation to verify the findings.

1.2. Checks by members: The results and interpretations are returned to the participants for confirmation and validation through member checks. The major findings of the research were communicated to the researchers and experts during the structured interview session, and all findings were confirmed accordingly.

3.5.2. Reliability

The degree to which a study may be repeated with the same results is referred to as reliability. The trustworthiness of the data and findings is one of the most important prerequisites of any research procedure. In general, reliability refers to the findings' consistency, dependability, and replicability. Cronbach's Alpha is a reliability test. As a result, Cronbach's alpha was used in this research, which was done in SPSS Statistics utilizing the Reliability Analysis. A reliability test was run to see if the scale used on the questionnaire was stable and consistently reflected what it was designed to measure. A Cronbach's alpha test was used to conduct an internal scale reliability test using SPSS (Statistical Package for Social Science Studies). The researcher used 353 samples from the target population to examine the reliability of the questionnaire, resulting in a Cronbach's Alpha Coefficient of 0.902, indicating that the data was appropriate. Also, the factors Cronbach’s Alpha was calculated separately and all factors are

above 0.6. The coefficient is higher than the normal cut-off of 0.7. (Nunnally, 1978). Cronbach alpha more than 6 is satisfactory, greater than 7 is good, greater than 8 is excellent, and greater than 9 is exceptional. This demonstrates that the data obtained from the instrument is accurate.

Table 2.2. Reliability statistics

Factor Description	Cronbach's Alpha	Number of Items
Operation	.775	7
Infrastructure	.622	9
City Logistics Practice	.787	4
Communication	.785	5
Cooperation	.824	5
Facilitation	.820	5

Source: Own Data, 2022

3.6. Ethical Consideration

The researcher has formally requested all participants' willingness to participate as questioner respondents and interviewee. The researcher has also ensured that the information acquired for this study has no negative impact on the participants' physical or psychological well-being. During the research process, all information and documents acquired from private companies and government offices were used solely for this research purpose only.

CHAPTER FOUR: DATA ANALYSIS, RESULTS, AND DISCUSSION

4.1 Introduction

This part of the study will cover analysing factors affecting city logistics in Addis Ababa. The analysis is performed by conducting a pre-Analytical process of data which includes data coding, data editing, error checking, and data entry. The statistical package for social science (SPSS) was properly used to analyse the data. The results of the study were presented according to the data analysis procedure proposed in the methodology part of the study. The report of the analysis is presented in tables, graphs, and charts.

4.2. Response rate

The respondents of this survey research are grouped into two major categories of experts: public servants (logistics experts) and experts working in the private city logistics operation. As planned in the methodology part of the study, 157 questionnaires were distributed to experts working in the public service sector for those experts that had a direct association with the logistics operation in the Addis Ababa city: ministry of transport and logistics 42, Addis Ababa transport authority 67, and Addis Ababa traffic management office 30. A total of 139 responses were received from the total number of questionnaires issued. Five of the surveys were not filled out. In this study, 134 valid survey questions were examined, accounting for 85 per cent of the total sample size.

As per the data source obtained from the ministry of transport and logistics and, Addis Ababa transport authority, 250 questioners were distributed to respondents in four private city logistics operators based on their number of experts share: Freight Associations more than 75 quintals (63), Self-owned freighters (107), Private limited companies (32) and freight associations less than 75 quintals (26). A total of 228 replies were received, with 9 of them proving to be invalid. As a result, 219 legitimate responses were examined, accounting for an 87 per cent response rate. Cooper and Schindler (2014) argue that a response rate of 30% to 80% is appropriate and that this percentage is satisfactory. The information gathered from both expert sources was combined and analyzed.

4.3. Demography of respondents

The fundamental information on the sample respondents is included in the first section of the questionnaire. This section of the paper will provide us with broad information about the re-

spondents in a certain variable. The frequencies of respondents in Gender, Job Position, Work Experience, Organization, and Educational Level are listed in the table below.

Table 3.1. Personal Information of Public and Private Service logistics Experts

Respondent Profile		**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Gender	Male	198	56.1	56.1	56.1
	Female	155	43.9	43.9	100
	Total	**353**	**100**	**100**	
Job Position	Researcher	12	3.4	3.4	3.4
	Experts	260	73.7	73.7	73.1
	Unit Head	58	16.4	16.4	93.5
	Manager	23	6.5	6.5	100
	Total	**353**	**100**	**100**	
Organization	Addis Ababa Transport Authority	67	19.0	19.0	19.0
	Ministry of Transport and Logistics	42	11.9	11.9	30.9
	Addis Ababa traffic Management Agency	25	7.1	7.1	38.0
	Freight Association more than 75Quintal	60	17	17	55
	Self-Owned freighters	104	29.5	29.5	84.4
	Private Limited Companies	30	8.5	8.5	92.9
	freight Associations less than 75Q	25	7.1	7.1	100
	Total	**353**	**100**	**100**	

Source: Own Data, 2022

The gender distribution of respondents in both the public and private sectors is shown in the first portion of Table 4.1. The total proportion of female experts who responded to the questioners is 43.9 per cent, whereas the total percentage of male experts who responded to the questioners is 56.1 per cent. According to the sample data, there are somewhat more male experts working in the operational field of city logistics who replied to the questionnaire than female experts.

The respondents' job positions are well-balanced since they are divided into four groups, each with its own set of work experiences and job responsibilities. Experts working in public and private logistics operation services account for 73.7 per cent of the answers to this inquiry.

Furthermore, freight association managers in the private sector and unit heads in transportation authorities are operationally experienced individuals who have been elevated to leadership positions through experience, accounting for 6.5 per cent and 16.4 per cent of the respondents, respectively. In addition, the researchers who are familiar with the issue are included in the study, accounting for 3.4 per cent of the respondents.

Table 4.2. Personal Information of Public and Private Service logistics Experts

Respondent Profile		**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Work Experience	0-5 years	127	36	36	36
	6-10 years	102	28.9	28.9	64.9
	11-15 years	28	7.9	7.9	72.8
	16-20 years	49	13.9	13.9	86.7
	Above 21 years	47	13.3	13.3	100
	Total	**353**	**100**	**100**	
Educational Level	BA/BSC	238	67.4	67.4	67.4
	MA/MSC	115	32.6	32.6	100
	Total	**253**	**100**	**100**	

Source: Own Data, 2022

The work experience and educational level of the experts is the other measure that shows the diversity and relevance of the respondents for this research. An expert for this study is defined as a person with a minimum of a BA and relevant job experience in the logistics sector, as stated in the methodology section. All of the professionals who replied to the survey had a bachelor's degree or above and appropriate job experience in logistics. The specialists' work experience ranges from 0 to 5 years (36%), 6 to 10 years (28%), 11 to 15 years (7.9%), and 16 to 20 years (13.9%). 67.4 per cent of respondents have a bachelor's degree in the Arts (BA) and 32.6 per cent have a master's degree in the Arts (MA).

4.4. Descriptive data presentation and discussion

The data collected using the five-item Likert scale from public and private sector city logistics specialists in Addis Ababa is examined using descriptive statistics. The Likert scale ranges from 1 to 5, with 1 indicating strong disagreement, 2 indicating disagreement, 3 indicating

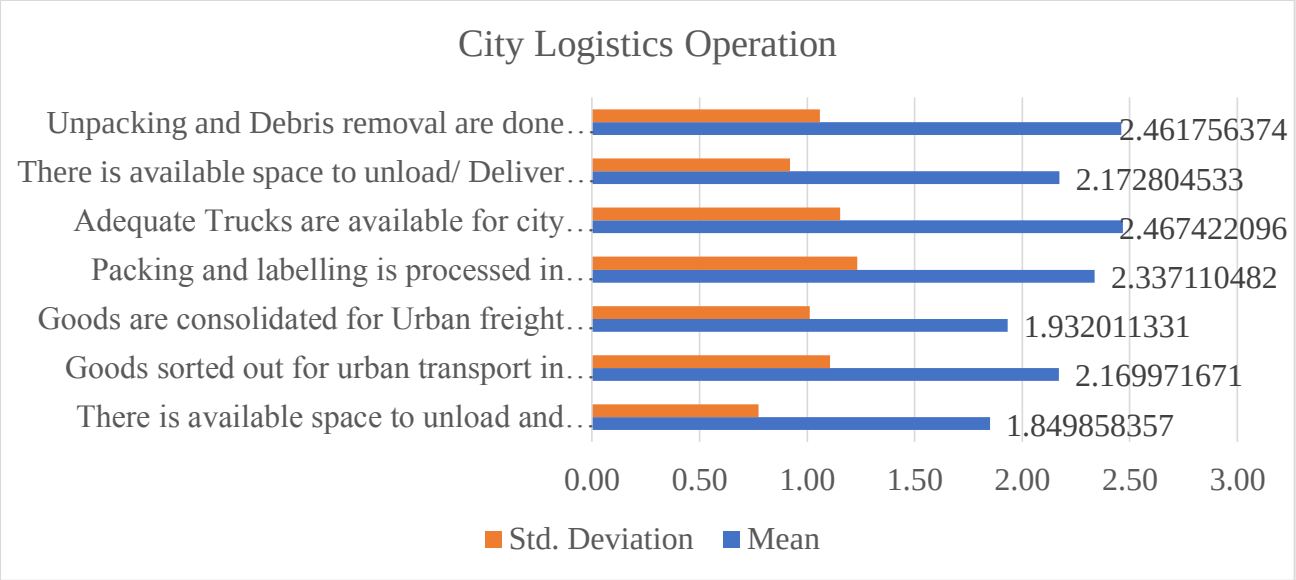
indifference, 4 indicating agreement, and 5 indicating strong agreement. The mean, frequency, and percentage of these primary data are calculated.

Tables, graphs, and charts were used to present the findings. The mean and standard deviation were determined based on the responses of the respondents. A mean (M) score of 0 - 1.8 indicates that the respondents ranked the questions 'strongly disagree.' A mean score of 1.81 – 2.6 indicates that the respondents ranked the questions 'disagree.' A mean (M) score of 2.61 to 3.40 indicates that the respondents were 'neutral,' 3.41-4.20 indicates that they labelled 'agree,' and a mean above 4.21 indicates that the respondents ranked the questions 'strongly agree' (Saul, 2019). A standard deviation of one indicates that the respondent group differs significantly on the variable.

4.4.1. Operational Model of city logistics

The first question to assess factors affecting city logistics was to see the overall perception of the experts about the city logistics operation of Addis Ababa. These six questions were forwarded to all respondents

Figure 4.1. City Logistics operation in Addis Ababa



Source: Own Data, 2022

The average mean of the respondent's impression of Addis Ababa's overall city logistics is 2.19, which is 'neutral,' as shown in table figure 4.1. One aspect that signals a good and smooth city logistics operation is the availability of appropriate space to load and unload products in the city centre. The average number of respondents who said there was enough

space in city centres is 1.84, which is a relatively low number. In the city centres of Addis Ababa, the majority of respondents believe there is no available location to load and unload products. The list means was evaluated for the item of consolidation of items for city logistics operation, in addition to the availability of space. The majority of the experts who participated in the poll confirmed that goods are not loaded in consolidation for Addis Ababa city operations, with a mean of 1.93. Furthermore, respondents gave a mean score of 2.17 for the availability of operations in consolidation centres. The majority of respondents agree that commodities for urban freight transportation are not sorted out in consolidation facilities. The significance of consolidation facilities in the organization of commodities for city freight is crucial. The average rating for the service of packaging and labelling in consolidation centres is 2.34. As a result, the majority of respondents agree that consolidation centres do not provide repacking and labelling services.

The operation of city logistics is handled with different size small trucks convenient for the road and repeated trips in the city logistics operation. The adequacy of trucks used for city logistics was the other question forwarded to respondents in this survey and the majority of them confirmed the unavailability of trucks designed for city logistics with a mean score of 2.47. The availability of space at the client's home to undertake loading and unloading operations had a mean of n 2.17, which is in the disagree group. The final question in this operational area concerns reverse logistics in city logistics operations. With a mean of 2.46, the unpacking and debris removal process at the client's residence is assessed as unavailable. Although the mean is greater than the other mean results within the category, it is nevertheless placed in the disagreement group. The majority of respondents rated the overall operation of Addis Ababa city logistics by disagreeing with the seven variables shown above to illustrate the current situation of Addis Ababa city logistics operation.

4.4.2. Infrastructural Network

Infrastructure plays a major role in the mobility of city logistics. The infrastructure covers the availability of adequate trucks, roads, consolidation centres, and parking spaces. These four aspects of the infrastructure model are categorized into the nine questions summarised in the below table 4.3 as one factor.

Table 4.3. Availability of infrastructure for city logistics

Description of Items	Minimum	Maximum	Mean	Std. Deviation
Connecting roads to city centres are available	1	5	2.87	1.200
Roads are available to connect with global transport operators	1	5	3.29	1.168
Trucks designed for city logistics operation are available	1	4	2.01	.664
The drivers of the city logistics vehicle are ethical	1	4	2.03	.734
Consolidation centres are available in different part of the city	1	4	2.03	.759
The consolidation centres are accessible for trucks	1	5	2.32	1.121
Parking space is available in the Consolidation centre	1	5	2.27	1.091
Loading and unloading area is available in the consolidation centre	1	5	2.32	1.096
There is a sufficient road infrastructure in Addis Ababa city?	1	4	2.05	.808

Source: Own Data, 2022

As per the respondent mean range defined above, the experts in the public and private sectors have rated low on the availability of ethical truck drivers, availability of consolidation centres, parking space at the consolidation centres, and sufficient road infrastructure in Addis Ababa. The mean average of each reads as follows; availability of ethical drivers 2.03, the availability of consolidation centres 2.03, availability of trucks designed for city operations 2.01, and the availability of sufficient road infrastructure in Addis Ababa 2.2.05. This shows that majority of the respondents disagree with the availability of the required infrastructure of road, trucks and consolidation centres in the city of Addis Ababa.

The respondents have rated a neutral mean for the availability of connecting roads within the city and the availability of roads that connect the city with the international transport routes. These two variables were rated higher in this category with a mean score of 2.87 for connecting roads within the city and 3.29 on the availability of connecting routes with transboundary freighters. Thus, the majority of the respondents are not certain about the availability of con-

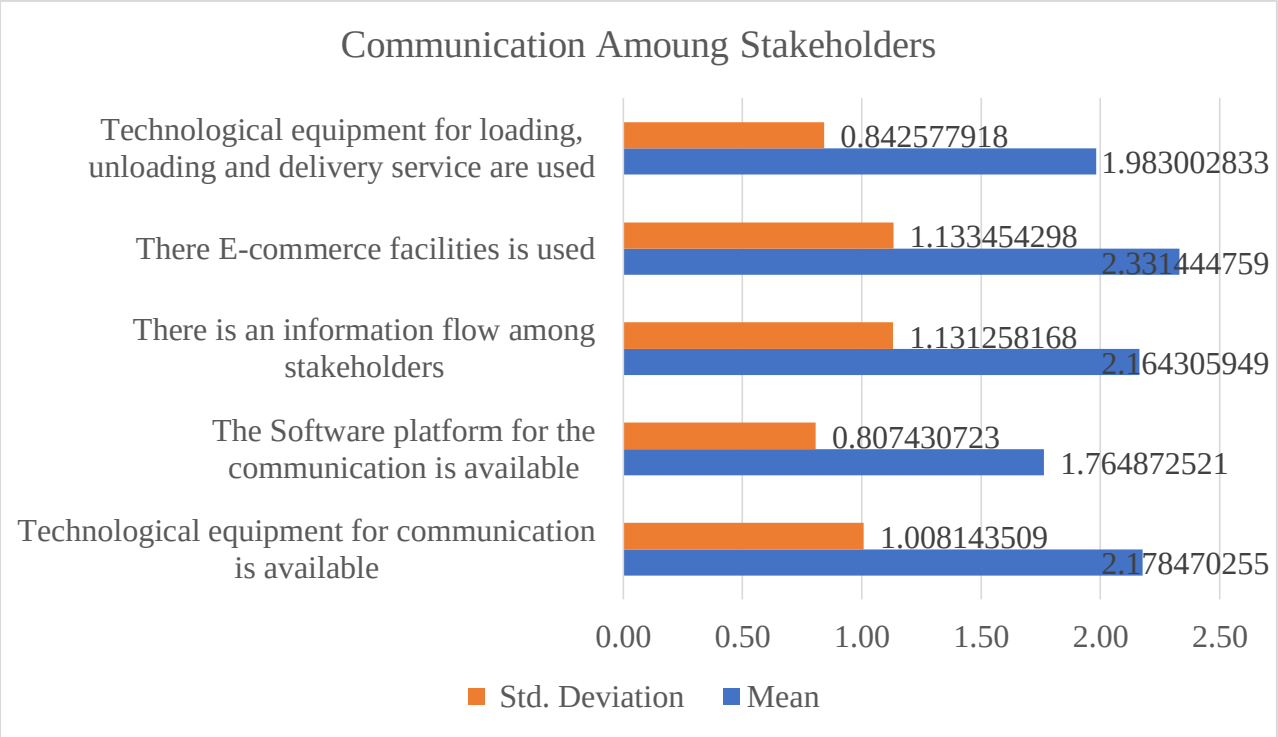
necting roads in the city and the availability of adequate connecting roads with the international transport service route. The other three questions related to the infrastructure of consolidation centres were considered unavailable by the respondents. The experts have rated a mean of 2.27 on the availability of parking space at the consolidation centre. The loading and unloading space in the consolidation centre is perceived by respondents as unavailable with a mean rate of 2.32. Similarly, the expert perceived that the roads to consolidation centres are not accessible for trucks.

Therefore, as per the respondents understanding the city logistics infrastructure is very low to accommodate the increasing needs of the city and its residents.

4.4.3. Information Platform

The descriptive statistics about the communication and platforms among stakeholders revealed an overall mean score of 2.08. This shows that the majority of the respondents are in disagreement about whether there is a sufficient technological tool used for communication and service delivery. From the five-question categorized in the communication variable, the respondents have rated low on all statements but at a different mean score. The availability of software platforms as a communication tool was strongly disagreed with by most of the respondents. Software platforms are not used as supporting communication platforms by city logistics operators of Addis Ababa. The availability and usage of technological equipment for loading and unloading service is not available as per the perception of the experts who participated in this survey. The statement has scored a mean of 1.98 which is categorised as disagreement. The respondent's perception of the information flow between the stakeholders of the city logistics system is the other question analyzed in this group. The information flow between stakeholders of city logistics is also rated as low with a mean score of 2.16. The availability utilization of E-commerce facilities in the city logistics of Addis Ababa was rated low by the respondents of this research survey with a mean rate of 2.33. The mean value for the last statement about the usage of technological equipment for communication in the city logistics scored 2.18 which is categorized as low. This means the majority of the respondents agree that there are no communication platforms devised for city logistics operations that connect the stakeholders.

Figure 4.2. Communication Among Stakeholders



Source: Own data, 2022

4.4.4. Cooperation among stakeholders

The extent of stakeholder cooperation is another element to consider and five Likert item questions make up the factor. In the first question, the average level of cooperation among shippers in consolidation centres was 2.45. As a result, the majority of participants agree that there is no coordination amongst shippers at consolidation facilities. The majority of respondents gave a Low rating to the second question about two shippers cooperating to employ a consolidated transport provider for their goods' last-mile delivery. A mean score of 2.10 was given by the respondents. The third statement has a mean of 2.69, which falls into the neutral category. As a result, the vast majority of experts in the fields are unsure whether shippers cooperate in municipal logistics operations. Furthermore, according to the mean value score of 2.65 for the fourth request, the experts who participated in this survey are unsure whether the client and the city logistics operators cooperate. This question's typical score value is characterized as neutral; neither agree nor disagree. The final statement, about communication between city logistics operators, received a mean score of 2.16, indicating that the majority of respondents do not believe communication exists between two city logistics pro-

viders. As a result of the following assertions made by survey respondents, we may deduce that stakeholder cooperation is important.

Table : 4.5. Cooperation among stakeholders

Description of Items	Minimum	Maximum	Mean	Std. Deviation
There is a cooperation between two shippers in using consolidation centres	1	5	2.45	1.122
There is a cooperation between two shippers in using consolidated transport	1	4	2.10	.793
There is a cooperation between the shipper and city logistics operator	1	5	2.69	1.052
There is a cooperation between client and city logistics operator	1	5	2.65	1.079
There is a cooperation between two city logistics operators	1	4	2.16	.758

Source: Own Data, 2022

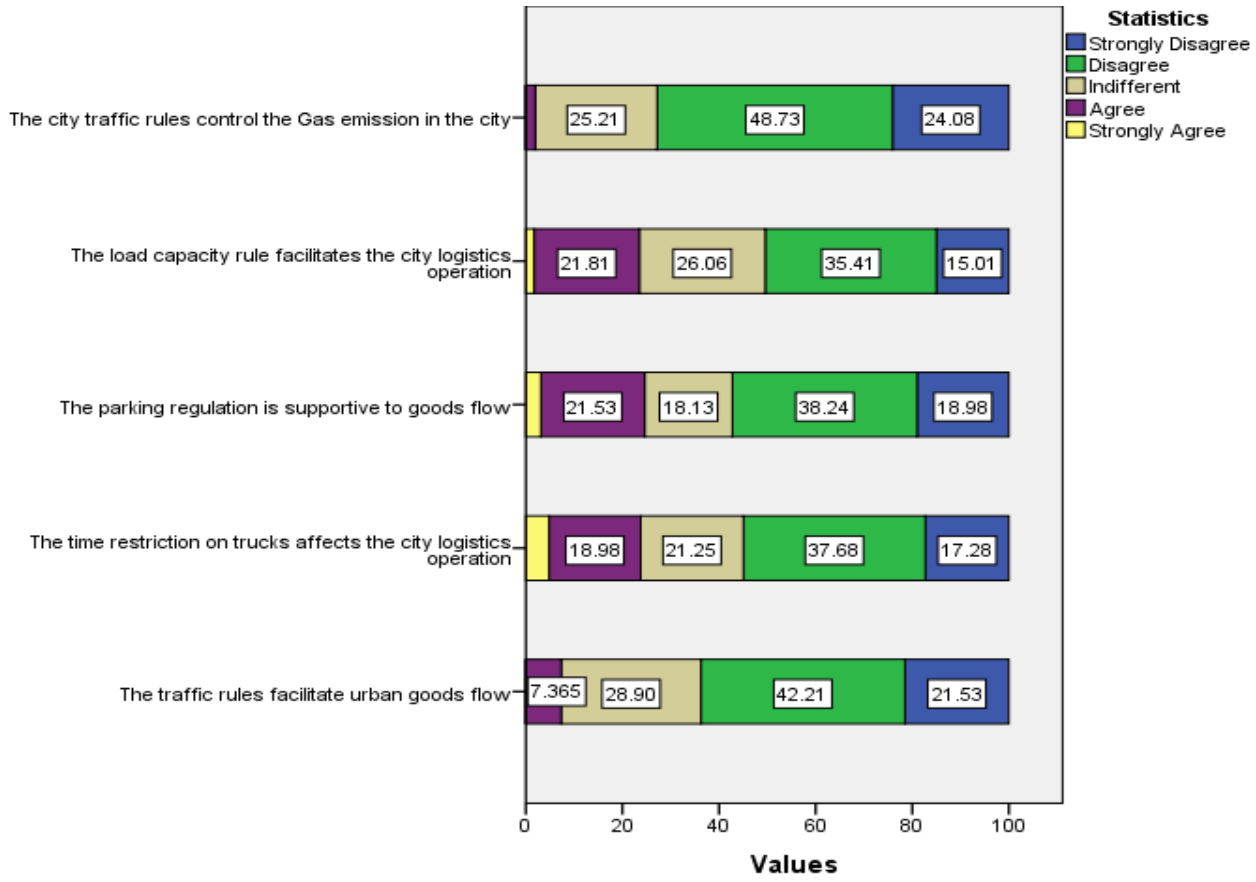
Shippers, Addis Ababa city residents, transport operators and public authorities are not working in cooperation either horizontal or vertical.

Cooperation among stakeholders is required to utilise the available limited resource cost-effectively and benefited from the positive value creation. The city logistics of Addis Ababa are not getting this benefit and operations are running expensively compared to the possible economic benefit to be obtained from their cooperation. Also, unless there is strong cooperation among stakeholders, the city logistics operation will be influenced by the need and requirements of external sources, which is the case in the Addis Ababa context where individual brokers informally lead the sector. Cooperation is a must to be competitive and cost-effective in the fast-changing market environment.

4.4.5. Facilitation and Support of Public Authority

The government authority plays a major role in the city logistics system by regulating the system and facilitating the environment for city logistics services. This group of factors are designed to see the level of facilitation and support provided by the federal and city administrative offices.

Figure 2.3. Facilitation and Support Level



Source: Own data 2022.

The percentile description of this factor group shows that 25.21 per cent of the respondent rated neutral on their perception of whether the current traffic regulation of Addis Ababa controls the gas emission or not. Out of the 353 respondents, 48.78% disagree that the current traffic rule does not control the gas emission of the city. Similarly, 24.08% of the respondents also strongly disagree with the protection of the traffic rules from the unnecessary gas emission in the city. So, we concluded that the majority of the respondents to this questionnaire does not believe that the current traffic rule control unnecessary gas emission in the city. The second statement forwarded to the respondents was to reflect their perception of whether the load capacity control rule facilities the mobility of transportation in the city operations. Out of the 353, respondents, 26.06% rated neutral, 34.28% disagreed with the statement and 15.01% the respondents strongly disagree. This means the majority of the respondents disagree that the regulation to control truckload capacity facilitates the mobility of logistics operations in the city of Addis Ababa.

The third question forwarded in this category was the respondent's reflection on whether the parking regulation of Addis Ababa city contributes to the good flow of freights. The majority of respondents agreed that the regulation does not support the freight movement in the city; out of respondents 38.24% rated disagree and 18.98% rated strongly disagree. The time regulation of heavy trucks on the city road was also rated low by the experts. The majority of the respondents feel that the time restriction on heavy trucks during pick hours has smoothened the freight movement during pick hours but affected the movement of freights by creating a long-hour delay in the city logistics operation. Out of the respondents, 21.25% rated indifferent and 37.68 disagreed and 17.28% strongly disagrees with the benefit of the regulation. The last question forwarded was how the traffic rule impacted the goods movement in the city and 28.90 % rated neutral, 42.21% disagree and 21.53 strongly disagree that the traffic rules are not supporting to the goods flow. Therefore, the logistics experts working in the public and private sectors affirm that the facilitation and support from the government agencies are Low.

4.5. Regression Analysis

The research is carrying out a multiple regression with experts' perceptions about the city logistics system in Addis Ababa (a) Operation, (b) Infrastructure, (c) Technology platform, (d) Facilitation as predictors (IVs) of city logistics system management practice in Addis Ababa. Operation, Infrastructure, Technology platform and facilitation are all continuous variables.

4.5.1. Assumption Checking

When running a Multiple Regression, there are several assumptions that we need to check our data to meet, for our analysis to be reliable and valid. As clearly explained by the statistician report on regression analysis (2007), it is important to make sure that any violations of the assumptions when writing up the results of the multiple regression analysis should fulfil the following six main assumptions. In this case:

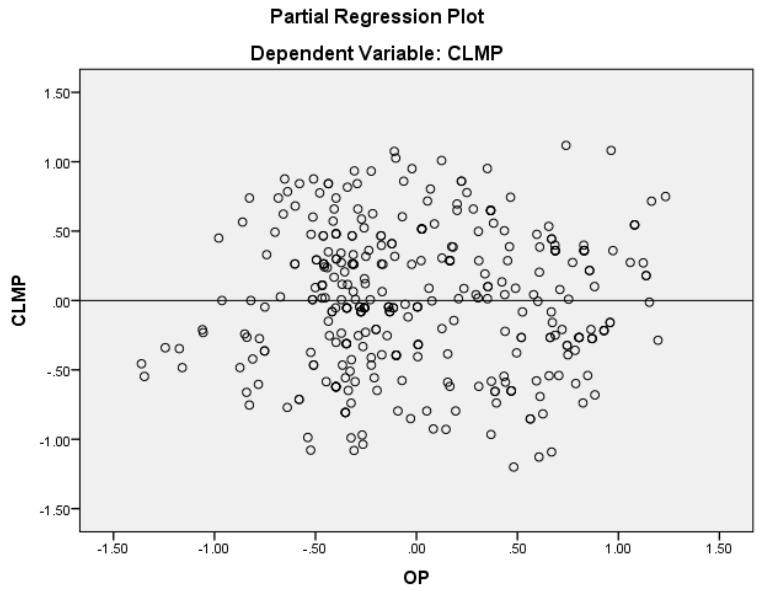
1. The relationship between the Independent and Dependent variables is linear.
2. There is no Multicollinearity in your data. Analysis of co-linearity statistics shows this assumption has been met, as VIF scores are below 10, & tolerance scores above 0.2.
3. The values of the residuals are independent. The Durbin-Watson statistic showed that obtained value was below 2 which is a positive auto-correlation.
4. The variance of the residuals is constant.

5. The values of the residuals are normally distributed.
6. No influential cases are biasing your model.

4.5.1.1. **Linear Relationship**

For linear regression to work, there must be a linear relationship between the independent and dependent variables.

Figure 4.4. Partial Regression plot of City logistics practice in Addis Ababa and Operation

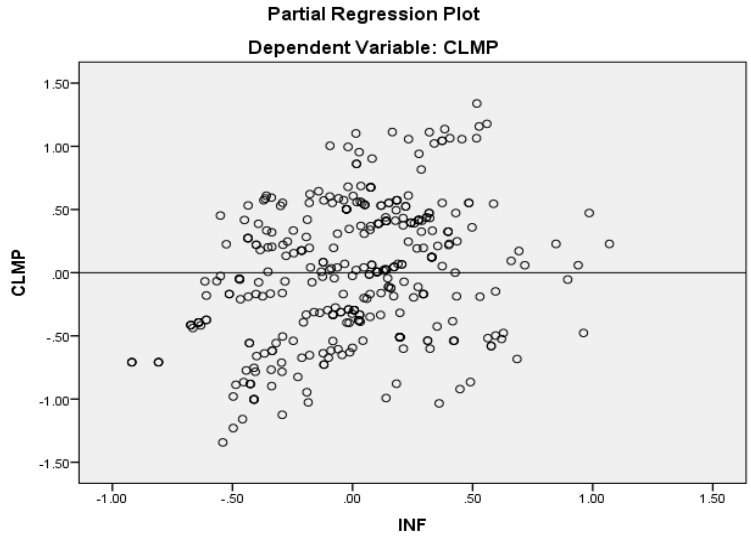


Note: CLMP = city logistics management practice in Addis Ababa

OP – City logistics Operation

Source: SPSS output 2022

Figure 4.5. Partial Regression plot of City logistics practice in Addis Ababa and city logistic Infrastructure

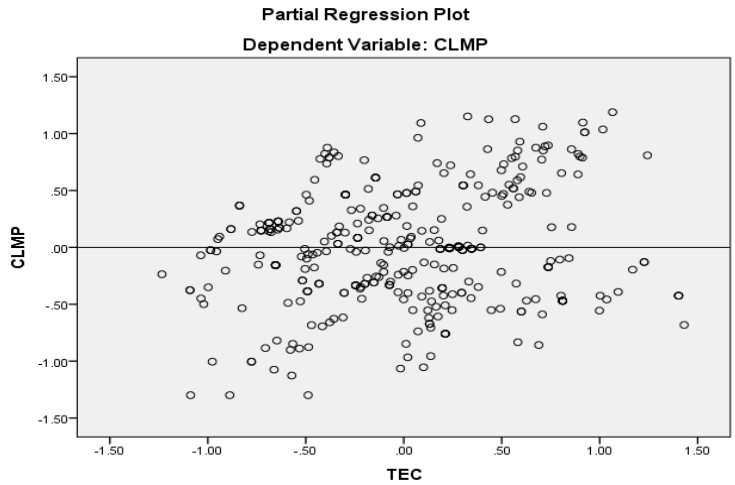


Note: CLMP = city logistics management practice in Addis Ababa

INF – City logistics infrastructure network of Addis Ababa

Source: SPSS output 2022

Figure 4.6. Partial Regression plot of City logistics practice in Addis Ababa and information Platform

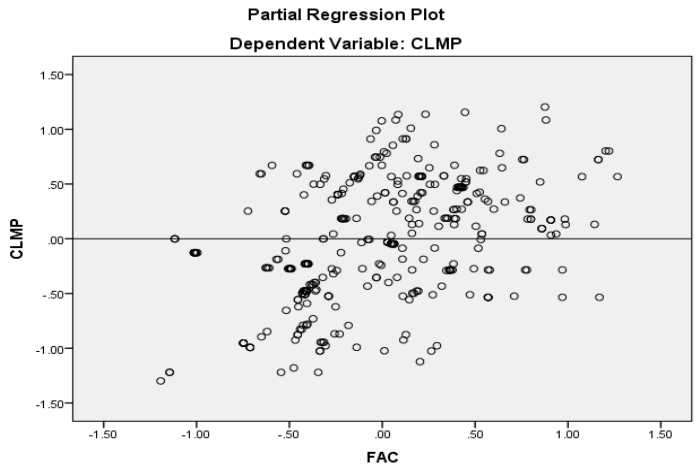


Note: CLMP = city logistics management practice in Addis Ababa

TEC – information Platform in Addis Ababa city logistics

Source: SPSS output 2022

Figure 3 4.7. Partial Regression plot of City logistics practice in Addis Ababa and facilitation



Note: CLMP = city logistics management practice in Addis Ababa

FAC – Facilitation and Support of the public authority

Source: SPSS output 2022

The above four figures confirmed that there is a linear relationship between the dependent and independent variables.

4.5.1.2. Multicollinearity test

Multicollinearity is a statistical notion in which the independent variables in the model are correlated. There is no multicollinearity among the variables for T< 0.1 and VIF > 10. As shown in the below table all T values are >0.1 and VIF values are <10. Therefore, there is no multicollinearity problem among the independent variables.

Table 4.6. Multicollinearity Test

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	.238	.149		1.599	.111	.531	.055					
FAC	.459	.053	.362	8.630	.000	.354	.564	.586	.420	.319	.777	1.288
INF	.503	.075	.341	6.674	.000	.355	.652	.620	.337	.246	.523	1.910
TEC	.172	.048	.173	3.559	.000	.077	.267	.525	.187	.131	.575	1.740
OP	.031	.049	.029	.628	.530	-.066	.128	.394	.034	.023	.628	1.594

a. Dependent Variable: CLMP

Source: SPSS output 2022

4.5.1.3. No independence of error

There is no link between the independent and residual variables (the value of the residuals is independent). The Durbin-Watson scale runs from 0 to 4, with a need value close to 2. Therefore, from the below model summary Durbin-Watson=1.1.766 no independence error is not a concern.

Table 4.7. Independence of error

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.725[a]	.526	.520	.50092	1.766

a. Predictors: (Constant), OP, FAC, TEC, INF

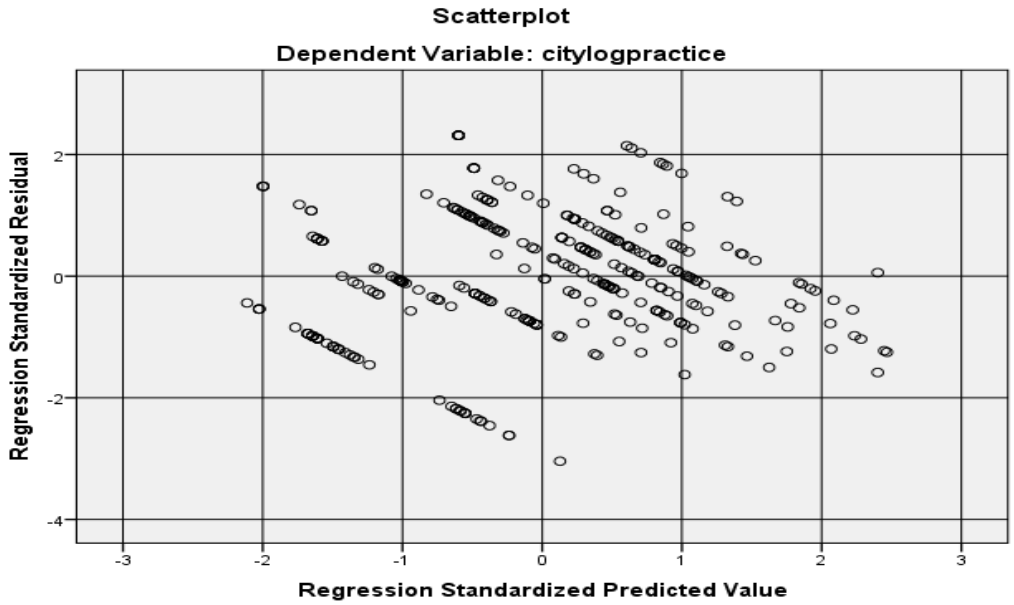
b. Dependent Variable: CLMP

Source: SPSS output 2022

4.5.1.4. Homoscedasticity

Homoscedasticity is assumed, which means that the residuals are equal across the regression line. There is no evident sign of funnelling, as seen in the diagram below. Therefore, the assumption of homoscedasticity is met.

Figure 4.8. Scatterplot

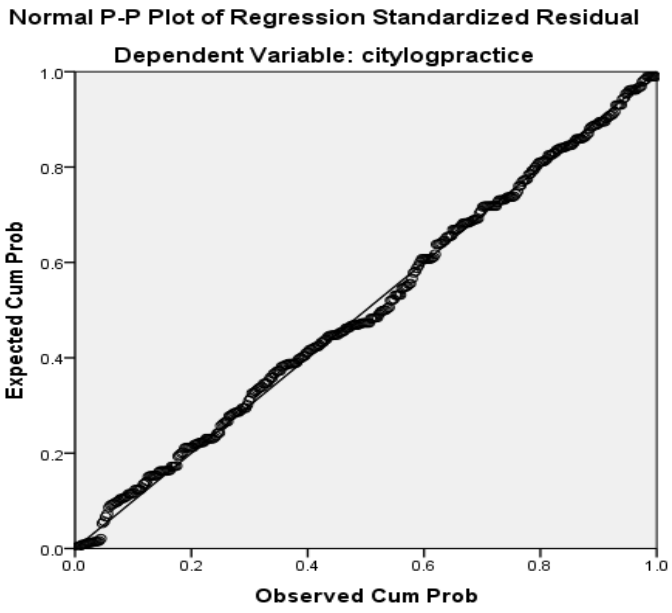


Source: SPSS output 2022

4.5.1.5. Normal Distribution

Residuals have a normal distribution of values. As the dots get closer to the diagonal line, the residuals become more evenly distributed. The below table affirms the normal distribution of the variables.

Figure 4.9. Normal P-P plot



Source: SPSS output 2022

4.5.1.6. Outliers

No influential cases biasing the model. Cook's Distance statistic values over 1 are likely to be significant outliers. Therefore, the minimum is .000 and the maximum is .072 based on the output of the SPSS.

Table 4.8. Residuals Statistics

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.1655	3.8200	2.5113	.52430	353
Std. Predicted Value	-2.567	2.496	.000	1.000	353
Standard Error of Predicted Value	.028	.096	.058	.015	353
Adjusted Predicted Value	1.1503	3.7945	2.5115	.52438	353
Residual	-1.21543	1.09486	.00000	.49806	353
Std. Residual	-2.426	2.186	.000	.994	353
Stud. Residual	-2.443	2.206	.000	1.002	353
Deleted Residual	-1.23167	1.11544	-.00013	.50582	353
Stud. Deleted Residual	-2.460	2.219	.000	1.004	353
Mahal. Distance	.124	11.812	3.989	2.654	353
Cook's Distance	.000	.023	.003	.004	353
Centered Leverage Value	.000	.034	.011	.008	353

a. Dependent Variable: CLMP

Source: SPSS output 2022

4.5.2. Regression output

The study pursues to investigate the effects of Operation, Infrastructure, information platform and Facilitation on the city logistics system practice of Addis Ababa. The dependent variable city logistics practice in Addis Ababa was regressed on predicting variables operation, Availability of infrastructure, Availability of information platform and the support and facilitation of public authority in Addis Ababa. The independent variables significantly predict the city

logistics practice in Addis Ababa. F (4,348) = 96.406, p < 0.001, which indicates that the four factors under study have a significant impact on city logistics management practice in Addis Ababa.

Table 4.9. ANOVA

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	96.760	4	24.190	96.406	.000[b]
	Residual	87.320	348	.251		
	Total	184.080	352			

a. Dependent Variable: CLMP

b. Predictors: (Constant), OP, FAC, TEC, INF

Source: SPSS output 2022

This regression analysis is to know by how much the independent variable explains the dependent variable.

Table 4.10. Regression Analysis

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.725[a]	.526	.520	.50092	1.766

a. Predictors: (Constant), OP, FAC, TEC, INF

b. Dependent Variable: CLMP

Source: SPSS survey output (2022)

The Durbin-Watson statistic showed that obtained value is below 2 which is a positive auto-correlation.

As indicated in the above table the coefficient of determinant R square is 0.526 and R is .725a. The coefficient of determinant R square indicates that 52.6% of the variation in the city logistics practice is explained by determinants of city logistics system determinants namely; Operation, Infrastructure, information platform and Facilitation. Thus, 47.4% of the variations in performance are accounted for by other factors/practices not presented in the model.

Table 4.11. Analytical model

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	.238	.149		1.599	.111	.531	.055					
FAC	.459	.053	.362	8.630	.000	.354	.564	.586	.420	.319	.777	1.288
INF	.503	.075	.341	6.674	.000	.355	.652	.620	.337	.246	.523	1.910
TEC	.172	.048	.173	3.559	.000	.077	.267	.525	.187	.131	.575	1.740
OP	.031	.049	.029	.628	.530	-.066	.128	.394	.034	.023	.628	1.594

a. Dependent Variable: CLMP

Source: Survey spss output (2022)

From the analytical model developed show that Facilitation (β1= 0.459, p= 0.000), Infrastructure (β2= 0.503, p= 0.000), and Information Platform (β3= 0.172, p=0.000) have a positive relation and significance on operational performance. Findings in the above table show that the major significant variables are Infrastructure (P=.000), Facilitation (p 0.000) and information platform (p=0.000) while the insignificance variable is operation (p= 0.53) respectively. This shows that increases in the dimensions of city logistics system determinants will cause an increase in city logistics system performance. Except for the operation variable, facilitation, Infrastructure and information platform are significant in the city logistics practice of Addis Ababa with 52.6%.

The above table gives the results for the regression coefficient for the multiple linear equations; ($Y=\beta 0+\beta 1X1+\beta 2X2+\beta 3X3+\beta 4X4+\varepsilon$) &by supplying the coefficients it becomes:

Y=0.238+0.459X1+0.503X2+0.172X3

where; Y -City Logistics Practice,

X1 -Facilitation,

X2 -Infrastructure,

X3 -Information platform

According to the regression equation established, holding all independent factors constant, the city logistics practice in Addis Ababa will be 0.238 units. Holding all other independent variables constant, a unit increase in Facilitation will lead to a 0.459 increase in the city logis-

tics practice of Addis Ababa. A unit change in the infrastructure network will lead to a 0.503-unit improvement in operational performance; a unit increase in the information Platform will lead to a 0.172 increase in the city logistics practice. However, at a 5% level of significance and 95% level of confidence, the three Variables have a significant influence on the city logistics practice of Addis Ababa with p-values of p= 0.000, p= 0.000, p=0.000 respectively.
Since open-ended questions are used to gather qualitative data, the other factors that are not covered in the above analysis will be gathered and analyzed from the open-ended questionnaire and interview.

4.6. Analysis of Secondary data and Structured interview

Five open-ended questioners are included in the study questionnaire to validate the responses to the Likert item question and to encourage experts to offer their thoughts if the questionnaire does not cover a certain topic. A framed interview question was also employed as a survey data gathering instrument in the study. This interview is made up of seven structured questions that were asked of three Addis Ababa city transport authority unit heads and three ministries of transport and logistics experts (one -researcher, one logistics expert, and one operation unit head). Three managers of private freight transport associations were also interviewed for their perspectives. These data are prescribed in written format to connect the major factors raised by the experts other than the above Likert scale questionnaire and thematic analysis is used to structure the data. The major issues are summarised below:

- Awareness – Another issue stated by experts during the interview and noted by the researcher when collecting data is the amount of knowledge of stakeholders about the concept. According to Gebrehiwot Mulatu, a federal transport and logistics specialist, political leaders and professionals involved in controlling freight movement in the city have a very low degree of awareness. Alazar agrees with the premise that most of us overlook the economic benefits of municipal logistics while drafting and enforcing freight logistics management standards. The industry receives very little attention, especially as compared to passenger operations, which are regulated and managed on a daily and trip basis. Yitagesu supports the notion that the majority of the specialists appointed to monitor the city's freight operations lack sufficient expertise in the subject and are unsure of what to control and support.

• Legal framework- According to the proclamation establishing the Ethiopian Transport Authority, the Federal Transport Minister administers and oversees trucks over 70 quintals, while the management of trucks under 70 quintals is allocated to Addis Ababa city and re-

gional states. However, the two offices do not work together in the city's truck administration and management. According to the team leader for transportation licenses in the Addis Ababa city administration (W/O Yemisrach), both the federal and city transport authorities issue licenses for city logistics operational trucks, particularly for companies that provide city logistics services using computer applications. In an interview with Gebrehiwot, the leader of the transport licensing team at the Federal Transport Minister, the same was confirmed.

According to the rule of 06/2011, the Addis Ababa city transport authority can regulate the licensing and operation of freight trucks with city plate numbers, however, there has been no effort to facilitate and assist freight truck operations in Addis Ababa so far. The city attempted to coordinate the fragmented freight service activity of transporters by implementing Directive 05/2010, which requires all freight vehicle owners in Addis Ababa to form an association and get their work license through that group. The municipal transportation authority also engaged two experts in each of the eleven sub-cities, however, there is no active operation within this chain because no working methods or manuals have been conveyed to the execution experts. So, the authority is only giving licenses to the associations with a minimum member of 35 and a maximum of 70. The Directive 05/2010 has the below limitation for effective execution:

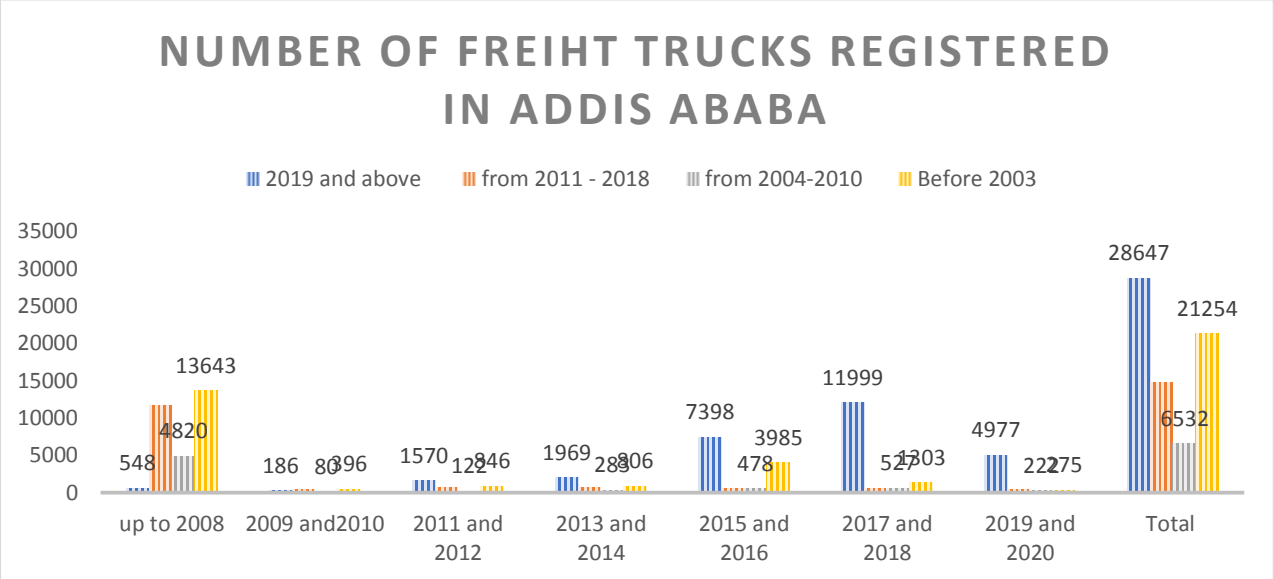
  - No direction about the operational aspect of the city freight logistics service
  - It does not incorporate disciplinary action which is vital to enforce the directive.
  - The directive does not incorporate disciplinary action while truckers violate the procedure
  - The directive is not obligatory to force all freight truck owners to be a member of an association. Thus far, there are around 71,192 trucks licensed in Addis Ababa to provide a freight service with a loading capacity of 70 quintals. But as per the registered data of the authority, only 17 associations (with 710 members) are registered and licensed this far. These figures of authority are an indicator of most freight trucks are not registered within the association and are operating on their own.

- License and registration - another murky area identified by experts in the license and registration to operate as a city logistics operator in Addis Ababa. Only freight transport vehicle owners are considered and registered as city logistics operators, according to Alazar and Yitagesu. The regulation does not apply to the other stakehold-

ers working in city logistics loaders and consolidation centres. Furthermore, to obtain a license to operate in the city, these truck owners must create an association of 20 to 70 members. According to Gebrehiwot, the members of this association are strangers. They are just linked to obtaining a license and do not collaborate in their operating activities. They only meet once a year in their annual meeting to hear the reports of the board. There is no strong system or operation to connect the truck owners as well.

- Gas Emission – The majority of freight vehicles operating in Addis Ababa are ancient. According to the data in figure 4.4, 71,192 commercial freight trucks are working in Addis Ababa, of which 30% (21,254) were produced 19 years ago. When compared to newer freight trucks, these older trucks consume a lot of fuel and emit a lot of gas. In the city, there is no legislation or system in place to regulate the age of trucks or gas emissions. There are no regulations in place in the country or in the city to monitor the gas emissions of trucks operating in the city.

Figure 4:4.4. Number of Commercial freight trucks registered in Addis Ababa



Source: Addis Ababa city administration licence registration and controlling unit, November 2021

- Pricing and Sourcing – there is no fixed or range system pricing for freight transport in the city. The brokers are the ones to set and negotiate the price with the customer on behalf of the transporters. The unorganized brokers are the one who manages and controls the sourcing system of city logistics operation. The customer and truck operators connect and communicate through the brokers. Yemisrach affirms the above

point that the city logistics service providers are not sufficient and work in a very disorganized way led by unorganized brokers.

- Unregulated Loaders – the loading and unloading activity in the city of Addis Ababa is not regulated. Organized youngsters' groups in different vicinity manage the loading and unloading process traditionally and subjectively. The private transporters involved in the city logistics complins that the negotiation between the customer and these groups of people, is the major challenge in the city logistics operation. The price seated by the loading and unloading workers is extremely high and in most cases, the owners of the goods are not willing to pay. The price negotiation between these two parties on average takes from two to three hours, where sometimes the local polices involve in the negotiation and mediate the process. This longer wasted time is the major challenge for city logistics transporters in Addis Ababa.

4.7. Discussion and Interpretation

As per the findings of the analyses from both primary and secondary data, the researcher has answered all the research questions and the outcome of the findings is summarised in the below paragraph:

- The city logistics system of Addis Ababa is affected by different factors that are detailed in 35 questions and grouped into four major groups. All the four factors were rated a mean average of low, which means the city logistics practice in Addis Ababa is poor.
- The regression analysis of the computed variables of the four factors showed that the city logistics practice is significantly affected by the operational model, infrastructure network, information platform and facilitation of the public authority. The model is significant. The four variables affect the city logistics practice of Addis Ababa at 52.6%. The increase in any of the dependent variables will significantly affect the dependent variable which is city logistics practice in Addis Ababa. The major factor that significantly affects the city logistics practice is Infrastructure (P=.000), Facilitation (p 0.000) and Technology (p=0.000).
- The first factor that significantly affects the city logistics practice is Infrastructure at a beta value and significance of ($\beta 2 = 0.503$, $p = 0.000$). The city logistics infrastructure network is the fundamental basis of the entire city logistics system. The infrastructure covers the connecting roads and places used for city logistics operations.

Both the connecting roads within the city and international freight are rated low, which means the base for the city logistics system is not sufficient enough to handle the operation. In addition, the availability of urban consolidation centres is also perceived as minimal to accommodate the city's logistics operations. This means the base to provide the city logistics service is limited to fulfilling the increasing demand of the city and requires the city authority to upgrade the connecting roads and consolidation warehouse to create a better city logistics platform. This problem also calls to see other alternative solutions like night shift service delivery and using trains for city logistics operations.

- The second factor that highly affects city logistics is Facilitation with a beta value and significance level of
- ($\beta 1 = 0.459$, $p = 0.000$). Facilitation is the main activity of the public authority in regulating appropriate laws to manage the city logistics system. But the respondents of this survey have affirmed that the authority has not enacted adequate policy, regulation and working manual to govern the city logistics system. The public service that is managing the city logistics operation of Addis Ababa has failed in meeting its objective of maximising operational efficiency and minimising the negative social and environmental Impacts on its city residents. So, the city authority has to enact additional regulations to fill the legislative gap in freight operation and implement it strictly to the benefit of the residents. Setting up a detailed regulation, work manual and policies is a crucial aspect of developing an efficient city logistics system and plays a significant role in the successful implementation of city logistics solutions.
- The third factor that highly affects city logistics is the information platform with a beta value and significance level of ($\beta 3 = 0.172$, $p = 0.000$). Communication among stakeholders also plays a vital role, but it was rated differently with an aggregate mean of 2.61. Good communication among stakeholders enables them to optimise operations based on their informed decisions. But the process to acquire, store, share and retrieve information about the city's logistics operation is very difficult. These days, countries are devising a technological devices to have a piece of real-time information about their city movement information like road safety, reduction of congestion, regulatory compliance, and supply chain information. In addition to the communication device, the technology is producing different advanced tools to support the operation of delivery and transportation. Adopting this kind of system and technology is also required to alleviate the problem of city logistics in Addis Ababa.

- The last factor analysed in the regression is the operational model which is found slightly insignificant insignificance variable in operation (p= 0.53). This means an increase in the operational model does not have a direct effect on the city logistics of Addis Ababa, rather it should be combined with the other three factors discussed higher as the model was workable with the four factors. The majority of the respondents are not certain about the adequacy of the operational process. As it is difficult to see the operation out of the above-discussed factors that build the external environment (infrastructure) and inner environment (Facilitation) of the city logistics. The operational aspect of city logistics covers the process of goods receiving, loading and unloading, identification, consolidation, pick and packing, storage, labelling, transportation, distribution, and reverse of debris or damaged goods. The respondents agreed that these activities are not provided properly and in an organised manner to satisfy the needs and expectations of the customers; city residents of Addis Ababa. The low rating for this factor is the other indicator of poor city logistics performance in Addis Ababa.
- These four variables are the major factors affecting the city logistics of Addis Ababa and hinder the sustainable growth and urbanisation of Addis Ababa city. These factors not only increase the operating times of freight vehicles within the City but also reduces the utilization of the vehicles and therefore increase the cost of transport which will finally impact the social, economic and environmental aspect of city residents.

CHAPTER FIVE: SUMMARY, CONCLUSION, AND RECOMMENDATION

This chapter presents the summary of major findings of the research conducted to assess factors affecting the city logistics practice of Addis Ababa. This part of the research incorporates the conclusion of the research based on the major findings and provides a recommendation for issues covered by the research.

5.1. Summary of findings

The primary goal of this research is to determine the major factors that influence Addis Ababa's city logistics system. The primary elements affecting city logistics practice have been summed up and categorized into four variables in the study. These include operational models, infrastructure networks, Information platforms and facilitation and support for public service sectors.

- According to the analytical model created, operational performance is positively correlated with facilitation (r=0.459, p=0.000), infrastructure (r=0.503, p=0.000), and information platform (r=0.172, p=0.000). According to the findings of the study, infrastructure, facilitation, and information platform are the three most significant variables, whereas operation is the least significant (p=0.53). This demonstrates that an increase in the dimensions of the factors that determine the performance of the municipal logistics practice will increase that performance. Except for the operation variable, facilitation, infrastructure, and information platform play a large role in Addis Ababa's city logistics practice (52.6%).
- One of the primary aspects evaluated in this study was infrastructure, which had a low mean value, indicating that experts are uncertain about the existence of suitable infrastructure capable of handling Addis Ababa's freight traffic. The respondents also think the road design and amenities in Addis Ababa are inadequate for enabling freight logistics mobility. The majority of specialists agree that the city's road layout is inefficient in supporting freight logistics.
- The mean average of facilitation and support from the government authority was also rated Poor where the experts are not certain about the availability of the support platform facilitated by the government to support the city logistics system.
- Communication among stakeholders is also perceived as low by the experts. The experts are not sure about the availability of an adequate communication platform that facilitates the connection among stakeholders.

- Experts are unsure about the accessibility of product receiving, loading and unloading, identification, consolidation, repackaging, storage, labelling, transportation, and distribution services in Addis Ababa.
- The poor horizontal and vertical cooperation of stakeholders is also considered one major factor affecting the city logistics system of Addis Ababa.

5.2. Conclusion

Based on the public and private sector logistics expert's opinions, interviews, Observation of cities during data collection, secondary data, and empirical literature, the following conclusions are derived about factors affecting city logistics in Addis Ababa:

- The operation, availability of infrastructure, Availability of Advanced communication platforms, and the Support and Facilitation of Public Authority in Addis Ababa were regressed on to the dependent variable City Logistics Practice in Addis Ababa. The four determinants under research have a considerable impact on city logistics practice in Addis Ababa, according to the independent variables' significant ability to predict city logistics practice in Addis Ababa, F (4,348) = 96.406, p 0.001. The calculated number is below 2, which is a positive auto-correlation, according to the Durbin-Watson statistic.
- The coefficient of determinant R square is 0.526 and R is.725a, as seen in the analysis part. According to the coefficient of determinant R square, the four components of the city logistics system—operation, infrastructure, technology platform, and facilitation—explain 52.6 per cent of the diversity in the practice of city logistics. Therefore, other characteristics or practices not included in the model explained 47.4% of the variability in performance.
- Holding all other parameters constant, the developed regression equation predicts that Addis Ababa's city logistics practice will be 0.238 units. A unit increase in Facilitation will result in a 0.459 rise in Addis Ababa's municipal logistics practice, keeping all other independent variables constant. A unit rise in the technological platform will result in a 0.172 increase in the city logistics practice, while a unit decrease in the infrastructure network will result in a 0.503-unit improvement in operational performance. However, the three Variables have a substantial impact on Addis Ababa's city logistics practice with p-values of 0.000, 0.000, and 0.000, respectively, at 5% level of significance and 95% level of confidence. The availability of consolidation centres in

different parts of the city is an issue in the city, and the operational space of the few consolidation centres that are accessible is very limited, according to both commercial and public sector logistics experts.

5.3. Recommendation

Based on the above conclusion, the below points are recommendations to alleviate the challenges affecting the city logistics of Addis Ababa and have a sustainable system:

- Improve Addis Ababa's fundamental infrastructure, particularly large consolidation centres at the city's five gates or in neighbouring cities, to unload, store, repack, label, and combine commodities for small truck operations. Establishing freight loading and unloading ports in various locations of the city will also alleviate the basic infrastructure problem. Further encouraging and incentivizing city logistical operations during the night shift could be one possible tool to properly utilize the available infrastructure.
- Inviting private city logistics operators to invest in technological equipment that facilitates communication among stakeholders and consolidation centres to harmonize the city logistics supply chain. The transport authority should develop or implement a technology system to track and display real-time data on the Addis Ababa city logistics movement and system.
- Furthermore, to alleviate the support and facilitation problems the city transport authority should review the transport policy, enact a working and operational manual and create awareness. The city lacks a strategic plan to handle existing concerns as well as a future freight transportation and logistics issues that may arise as a result of the city's overall future development. Unless the city's freight transportation and logistics management are seriously organized, the existing situation will only worsen, and the city's overall economic efficiency will be harmed. Also, the authority should facilitate the enactment of a law and operating manual that oversees Addis Ababa's municipal logistics system by involving all stakeholders, including loaders, technology service providers, warehouse/consolidation centres, and the public sector, in addition to truck owners. In addition to the above, the transport authority should have to organise awareness-raising seminars regarding the extent of city logistics and its value creation chains for all parties involved in city logistics, including policymakers, higher government officials, and commercial operators.

5.4. Future research recommendation

The subject research was conducted to assess the factors affecting city logistics in Addis Ababa. But the area needs further research on seeing night shift city logistics operation as one researchable area. Also, With the development of train transport in the city and the country, seeing train transport as an alternative transport infrastructure for city logistics could be a potential study area in the future.

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Data collection instrument

Annex – 1. Questioner

Questionnaire

Addis Ababa University

School of Commerce

Department of Logistics and Supply Chain Management

Questionnaire on Factors affecting City Logistics in Addis Ababa

Dear Respondent!

My name is Biniyam Ketema. I am MA students in Logistics and Supply chain management at Addis Ababa University, School of Commerce, and would like to conduct research on factors Affecting city logistics in Addis Ababa. The Aim of the study is to identify major factors affecting city logistics operation in Addis Ababa and recommend possible solutions that improve the efficiency of urban freight logistics in the city.

So, I would like your cooperation to share me your time in filling your perception about the factors in a Likert scale. The questions will have a defined scale from 1 to 5.

Thank you in advance for your cooperation.

General Directions

1. No need of writing your name.

2. All the questions raised here are equally important to attain the objectives of the study. Failure to complete any of them would adversely affect the overall quality of the study.

3. Please put a tick (□) for your answer and for the number of your choice listed in the sections.

4. If you require further clarification or details, please feel free to contact me with either of the following addresses:

Phone: 0911- 104341

Email: yemamylij@yahoo.com

Section I: Background Information

1. Name of your Organisation _____
2. Current Position _____
3. Years of Experience
   A. 0-5 B. 6-10 C. 11-15 D. 15-20 E. 21 and longer
4. Highest Educational Qualification
   A. Certificate B. Diploma C. BA/ BSC D. MA/MSC E. PHD and Above
5. Role _____
6. Type of goods your company transport
   A. Consumables B. building Materials C. Industrial Goods D. Public products (mil and waste collection) E. others (for Events)
7. Your field of Specialisation _____
8. Trainings _____

Section II. Survey Questions

No.	**How do you see the current status of city logistics operation in Addis Ababa? 1= strongly disagree, 2= Disagree, 3, indifferent, 4= agree, to 5 strongly Agree.**	**1**	**2**	**3**	**4**	**5**
1	There is available space to unload and reloading goods					
2	Goods sorted out for urban transport in terminals/ consolidation centres					
3	Goods are consolidated for Urban freight transport					
4	Packing and labelling is processed in consolidation centres					
5	Adequate Trucks are available for city logistics operation					
6	There is available space to unload/ Deliver goods in client's residence					
7	Unpacking and Debris removal done by operators at the client's residence					
8	The consolidation centres are accessible for trucks					

No.	How do you rate the city logistics infrastructure Availability in Addis Ababa? 1= Not Available at all, 2= Not Available, 3, Average, 4= Available, to 5 Fully Available.	1	2	3	4	5
1	Connecting roads to city centres					
2	Roads connect with global transport operators					
3	Trucks for city logistics transport					
4	Ethics of urban freight truck drivers					
5	Consolidation centres					
6	Parking in the Consolidation centre					
7	Loading and unloading area in the consolidation centre					
8	Parking space in City centres					
9	Parking space in client's residential area.					
No.	How do you rate the city logistics practice of Addis Ababa: 1= strongly disagree, 2= Disagree, 3, indifferent, 4= agree, to 5 strongly Agree.					
1	The road design and infrastructure of the city					
2	There is a support and facilitation from the authorities					
3	There is a platform to communicate among stakeholders					
4	The operation model covers all activities in the city logistics					
No.	How do you see the communication between the stakeholders, Shippers, customers, operators? 1= Not Available at all, 2= Not Available, 3, Average, 4= Available, to 5 Fully Available	1	2	3	4	5
1	Technological equipment for communication					
2	Software platform for the communication					
3	Information flow among stakeholders					
4	E-commerce facilities					
5	Technological equipment for loading, unloading and delivery service?					
No.	What is the cooperation level of infrastructure between the stakeholders? 1= Too low, 2= Low, 3, Medium, 4= High, to 5 too High	1	2	3	4	5

1	Between two shippers in using consolidation centres					
2	Between two shippers in using consolidated transport					
3	Between the shipper and city logistics operator					
4	Between client and city logistics operator					
5	Between two city logistics operators					
No.	**The public authority is facilitating and supporting the city logistics by enacting regulatory framework. 1= strongly disagree, 2= Disagree, 3, indifferent, 4= agree, to 5 strongly Agree.**	**1**	**2**	**3**	**4**	**5**
1	The traffic rules facilitate urban goods flow					
2	The time restriction on trucks affects the city logistics operation					
3	The parking regulation is supportive to goods flow					
4	The load capacity rule facilitates the city logistics operation					
5	The city traffic rules control the Gas emission in the city					

III – Open ended questions to support the responses of the close ended questions.

In answering the close ended question, please try to be as brief as possible:

1. How do you see the city logistics operation in Addis Ababa? _____
   _____
   _____

2. What challenges have you seen in City logistics operations?_____
   _____
   _____

3. What are the possible solutions for the challenges stated in the above questions? __
   _____
   _____

4. what is the cooperation level among stakeholders? _____

_____

_____

5. What are the major areas that needs improvement in city logistics system? _____

_____

_____

Annex 2-

Structured interview questions

1. What is city logistics
2. How does city logistics affect urbanisation?
3. What are the policy and legal framework governing the city logistics operation?
4. What are the challenges in city logistics?
5. What are the initiatives taken by the authority to alleviate the major challenges in city logistics?
6. Is there any innovative initiated to enhance the efficiency of city logistics?
7. Is there any technological instrument used to control the efficient urban freight transport?