Assessment of Factors Affecting Container Inventory Management Practice: The case of Ethiopian Shipping and Logistics Service Enterprise (ESLSE)

By

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Declaration

I, the undersigned, hereby declare that the work contained in this thesis entitled "Assessment of Factors Affecting Container Inventory Management Practice: The case of Ethiopian Shipping and Logistics Service Enterprise (ESLSE) "is my original work and that I have not previously in its entirety or p submitted at any university for a degree.

Signature: Bisrat Ayele Date: June 9, 2022

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This is to Certify that the thesis prepared by Bisrat Ayele, entitled: Assessment of factors affecting Container Inventory Management practice the case of Ethiopian Shipping and Logistics Enterprise (ESLSE) submitted in partial fulfillment of the requirements for the degree of Master of Arts Degree in Logistics and Supply Chain Management complies with the regulations of the University and meets the accepted standards with concerning originality and quality.

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Chair of Department of Graduate Program Coordinator

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List of Acronyms

ESLSE: Ethiopian Shipping and Logistics Service Enterprise.

ISO: The International Organization for Standardization.

CII: Container Inventory Imbalances.

CIM: Container inventory management.

TEU: Twentieth equivalent unit or a '20-foot container.

DCSA: Digital Container Shipping Association

EFA: Exploratory Factor Analysis

DP: Dependent variable

IDP: Independent Variable

ABSTRACT

The study's objective was to determine the impact of container controller knowledge, unreturned containers, Customs clearances, and standard container inventory management on ESLSE's container inventory management practice. The study included 306 ESLSE employees in total. The study made use of a Five-Linkert-scale instrument that has been verified. The data was investigated using descriptive statistics, factor analysis, and regression analysis. Container controller knowledge, lengthy customs clearance, and standard container inventory management all have a positive effect on container inventory management practice, according to the study. Unreturned Containers, on the other hand, have a detrimental impact on the practice of managing container inventories The findings of this study provide a detailed understanding of the practical implications of factors that influence container inventory management practices and will help the Enterprise maximize container utilization by mitigating these factors. The findings will also serve as a foundation for future research, particularly for those looking into the factors that influence container inventory management in the maritime industry.

Key Words: Container Inventory Management particle, Customs clearance, Standard Container Inventory Management, and Unreturned Containers

CHAPTER ONE

INTRODUCTION

1.1 Introduction

The major goal of this research is to determine the factors that influence container inventory management practices in Ethiopian shipping and logistics companies (ESLSE). The background of the study, the scope of the study, the definition of words, and the study's organization are all presented in this chapter.

1.2 Background of the Study

Earlier cargoes were transported in wooden crates, pallets, boxes, barrels, or wrapped in sheets till the idea of standardized shipping containers comes to light. These cargo shipping methods were expensive, labor-intensive, and slow, and loading and unloading were troublesome. In the 1952 Mclean, the pioneer behind Mclean Trucking Co.in 1935 saw an open door a standard size box could be stacked off a truck onto a boat and visa-versa a lot quicker to reduce expenses and speed up the movement of products. The primary ISO container was designed in 1956 following several tests. Steel and stackable. The containers could be stacked without causing damage due to the built-up corners. They were all the same size, theft-proof, and simple to stack. In 1968, ISO 668 was introduced, which defined the current aspects. ISO principles are 8 ft.(2.43m),9 ft.(2.99m),20 ft.(6.10m),40 ft.(12.19m),45 ft.(13.72m),48 ft.(14.63m) and 53 ft.(16.15m).

Containerization marked a turning point in the maritime industry. Containerization demonstrated its true capacity as an undeniably productive and quick technique for transport, prompted extraordinarily diminished transport costs, and upheld a tremendous expansion in worldwide trade (Edirisinghe, 2018). Seaborne trade carried by container ships in 2020 amounted to 1.85 billion tons which steadily increased since 1980 (Statista, 2021).

The Seaborne trade is exposed to trade imbalance. Contingent upon how the country’s economy is based nations import more and export less or the other way around. As reflected

in import/export imbalance for developing economies and surplus for created economies. So the containers that bring freight should be sent back with freight or without freight. The containers transported without cargo are empty containers. Container inventory imbalances(CII) are mostly caused by trade imbalances. Many empty containers are waiting to be transferred as a result of the trade imbalance. During repositioning, these empty containers take up the same amount of area as loaded containers.

In a perfect scenario, containers being sent to one site would already be loaded with shipments and be on their way back. Be that as it may, it isn't the way it works in the genuine world. Trade imbalance among countries or mismatch of import and export constantly creates container imbalance. As a result of container imbalance, approximately 10% of global container assets are empty containers. Each year, the costs of relocating all of these empty containers range from $15 billion to $20 billion across the shipping industries (Lotte, 2020). As a result, in order to avoid CII concerns, the company must adopt extremely efficient and effective container Inventory Management (CIM).

Container inventory management(CIM) is a very sensitive and important activity in the liner shipping business. Material and goods are worldwide supplied promptly and in a cost-effective manner thanks to well-planned, properly projected, realistically allotted, and effectively managed container flows (Edirisinghe, 2017). However, CIM practice is affected by different factors both the internal and external factors that influence the existing practice. Infective CIM creates economic damage and marketing hindrance to the shipping business (Edirisinghe, 2018)

Container inventories can be used to their full potential if containers are constantly moving with freighted cargo. However, factors such as parties' mistakes in maintaining container inventory, container backlogs, and different parties' misuse of containers cause container cycles to be delayed and inactive for long periods of time.

The Ethiopian Shipping and Logistics Services Enterprise (ESLSE) which is the sole multimodal operator in Ethiopia owns 2,940 containers with two common sizes of twenty or forty feet; amongst 2,398 twenty feet containers (TEUs), 184 forty feet high cube (HCs)

and 358 forty feet general-purpose (GPs) containers In addition to having a variety of container sizes. Container leasing is a growing business trend in the logistics industry, according to ESLSE. On that basis, it now controls 49 TEUs and 500 HCs on a lease basis. Aside from that, ESLSE was purchased in around 6000 containers. Since 2021, the company has increased its inventory to 10,000 (Yewondwossen, 2021).

Container Inventory Management in the ESLSE is particularly complicated, according to the CEO of ESLSE, because public and government organizations and endeavors are not returning containers on time and have been sanctioned for hoarding the containers. Meanwhile, the dry port office is owned by ESLSE, and the Customs Commission controls the containers, as it claims. (Yewondwossen, 2021).

As per the CEO, factors such as customs delays, miss-use of containers, and container hoarding make Enterprise container inventory management difficult. The main issue is that there is no scientific evidence of how much each of these factors affects CIM practice in the company. As a result, the focus of this research was on the factors that influence container inventory management practices.

1.3 Problem Statement

According to the CEO of ESLSE, “container management in the ESLSE is very complicated due to public and government institutions and enterprises which are not returning containers on time and meanwhile the dry port facility is owned by ESLSE, Customs Commission act like it owns and controls the containers” (Bogale, 2021).ELSE blames importers' hesitance to offload freight and return rented containers in time. Importers and freight forwarders have long criticized the lengthy customs procedures. Despite the fact that they would prefer not to keep the containers for long periods of time, they contend that completing the process within the timeframe is difficult. (Bogale, 2022).

Carriers do not use or seek uniform container inventory management, which is a major problem. Each carrier creates an inventory management system that is tailored to its vision, purpose, and goals. These methods are rarely shared among carriers, and most of them feel that container inventory management is solely the domain of their container controllers'

implicit knowledge and that there is no reason to question their decisions. This approach prevents the industry from acquiring a head start on the competition and learning from its failures. As a result, the same mistake occurs frequently, which is incredibly ludicrous. (Edirisinghe, 2017).

Container inventories can be used to their full potential if containers are moved regularly with freighted cargo. However, factors such as parties' failures in managing container inventory, container backlogs, and different parties' misuse of containers cause container cycles to be delayed and inactive for long periods of time. The main difficulty to be solved is determining how much each of these elements influences CIM practice and devising a technique to reduce their impact in order to maximize resource usage (Srilekha, 2018).

Container inventory management is said to be influenced by customs clearance procedures, unreturned containers, non-standard CIM systems, and container controller knowledge. However, there is no scientific proof that these characteristics have a favorable or negative impact on the container inventory management method at ESLSE because no empirical studies have been conducted. As a result, the study looked into how and to what extent these factors influence ESLSE's container inventory management practices.

1.4 Research Objectives

1.4.1 General Objective

The major goal of this study was to see to what extent each of the factors influenced ESLSE's container inventory management practice.

1.4.2 Specific objectives

1. To assess the effect of Knowledge of container controllers on CIM practice.
2. To assess the effect of an unreturned container, on CIM practice.
3. To assess the effect of Customs clearances, on CIM practice.

4. To assess the effect of nonstandard container inventory management on CIM practice.

1.5 Research Hypotheses

H_1: The knowledge of container controllers has a positive impact on container inventory management practice.

H_2: Unreturned Containers have a negative impact on container inventory management practice.

H_3: Lengthy customs clearance has a negative impact on container inventory management practice.

H_4: Standard container inventory management has a positive impact on container inventory management practice.

1.6 Significance of the Study

The findings from this research offer exhaustive knowledge of the practical implications of factors that affect container inventory management practice and will help the Enterprise to maximize its container utilization by mitigating these factors. The findings will also be a jumping point for future research, especially for those who want to do similar research by assessing factors that affect container inventory management in the maritime industry.

1.7 Scope and Limitation of the Study

The main purpose of this study is to assess factors that affect Container Inventory Management Practice in the Ethiopian Shipping and Logistics Service Enterprise. The study was conducted from January 2022 to May 2022. The subjects were from ESLSE head office Modjo and Kalility port and Terminal. Each of the respondents was given a 5-point Likert scale questionnaire with a total of 23 questions and the responses were analyzed using SPSS. First Explanatory factor analysis data reduction and then the regression analysis is computed.

1.8 Definition of Terms

For the purpose of this study

- Temporary admission - shall mean temporary importation, subject to re-exportation, free of import duties and, taxes, and free of import prohibitions and restrictions (World Customs Organization, 1972)
- Stochastic-having a random probability distribution or pattern that may be analyzed statistically but may not be predicted precisely (Vocabulary.com).
- Liner Shipping - The Term Liner shipping uses to describe the cargo operations of vessels run on a schedule. These ships have fixed passages and port rotations for cargo loading and unloading (Vocabulary.com).
- TradeLens - is a highly secure data and document-sharing platform that simplifies and speeds your trade workflows. (Vocabulary.com).

1.9 Organization of the Study

There are five chapters in this report. The first chapter covers the introduction, the study's background, the Enterprise's background, the problem statement, the study's objectives, the research hypothesis, the study's importance, the scope, and the study's limitations. A review of theoretical and empirical literature was offered in the second chapter. The study's research strategy and methodology were discussed in the third chapter. Data analysis and presentation were covered in the fourth chapter. The findings, conclusion, and recommendations were all found in the fifth chapter of this paper.

CHAPTER TWO

2 RELATED LITERATURE REVIEW

2.1 INTRODUCTION

2.2 Theoretical Review

2.2.1 Container Inventory Management.

Inventory management is all about guaranteeing that a business will constantly have the right quantity of the right item in the right location at the right time. I the maritime industry Container Inventory Management(CIM) includes inward movement, storage, repairs, maintenance and outward movements of all containers belonging (including leased units) to the shipping line (Edirisinghe, 2018). Container inventory management(CIM) is a very sensitive and important activity in the liner shipping business. Material and goods are globally supplied promptly and at a cost-effective rate thanks to well-planned, properly projected, realistically allotted, and effectively managed container movements. (Edirisinghe, 2017). However, CIM practice is affected by different factors both the internal factors that influence the existing practice. Infective CIM creates economic damage and marketing hindrance to the shipping business (Edirisinghe, 2018)

There are three sources of containers for a carrier which are, carrier owned containers, leased containers and shipper owned container (Edirisinghe, 2017). At a given time, carriers may have containers dispersed globally in a sailing ships, in the hands of importers, exporters, at dry ports, port terminal, in customs warehouse, on the road on trucks, on rail or simply abounded by third party with some issues. These Containers must be inventoried and tracked because Containers are valuable and companies maintain ownership of them even they are in the position of the customers. Therefore, Container trucking should be for both empty and full containers

Container inventories can be used to their full potential if containers are moved regularly with freighted cargo. Containers, on the other hand, are idle for nearly half of their lives while being maintained, repaired, or stored. As a result, the industry's main concern is

figuring out the best way to optimize CIM strategies and practices. (Edirisinghe, 2018). It is then obviously required to identify the factors that influence the existing practices.

2.2.2 Container Inventory Management Practice

The well-known practice in container inventory management is the repositioning of empty containers from idle locations to locations where they are in demand. Alternative sources of containers include renting, leasing, and buying. The present practice can be summarized as follows:

The exporters are in need of empty containers. These empties containers are obtained from container freight stations. After empties containers are stuffed with cargo and transported through the intermodal facilities to the container yard. After that, the loaded container is loaded into ships in ports and transported to the target port. Transported and delivered to the consignees' location from the destination port. The consignees de-stuffed the containers, which were then returned to container terminals empty. These empty containers might require cleaning or maintenance if not they will be stored or transported to the place of demand. In the case of ESLSE, if containers are in need of repair the containers will be sent to India or China for repair. If the containers were leased they will be returned to the owner based on the prior agreement. Containers, on the other hand, are idle for around half of their lives while they are either being maintained, repaired, or stored. (Edirisinghe, 2018).

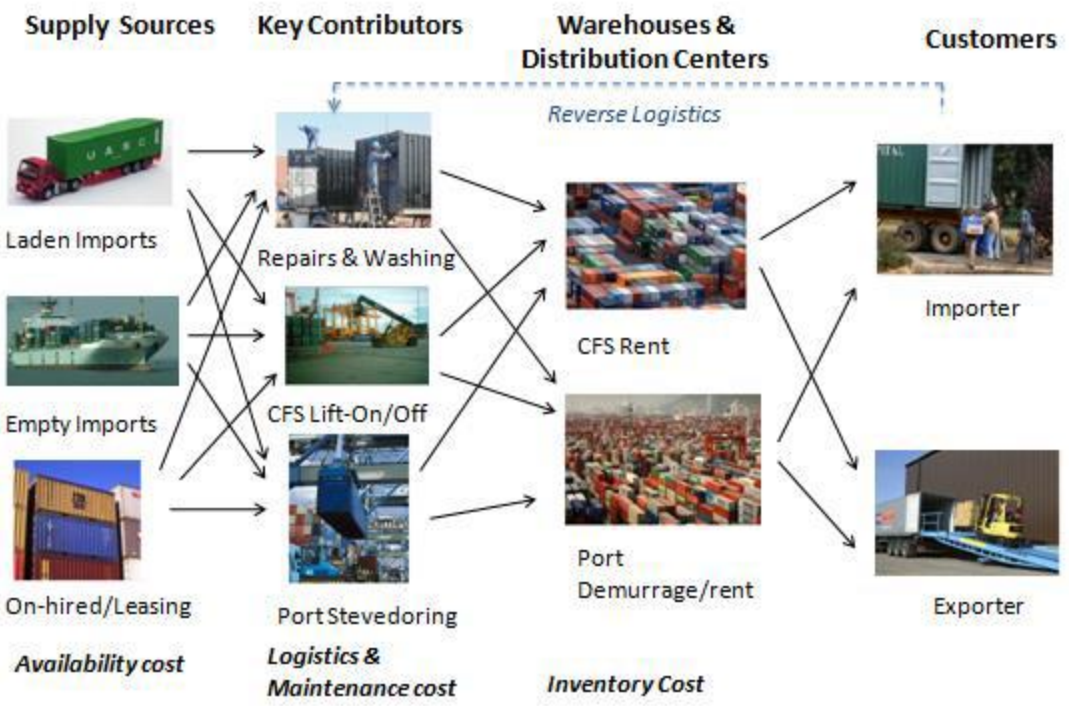


Figure2. 1: Container supply chain

Source : (Edirisinghe, 2016)

The concept of Container inventory management is based on the theory of Stochastic inventory theory where the demand in any period is a random variable rather than a known constant. In economic terms, shipping is a derived demand of international trade (Karmelic, 2012). Several studies were performed and different theories were developed to mitigate container inventory management and factors and challenges that affect container inventory management.

The 3F container inventory management(CIM) conceptual theory provides an independent opinion about the key dimensions that should be the focus of a carrier's attention when managing its container inventories. The 3F model's components are chosen based on expert rating ratings for 22 popular CIM tactics, followed by a conventional filtration process. Reduce import freight; reduce export freight; service agreements; synchronized budget; agile inventory; and export priority are the six strategies. These variables can be broken

down into three categories: freight, forecasting, and flexibility. The 3F concept aids managers in thinking beyond standard container repositioning and profit maximization This approach provides an objective, "proactive" solution rather than the more common, ad hoc "reaction" to market conditions related to empty container repositioning. This approach allows carriers to operate more effectively and efficiently by evaluating their decisions on a regular basis using an indicator comprised of industry-validated criteria. (Edirisinghe et al, 2018, pp. 363-386).

The concept of a virtual container pool is based on the concept of container exchange across carriers on a worldwide platform, which leads to maximum utilization. The presence of a carrier in short supply and another carrier in excess is a basic requirement for a container exchange. The primary criterion for this activity is that one carrier has a shortage of containers (either the size or type in demand), while another carrier has a surplus of the same size and kind of containers at the same time horizon and at the same area. The offeror, on the other hand, must first ensure that they have ongoing services (and agents to manage) at the desired location. Second, the offeror should have a requirement for empty containers at the time the corresponding containers are expected to arrive. The demand for containers must be more than or equal to the quantity of containers offered by the other carrier (offeree). The quantity and variety of inventory held by one or more businesses. (Edirisinghe, 2016)

The 6R container supply theory: Shipping supply is a complicated phenomenon. Unlike the demand prediction for a common consumer commodity, which is based on consumer-centered criteria, shipping supply has its own indirect characteristics. For example, supply can be increased by adding more ships, increasing ship size, improving ship speed, boosting port productivity and reducing port stay, changing shipping routes, and many more strategic approaches that aren't always related to ship size and quantity. The 6Rs refer to the right quantity of containers, right types (such as standard, open top, reefer, etc.), right size (20'40'45'etc.), and right quality containers to be given by the carrier at the right time and at the right price. (Edirisinghe, 2017). These requirements are initiated by exporters. As a result, carriers must carefully examine these factors in order to strike the correct balance between demand and supply.

Although there are not that many theories and literature regarding container inventory management practice. This study however guided by the 3F container inventory management theory because this theory provides an independent opinion about the key dimensions that should be the focus of a carrier's attention when it comes to keeping track of its container inventories. In this study the study it is assumed that the independent opinion about the key dimensions that should be the focus of a carrier's attention when managing its container inventories are the four factors studied. The theoretical background of this research is derived from the work of (Edirisinghe et al, 2018) and (Edirisinghe, 2017) selected literature on customs clearance and unreturned container effects on container inventory management practice.

Theoretically, prior studies agree on ,in the worldwide container supply chain, there is no standard container inventory management , resulting in significant costs and frequent failures, Container carriers use a number of techniques (in isolation) to efficiently and effectively manage their container inventories, but each carrier's approach is often unique, and container inventory management is the tacit knowledge of their container controllers and the shifting of empty containers from their idle location to other areas where they are in demand is a dominant practice in container inventory management.

2.3 Review of Variables

2.3.1 Lack of standard container inventory management

Standards and horizontal collaboration amongst rivals are more important than ever as new and emerging technologies gain traction. A standard is an agreement reached by members of a business network who are interested in the same thing. Collaboration is critical to improving services and increasing customer happiness, as well as attaining cost-efficiency and satisfying sustainability goals. The major shipping lines have aided in the formation of a non-profit consortium called Digital Container Shipping Association (DCSA) a coordinated industry effort to build technology standards to replace unproductive practices and speed digitalization. The TradeLens platform, coming out of the collaboration between Maersk and IBM followed by CMA CGM, MSC, Hapag Lloyd, and ONE becoming

engaged as well, is providing opportunity to standardize all events relating to goods movement tracking and tracing across various modes of transportation, as well as stakeholders such as cross-border agencies. (Hanane et al, 2020).

(Edirisinghe, 2018); (Ratnayake et al, 2015) Carriers do not implement or pursue a standard container inventory management , according to their research. Each carrier creates an inventory management system that is tailored to its vision, purpose, and goals. These techniques are almost seldom shared among carriers.

Carriers now have to handle their competitors' containers in addition to their own, thanks to the establishment of carrier alliances and the start of slot sharing. Carriers, likewise, are required by the alliance agreement to release their containers into the hands of competitors. As a result, having a consistent container inventory management across the industry is advantageous.

2.3.2 The knowledge of container controllers impacts on container inventory management practice.

Container controllers' primary responsibilities include supplying the needed quantity of containers, in the suitable quality, sizes, and varieties, as requested by exporters, at the exact time and location. According to (Edirisinghe, 2018) Most carriers assume that container inventory management is solely based on their container controllers' implicit knowledge and that there is nothing they can do about it. This mindset prevents the industry from acquiring a head start on the competition and learning from its failures. It is impossible to attain the presupposed aim in supply chain organizations without a cooperative interaction with one another.

Implicit knowledge is a type of knowledge that exists between tacit and explicit information. There is a type of tacit information that can be transformed into explicit knowledge. Many organizations will disregard implicit knowledge because they require expert-level knowledge, and another reason is that implicit knowledge must be turned into explicit knowledge, which necessitates the assistance of an expert who is familiar with the

scenario. The basic purpose of organization is to determine how much tacit knowledge exists in the data and attempt to convert it to explicit knowledge. (UKEssays, 2018).

Tacit knowledge is knowledge that cannot be articulated, or knowledge that cannot be communicated in words. This knowledge will not be documented, and putting it into words will be difficult. The term "know how" refers to tacit knowledge. When tacit knowledge is passed on to another person, a new piece of knowledge is created, which may be tacit or explicit depending on the recipient. The word, which indicates that information is observable, distinguishes explicit knowledge from tacit knowledge. It's personal information that's well-stated and easily communicated. This can be stated in both words and numbers. This data, and this sort of data, can both be shared. (UKEssays, 2018).

2.3.3 Customs clearance impact on container inventory management practice.

The gatekeepers of international trade are customs officers. All transactions leaving or entering a country must be handled through the country's customs offices, which takes time. With the expanding volume of international trade, the necessity for quick clearance of products at the port in the shortest amount of time is becoming increasingly important. Customs is supposed to meet the needs of both the government and border crossing traders without jeopardizing the balance between trade facilitation and control by adhering to the rules and regulations that govern international trade. (Krishna et al, 2019).

After customs clearance, the container is delivered to the customer, and it is typical for the customer to hold the container for an extended period of time (i.e., keep the containers longer than the agreed time). Although customs clearance timing and container hoarding have an impact on container inventory management, it is unclear how much of an impact they have. As a result, the purpose of this study is to determine how these factors influence container inventory management technique.

Containers are used to transport products across borders, and the goods carried in them must be cleared and controlled by Customs. The process may take longer than expected depending on the commodity and Customs requirements (UKEssays, 2018). Containers are

being held by customs in all of the aforementioned circumstances. A shipment may be placed on hold for a customs release for a variety of reasons. Missing commercial documentation, missing notified party, incomplete commercial invoice, missing country of origin, and missing HTS classification are the most typical reasons. Containers spend more time at dry ports as a result of customs delays. Furthermore, the detection of infractions may lead to the seizure of containers.

Containers are allowed temporary admission and re-exportation, whether filled with goods or not, according to the Handbook Customs Convention on Containers, 1972 (Article 3.1); and Containers granted temporary admission must be re-exported within three months of the date of importation. The competent Customs authorities may, on the other hand, prolong this term (Article 4.1). If a container granted temporary admission cannot be re-exported as a result of a seizure, the need of re-exportation set forth in Article 4, paragraph 1 is deferred for the period of the seizure. (Article 5.2).

Cargoes are sometimes abandoned in addition to being seized. A cargo may be abandoned for a variety of reasons, the most common of which are: the cargo has not been cleared by an importer, the importer does not have an import permit or license, the importer cannot pay the import duties, the buyer is dissatisfied with the quality of the goods, the consignee no longer requires it due to shipping delays, damaged shipment, and a dispute between shippers and consignees. One of the parties engaged in the process will lose money if the shipping containers do not move. Both customs and shipping lines are burdened by abandoned containers. When a container is abandoned, the customs authorities has the option of auctioning the contents.

Several containers have been held for inquiry at various ports and locations throughout the country. The shipping companies must continue to pay container rentals as well as the port's ground rent. The Customs auction of seized/confiscated goods takes time, and during that time, the port's storage yards and go downs stay occupied, resulting in inefficient use of space. Delayed auctions result in a loss in the value of commodities, as well as valid dues to Customs, the Port, and the Lines, which far outweigh the auction earnings. It will be useful to keep track of how much space such undeclared cargo takes up at various ports.

Taking 12 main ports into account, the amount of space occupied by such goods is about 6.5% of the total area (Song, 2021)

According to customs officials, obtaining authority to hold a public auction for abandoned cargo might take anywhere from six months to two years. In such circumstances, a dispute arises between shipping lines and customs. The shipping companies want the container returned, but customs want it held until the cargo is disposed of.

The amount of time containers spends in dry ports or customs bonded warehouses is directly affected by customs delays. The quicker the customs clearance process is completed, the faster the containers are returned to their owners. (Krishna et al, 2019) The following determinants have been identified as major drivers of delays in goods clearing customs at international border crossings. Excessive document requirements by border regulating agencies; little use of information technology and less automation consumption; unclear and unspecified requirements for imports and exports by border management regulatory bodies; a lack of coordination and modernization among customs and other government agencies involved in the regulations; and inefficient customs procedures accompanied by rigorous physical and documentary supervision. The impact of an unreturned container on container inventory management practice

2.3.4 The impact of an unreturned container on container inventory management practice.

Customers frequently over hold laden containers when they arrive at their destination (i.e., keep the containers longer than the agreed time). Furthermore, containers may be damaged during shipping, resulting in logistical challenges such as when and where to do maintenance, repair, and cleaning. Containers come in a variety of sizes, styles, and grades, and shippers have varying preferences when it comes to container types. As a result, container logistics management might be expanded to include these operational aspects. (Song, 2021).

The international shipping industry is subject to a variety of controls and regulations. In the case of international trade and shipping, the terms demurrage and detention are used.

Importers and exporters must pay these fees if they use the container service excessively. Understanding these two concepts and how they are related to one another are direct elements that influence container returns on time. Demurrage and detention, in general, are expenses incurred by importers and exporters when containers are not picked up or left off within the specified time frame. It makes no difference whether the containers are empty or full and whether they are at the port or at a terminal outside the port. The location of the container is the main distinction between Demurrage and Detention. Detentions may occur if the container is outside of ports or in dry ports. The charges only apply if the free time has run out in both cases.

The charge for using a container inside a port or terminal after the free time period has expired is known as demurrage. After the free time period has expired, one must pay to use the container outside of a port or terminal. In the case of ESLSE, there is a 15-day free period after the cargo arrival date for normal/general purpose/container purposes, including Saturday, Sunday, and holidays. The penalty for failing to deliver containers within the allotted time is USD 6 for 20 feet and USD 11 for 40 feet each day. The major goal of levying these charges is to ensure that importers and exporters return containers as soon as possible.

There are a number of causes for the containers not being returned on time. Some of the most common grounds for demurrage and detention charges are, Factors outside the importer's or exporter's control. Weather, political turmoil, labor strikes, lack of transportation, and closure due to pandemics such as COVID-19 are examples of these clouds, delay in getting customs clearance or custom seizure, incomplete or inaccurate documents, delay in vessels departure, delay in releasing cargo by shipping companies, unavailability of the cargo receiver and the use of containers as storage in an irresponsible manner.

2.4 Empirical Review

(Edirisinghe et al, 2021) revealed in the study that the most effective and efficient way for carriers to manage their container inventory is to move empty containers from idle sites to other places where they are in demand and introduced the Virtual Container Pool (VCP), which suggests carriers trade containers between carriers. The study also anticipated that it will be a significant factor in the methods for maximizing container use.

(Srilekha, 2018) is intended to offer a summary of the empty container relocation issue and it made an effort to research pertinent literature and pinpoint the factors contributing to the necessity for repositioning. The study recommended Concentration is required in focus areas such as cost control, inventory level optimization, predicting future demand requirements, and container repositioning expenditure optimization.

(Edirisinghe, 2018) Put a focus on the factor that impacts how shipping lines are trading containers and comprehend how much each of these variables affects the imbalance in the container fleet. In the study, the idea of carrier cooperation is put out as a practical remedy for the empty container issue. Further another study (Edirisinghe, 2017) concluded that developed economies suffer regular container deficits while import-dependent countries experience excess inventories of empty containers.

(Hosseini, 2018) The imbalanced movement of laden containers during container transportation causes shipping companies to relocate empty containers. This study analyzes the issue of empty container repositioning (ECR) in a European logistics company's distribution network, where certain constraints create a challenging decision-making environment.

(Edirisinghe, 2017) Challenges reality container inventory management is purely the tacit knowledge of their container controllers and nothing to argue on their decisions. And provide conceptual model comprises a Multidimensional carrier index and country index;

3F Container Inventory Management conceptual model; 6R container supply model; and Virtual container pool.

(Edirisinghe, 2016) Examines the issues that could affect carriers' container inventory management techniques and covers 6 popular container inventory management strategies. It looks at 10 important variables that could affect how the carriers manage their container inventories. The study makes an appeal to the carriers about the requirement for a modern evaluation of container inventory management systems and to lower the astronomical cost associated with empty container repositioning across the globe.

(Karmelic, 2012) conclude that empty container logistics is a complicated system involving a vast number of stakeholders, including owners/operators, leasing companies, port authorities, terminal operators, and local governments. (Edirisinghe et al, 2021) The study indicates that a paradigm shift may be necessary because the current CIM system is not operating as well as it should for the general good of humans.

The vast majority of container inventory management research has focused on establishing the best technique for optimizing and maximizing container inventory utilization. This study addresses a gap in the literature by focusing on the factors that influence CIM practice as well as the link between CIM and these factors.

2.5 Conceptual framework

From the standpoint of the logistics channel, container logistics issues could be handled by a variety of solution approaches, including organizational, intra-channel, inter-channel, and technology means. To effectively address the challenges in container logistics, it is believed that a combination of measures (e.g., mitigating root causes, seeking efficient organizational strategies, collaborating with channel members, collaborating with competitors, and adopting innovative technologies) is required. (Song, 2021)

In the context of this study factors that affect container inventory management will be identified using Exploratory Factor Analysis(EFA). The study will conceptualize that container inventory management(CIM) could be affected by 4 factors. Nonstandard CIM, Knowledge of container controllers, customs clearance procedures, and unreturned containers respectively. These factors are identified by (Edirisinghe et al, 2016) (Yewondwossen, 2021) (Edirisinghe, 2017) (Krishna et al, 2019). The use of EFA will be the most reliable research approach to identifying study factors that affect container inventory management. EFA was previously applied by (Edirisinghe et al, 2021) to study Virtual Container Yard: A Paradigm Shift in Container Inventory Management. According to (Maskey, 2018) .

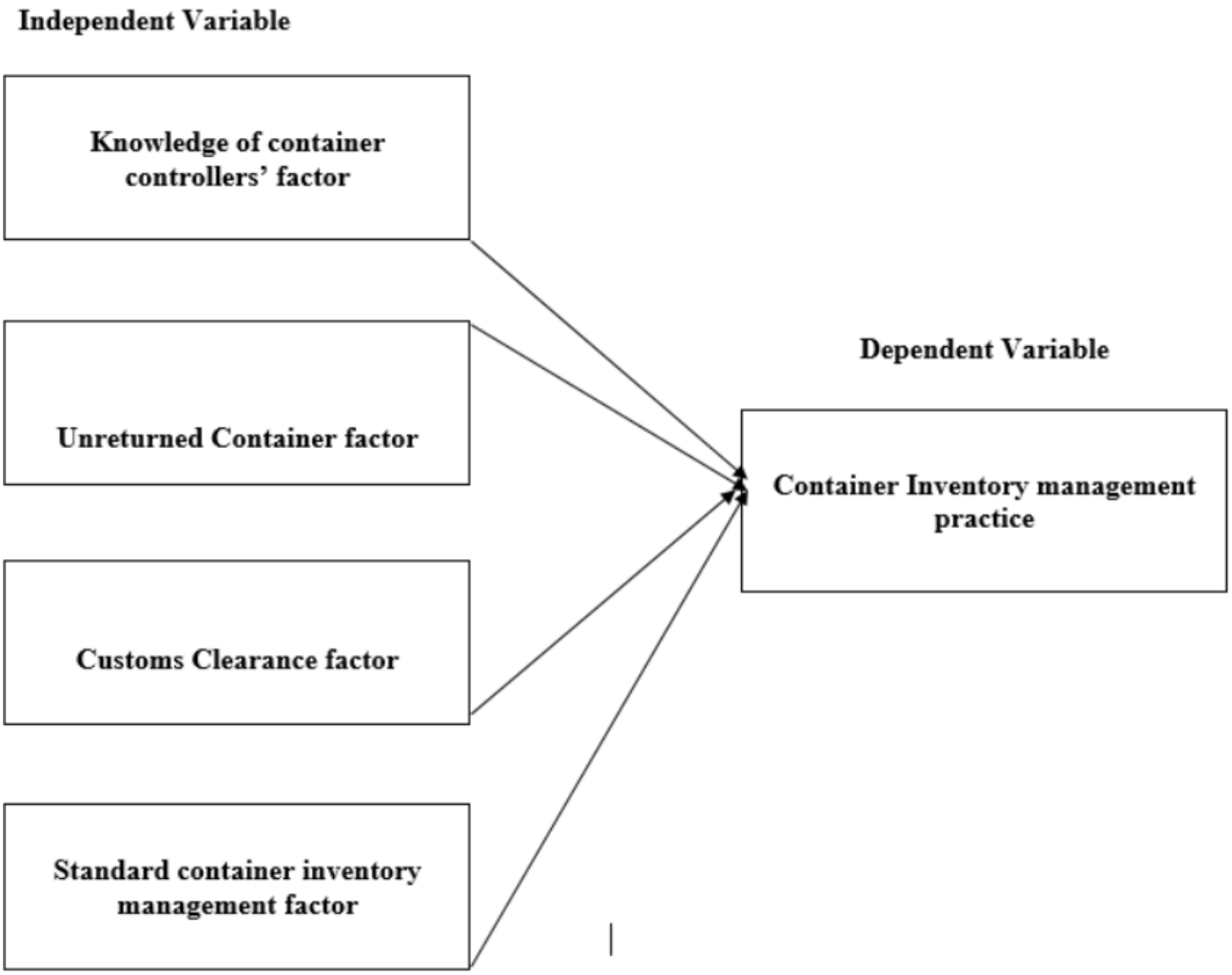


Figure2. 2. Factors Affecting Container Inventory Management

Source: (Edirisinghe, 2017)

CHAPTER THREE

3 RESEARCH METHODOLOGY

3.1 Introduction

This chapter deals with the methodology of the study whereby research design, sample & sampling technique, data collection methods, and data analysis techniques, Ethical Considerations are discussed.

3.2 Research Approach

This study applied a quantitative approach. Using quantitative data with statistical, mathematical, or computational procedures. In this study, Exploratory factor analysis (EFA) will examine the interrelationship among 23 variables and attempt to explain them in terms of their common underlining dimensions. Common underline dimensions are referred to as factors. Quantitative research examines the link between variables to test objective ideas. These variables can then be measured with tools, resulting in numerical data that can be evaluated using statistical processes (Creswell, 2014).

3.3 Research Design

The main objective of this study is to assess and analyze factors that affect container inventory management practice at ESLSE. These factors contribute and associate with a problem related to container inventory management practice at ESLSE. To addressed such a state of knowledge of the problem the study applies Explanatory and Analytical design. Explanatory studies are defined by research hypotheses that describe the nature and direction of the interactions between or among the variables being investigated. Analytical research used already available facts and information; to analyze them to make a critical evaluation (Pawar, 2020).

3.4 Sampling Design

3.4.1 Target Population

The target or theoretical population for this study is ESLSE employees who are currently working at head office, Modjo dry port, and Kaliti port and terminal. (Skaran, 2010) refers The term "population" refers to the entire group of individuals or objects that the researcher is aiming to assess. According to Human resource department of ESLSE as of February 28,2022, the target population is summarized in the below table.

Table3. 1 Summary of Target Population

Strata	Male	Female	Total
Head Office	330	310	640
Modjo dry port	367	101	468
Kaliti port and terminal	136	62	198
Total	**833**	**473**	**1306**

3.4.2 Sampling and Sample Size

For the purpose of this study Stratified random sampling technique was applied because the targeted population are fragmented over into two different geographical areas. ESLSE head office and Kaliti port and terminal are located in Ababa but different geographical locations within Addis Ababa and Modjo dry port is located outside Addis Ababa Oromia region. According to (Taherdoost, 2016) Researchers with individuals distributed across large geographic areas benefit from Stratified random sampling because it saves them time and money. The appropriate sample size for the study was determined by the sample size table developed by The Research Advisors (2006). At 95% confidence level, at 5% margin error.

Therefore, based on the Research Advisors (2006). of sample size table, 306 employees were selected for the study.

After the total sample size was set based on the weights of each strata sample size was assigned for each strata.

Table3. 2 Summary of sample size.

Strata	Total	Weight	Sample size
Head Office	640	0.5	153
Modjo dry port	468	0.35	108
Kaliti port and terminal	198	0.15	45
Total	**1306**	**1**	**306**

3.5 Data collection

The data collection process was performed sequentially. First permission was requested to Human resources and permission was granted in order to avoid any possible interruption. In this study, a 5-point Likert scale questionnaire was used to collect data. Strongly Agree to Strongly Disagree are the options. The questionnaires were anonymous, and a cover letter was written to describe the study's goal and use. Respondents were given questionnaires in person and through a Google e-form.

Effect of customs clearance on container inventory management practice (CCE):7 items developed by (Krishna et al, 2019) and modified to measure the effect of customs clearance on the inventory management practice at ESLSE.

Lack of standard container inventory management practice in Marie time industry. (SDCIM) :5 items developed by researcher based literature from (Edirisinghe, 2017), (Edirisinghe et al, 2016) and (Edirisinghe, 2016).

Unreturned Container Effect on container inventory management practice. (URC):6 items developed by the researcher based secondary data from the internet and newspapers (Bogale, 2022)

Knowledge of container controllers. (KCC) : 5 items developed by (UKEssays, 2018) and modified by the researcher to fit the purpose of the study.

A total of 340 questionnaires were created, with 170 delivered to the main office, 120 supplied to the Modjo dry port, and 50 provided to the Kaliti port and terminal. To compensate for the non-responded questions, 340 questionnaires were produced. (Taherdoost, 2016) .The sample sizes are based on the number of responses received rather than the number of questionnaires issued.

3.6 Data Processing and Analysis

The Statistical Package for Social Sciences software (SPSS) version 23 was used in this study. First, Exploratory factor analysis (EFA) was conducted. (Reenu, 2018) Using an empirical data set, EFA demonstrates how to make suitable decisions about whether to keep or eliminate an item from the analysis in order to arrive at an interpretable factor solution. techniques that can be used to decide whether to keep or eliminate an item from the analysis in order to arrive at an interpretable factor solution. Second, once the variables have been refined and reduced to a smaller number of scales that assess the construct as a whole Then, using a multiple regression analysis, a linear regression model was used to predict the dependent variable from all other factors.

3.7 Reliability and Validity Test of instrument

3.7.1 Reliability Test of instrument

One of the most crucial requirements of any research technique is the reliability of the data and findings. Reliability, in general, relates to the consistency, dependability, and replicability of the findings. Cronbach's Alpha is a test for reliability. As a result, Cronbach's alpha was calculated in SPSS Statistics using the Reliability Analysis. Scales with a coefficient alpha dependability of 0.80 to 0.95 are considered to be very reliable. A coefficient alpha of 0.70 to 0.80 indicates strong dependability, while a coefficient alpha of 0.60 to 0.70 indicates average reliability. The reliability will be poor if the coefficient alpha is less than 0.6, and it will be undesirable if the coefficient alpha is less than 0.5. As a result, the study's Cronbach alpha test revealed average reliability.

	Number of items	Cronbach's Alpha
Effect of customs clearance on container inventory management practice	7	0.612
Effect Unreturned Container on container inventory management practice	6	0.595
Lack of standard container inventory management	5	0.674
Knowledge of container controllers	5	0.58
Total	23	0.693

Table3. 3 Reliability Statistics

Source: Own Survey and SPSS Output, 2022

3.7.2 Validity Test of instrument

Validity is a matter of the evaluator's and different stakeholders' credibility, utility, and reliability. As a result, it is critical that the data and instruments be confirmed. 30 questions were forwarded via the Telegram phone application to check the instrument's content validity. The complex items were reworded and ambiguous and cryptic questions were amended based on the responses. Furthermore, the use of factor analysis in this study confirms construct validity. (Eva et al , 2019) Factor analysis is the most popular method for establishing construct validity measured by an instrument and is regarded one of the strongest approaches to establishing construct validity.

3.8 Ethical Consideration

In a letter dated November 22, 2021, the researcher asked ESLSE for permission to conduct research on the subject and to use the organization's data for this study. The researcher was allowed access by ESLSE. Before being asked any questions, respondents in this survey were asked if they were willing to participate. The study did not use the respondent's name or any other identifying information. The information acquired in this study did not cause any physical or physiological harm to the participants.

CHAPTER FOUR

4 RESULTS AND DISCUSSION

4.1 Introduction

This chapter summarizes the results of the analysis, which were gathered using five Likert scale questionnaires. SPSS software is used to examine and test the data. The data is arranged and presented in an easily understandable manner utilizing various tools such as a chart, figure, table, and percentages.

4.1 Response rate

A total of 340 questionnaires were prepared, with 170 being distributed at the main office, 120 being delivered at the Modjo dry port, and 50 being distributed at the Kaliti port and terminal. The extra questionnaires were added to account for non-returned questionnaires. Out of 170 questionnaires sent to the head office, 159 were returned, with four blanks and two partially finished. 113 questionnaires were returned from Mojo. 45 questionnaires were returned from the Kaliti port and terminal. The researcher was able to obtain all of the required 306 replies thanks to the distribution of supplementary questionnaires

4.2 Demographic data summary of the respondents

Age		
Variable	**Frequency**	**Percent**
23 to 29	109	35.6
30 to 39	145	47.4
40 to 48	52	17
Sex		
Variable	**Frequency**	**Percent**
Male	165	53.9
Female	141	46.1
Education		
Variable	**Frequency**	**Percent**
Diploma	15	4.9
BA/BSC	225	73.5
MA/MSC	66	21.6
Work experience		
Variable	**Frequency**	**Percent**
0 to 2	31	10.1
2 to 5	77	25.2
>5	198	64.7
Job category		
Variable	**Frequency**	**Percent**
Employee	2	0.7
operation manager	19	6.2
Chief executive	285	93.1

Table4. 1 Demographic data summary of the respondents

Source: SPSS Output, 2022

4.3 Data Analysis and Result

4.3.1 Explanatory Factor Analysis

Based on the literature, four factors were initially identified as factors that affect the container inventory management practice at ESLSE. The survey questionnaire is composed of these 23 variables.

4.3.2 Reasons for Explanatory Factor Analysis

The reason for the researcher to apply Explanatory factor analysis is, to check the conceptualization of the 4 factors fits the data or not, to examine the interdependence among the set of observed variables, and what the researcher did in theory actually stands in practice based on the data collected.

Factor 1: Knowledge of container controllers. (KCC)

1. The container inventory controllers of ESLSE are highly qualified. (Q19)
2. The decisions of the ESLSE container inventory controller are flexible enough to influence container inventory management. (Q20)
3. ESLSE's container inventory controllers can clearly explain their decisions that have an impact on managing container inventories. (Q21)
4. At ESLSE, container inventory controllers are able to simply share their experiences. (Q22)
5. Container inventory controllers at ESLSE make wrong decisions that affect container inventory management. (Q23)

Factor 2: Unreturned Container Effect on container inventory management practice. (URC)

1. Due to political turmoil, labor disputes, transportation shortages, and closures brought on by pandemics like COVID-19, the organization was unable to deliver the container on time. (Q8)

2. Due to a delay in gaining customs clearance, the organization was unable to return the container on time. (Q9)
3. Due to inadequate paperwork, the organization was unable to return the container on time. (Q10)
4. ESLSE's customers don't get their containers right away. (Q11)
5. Due to personal circumstances, the organization was unable to accept the container. (Q12)
6. Instead than returning the container, the organization used it for temporary storage. (Q13)

Factor 3: Customs clearance effect on container inventory management practice (CCE)

1. Ethiopian customs' excessive document requirements cause delays in container clearance (Q1)
2. Ethiopian customs' extensive physical and paper inspections cause delays in container clearance. (Q2)
3. Container clearance is delayed by a lack of collaboration between the Ethiopian government and customs authorities. (Q3)
4. Customs' lack of technology causes delays in clearing containers. (Q4)
5. Because the importer and exporter are absent, Ethiopian customs is holding the containers. (Q5)
6. Containers are held longer by Ethiopian customs because of missing commercial paperwork. (Q6)
7. Containers are held longer by Ethiopian customs because of missing HTS classification (Harmonized Tariff Schedule). (Q7)

Factor 4: Lack of standard container inventory management practice in Marie time industry. (SDCIM)

8. When compared to other shipping lines, ESLSE has a unique inventory management system. (Q14)

9. The ESLSCE Container Inventory Management Patrice is in line with the organization's vision, purpose, and goal. (Q15)
10. Container inventory management practices at ESLSE are impacted by shipping lines' lack of standardization. (Q16)
11. Communications between shipping lines are hampered by a lack of standardized container inventory management. (17)
12. Lack of data sharing between shipping lines affect ESLSE container inventory management. (Q18)

4.4 EFA Report

4.4.1 EFA Suitability Test

The applicability of Exploratory Factor Analysis(EFA) was evaluated using the Kaiser-Meyer Olkin measure of sample adequacy (KMO) (> 0.50) and Bartlett's test of sphericity (significant at p 0.001). According to Kaiser (1974), KMO levels of 0.9 are excellent, 0.8 are commendable, 0.7 are average, 0.6 are mediocre, 0.5 are depressing, and 0.50 are awful. The Kaiser-Meyer Olkin of sampling adequacy 0.651 was found to be average in the initial KMO and Bartlett's test. The significance of Bartlett's sphericity test is p 0.001. As a result, it is ideal for EFA.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.651
Bartlett's Test of Sphericity	Approx. Chi-Square	1498.267
	df	253
	Sig.	.000

Table4. 2KMO and Bartlett’s Test

Source: Own Survey and SPSS Output, 2022

4.4.2 Communalities

An exploratory factor analysis (EFA) was performed on the 23 variables using principal component analysis with extract Eigenvalues larger than one and varimax rotation. The minimal factor loading criterion was set at 0.50. Loadings of 0.5 or above for a factor can be deemed sufficient indications for that component. (Hair Jr., 1998). To define acceptable degrees of explanation, the communality, which measures the degree of variance in each dimension, was also examined. It was also evaluated in each dimension. The results show that all communalities were greater than 0.50, with the exception of two items, Q4 and Q16, which had communalities somewhat less than 0.5. These items, on the other hand, had no effect on the overall factor structure and were fully loaded in their individual factors.

Communalities

	Initial	Extraction
Q1	1.000	.531
Q2	1.000	.567
Q4	1.000	.461
Q8	1.000	.546
Q9	1.000	.746
Q10	1.000	.621
Q15	1.000	.541
Q16	1.000	.481
Q17	1.000	.673
Q19	1.000	.665
Q20	1.000	.649
Q21	1.000	.638

Extraction Method: Principal Component Analysis.

Table4. 3Communalities

4.4.3 Total Variance Explained

The factor solution produced from the analysis showed four factors for the scale, accounting for around 59.319 percent of the data variation. When a solution accounts for 60% of the entire variance, it is often considered good (or even less in some cases).

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.320	19.331	19.331	2.320	19.331	19.331	2.102	17.515	17.515
2	1.951	16.258	35.589	1.951	16.258	35.589	1.796	14.966	32.481
3	1.557	12.977	48.565	1.557	12.977	48.565	1.668	13.902	46.383
4	1.290	10.754	59.319	1.290	10.754	59.319	1.552	12.936	59.319
5	.948	7.902	67.221						
6	.787	6.559	73.780						
7	.683	5.688	79.469						
8	.574	4.783	84.252						
9	.547	4.558	88.810						
10	.480	4.002	92.812						
11	.448	3.734	96.546						
12	.414	3.454	100.000						

Extraction Method: Principal Component Analysis.

Table4. 4Total Variance Explained

Source: SPSS EFA 2022

4.4.4 Items Removed

Methodological decisions that were made in this research were, first remove items that are no load at all, second remove items that have communalities less than 0.5 and finally remove items that were not load well with their underline construct. Based on these methodological decisions Q3, Q5, Q6, Q7, Q11, Q12, Q13, Q14, Q18, Q22, and Q23 were removed. Cut off value for FA was the underline construct of the research based which is four factor as indicated on scree plot.

The EFA was performed again, but without the components that had been removed. The results of this new study backed up the study's four-dimensional structure. The Kaiser–Meyer–Olkin MSA was 0.638. The four dimensions explained a total of 59.319% of the variance among the items in the study. The sphericity test by Bartlett was significant, with all communalities exceeding the required value of 0.500. expect Q4 which is 0.469 and Q16 which is 0.48. The four factors identified as part of this EFA aligned with the proposed in this research. Factor 1includes items Q19, Q20 and Q21, which represents Knowledge of container controllers. (KCC). Factor 2 includes Q8, Q9 and Q10 referring to Unreturned Container Effect on container inventory management practice. (URC). Factor 3 includes items Q1, Q2 and Q4, referring to Customs clearance effect on container inventory management practice (CCE). Factor 4 includes items Q15, Q16Q and Q17 referring to Lack of standard container inventory management. (SDCIM)

Rotated Component Matrix

	Component			
	1	2	3	4
Q1			.725	
Q2			.738	
Q4			.650	
Q8		.658		
Q9		.847		
Q10		.771		
Q15				.531
Q16				.690
Q17				.768
Q19	.785			
Q20	.790			
Q21	.782			

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Table4. 5 Rotated Component Matrix

Source: SPSS EFA 2022

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.638
Bartlett's Test of Sphericity	Approx. Chi-Square	613.010
	df	66
	Sig.	.000

Table4. 6KMO and Bartlett’s Test

Source: SPSS output 2022

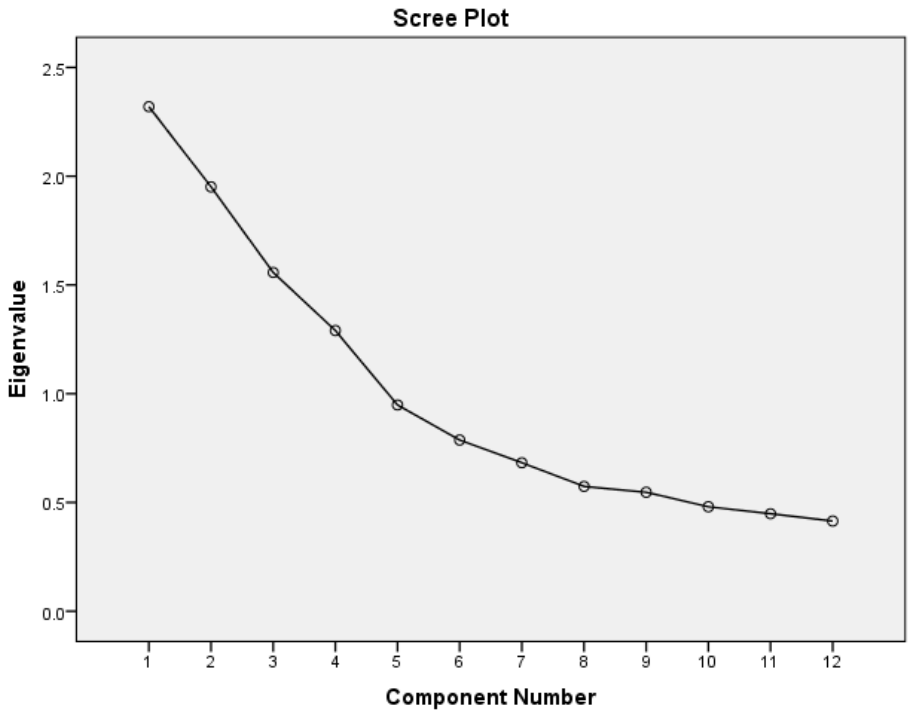


Table4. 7 Scree Plot

Source: SPSS output 2022

4.5 Descriptive characteristics of Independent variables.

4.5.1 Factor _1: Knowledge of container controllers

The three selected variables (Q19, Q20, and Q21) frequency distribution of the respondents are summarized in the below bar charts.

The container inventory controllers of ESLSE are highly qualified.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	15	4.9	4.9	4.9
	Disagree	52	17.0	17.0	21.9
	Neutral	97	31.7	31.7	53.6
	Agree	132	43.1	43.1	96.7
	Strongly Agree	10	3.3	3.3	100.0
	Total	306	100.0	100.0	

Table4. 8Q19 frequency distribution.

Source: SPSS output 2022

The decisions of the ESLSE container inventory controller are flexible enough to influence container inventory management.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	5	1.6	1.6	1.6
	Disagree	78	25.5	25.5	27.1
	Neutral	87	28.4	28.4	55.6
	Agree	126	41.2	41.2	96.7
	Strongly Agree	10	3.3	3.3	100.0
	Total	306	100.0	100.0	

Table4. 9Q20 frequency distribution.

Source: SPSS output 2022

ESLSE's container inventory controllers can clearly explain their decisions that have an impact on managing container inventories.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	8	2.6	2.6	2.6
	Disagree	70	22.9	22.9	25.5
	Neutral	77	25.2	25.2	50.7
	Agree	131	42.8	42.8	93.5
	Strongly Agree	20	6.5	6.5	100.0
	Total	306	100.0	100.0	

Table4. 9Q210frequency distribution

Source: SPSS output 2022

4.5.2 Factor _2: Unreturned Container Effect

The three selected variables (Q8, Q9, and Q10) frequency distribution of the respondents are summarized in the below bar charts.

Due to political turmoil, labor disputes, transportation shortages, and closures brought on by pandemics like COVID-19, the organization was unable to deliver the container on time.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	10	3.3	3.3	3.3
	Disagree	21	6.9	6.9	10.1
	Neutral	35	11.4	11.4	21.6
	Agree	152	49.7	49.7	71.2
	Strongly Agree	88	28.8	28.8	100.0
	Total	306	100.0	100.0	

Table4. 10Q8 frequency distribution

Source: SPSS output 2022

Due to a delay in gaining customs clearance, the organization was unable to return the container on time.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	2.0	2.0	2.0
	Disagree	36	11.8	11.8	13.7
	Neutral	45	14.7	14.7	28.4
	Agree	172	56.2	56.2	84.6
	Strongly Agree	47	15.4	15.4	100.0
	Total	306	100.0	100.0	

Table4. 11 Q9 frequency distribution

Source: SPSS output 2022

Due to inadequate paperwork, the organization was unable to return the container on time.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	.7	.7	.7
	Disagree	50	16.3	16.3	17.0
	Neutral	66	21.6	21.6	38.6
	Agree	147	48.0	48.0	86.6
	Strongly Agree	41	13.4	13.4	100.0
	Total	306	100.0	100.0	

Table4. 12 Q10 frequency distribution

Source: SPSS output 2022

4.5.3 Factor _3: Customs clearance effect

The three selected variables (Q1, Q2, and Q4) frequency distribution of the respondents are summarized in the below bar charts.

Ethiopian customs' excessive document requirements cause delays in container clearance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	8	2.6	2.6	2.6
	Disagree	1	.3	.3	2.9
	Neutral	21	6.9	6.9	9.8
	Agree	235	76.8	76.8	86.6
	Strongly Agree	41	13.4	13.4	100.0
	Total	306	100.0	100.0	

Table4. 13 Q1 frequency distribution

Source: SPSS output 2022

Ethiopian customs' extensive physical and paper inspections cause delays in container clearance.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	9	2.9	2.9	2.9
	Disagree	7	2.3	2.3	5.2
	Neutral	42	13.7	13.7	19.0
	Agree	196	64.1	64.1	83.0
	Strongly Agree	52	17.0	17.0	100.0
	Total	306	100.0	100.0	

Table4. 14 Q2 frequency distribution

Source: SPSS output 2022

Customs' lack of technology causes delays in clearing containers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	10	3.3	3.3	3.3
	Disagree	48	15.7	15.7	19.0
	Neutral	53	17.3	17.3	36.3
	Agree	143	46.7	46.7	83.0
	Strongly Agree	52	17.0	17.0	100.0
	Total	306	100.0	100.0	

Table4. 15 Q4 frequency distribution

Source: SPSS output 2022

4.5.4 Factor 4: Lack of standard container inventory management

The three selected variables (Q16, and Q17) frequency distribution of the respondents are summarized in the below bar charts.

Container inventory management practices at ESLSE are impacted by shipping lines' lack of standardization.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	8	2.6	2.6	2.6
	Neutral	82	26.8	26.8	29.4
	Agree	186	60.8	60.8	90.2
	Strongly Agree	30	9.8	9.8	100.0
	Total	306	100.0	100.0	

Table4. 16Q16 frequency distribution

Source: SPSS output 2022

Communications between shipping lines are hampered by a lack of standardized container inventory management.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	68	22.2	22.2	22.2
	Neutral	53	17.3	17.3	39.5
	Agree	143	46.7	46.7	86.3
	Strongly Agree	42	13.7	13.7	100.0
	Total	306	100.0	100.0	

Table4. 17 Q17 frequency distribution

Source: SPSS output 2022

4.5.5 Descriptive characteristics of dependent variables.

The frequency distribution dependent variable (Q15) of the respondents is summarized in the below bar charts.

The ESLSCE Container Inventory Management Patrice is in line with the organization's vision, purpose, and goal.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	1.3	1.3	1.3
	Disagree	61	19.9	19.9	21.2
	Neutral	74	24.2	24.2	45.4
	Agree	145	47.4	47.4	92.8
	Strongly Agree	22	7.2	7.2	100.0
	Total	306	100.0	100.0	

Table4. 18Q15 frequency distribution

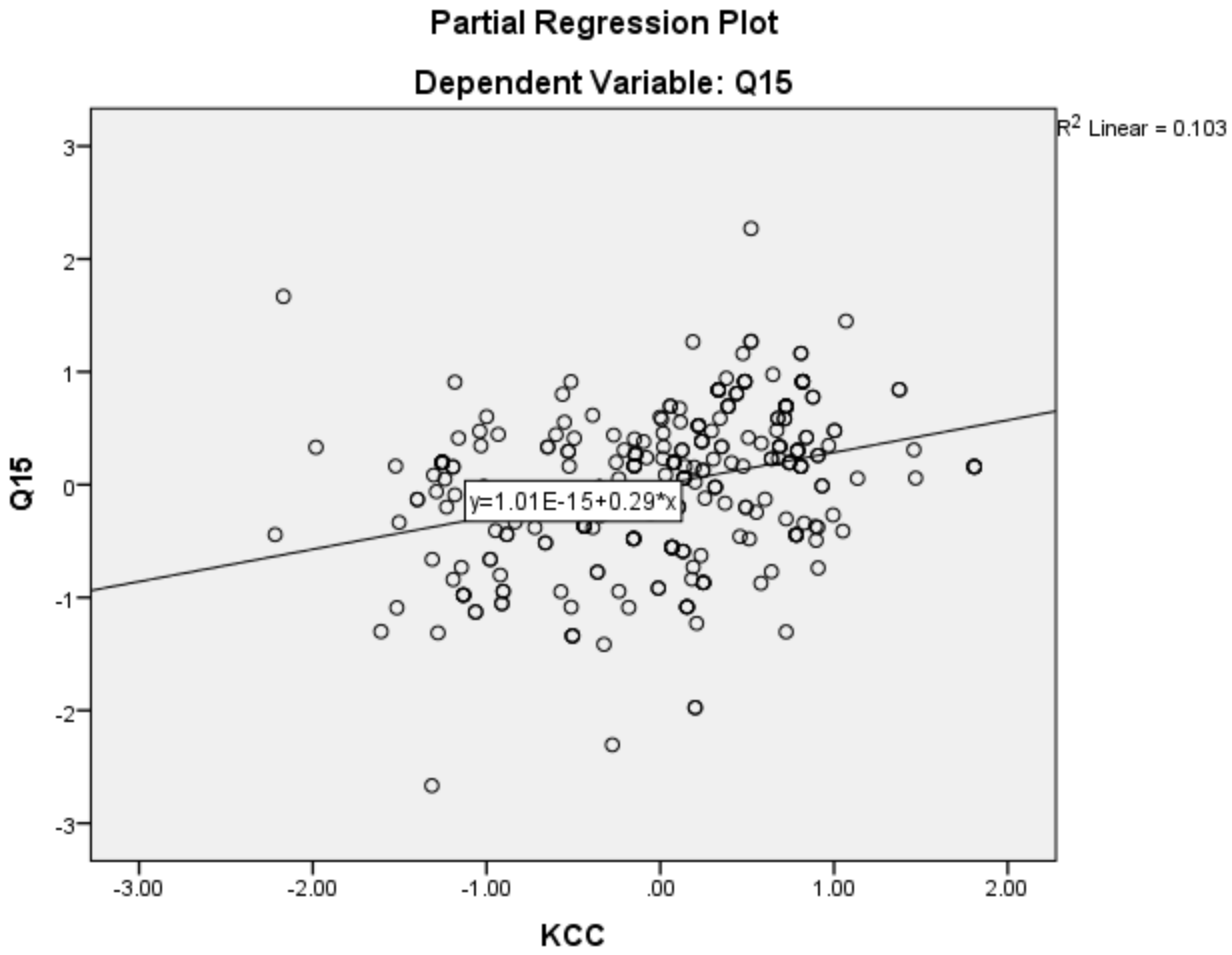
Source: SPSS output 2022

4.6 Regression Analysis

4.6.1 Assumption Checking

4.6.2 Linear Relationship

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

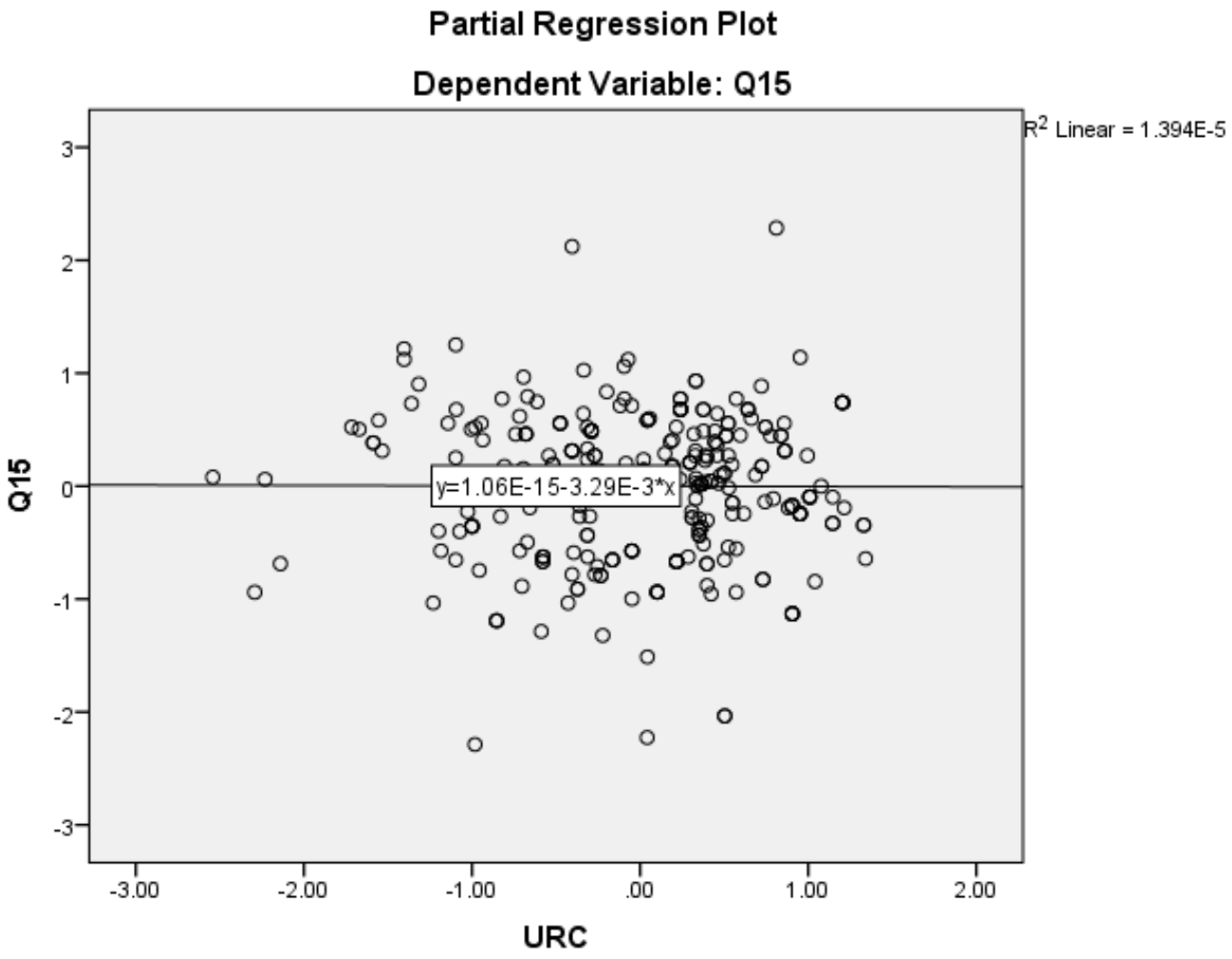


Note.Q15= ESLSE Container Inventory Management Patrice

KCC = Knowledge of container controllers.

Figure4. 1 partial regression plot Q15 DP & KCC IDP

Source: SPSS output 2022

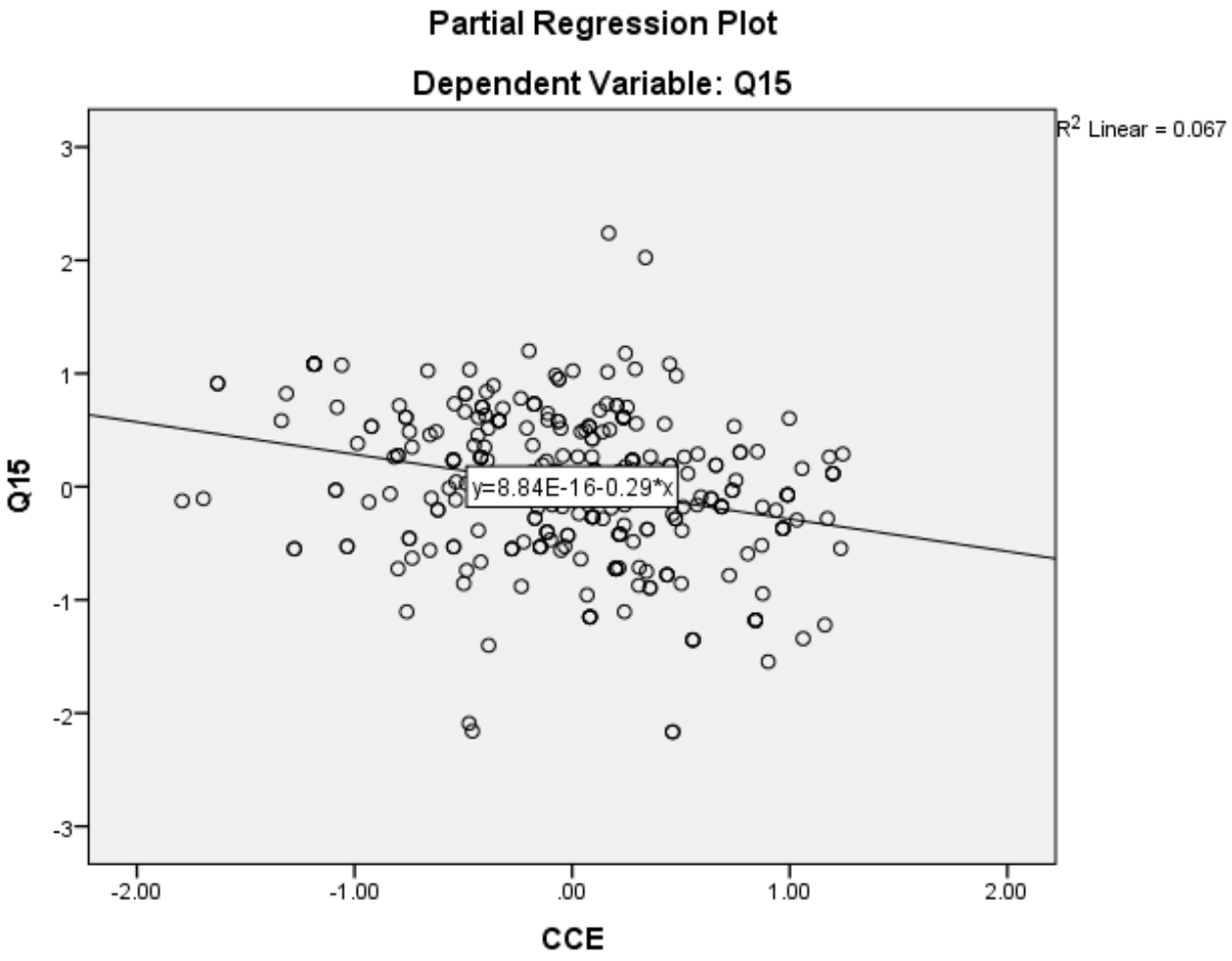


Note.Q15= ESLSE Container Inventory Management Patrice

URC = Unreturned Container Effect.

Figure4. 2 partial regression plot Q15 DP & URC IDP

Source: SPSS output 2022

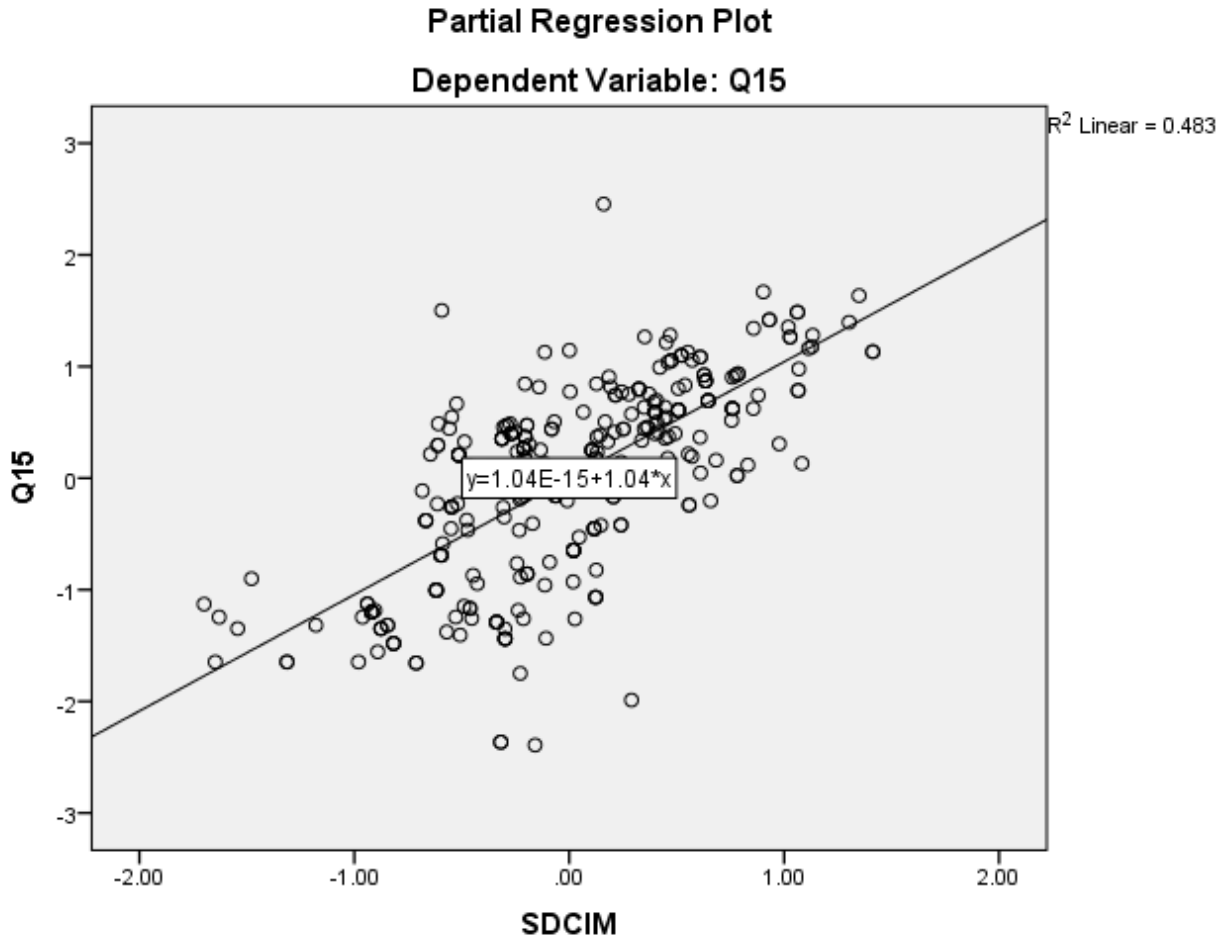


Note.Q15= ESLSE Container Inventory Management Patrice

CCE = Customs clearance effect.

Figure4. 3partial regression plot Q15 DP & CCE IDP

Source: SPSS output 2022



Note.Q15= ESLSE Container Inventory Management Patrice

SDIM = Lack of standard container inventory management.

Figure4. 4 partial regression plot Q15 DP & SDCIM IDP

4.6.3 Multicollinearity

Multicollinearity is a statistical notion in which the independent variables in a model are correlated. There is obviously 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, No Multicollinearity test is passed.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-.144	.371		-.388	.698	-.874	.586		
	KCC	.286	.049	.232	5.865	.000	.190	.382	.981	1.019
	URC	-.003	.051	-.003	-.065	.948	-.103	.097	.965	1.036
	CCE	-.286	.061	-.188	-4.666	.000	-.407	-.165	.946	1.057
	SDCIM	1.043	.062	.665	16.775	.000	.921	1.165	.977	1.023

a. Dependent Variable: Q15

Table4. 19 No independence of error

Source: SPSS output 2022

4.6.4 No independence of error

There is no link between the independent and residual variables (the value of the residuals are 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=1.731 no independence error is not a concern.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.733[a]	.537	.531	.636	1.731

a. Predictors: (Constant), SDCIM, URC, KCC, CCE
b. Dependent Variable: Q15

Table4. 20No independence of error

Source: SPSS output 2022

4.6.5 Homoscedasticity

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

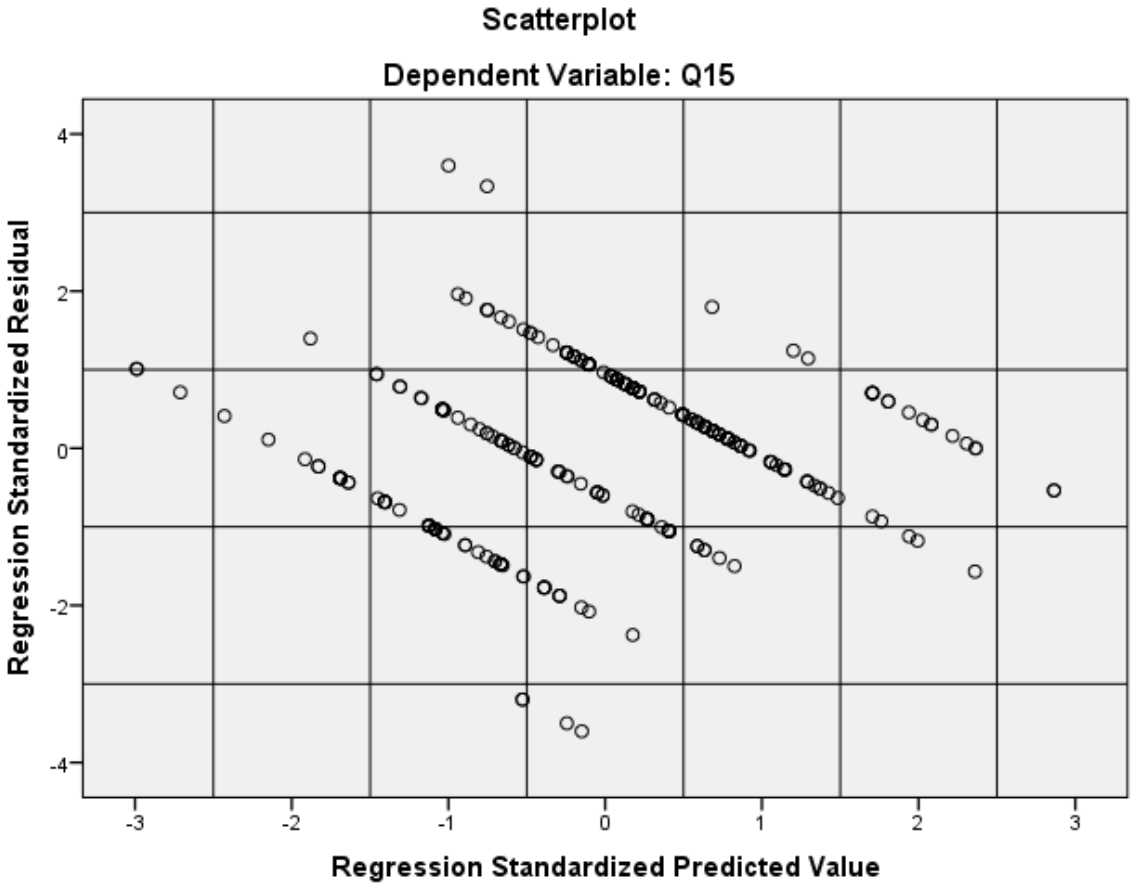


Figure4. 5 Scatterplot

Source: SPSS output 2022

4.6.6 Normal Distribution

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

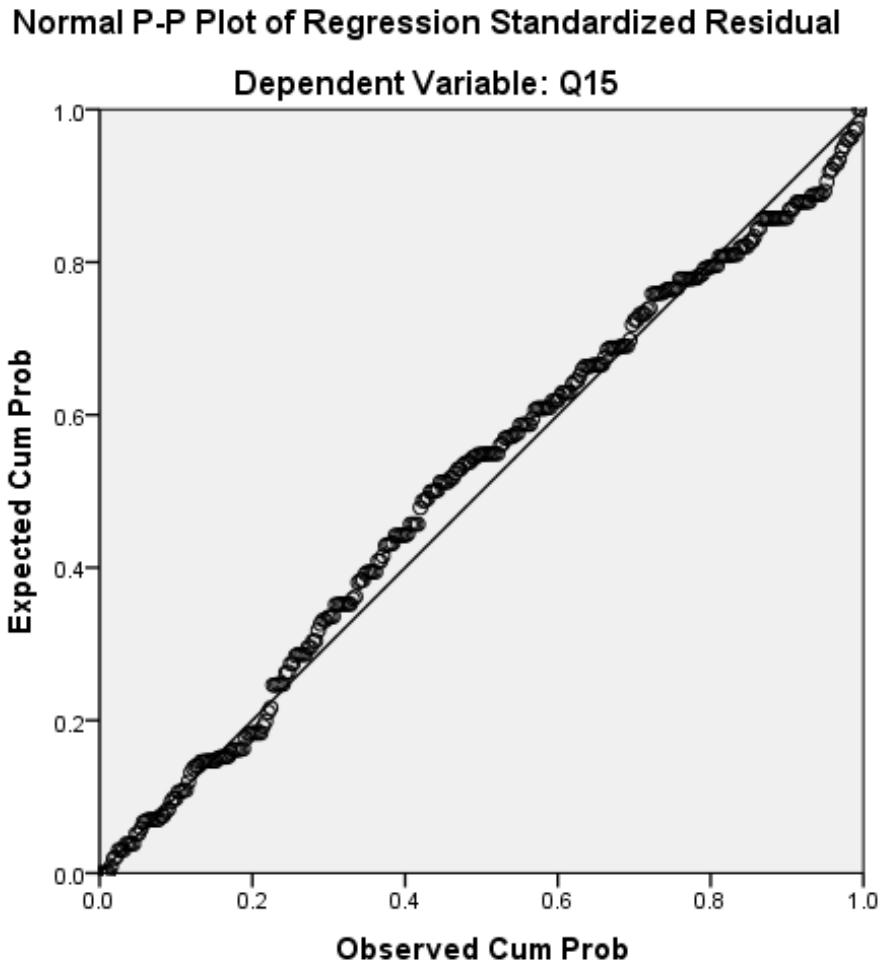


Figure4. 6Normal P-plot

Source: SPSS output 2022

4.6.7 Outliers

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

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.36	5.34	3.39	.680	306
Std. Predicted Value	-2.992	2.864	.000	1.000	306
Standard Error of Predicted Value	.038	.145	.078	.022	306
Adjusted Predicted Value	1.33	5.36	3.39	.681	306
Residual	-2.291	2.288	.000	.632	306
Std. Residual	-3.602	3.598	.000	.993	306
Stud. Residual	-3.642	3.667	.000	1.001	306
Deleted Residual	-2.342	2.377	.000	.642	306
Stud. Deleted Residual	-3.719	3.746	.000	1.007	306
Mahal. Distance	.119	14.850	3.987	2.791	306
Cook's Distance	.000	.105	.003	.008	306
Centered Leverage Value	.000	.049	.013	.009	306

a. Dependent Variable: Q15

Table4. 21 Residuals Statistics

Source: SPSS output 2022

4.6.8 Regression output

The study pursues to investigate effects of Customs clearance, unreturned containers, container controllers' knowledge and non-standard container inventory management on container inventory management practice at ESLSE. The following hypothesis were proposed.

H_1: The knowledge of container controllers has a positive impact on container inventory management practice.

H_2: Unreturned Containers have a negative impact on container inventory management practice.

H_3: Lengthy customs clearance has a negative impact on container inventory management practice.

H_4: Standard container inventory management has a positive impact on container inventory management practice.

The dependent variable Container inventory management practice at ESLSE was regressed on predicting variables Container controllers', Unreturned Container, Customs clearance and Lack of standard container inventory management. The independent variables significantly predict Container inventory management practice at ESLSE. $F(4,301) = 87.316$, $p < 0.001$, which indicates that the four factors under study have a significant impact on container inventory management practice at ESLSE. Also, the $R^2 = 0.537$ describe that the model explains 53.7% of the variance in container inventory management practice at ESLSE.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	141.228	4	35.307	87.316	.000[b]
	Residual	121.713	301	.404		
	Total	262.941	305			

a. Dependent Variable: Q15

b. Predictors: (Constant), SDCIM, URC, KCC, CCE

Table4. 22 ANOVA

Source: SPSS output 2022

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.733[a]	.537	.531	.636	.537	87.316	4	301	.000	1.731

a. Predictors: (Constant), SDCIM, URC, KCC, CCE

b. Dependent Variable: Q15

Table4. 23 Model Summary

Source: SPSS output 2022

In addition, Coefficients were further assessed to determine the effect of each factor on container inventory management practice at ESLSE. H_1 evaluates Container controllers' knowledge positively affects container inventory management practice ESLSE. The result discovered that Container controllers' knowledge has significant and positive impact on container inventory management practice at ESLSE (B = .286, t = 5.865, p = .000). Therefore, H_1 is supported. The squared semi-partial (sr^2) that estimated how much variance in container inventory management was uniquely predicted from Container controllers 'knowledge was 0.230, indicating that 23% of the variance in container inventory management is uniquely accounted for by Container controllers' knowledge when the remaining three factors are controlled. H_2 evaluates whether Unreturned Container negatively affects container inventory management practice at ESLSE. The result shows that the null hypothesis is shown to be true. (B = -.003, t = -.065, p = .948).

H_3 evaluates whether Customs clearance negatively affects container inventory management practice at ESLSE. The result shows that Customs clearance negatively affects container inventory management practice at ESLSE. (B = -.286, t = -4.666, p = .000). Hence H_3 is supported and when other factors are controlled 18.3% of the variance in container inventory management is uniquely accounted for by Customs clearance. Finally, H_4 evaluates whether Standard container inventory management practice in the marine time industry positively affects container inventory management practice at ESLSE. The result depicts that Standard container inventory management practice in marine time industry has positively impact container inventory management practice at ESLSE. When other factors are controlled 65.8% of the variance in container inventory management is uniquely accounted for by Standard container inventory management.

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
(Constant)	-.144	.371		-.388	.698	-.874	.586					
KCC	.286	.049	.232	5.865	.000	.190	.382	.302	.320	.230	.981	1.019
URC	-.003	.051	-.003	-.065	.948	-.103	.097	.010	-.004	-.003	.965	1.036
CCE	-.286	.061	-.188	-4.666	.000	-.407	-.165	-.140	-.260	-.183	.946	1.057
SDCIM	1.043	.062	.665	16.775	.000	.921	1.165	.662	.695	.658	.977	1.023

a. Dependent Variable: Q15

Figure4. 7Coefficient

Source: SPSS output 2022

Hypothesis Result

Hypothesis	Regression Weights	B	t	p-value	Results
H_1	KCC to Q15	0.286	5.865	0	Supported
H_2	URC to Q15	-0.003	-0.065	0.948	Rejected
H_3	CCE to Q15	-0.286	-4.666	0	Supported
H_4	SDCIM to Q15	1.043	16.775	0	Supported
R	0.531				
F(4,301)	87.316				

Note. P < .005. KCC: Knowledge of container controllers

URC: Unreturned Container Effect on container inventory management practice

CCE: Customs clearance effect on container inventory management practice

SDCIM: Standard container inventory management practice in Marie time Industry.

Q15: Container inventory management practice at ESLSE

Table4. 24 Hypothesis Result

Source: SPSS output 2022

CHAPTER FIVE

5 Summary of Key Findings, Conclusions, and Recommendations.

5.1 Introduction

The following Summary of the Findings, Conclusions, and Recommendations are extracted from the previous chapter.

5.2 Summary of the Findings

The purpose of the study was to see how and to what extent knowledge of container controllers, unreturned containers, Customs clearances, and standard container inventory management affected ESLSE's container inventory management practices. The study explores these factors in-depth, determining how and to what extent they influence CIM practice. ESLSE employees working at the head office, Modjo dry port, and Kaliti port and terminal were the study's target group. A 5-point Likert scale questionnaire was used to collect data. The research used a sample size of 306 respondents, and 306 people took part in the survey. The data was analyzed using the Statistical Package for Social Sciences (SPSS) version 23.

The study's findings revealed that the four variables under consideration had a substantial impact on container inventory management practices. knowledge of container controllers and Standard container inventory management has a positive impact on container inventory management practice. 23% of the variance in container inventory management is uniquely accounted for by Container controllers ‘knowledge and 65.8% of the variance in container inventory management is uniquely accounted for by Standard container inventory management. Further, Customs clearance has a negative impact on container inventory management, according to the study, and Customs clearance accounts for 18.3 percent of the variance in container inventory management. Although the study found that Unreturned Container has a negative impact on container inventory management practices, it also found that Unreturned Container has a little impact on CIM practices if other factors are constant.

5.3 Conclusion

This study aims to assess factors that affect CIM practice. The case of ESLSE. The study examines the following hypothesis:

H_1: The knowledge of container controllers has a positive impact on container inventory management practice.

H_2: Unreturned Containers have a negative impact on container inventory management practice.

H_3: Lengthy customs clearance has a negative impact on container inventory management practice.

H_4: Standard container inventory management has a positive impact on container inventory management practice.

To accomplish the research objective 5-point Likert scale questionnaire was conducted using a quantitative survey. By estimating the factors with Varimax rotation and utilizing the SPSS statistical tool, a principal component analysis (PCA) was used to describe the factor analysis and its application. The survey-based application included 306 randomly selected ESLSE personnel. Then, in multiple regression analysis, a linear regression model was used to predict the dependent variable from all other factors.

For the H_1 the study found out that, the knowledge of container controllers has a positive impact on container inventory management practice and 23% of the variance in container inventory management is uniquely accounted for by Container controllers' knowledge when the remaining three factors are controlled. For H_3 the study found out that Customs clearance negatively affects container inventory management practice and when other factors are controlled 18.3% of the variance in container inventory management is uniquely accounted for by Customs clearance. For H_4 the study found that the result depicts that Standard container inventory management practice in the marine time industry has positively impacts container inventory management practice and 65.8% of the variance in container inventory management is uniquely accounted for by Standard container

inventory management. For H_2 further, the study found that the effect of Unreturned Container on container CIM is insignificant.

From the above findings, the study concludes that knowledge of container controllers and Standard container inventory management has a positive impact on CIM practice while Customs clearance has a negative impact on CIM practice. In addition, the study also concludes in the absence of other factors, Unreturned Container has no substantial impact on CIM.

5.4 Recommendations

After reviewing all of the research findings and data, the researcher is eager to make the following recommendations.

CIM is a delicate and crucial operation in the liner shipping industry. According to the results of the study, the four criteria have a major impact on CIM practice. Mitigating these issues allows ESLSE to get the most out of its container utilization. As a result, the research suggests Container controller knowledge has a positive impact on CIM practice based on the findings of the study. As a result, ESLSE should concentrate on educating and developing staff and employees who are responsible for CIM in the Enterprise. This will also reduce some of the human errors that are common in CIM practice.

As a monopoly power, ESLSE has the responsibility for standardizing the CIM across the country. ESLSE must collaborate with other carriers to provide a framework for a standardized CIM in Ethiopia. According to the findings, standard container inventory management has a considerable impact on CIM practice, accounting for 65.8% of the variance in container inventory management.

According to the study, customs clearance has a negative influence on container inventory management, thus collaboration between ESLSE and ERCA is required to mitigate the negative impact of customs. The two governmental agencies may easily resolve the confusion about who has jurisdiction over the laden containers by working together for the common good of the country.

Finally, based on the findings of this study, the researcher advised ESLSE that rather than focusing solely on the Unreturned Container issue, it is better to combine it with other factors such as Container controller knowledge, customs clearance, and Standard CIM to reduce the impact of unreturned containers.

5.5 Suggestions for further study

The study could be expanded by utilizing a mixed-methods approach, and geographical areas not included in this study could be investigated further.

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7 Appendix: Questionnaire

Survey questionnaire and cover letter

Dear Sir/Madam

The goal of this questionnaire is to fulfill a part of the criteria for a master's degree in logistics and supply chain management at Addis Ababa University's College of Commerce. Analysis of Factors Affecting Container Inventory Management: The Case of Ethiopian Shipping and Logistics Service Enterprise was the title of the research (ESLSE).

Because of the nature of your work environment, you were chosen at random. You may contribute by sharing your thoughts and opinions. Your responses will be kept fully private and will only be shared in aggregate form, with no identifying information. This survey is completely voluntary. However, you can really assist us by taking a few minutes to share your thoughts and experiences. If you prefer not to respond for whatever reason, please let us know by returning the blank questionnaire.

I would highly appreciate it if you could take part in this survey. Please assist me by filling out the questionnaire today.

Sincerely yours,

Bisrat Ayele

No	Effect of customs clearance on container inventory management practice	Strongly disagree(1)	Disagree(2)	Neutral(3)	Agree(4)	Strongly agree(5)
1	Ethiopian customs' excessive document requirements cause delays in container clearance					
2	Ethiopian customs' extensive physical and paper inspections cause delays in container clearance.					
3	Container clearance is delayed by a lack of collaboration between the Ethiopian government and customs authorities.					
4	Customs' lack of technology causes delays in clearing containers					
5	Because the importer and exporter are absent, Ethiopian customs is holding the containers.					
6	Containers are held longer by Ethiopian customs because of missing commercial paperwork.					
7	Containers are held longer by Ethiopian customs because of missing HTS classification (Harmonized Tariff Schedule).					
	Effect Unreturned Container on container inventory management practice	**Strongly disagree(1)**	**Disagree(2)**	**Neutral(3)**	**Agree(4)**	**Strongly agree(5)**
8	Due to political turmoil, labor disputes, transportation shortages, and closures brought on by pandemics like COVID-19, the organization was unable to deliver the container on time.					
9	Due to a delay in gaining customs clearance, the organization was unable to return the container on time.					
10	Due to inadequate paperwork, the organization was unable to return the container on time.					
11	ESLSE's customers don't get their containers right away.					
12	Due to personal circumstances, the organization was unable to accept the container.					
13	Instead than returning the container, the organization used it for temporary storage.					
	Lack of standard container inventory management	**Strongly disagree(1)**	**Disagree(2)**	**Neutral(3)**	**Agree(4)**	**Strongly agree(5)**
14	When compared to other shipping lines, ESLSE has a unique inventory management system.					
15	The ESLSCE Container Inventory Management Patrice is in line with the organization's vision, purpose, and goal.					
16	Container inventory management practices at ESLSE are impacted by shipping lines' lack of standardization.					
17	Communications between shipping lines are hampered by a lack of standardized container inventory management.					
18	Lack of data sharing between shipping lines affect ESLSE container inventory management					
	Knowledge of container controllers	**Strongly disagree(1)**	**Disagree(2)**	**Neutral(3)**	**Agree(4)**	**Strongly agree(5)**
19	The container inventory controllers of ESLSE are highly qualified.					
20	The decisions of the ESLSE container inventory controller are flexible enough to influence container inventory management.					
21	ESLSE's container inventory controllers can clearly explain their decisions that have an impact on managing container inventories.					
22	At ESLSE, container inventory controllers are able to simply share their experiences.					
23	Container inventory controller’s at ESLSE make wrong decisions that affect container inventory management					

Personal information

24	What is your age? (in years)					
25	You are	1. male		2. Female		
26	Education	1. Diploma	2. BA/BSC	3. MA/MSc	3. PHD	4. other
27	Work experience in years	1. 0 to 2	2. 2 to 5	3. More than 5		
28	Job Category Position	1. Chief executives	2. Operation Manager	3. Employee		