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School of Commerce

Graduate Studies Program

Department of Logistics and Supply Chain Management

Factors that Affect Lead Time Optimization of Break Bulk Cargo: In the Case of Sugar Import by the Sugar Corporation via Djibouti- Addis Ababa Corridor.

By

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List of Acronyms and Abbreviations

ESLSE	Ethiopian Shipping and Logistics Service Enterprise
IT	Information Technology
GDP	Gross Domestic Product
SCM	Supply Chain Management
SPSS	Statistical Package for Social Science
ERP	Enterprise Resource Planning
E-SCM	Electronic Supply Chain Management
GTP	Growth and Transformation plan
Ro-Ro	Roll on and Roll off
CIF	Cost Insurance and Freight
ERC	Ethiopian Rail Ways Corporation
WCO	World Customs Organization
ERCA	Ethiopian Revenue and Customs Authority
MOFED	Ministry of Finance and Economic Development

ABSTRACT

Increasing sugar import transit time delays at various nodal points along Djibouti Addis Ababa corridor is a pertinent problem for Sugar Corporation. The purpose of this research is to assess the factors that contribute to lead time optimization of sugar import along Djibouti-Addis Ababa corridor. The research will benefit Sugar Corporation in reduction of its sugar import lead-time and make the corporation's import logistics operation more efficient. In order to address the research questions the pertinent research design selected was explanatory research design and both qualitative and quantitative research approach was applied. Besides, purposive sampling was used as sampling technique. Primary data on impact of port congestion, truck availability, customs process and warehouse facility as independent variable on lead-time of sugar import as dependent variable were collected from Sugar Corporation, Sugar Factories, Maritime Authority of Ethiopia, Ethiopian Shipping and Logistics Enterprise, Djibouti Port Authority in Addis Ababa. Related to this total of 150 questioners were distributed and response rate of 92.17 % was achieved. The data were collected using the five point Likert-Scale while the Cronbach's Alpha was used to check the data reliability of measurement scale. Descriptive statistics was used to identify and summarize significant contributing factors for delay in lead time of sugar import. Correlation was conducted among the variables to identify the existence of linear relationship between independent and dependent variables. The result of analysis showed that port congestion significantly delayed lead time of sugar import mainly because of shortage of trucks, limited berth availability and inefficient vessel arrival schedule. Truck availability also significantly delayed lead-time of sugar import mainly because of failure of transport companies to avail truck, the bad road condition from Addis Ababa to Djibouti, and late hiring of transport service. The result also revealed that lead-time of sugar import was moderately affected by customs process and warehouse availability. The study definitely answered the question regarding the impact of port congestion, truck availability, customs process and warehouse facility on lead-time of sugar import along Addis Ababa Djibouti corridor. Further studies should be conducted on cost impact of the delay on sugar import, impact on sugar export lead time and cost. Besides the influence of lack of logistic and supply chain management knowledge and skill on lead time of sugar import and export can be considered.

Key Words: optimization, lead time, port congestion, truck availability, warehouse facility

Chapter One

Introduction

1.1 Background of the study

Ethiopia, being one of the least developed countries in the world, is characterized by poor logistics practice and infrastructure. Hailemichael (2011) suggested that supply chain management practice in Ethiopia is in the beginning stage and there are small numbers of companies integrating it in to their organizational system. In spite of these problems ,the country has demonstrated significant growth in its economy and social development .The average Gross Domestic Product (GDP) has been 10.442 percent from 2004 to 2018(World Bank 2019).The country has planned to become a middle income country by 2025.Among the major priorities of the government include building on economic resilience through strengthening the agro-based industry .One of this industry is Sugar and related products manufacturing . The vision of Sugar Corporation is to create the sugar industries to be competitive enough to maintain sustainable growth pattern at the international level (Assefa 2015).

Sugar Corporation has owned eight sugar Factories and currently building five new sugar factory projects (Sugar Corporation 2019). These factories have a large total installed production capacity of sugar and other bi -products including ethanol. The current local market sugar supply is about 650 thousand to 700 thousand tons of sugar per annum. Of this only 325 thousand to 400 thousand tons of sugar is produced in the country despite the large installed capacity. To fill in this gap about 200 thousand to 300 thousand tons of sugar is imported annually by the government spending high amount of foreign currency. In the meantime, the country has targeted to become one of the top ten sugar producing countries of the world by 2023. Generally, when the remaining five sugar factories under construction are completed Ethiopia would have 13 sugar factories and its annual sugar production would become 2 million 250 thousand tons (Sugar Corporation 2019).

When vessels carrying various bulk and break bulk cargos call Djibouti port at similar time the port will be congested and high delay and demurrage shall occur. Note that vessels require appropriate draft based on their dead weight .Which implies vessels with higher dead weight

requiring high draft .It will be easy to find vessel berth for lower weight vessels than higher dead weights .One of the problem that contributes to high lead time of imported bulk or break bulk goods is availability of appropriate berth at port of Djibouti (UNDP 2017).

Sugar corporation being one of the importer of sugar for the public consumption is facing the above stated problems .Sugar that is usually bought under government debt and with large foreign currency should be transported to the country in an efficient manner that otherwise causes severe consequence to the national economy and also the final consumer .Loading of sugar at loading port ,transportation of sugar by sea ,direct delivery of sugar from vessel to trucks, transportation of sugar from port of Djibouti by trucks and unloading of sugar at various ware houses shows the logistics activities conducted in supply chain management of sugar that needs lead time optimization.

There are many delays at loading port ,discharge port and also inland discharge ware houses that increases the lead time of import sugar logistics practice which is followed by increase in logistics performance cost at Sugar Corporation .Nowadays business companies in Ethiopia are in a process of change to attain competitive position in the business. The business environment is becoming customer driven, competitive and technology based. Hence, it is unquestionable that companies should build an integrated and efficient system through which resources would flow in a seamless and instantaneous manner across the supply chain (Assegai 2011). The purpose of this thesis is to recommend Sugar Corporation to reengineer its sugar import logistics activities towards this seamless supply chain management practice with optimum lead time to be competent in the local and global market in the forthcoming future.

1.2 Statement of the problem

There are a few researches that are conducted based on lead time optimization of break bulk cargo specially on sugar import .In fact, there are a number of researches carried out on lead time optimization of global sourcing in other countries especially in developed countries.

Hana (2016) concluded, after a thorough study at Sugar Corporation, that the Company's organization towards SCM is traditional that lacks efficient substantial indicators of an integrated, efficient and effective SCM. She also concluded that the qualitative and quantitative analysis result disclosed company's orientation towards customer satisfaction is poor and SCM practices have direct impact on the customer.

Sugar has been imported for many years to Ethiopia. This is the result of the gap in sugar demand and the production capacity of Sugar factories in the country. This gap increases from time to time because of the increase in sugar demand caused by increase in population growth and change in life style associated with individual income. This is irrespective governments high investment in new green field sugar factories construction and expansion of existing factories.

As the supply and demand gap increases the government is forced to increase the import of sugar year after year that raise the amount of foreign currency the government spends for the purchase of sugar. The price of this imported sugar is competitive at port of selling country, while the cumulative cost (DDP) at ware house is very high. One main reason for this high cost build up is unnecessary delays in the import logistics process.

Current practice shows that the bulk shipment is stuffed and consolidated in Djibouti, which sometimes takes up to two months to unload from the ship especially during drought event. This has resulted in high demurrage costs plus opportunity cost due to excessive delay of the ship at the seaport to serve as storage facility for the shipment. (Ethiopia Ministry of Transport Ethiopian Maritime Affairs Authority 2016). This increases the supply chain lead time that consequently increases the logistics cost from port of loading to final destination. Ethiopia annually pays more than USD 700 million to Djibouti government because of demurrage, storage and port facility charges. The demurrage and other unnecessary charges that are caused by delays and malpractices can be avoided if appropriate measures are taken. (Ethiopia Ministry of Transport -Ethiopian Maritime Affairs Authority 2016).

The transport network between Addis Ababa and Port of Djibouti is the international corridor serving Ethiopia. This Djibouti -Addis Ababa corridor where the import of sugar is being conducted faces serious problem of delays expected to be caused by port performance, truck availability, customs process and delays caused by ware house facility. Fig 1.1 (Annex-2) shows the various nodal points along the corridor such as Djibouti port, Galafi, Mille, Awash and Kaliti.

These are the port, boarder post, weighing and scanning facilities, custom facilities that are used to separate links. The port nodes contain information regarding three elements in the port: the yard, customs clearance and the gate .The other nodes stated above have their own operations. The links are road segments between nodes. This research has described and analyzed the nodal points or lead time optimization factors which are the port, border posts weighing/scanning

facilities, customs facilities and ware houses .The links that were analyzed as lead time optimization factor are transport facility specifically truck availability .Consequently ,the causes and points of delays that have increased the lead time of sugar import are identified and possible solutions are recommended to alleviate the problem.

1.3 Research Questions

The thesis has been initiated to answer the following questions which are not answered so far through empirical studies particularly as applied to Sugar Import experiences of the Sugar Corporation via the Djibouti-Addis Ababa route.

- How does port congestion affect the lead time of sugar import of Sugar Corporation along the corridor?
- Does truck availability affect the lead time of sugar import of Sugar Corporation along the route?
- What is the role of customs process in the prolonged lead time of sugar import of Sugar Corporation along the route?
- What is the impact of warehouse facility on the lead time of sugar import of Sugar Corporation along the route?

1.4. Objective of the Study

1.4.1 General Objective

The general objective of the study is to asses the lead time optimization factors of break bulk cargo in the case of case of Sugar Corporation's sugar import via Djibouti-Addis Ababa corridor.

1.4.2 Specific Objectives

The specific objectives of the study are :-

1. To assess the impact of port congestion on lead time of sugar import in the case of Sugar Corporation.
2. To assess the impact of truck availability on lead time of sugar import in the case of Sugar Corporation.
3. To assess the impact of costume process on lead time of sugar import in the case of Sugar Corporation.
4. To assess the impact of warehouse facility on lead time of sugar import in the case of Sugar Corporation.

1.5 Significance of the Study

The increase in lead time sugar directly increases the cost of sugar import that consequentially increases the price of sugar. This increase in the price of sugar affects many direct consumers of sugar and producers of food, beverage, pharmaceuticals, and related industries that use sugar as an input for their production. Therefore the increase in the price of sugar affects not only direct house hold consumers but leads to increase in the price of food, beverage, medicine and related processed products.

Optimization of the lead time of break bulk cargo requires identification of bottle neck areas that contribute to increase in logistics lead time of imported sugar and give recommendable practices that lead to reduction in total lead time of imported sugar from global market .The result of the study is expected directly to impact the cost of import sugar and brings about significant cost reduction in the import logistics cost of sugar.

Besides, the study is expected to fill the literature gap identified on the topic area and to be used as an input for future studies so that possible solutions can be researched, new gaps identified and suggested to be solved by researchers. The final finding of this study is also expected to help domestic bulk and break bulk cargo importing companies to be well aware of the major

challenges and bottlenecks of import logistics and implement the recommended solution in by considering the context of their company. Besides, it can also be used for academic purpose.

Moreover, the research highlighted how various stake holders can contribute to the reduction of lead time and cost of import goods if they contribute their part by working efficiently and effectively.

1.6 Scope of the Study

This research scope is limited to optimizing the import logistics activity of break bulk sugar cargo of Sugar Corporation. The lead time of sugar import logistics depends on loading time at loading port, discharge time at discharge sea port, transportation, customs check and discharge time at warehouses. The study focuses on the impact of waiting time at the stated nodal points and links along the Djibouti Addis Ababa corridor.

1.7 Limitations of the Study

The sample population selected could have included the port of Djibouti and other port stake holders in Djibouti .But resource limitations couldn't allow the researcher to do so . Related to this the lack of organized secondary data that shows the history of every sugar carrying vessel operation along Djibouti Addis Ababa corridor had been a problem .The researcher also identified availability of few research related to the topic under study .Therefore, further studies should be encouraged to be conducted in the area so that future researchers will have ample empirical reference . Furthermore the quantitative research data depends on what my respondents in the sample frame said whether in interviews or on questionnaires, at face value. These self reported data may contain several potential sources of bias that should be noted as limitations.

1.8 Definition of Terms

Draft: determines the minimum depth of water a ship or boat can safely navigate time (John et al. 2013).

Dead weight is the total weight of cargo, stores, etc. which a ship carries or can carry time (John et al. 2013).

Bulk cargo: is cargo that is unpacked (un-bundled or un-bound) and is of the same or a similar kind or nature (homogeneous). Bulk cargos are classified as liquid or dry time (John et al. 2013).

Break bulk cargo: break bulk cargo or general cargos are goods that must be loaded individually, and not in intermodal container nor in bulk cargo as with oil or grain. Break bulk cargo is transported in bag, Box, Crate or Barrel (John et al. 2013).

DDP: Delivery duty paid .The seller bears all the costs and risks involved in bringing the goods to the place of destination, has an obligation to clear the goods not only for export but also for import, to pay any duty for both export and import, and to carry out all customs formalities (Tony 2004).

1.9 Organization of the Study

This research thesis comprised of five chapters that are organized sequentially as introduction, review of related literature, research methodology,, data analysis results and discussions, and summary of main findings, conclusions and recommendation . Chapter one contain an introduction parts covering background of the study and the organization, statement of the problem, basic research questions, objectives of the study, definition of terms, significance of the study, delimitation /scope of the study, limitation of the study and definition of terms. The second chapter which is called review of related literature contains a general idea of earlier researches. It also contains theoretical review, empirical review and the conceptual framework of the study. And the third chapter, research methodology discloses the view on research design, type and methodology including the participant of the study; the sources of data; the data collection tools/instruments; the procedures of data collection; and the method of data analysis used in the research. The fourth chapter represents the analysis part of the primary data collected from the selected respondents and secondary data. Finally, in the fifth chapter conclusion and recommendation is delivered based on findings of the study.

Chapter Two

Review of Related Literature

2.1 The Concept of Supply Chain Management and Its Relevance to Imports

Organizations in the supply chain are linked together through physical flows, information flows, and monetary flows. These flows go both up and down the chain(Cecil and Robert 2013) .Supply chains link together the operations functions of many different organizations to provide real value to customers (Cecil and Robert 2013) . This implies that organizations that involve in supplying, transporting ,port handling ,stevedoring ,custom clearing, banking and insurance, loading and unloading and ware housing of import sugar should work together to create value in the eyes of Sugar Corporation's customers. That is why it is stated that supply chain management is the active management of supply chain activities and relationships in order to maximize customer value and achieve a sustainable competitive advantage. It represents a conscious effort by a firm or group of firms to develop and run supply chains in the most effective and efficient ways possible (Cecil and Robert 2013).

Quality logistic services play an important role in facilitating the transportation of international trade in goods; inefficient logistic services impede trade by imposing an extra cost in terms of time as well as money (Fekadu 2013).In general, logistics affects trade performance of a country in terms of cost, time, reliability and predictability and customer services, which further affect overall competitiveness of import and export in the international market. As countries of the world become more and more integrated through trade and competition to acquire the great market share prevails, they are expected to develop efficient logistic system. This implies development of a plan, implementing, and controlling the efficient cost effective flow and storage of raw materials, in-process inventory, finished goods and related information from point of origin to point of consumption for the purpose of meeting customers' requirements (Shewangizaw, cited in Kalkidan 2017).

Time delays in logistics create indirect costs and can take several forms. They also increase the cost of firms that are then passed on to consumers. The cost of holding inventory and depreciation is higher for ocean shipped goods. Lower shipping times are associated with higher

volume of trade, and there is some evidence that shipping time rather than distance is a more accurate reflection of shipping costs since it better captures the time-sensitivity of certain goods. Time delays at the border due to inefficient and lengthy administrative procedures related to importing and exporting can also have detrimental effect on trade volumes (Shewangizaw, cited in Kalkidan 2017).

The IMF report confirmed the above problem by disclosing that logistics cost on average account for 12% of the world GDP and on another study conducted by Natan associates, Ethiopia's expenditure on logistics account for 30 up to 40 % of the county GDP showing magnitude of the impact of logistics (Petros 2015) .Sugar import logistics requires chartering of vessels that costs from the smallest USD10,000 to 30,000 per day even more for vessel demurrage charges depending on agreed terms in the charter party .This enforces the placement of dynamic process and system to accomplish the import operation timely and efficiently. The dynamic supply chains drive, amongst other things, the development of new business strategies, in which the integration of customers, the outsourcing of business functions, the customer and supplier cooperation, and warehouse management are the focal point (Rolf 2016,p.21).

Lead time optimization of supply chain practices in sugar import requires coordinated ,steady and fast flow of material and information keeping strong link up and downstream the supply chain. The optimization in a single area (e.g. through the reduction of stock), has only a limited effect if the upstream or downstream processes (e.g. in procurement and production), are not simultaneously coordinated or adapted. As a consequence, the entire flows of material and information must be considered in order to make real improvements in efficiency. This virtually determines the weakest link in the supply chain efficiency(Rolf 2016) .The analysis of material flow bottlenecks concentrates upon the identification of events, inefficiencies and problems with regards to the movement of goods—from suppliers through the business and up to the customer, in other words: throughout the complete supply chain(Rolf 2016).

In order to maintain stability of supply chain performances, it is necessary to design robust supply chains. Robust supply chains should be able to continue to function well in the event of a disruption as well as in the normal business environment (Dong, Tang & Waters, cited in Kulwant et al. 2016). Generally, robustness of the supply chain depends on its capability to respond adequately to different kinds of risks of disturbances (Kulwant et al.2016). As supply

chain of sugar faces various disruptions such as weather condition, pirates, port congestion etc various risk management systems should be applied to avoid or mitigate the risk.

2.2 Relevant Factors for Import Break Bulk Cargo Lead Time Optimization in case of Sugar Imports of Sugar Corporation.

There are numerous perspectives pertaining to what factors actually determine the length of lead time in cargo logistics. For example, John et al. (2013) stated that port congestion problem is one of the major problems faced by carriers and importers at port of Djibouti like other international ports. This problem results in supply chain delays that impact demand fulfillment. In addition, Fekadu (2013) revealed that the schedule of the ships arrival times at the port of Djibouti was not coordinated and when grains and fertilizer ships arrived at the same time resulting in congestion of the port and shortage of trucks.

Arega (2015) expressed the sever impact of truck availability by stating with economic growth, the demand for freight transport soared and consequently shortages and congestion problems surfaced due to the inefficiency of scanning machineries, failure in the system, lack of skilled manpower to operate the machineries at the Ethiopian Custom and Revenue checking points and also congestion occurs at main traffic dense cities along the main Ethio-Djibouti corridors. Elias (cited in Arega 2015) expressed that due to many factors such as delays through bad roads, border delays, weighbridge checks, customs delays at roadside and at destination, poor scheduling for loading and unloading, road accidents, single driver operation and congestion all reduce vehicle utilization resulting in shortage of trucks at port of Djibouti. According to Fekadu (2013), vehicle coordination contributes in optimizing the supply chain system by maximizing the load rate of vehicles. This will result in higher utilization of available fleet and reducing transport costs which could benefit all: the operator, the shipper and the national economy. The above points clearly state the impact of truck availability at port of Djibouti.

According to ESLSE (cited in Nathanael 2015), the unimodal system that enforces every imported goods to be taxed and given customs clearance before entering Ethiopia has caused delays of cargo at port of Djibouti resulting in significant demurrage charges. UNDP (2017) further confirmed this by stating that the Unimodal method is the slower option, and this is the result of the lengthy clearance processes undertaken within the Djibouti Port.

Arega (2015) stated that one of the major obstacles for efficient freight transport and logistics system of the country in international freight movement and distribution system is lack of storage facilities, adequate loading and unloading equipment and efficient management of the system. This revealed the impact of warehouse facility in import logistics activity of the nation. World Bank (2017) reinforced this statement by stating that currently the bulk shipment is stuffed and consolidated in Djibouti, which sometimes takes up to two months to unload from the ship especially during the recent drought event. This has resulted in high demurrage costs plus opportunity cost due to excessive delay of the ship at the seaport to serve as storage facility for the shipment. Therefore, the following sub-sections of this chapter have presented an extended review of the perspectives, studies and arguments pertaining to these determinant factors; along with pertinent reflections on the Sugar Corporations' contexts.

2.2.1 Port congestion

Maritime logistics is generally preferred to transport trade cargoes, because it can provide cheap and high volume transport for customers (Tseng et al. cited in Elizabeth 2019). Being capital intensive, technology intensive and high value-added, ports have a top priority for trade and economic improvement, as ports are in the transportation interface between land and water. They are in a special position in the integrated logistics service chain and play an increasingly important role in supply chains and logistics processes to cope with trade (Bichou et al. cited in Elizabeth 2019). Ports have become the core strategic resource to drive the regional economy within the context of globalization and the trade boom (Elizabeth 2019).

Furthermore, seaports are areas where there are facilities for berthing or anchoring ships and where there is the equipment for the transfer of goods from ship to shore or ship to ship. To put it the other way, it is a ship/shore interface or a maritime intermodal interface (Patric 2008). The use of such port has been longstanding bond between Ethiopia and Djibouti. For Ethiopia Djibouti port was and still is preferred outlet to sea even when Ethiopia had its own ports at Assab and Massawa due to the connection of the port with Addis Ababa-Djibouti railway, and its proximity to many parts of Ethiopia (Pankhurst and Barratt, cited in Urgassa 2014). The Port of Djibouti is a port in Djibouti City, the capital of Djibouti. It is strategically located at the crossroads of one of the busiest shipping routes in the world, linking Europe, the Far East, the Horn of Africa and the Persian Gulf (Port of Djibouti 2019). Nowadays Djibouti Port is the

principal transit point for cargo in and out of Ethiopia handling about 95% of Ethiopia's import/export traffic (ibid, cited in Urgassa 2014).

Currently very small volumes of Ethiopian traffic are using the other ports in the region; Port Sudan, Berbera and Mombasa. Recent investments in road and rail along the Djibouti corridor have the potential to significantly reduce transport costs and time and are a key element encouraging greater interest from investors in opportunities to develop manufacturing export capabilities in Ethiopia. With projections that imports and exports will be more than double under GTP II by 2020 (relative to the base of 2012) and the performance of this corridor will be of paramount importance. This has been recognized by the government which is paying special attention to logistics performance and has developed a National Logistics Strategy (World Bank 2017).

Port congestion problem is one of the major problems faced by carriers and importers at port of Djibouti like other international ports. This problem results in supply chain delays that impact demand fulfillment (John et al.2013). Maduka (cited in Adebisi 2011) defined port congestion as massive un-cleared cargo in the port, resulting in delay of ships in the seaport. According to him, this occurs when ships spend longer time at berth than usual before being worked on or before berth. According to Onwumere (cited in Adebisi 2011) port congestion as a situation where in a port; ships on arrival spend more time waiting to berth. In this context, more ships will queue at the channels and the outside bar waiting to get space at the terminal for berth age. In his view, this waiting time is calculated using the service time of vessels which is one of the ways of measuring port efficiency. Besides, he stated that this is a situation where cargoes coming into the port are more than the storage.

The effectiveness of a Port is contingent upon loading and unloading of ships. The traffic movement through a port is a complex phenomenon because of the random nature of the arrival and service time of the ships. This requires a systematic approach in port planning and management (Adebisi 2011).Consistent lack of capacity may cause port customers to shift to competing ports which is very difficult in Ethiopian case as the situations on the ground don't give such options. Traffic volume growth entails a mismatch between port resources that is yard capacity, handling facilities and gate capacity and ability to handle those volumes. This situation leads to congestion as port user end up interfering with each other in the utilization of port

resource (Talley, cited in Elizabeth 2019).When vessels arrive at Port of Djibouti they will be forced to wait at the pilot anchorage and then berth alongside to load or unload cargo because most of the time the port is very busy.

Meanwhile in other area of the world where there are abundant ports, ports struggle to be efficient and attract market. The increasing openness of the port with the economic globalization has brought opportunities to the port; on the other hand, the port has been exposed to increasingly fierce competition. In the fierce competition, providing high-quality and cheap handling service for ships is the key driving force to promote the development of the port (Adebisi 2011).

To clarify what type vessels are appropriate for sugar import let us see what type of vessels are available in the maritime world .According to John et al.(2013) globally water carriers dominate all other modes, garnering approximately half of the international freight revenue and handling nearly all tonnage. Two primary carrier types dominate the for-hire portion of the water industry, as follow:

- **Liner services** employ a wide variety of ships in their fixed- route, published schedule service. Liner service carriers like Maersk, MSC typically handle individual shipments for their customers, including containers, pallets, and other unit loads.
- **Charter services** lease ships to customers on a voyage or time basis and follow routes of the customer's choosing .The charter customer normally uses the entire capacity of the ship for large –volume freight.

Ocean transportation of goods ranging from crude oil to electronics is facilitated by wide range of specialized ships .The most widely used options include container ships, bulk carriers ,Tankers, General cargo ships, Roll-on roll off(RO-RO) vessels. Bulk carriers carry cargoes with low -value to weight ratios, such as ores, grain, coal, scrap metal. Very large openings on these ship holds allow easy loading and unloading .Watertight walls dividing the holds allow the ship to carry more than one commodity at a time (John et al. 2013).

The ship that are used to import sugar (general cargo ships)are usually engaged to transport shipload cargoes on a charter basis and have large cargo holds and freight -handling equipment to facilitate the loading and unloading of a large variety of freight. The self sufficiency of these ships allows them to load and discharge cargo at ports that lack up-to-date cargo-handling equipment. This feature is very important for ships transporting goods to less-developed portions of the world like Djibouti and Ethiopia (John et al. 2013).

2.2.2 Truck availability

Conceptually ,a supply chain is a network of organizations that are separated by distance and time .Transportation provides a critical link between these organizations ,permitting goods to flow between their facilities .By bridging these buyer-seller gaps ,transportation allows organizations to extend the reach of their supply chain beyond local supply capabilities and market demand. With efficient and effective transportation capabilities, organizations can build global supply chains that leverage low -cost sourcing opportunities and allow them to compete in new market (John et al. 2013).

Transportation efficiency promotes the competitiveness of a supply chain .In terms of supply management, cost effective transportation helps companies gain access to higher quality, lower priced materials and realize economy of scale in production. Likewise, low- cost transportation improves demand fulfillment opportunities. By keeping transportation expenses reasonable, the total landed cost of a product (its production cost plus transportation cost and related supply chain management cost) companies can be competitive in multiple markets (John et al.2013).

Inexpensive transportation is of little value to a supply chain if the product doesn't arrive as scheduled and damage free to the correct location. High quality, customer focused transportation has a direct impact on organization's ability to provide the "Seven Rs of Logistics"- getting the right product to the right customer, in the right quantity, in the right condition, at the right place, at the right time, and right cost (John et al.2013).

According to John et al. (2013), there are numerous obstacles such as supply chain complexity, competing goals among supply chain partners, changing customer requirements, and limited information availability-to synchronizing transportation with other supply chain activities.

As stated by Arega (2015) there are two principal road routes connecting Djibouti and Addis Ababa. One of them passes through Nazareth and Awash and the other passes through Kombolcha. These two routes join near Mille and the section from Mille to Djibouti is common to both routes. The Djibouti- Awash Addis Ababa route has a distinct advantage over Djibouti-Kombolcha Addis Ababa due to differences in terrain. The corridor analysis in this study however, refers to the Addis Ababa- Awash- Djibouti road route. The road is 909 km long passing through Awash valley which has high agricultural potential. Dire Dawa, Nazareth, Modjo and Deberzeit are important towns enroute which are bristling with industrial activity and serve as distribution centers to and from southern parts of the country. As the country's imports are significantly greater than exports, long distance road traffic is unbalanced (empty back-haul). Because of this fact the average freight rate is very high.

According to Arega (2015), the country's major freight transport road vehicles in terms of size, age and capacity, are not sufficient to support the growth in the economic activities. With economic growth, the demand for freight transport soared and consequently shortages and congestion problems surfaced due to the inefficiency of scanning machineries, failure in the system, lack of skilled manpower to operate the machineries at the Ethiopian Custom and Revenue checking points and also congestion occurs at main traffic dense cities along the main Ethio-Djibouti corridors. In his opinion due to increase in import and export goods of the country freight transportation by road becomes time consuming, high transportation cost and difficult to manage.

Truck availability at port of Djibouti is not uniform and at peak time there will be many vessels waiting for trucks at port that carry sugar, wheat fertilizer coal etc... .In order to give temporary solution Ministry of Transport enforces truck carriers to transport cargo from port of Djibouti. This shows efficiency and adequacy of road transport is a function not only of the road network but also vehicle availability and sustainability for particular tasks in specific conditions. Roads are of no use without road vehicles. According to the new system trucks are classified in different levels. Every level has unique grades based on their loading capacity and manufacturing date or type of service provided. For instance associations included on level one are divided into two different grades; the manufacturing date of a truck included.

According to (Arega 2015), similar to other emerging nations the infrastructure in Ethiopia is under developed and also the land locked population is constrained by supply chain bottlenecks at the seaports. High cost of charges due to the impact of illegal brokers who act on the behalf of transporters and importers/exporters, reduced free.

The main charges on Ethiopian transit cargo passing through the port of Djibouti comprise port charges related to cargo handling (measured in volumes and/or weights); clearing and forwarding charges, based on value and cost insurance and freight (CIF); the cost of road transportation; and weight. In addition to these costs, there are a number of indirect costs associated with transit cargo. Most of these cost components are affected by delays at the port and can bring about significant logistic cost increment (Kalkidan 2017).

Indirect additional transit costs caused by delays at various nodal points in Ethiopia are due to other factors such as delays of vehicles caused by customs checks, time lost at weighbridge stations, overloading fines and other local but unofficial charges. Although the number of customs checks within the Ethiopian territory is often ignored, they adversely affect vehicle utilization rates and the number of turnaround trips, therefore constituting a major transit delays and cost. Transit vehicles are usually halted for about two hours per trip on each of the four checkpoints (at the Galafi border, Mille, Awash and Nazareth) within the Ethiopian territory, occasioning an average total delay of eight hours per vehicle (Kifle et al., cited in Kalkidan 2017).

ERC has launched a 656 Kilometers railway network construction project that links the capital city Addis Ababa to the port of Djibouti. This railway expansion project has been completed and inaugurated in October 5, 2016 (Ethiopian Rail Ways Corporation 2019). The two countries are to be interconnected through two modern railway lines which are under construction: Addis Ababa (Sebeta)-Dire Dawa-Djibouti line and Mekele-Weldya-Semera-Tadjourah line. The Ethiopian Government is working on the projects as part of its plan to construct nearly 6000 kilometers of railway network as set in the Five-Year Growth and Transformation Plan (Urgassa 2014).

2.2.3 Custom Process

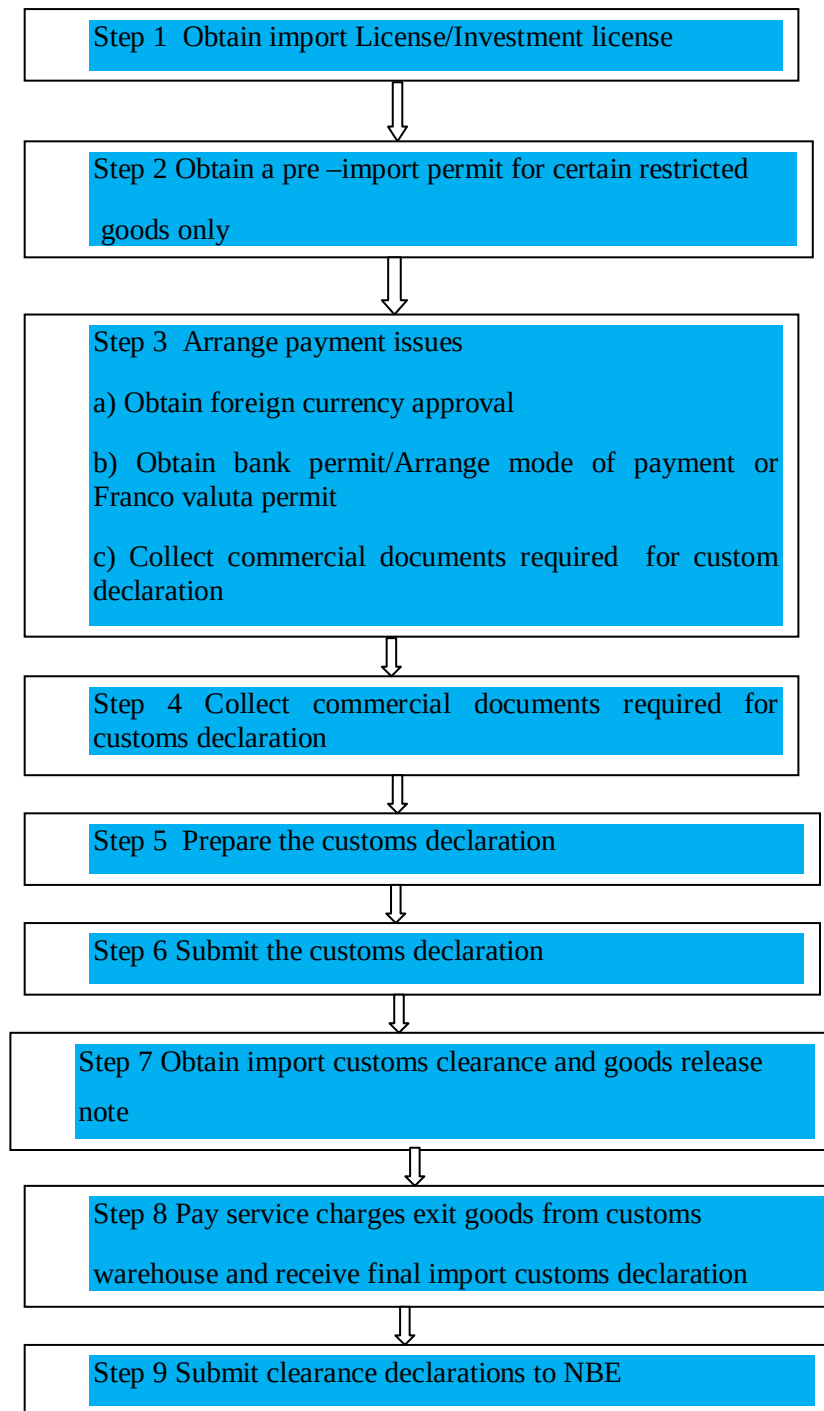
The import and export of goods is an inherently complex undertaking, and is often made even more complex due to the multitude of rules in place. These complex rules in combination with traders and other stakeholders involved in international trade which are not well informed of the rules create uncertainty, risk, and contribute to limited compliance with rules. Ultimately, they increase the cost of trading and harm the investment environment. The World Customs Organization (WCO) defines Customs as “the government service which is responsible for the administration of Customs law and the collection of import and export duties and taxes and which also has responsibility for the application of other laws and regulations relating, inter alia, to the importation, transit and exportation of goods.” (Patric 2008).

From an historical point of view the customs facility is important because without it no international commercial intercourse was legally possible. In many older ports the most imposing piece of architecture on the waterfront is the Custom House (Patric 2008).

In Ethiopia, ERCA’s functions include the enforcement of the Customs Proclamation provisions governing the import and export of cargo, baggage and postal articles; the arrival and departure of vessels, aircrafts, and other means of transport; goods in transit; and the governance of any goods subject to customs control, including rights and obligations of persons taking part in customs formalities. Customs operations involve the administration of customs law relating to the importation, exportation, movement or storage of goods and the collection of duties and taxes. In this regard, customs operations are a key factor for trade facilitation and economic development of a country (Ethiopian Revenues and Customs Authority 2017).

The development in customs can be described in three stages. In the first, the customs authority concentrates on physical inspection and paperwork, in the second, the customs authority works to reduce fraud and maximize revenues, and in the third, the customs works to facilitate trade through internal checks, process management and the development of electronic data exchange (Appels and Henry, cited in Elizabeth 2019). Accordingly, there are nine major steps to be followed in Ethiopia to import and clear cargo from customs:-

Figure 2.1 How to import goods into Ethiopia – summary of steps



Source: Ethiopian Customs Guide

Beside the above steps (Fig. 2.1) sugar import requires health certificate and permit from Ministry of Finance and Economic (MOFED) to get loan permit from Commercial Bank of Ethiopia and National Bank. All these steps unless properly handled causes delays in clearing of sugar import.

According to (ESLSE cited in Nathanael 2015), for the past many years, Ethiopian goods were imported through a customs transit clearance system commonly called ‘uni-modal’ transport. The main principle behind the ‘uni-modal’ system is that ‘Every imported goods has to be taxed and given a custom clearance before entering Ethiopia’. So due to this rule before the importer get the transit allowance, the importer has to get a release of the original bill of lading from the bank by paying the freight transport fee and also the customs tax. These preliminary processes before transiting the imported goods to Ethiopia costs a lot of time and money which in turn led to the accumulation, congestion of more goods and incurred an additional expense towards the importers at Djibouti port. The accumulation of imported goods through ‘uni-modal’ transport at Djibouti port for a long period of time has incurred rental and storage cost in a foreign currency, then also when the limit of storage time reached the imported goods were taken away by the neighbor country (ESLSE ,cited in Nathanael 2015). These all consequences of the ‘uni-modal’ transport have affected the nation’s economy growth and also the customers of the ESLSE negatively (Nathanael 2015).

Afro Consult (2010) also showed that in Africa, East Africa has the highest transport cost in the world. For instance, the logistics cost proportion in 2003 was about 15% of import value compared to 5.4% for the world average. The situation of landlocked countries, such as Ethiopia was 16% of the foreign trade values in 2008 wherein that much cost was consumed by transport and transit costs which were nearly double of the coastal countries on average at the time (Afro Consult, as cited in Nathanael 2015)

2.2.4 Warehouse Facility

Storage is the physical holding of inventories awaiting transport to customers. An important part of the process is warehousing which has been described as that part of an organization’s transport system where goods are travelling at zero miles per hour. It is part of a total logistics system that stores raw materials, work-in-progress and finished goods at and between points of

origin and point of consumption (Murphy and Wood, cited in Tony 2004). Storage can take place at warehouses or distribution centers, the latter being for rapid movement of inventory to where they are in demand to maximize throughput. Faster throughput times means faster stock-turnover, lowering holding cost for inventories (Tony 2004). In global sugar supply chain there are various types and sizes of warehouses that help to store sugar based on the chemical and physical nature of sugar.

Historically the emphasis on storage and warehousing was a means of holding inventories to meet internal and external customer needs and a means of avoiding loss through wastage, deterioration, theft and obsolescence. The current emphasis is on the movement of inventories (Tony 2004). When it comes to sugar import, silos equipped with homogenizing equipments are used to keep the sugar under fluidized state as this action avoids agglomeration of sugar.

According to Arega (2015), one of the major obstacles for efficient freight transport and logistics system of the country in rural, regional and international freight movement and distribution system is lack of storage facilities, adequate loading and unloading equipment and efficient management of the system. At present, there is a total of about 0.8 million metric ton capacity warehouses all over the country. Most of these are owned by public institutions such as Coffee Marketing, Ethiopian Grain Trade Enterprise, and World Food Program etc. Most warehouses particularly the private ones are not designed to handle heavy truck trailers and semi-trailers, which implies adequate doors and turning areas are not provided. In short, there is no standard set for commercial warehouse building. There is a serious lack of cargo handling equipment all over the country which normally is part of warehousing businesses. Cranes, forklifts and other material handling equipment are rented while cargo is already waiting to be loaded and unloaded at the warehouses.

A study by Addis (cited in Elizabeth 2019), clearly shows that the major problems observed in logistics performance practices of Ethiopian shipping and logistics enterprise are the overall design of the warehouse is still poor to access items and not convenient to load and unload, inefficient utilization of computer and other technologies to perform. Warehouses are a substantial component of logistic operations, and an important contributor to speed and cost in supply chains (Elizabeth 2019).

2.2.5 Lead time of Sugar Import

Lead time of sugar import is the time between when sugar stock is ordered and when it is delivered and available for use (USAID 2011). It is the time elapsed from first effort to initiate acquisition of goods or services, up to the time of their arrival. A parameter that shows the relative lead time status of a nation is logistics performance index that is being managed by World Bank. The logistics performance index of Ethiopia was 2.4 in 2018. This puts the country at 130th position out of 167 countries. Logistics Performance Index overall score reflects perceptions of a country's logistics based on efficiency of customs clearance process, quality of trade and transport-related infrastructure, ease of arranging competitively priced shipments, quality of logistics services, ability to track and trace consignments, and frequency with which shipments reach the consignee within the scheduled time. The index ranges from 1 to 5, with a higher score representing better performance. The last one which is the frequency with which shipments arrive within the schedule time refers to the lead time. The result reveals how poor the logistic performance of the country is with timeliness index of 2.49 compared to Germany's 4.4 (World Bank 2020).

It is clear that supply chains are as good as their weakest links and same applies to sugar import lead time. As the sugar import is performed in the country that experiences such level of logistics performance, the delay in the logistics performance of sugar import is significant. This research tried to assess factors such as port logistics, truck availability, customs process and warehouse facility that impacted sugar logistics lead-time of Sugar Corporation along Addis Ababa Djibouti corridor..

2.3 Reviews of Empirical Studies

As per the research finding conducted by (Arega 2015) on alternative inland transport means, to decrease the cost and lead time of in land Djibouti Addis corridor using rail, integrating rail-road for hinterland bound goods would be potentially save 42.67% freight costs and time of transportation than that of using uni-modal transportation. The data set are combined with the model development and validation to create the full model of the transport system used to answer the research questions; and contains the system size, transport demand, infrastructure and geographical data (rail network, road network, terminals, demand points, etc.), equipment

(trucks, trains, etc.), costs data, environmental data, time windows, etc. The data was analyzed using Geometric Mean analysis.

Both descriptive and an explanatory research design was employed with qualitative and quantitative research approach by (Elizabeth 2019). Stratified and purposive sampling technique was used as a sampling technique. Pearson correlation matrix was used to cross check the relationship between independent and dependent variables. The result of the analysis indicated that, ICT, customs service's, staff competence and importers behavior are major challenges of Modjo dry port management. Based on the findings of the study it is recommended that recruiting skilled manpower and preparing work related trainings, investing on modern dry port physical and ICT infrastructure and rising the awareness of importers to collect their containers on time.

Kalkidan (2017) used both secondary and primary data on her research on “Assessing Freight Transport Performances in Relation to Delays in Ethiopia “. In relation to secondary data, necessary documents from different public and private organizations were gathered also related documents were reviewed. Regarding primary data, total average time of customer waiting for commodity were measured and questioners were presented to different stakeholders and analyzed using SPSS software. As a result the analysis found out that on average it takes 37.4 days for transport companies to transport goods and deliver to customers. The causes of delay are factors related to Djibouti port management problems, Poor condition of Djibouti-Addis Ababa road, bureaucracy, long clearance time at dry ports and check points, poor information flow and lack of integration between stakeholders.

Nathanael (2015) also used both primary and secondary data on his research on “ Assessment of Freight Transport and Transportation Infrastructures Along International Trade Route: The Case of China – Djibouti – Ethiopia “.Primary data has been collected using interview and questionnaire; also secondary data from literatures. The methodology used is qualitative and quantitative type for a comparative assessment and analysis. From the research it was found out that for containerized goods, the sea freight unit cost applied for 20TEU containers from Chinese ports of Tianjin and Shanghai to Djibouti port was USD 1,500 and USD 1,315 respectively. And for the inland road transportation, the freight rates from Djibouti port to Modjo dry port ranges from 1,734 to 1,854 USD per 20TEU container. This means it costs more to truck a container

from Djibouti to Addis Ababa, than to ship the same container from China to Djibouti. In terms of time the sea transport will take a voyage time of 40days and 37days (including sea time and time in ports) from Tianjin and Shanghai ports to Djibouti port respectively. For inland road transportation from Djibouti to Modjo dry port, it takes 2 – 10 days on performance basis under normal circumstances.

The study made by Reta (2016) investigated whether fertilizer is delivered to farmers in an efficient way, at the lowest possible costs and in an effective way, with shortest lead time. The researcher employed analytical approach of research design named supply chain analysis which comprises supply chain mapping and measuring chain performance. The study relied on secondary data articles, books, publications and stakeholders records as well as primary data collected from actors of supply chain of fertilizers right from importer up to farmers. Both qualitative and quantitative data interpreted using narrations, tables, graphs, charts, descriptive and inferential statistical methods. The study found out the lack of integration and communication among stakeholders, inefficient supply chain in terms of high cost of fertilizers, ineffective supply chain in terms of longer lead time, little involvement of farmers in demand estimation, mismatch between quantity supplied and demanded.

A Study on “The Effect of Supply Chain Management on the Financial Performance of the Sugar Manufacturing Sector in Ethiopia by Selam (2017) used descriptive research design. Two sets of data – primary and secondary- were gathered. Primary data was collected using a questionnaire that consisted of both open and closed ended questions while secondary data was collected from the factories’ financial records covering a period of seven years (2010-2016). The data collected was analyzed using descriptive statistics and also an inferential analysis involving multiple regressions was performed. The findings of the study were that supply chain across the three factories on average account for 55.1% of their annual cost entailing its worth to successful performance.

2.4 Literature Gap

The studies conducted above have shown the various variables that affect supply chain performance of the country in general and specific institutions as well. The researchers tried their best to identify and disclose logistics bottle necks along the Djibouti –Addis Ababa Corridor and

gave very good recommendations that could change the situation on the ground if properly implemented. But the gap identified is that there is no research conducted on Uni-modal operation in case of Sugar Corporation along the Djibouti -Addis Ababa corridor. Therefore, this research will try to assess and analyze the impact of port congestion, truck availability, customs process and warehouse on the lead time of sugar import.

2.5 Conceptual Frame Work

The conceptual framework is created based on developing four major constructs derived from the above summarized reviews of literature, empirical studies observed gaps. The previously explained port congestion, truck availability, customs process and warehouse facility were considered as independent variable and were expected to affect the dependent variable, lead time of sugar import. Sugar import is conducted along Djibouti-Addis Ababa corridor where marketing department of Sugar Corporation conducts the operation with Sugar Factories, Ethiopian Shipping and Logistics Service Enterprise, Maritime Authority of Ethiopia, Port of Djibouti, transport companies and customs office etc.

Sugar carrying vessels after arriving at port of Djibouti make call requesting berth. If there is no berth because of port congestion, they will be forced to wait at anchorage area counting demurrage. After the vessel get berth discharging operation starts and if there is no sufficient truck to receive sugar cargo from the vessel, operation will be interrupted causing vessel demurrage. If customs process is not finalized before vessel arrival, discharging operation can't start and the consequence will be delay followed by vessel demurrage. Once trucks arrived at warehouse and couldn't unload cargo and return back to port in time, the vessel discharging operation will be interrupted resulting in delay of sugar import lead time and both vessel and truck demurrage charges. Actual existence of these scenarios was expected to be assessed and proved by these research and the summarized conceptual framework of the study presented below.

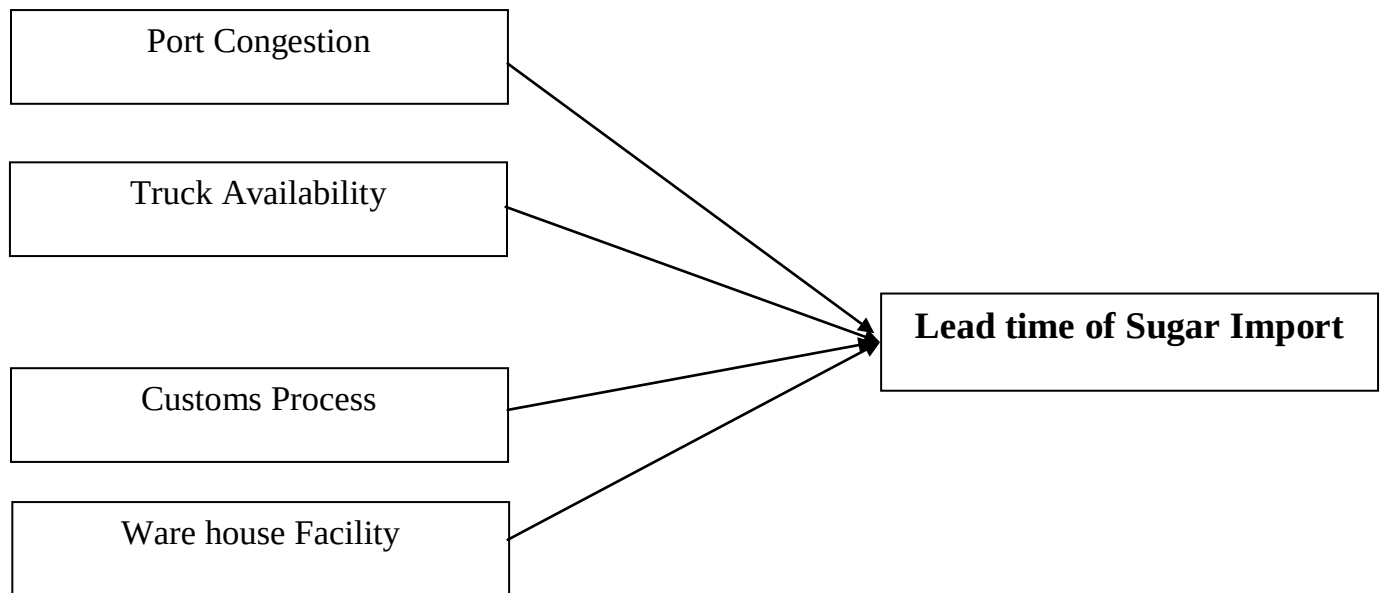


Fig 2.2 Conceptual frame work of the study

Source: Own Construction

Chapter Three

Research Methodology

3.1 Description of the study Area

This study was conducted focusing on Sugar Corporations' sugar import by Marketing division, at head quarter of the company in Addis Ababa. Furthermore, the study area also covered Maritime authority of Ethiopia, Ethiopian Shipping and Logistics Services Enterprise (ESLSE) and Djibouti Port Authority office in Addis Ababa. These are offices that are currently working with Sugar Corporation to handle the import logistics of sugar.

3.2 Research Approach

Because mixed research is useful to capture the best of both qualitative and quantitative data , it will help the researcher to examine in detail the problems and challenges that has contributed to unnecessary delay and resulting in higher lead time of sugar import logistics. The advantage of using mixed methods is that it enables to triangulate and support the data and result collected by questionnaire (Greener 2008). According to Kothari (2004) mixed research method is defined as the class of research welfare the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language in to a single study. The quantitative approach involves the generation of data in quantitative form which can be subjected to rigorous quantitative analysis in a formal and rigid fashion. Moreover, the results from quantitative research are assumed to be measurable and presentable in figures.

Qualitative approach to research is concerned with subjective assessment of attitudes, opinions and behavior (Kothari 2004). Therefore, the qualitative approach in the study will be focused on detailing the results of the quantitative phase and describing the factors that contributed to higher lead time and consequently higher cost .Based on the qualitative and quantitative analysis result recommendations that mitigates the inefficiency in the supply chain of sugar import is delivered.

3.3 Research Design

The researcher used explanatory approach of research design. An explanatory study sets out to explain and account for the descriptive information. So, while descriptive studies may ask ‘what’ kinds of questions, explanatory studies seek to ask ‘why’ and ‘how’ questions (Tesfaye 2017). Explanatory research looks for causes and reasons and provides evidence to support or refute an explanation or prediction. It is conducted to discover and report some relationships among different aspects of the phenomenon under study.

As defined in previous section, the main objective of the study is to assess the impact of port congestion, truck availability, customs process and warehouse availability on lead time of sugar import. To achieve this, it draws statistical, quantitative results and further seeks to provide justifications on the established relationship with qualitative study. Therefore the pertinent research design obviously is explanatory type that responds to both the how and why aspect of the fundamental research question.

It is known that the research objective determines the type of research design that the researcher should apply. This will help the researcher to answer the research questions in the research that are based on the research problem. The research problem is an issue or concern that needs to be addressed in this thesis. In such regard, this study aims to test whether the above stated four variables affect the lead time of sugar imports, find out how and why they affect and give possible recommendations on actions to be taken to mitigate their impact. Therefore, the researcher feels that explanatory design is the proper research design to address the central questions of the study.

3.4 Population and Sample

The supply chain of sugar involves the supplier, sea and inland transporters, transit companies, customs, banks, insurance and other third party logistics providers. Among all the stake holders to be potentially considered in the population, focus was given to data from Sugar Corporation, Maritime Authority, Ethiopian Shipping and Logistics Service Enterprise, Port Djibouti Office in Addis. Managers and employees from these companies are supposed to have better know how of

activities conducted to handle import logistics of bulk and break bulk cargo of Sugar Corporation.

Therefore, 150 employees from these companies were selected for data collection by the researcher as the employees who worked in these companies more than two years are expected to know logistics activities along this main corridor. Because of the specific nature of the study that need knowledgeable respondents in the logistics practice of Djibouti to Addis Ababa logistics corridor, purposive sampling which is also called judgmental sampling method was used to determine the sample of population. According to Saunders et al. (2007), purposive sampling is a useful sampling method which allows a researcher to get information from a sample of the population that one thinks knows most about the subject matter. As the name suggests, researchers went to this community on purpose because they think that these individuals fit the profile of the people that they need to reach. Therefore, the reason why the researcher selected purposive sampling was that the data collected from selected staff members of the above five companies, whom he believed knows most about the logistics situation along Djibouti -Addis Ababa corridor, would be a good representative of the target population.

3.5 Data sources and types Data collection procedure

3.5.1. Primary data Source

The primary data was gathered through distributing the questioner in person to target stake holders involved in the supply chain .Interviews were made to managers and employees that have a better knowhow and skill in the area from Maritime Authority, Djibouti Port Office in Addis Ababa, Ethiopian Shipping and Logistics Service Enterprise, Sugar Corporation and Sugar Factories.

3.5.2. Secondary Data Source

Secondary data was collected from articles, books, magazines, journals research papers, reports and records ESLSE, Maritime Authority, Sugar Corporation and Sugar Factories.

3.6 Ethical Consideration

According to Leedy and Ormrod (2010), there are few main ethical issues that need to be addressed in the process of undertaking a research. These are: Protection from harm, informed consent, right to privacy and honesty with professional colleagues. Thus, the researcher

- Will not expose participants in any physical or psychological harm.
- Will requests their consent and participates only on voluntary basis.
- Respect the participant right to privacy
- Report the findings in a complete and honest passion. The literatures referred in the study as secondary source are acknowledged appropriately and honestly by describing the sources of any literatures that was included in this thesis.

3.7 Data collection and analysis

The study used both primary data gathered from respondents through interview and questioner and secondary data that was collected from past records like reports ,books, magazine, journals, research papers that focus on supply chain management in general and sugar supply chain in particular.

Using both qualitative and quantitative data analysis methods help to show detail pictures of the existing problems as much as possible. The qualitative method allows obtaining and describing the opinions from the respondents and it helped the researcher in getting and analyzing as much information as possible. After completing the data collection process, descriptive data analysis methods was used to process the data through SPSS statistical data analysis method. The descriptive statistical data including opinions and suggestions obtained from open ended and interview questions of the study were analyzed using descriptive statistical analysis methods (frequency, percentage, mean & standard deviation). In addition, inferential statistical analysis methods (Pearson's bivariate correlation) was employed for quantitative data.

3.8 Validity

The validity of the data collection instrument was checked by the researcher through pretesting of questioner by six Ethiopian Shipping and Logistics Enterprise and four Maritime Authority employees. Valuable comments were delivered and the questioner was amended accordingly.

3.9 Reliability

Reliability test was conducted using SPSS software and Crombach's alpha test result of the variables (dimensions) is disclosed in Table .The result revealed reliability test result of each variable and total data to be more than coefficient of alpha 0.70.This implies each variables and the total data test result had a good reliability and considered as adequate to determine reliability

Table 3.1 Reliability test result

Factors	Crombach's Alpha	N of Items
Port congestion	0.792	15
Truck availability	0.770	10
Customs process	0.907	13
Warehouse Facility	0.910	7
Overall test	0.884	45

Source: Own survey, 2020

Chapter Four

Data Analysis Results and Discussions

4.1 Introduction

The chapter presents the procedures results and discussions of the data analysis of various primary and secondary data collected on the relevant factors for the optimization of sugar import lead time in the case of Sugar Corporation .The factors include port congestion, truck availability, custom process and warehouse on lead time of sugar import .Particularly, the response rate ,demographic information of the respondents, finding of the survey with detail interpretation and discussion of findings have been presented.

4.2. Response rate

In order to collect primary data on impact of port congestion, truck availability ,custom process and warehouse facility on lead time of sugar import, 150 questioners were prepared and out of these 115 questioners were delivered to respondents who are expected to know more about the subject matter .It is known that because of Corona virus (Covid-19) most employees were working from home and the researcher found it difficult deliver all questioners even to collect .Out of those 115 questioners 106 questioners were returned that made the response rate to be 92.17 %. Fortunately, all the returned questioners were properly responded . Hence, analysis and interpretation of respondents' opinion were conducted based on data on returned questioners.

4.3 Demographic characteristics of respondents

4.3.1 Educational Level ,Experience and Job position of Respondents

The demographic characteristic of respondents focused on their academic achievement, experience, position and area of work specialization. As it is seen on Table 4.1 below ,the position of respondents in their respective company was found to be 3.7 %Executive officer/Director , 17.8 % Team Leader ,Senior expert 40.2 % and 37.4% experts .This disclosed that most of the respondents were from management group and very close to management group

who can have over all view and knowledge on the logistics activities along Addis Ababa-Djibouti corridor .

Table 4.1 Job position and year of experience of respondents

Position in the Company			Year of experience		
	Frequency	Percent		Frequency	Percent
Executive officer/director & above	4	3.7	< 2 years	1	.9
Team leader	19	17.8	2-5 years	28	26.2
Senior expert	43	40.2	5-10 years	58	54.2
Expert	40	37.4	>10 years	19	17.8

Source: own survey,2020

Regarding level of respondent's experience (Table 4.1) 9% have less than 2 years experience ,26.2% have 2 to 5 years experience ,54.2 % have 5 to 10 years experience and 17.8 % have greater than experience .This shows more than 91 % of the respondents have good experience in the area of assignment.

The data collected to acquire information on the academic status of the respondents (Table 4.2) showed that 2.8 % have diploma , 54.2% have BA/BSc and 42.1 % of the respondents are with MA/MSc and above status .This shows more than 97% the respondent's academic status is first degree and above which is more appropriate to address the issues on the questioner .

Table 4.2 Academic level and job unit of respondents

Academic Level			Department		
	Frequency	Percent		Frequency	Percent
Diploma	3	2.8		1	.9
BA/BSc	58	54.2	Supply chain related	98	91.6
MA/MSc and above	45	42.1	Not supply chain related	8	7.5

Source :Own survey,2020

Concerning the work specialization that respondents are currently engaged, Table 4.2 showed that 91.6 % respondents were engaged in supply chain related activities .This further confirmed better information was gathered along logistics activities of Addis Ababa Djibouti corridor.

4.4 Analysis of Lead Time Optimization Factors of Sugar Import of Sugar Corporation

This section focuses on presentation of analysis on qualitative and quantitative primary data collected from the participants .The researcher tried to address the impact of port congestion, truck availability ,customs process and warehouse facility on lead time of sugar import .In order to answer the why parts of explanatory research detail data was collected and analyzed on independent variables that were thought to influence the lead time of sugar import. It is clear that port is the main gate way (node) that connects the sea to the inland transport .Any delay of the vessel unloading caused by port activities shall delay the entire sugar import logistics lead time . It was based on the above stated concepts that the research design had been prepared and data was collected . The data collection was conducted based on five point Likert scale where 1= Strongly disagree, 2 =disagree ,3=neutral ,4= agree and 5 = strongly agree.

The rule of thumb related to the intervals for breaking the range in measuring variables that are captured with five – point Likert scale (that ranges from strongly disagree to strongly agree) is calculated by ($5-1=4$) then divided by five as it is the greatest value of the scale ($4/5=0.8$).Afterwards ,number one which is the least value in the scale is added in order to identify maximum of this cell. Hence a calculated mean value that ranges from 1 to 1.8 implies strong disagreement ,where as the remaining ranges of 1.81 to 2.6,2.61 to 3.4,3.41 to 4.2 and 4.21 to 5 .00 representing the participant's perception of disagreement ,neutrality ,agreement and strong agreement respectively .And also a standard deviation of 1 implies a significant difference on the variable among the respondents .Accordingly one dependent and four independent variables were considered and analysis of composite mean score and standard deviation was applied using SPSS software .

4.4.1 Port Congestion

Port congestion problem is one of the variables that this research was expected to prove its impact on lead time sugar import. Once vessel arrived at port of Djibouti and send notice of readiness demurrage will count unless it gets berth for unloading. Factors that potentially could contribute towards port congestion such as slow sugar cargo offloading, inefficient vessel arrival schedule, competency of port labor, cargo handling facility, overall efficiency of Djibouti port management, limited berth availability, shortage of trucks, sugar bag tally (surveying), shortage of storage facility were considered for analysis on why port congestion was occurring that could impact lead time of sugar import.

As sugar cargo is directly loaded from vessel to truck, which is called direct delivery, availability of truck is very vital for smooth vessel unloading operation. The data collected related to impact of shortage of truck on vessel delay disclosed the highest mean value of 4.09 and standard deviation of 0.640 (Table 4.3). This result confirmed most respondent's agreement concerning impact of truck shortage on vessel discharging delay that resulted in port congestion. As per interview with senior expert at Maritime authority, limited berths are available for bulk and break bulk cargo unloading at the old port. Most of them have limitation on draft and simplicity of unloading. Because of this, vessels will be forced to stay at anchorage area waiting for berth. Accordingly, the respondents' data analysis result revealed mean value 3.75. This implied most respondents agreed that the limited berth availability at port of Djibouti lead to port congestion that in turn impact lead time of sugar import.

According to the analysis result on impact of efficiency of vessel scheduling on port congestion (Table 4.3), the mean value of 3.71 with standard deviation of 0.883 demonstrated most respondents agreed that there is inefficient vessel arrival scheduling that influence port congestion at port of Djibouti.

The result of analysis (Table 4.3) on slow sugar cargo off loading from the ship showed most respondents agreed that sugar cargo off loading is slow at port of Djibouti. The mean value found on the slow offloading from the vessel disclosed 3.67. As per benchmarking scale for interpretation of mean value the analysis result showed most respondents agreed on the idea.

The competency of port labor at port of Djibouti is the other parameter forwarded to respondents. When their response had been analyzed mean score of 3.65 was disclosed that confirmed most respondents agreed that the competency of port labor affected vessel discharge rate. This forced the vessel to stay at berth than planned and created port congestion.

Availability of storage facility helps to unload sugar vessel regardless of shortage of trucks by keeping smooth unloading operation. The impact of shortage of storage facility on vessel unloading was analyzed upon respondent's response and mean value of 3.57 (Table 4.3) confirmed most respondent's agreement on the contribution of storage facility shortage over vessel delay. These further delayed the vessel to stay at berth resulting in port congestion.

The cargo handling facility like cranes, fork lifts ..etc as measurement parameter for cause of port congestion was considered. The analysis result (Table 4.3) disclosed mean value of 3.55 and standard deviation of 0.770 that confirmed most respondents agreed to idea that cargo handling facility contributed to port congestion.

Djibouti port management is responsible for overall management of port activities. The strength of the management significantly affects the efficiency and effectiveness of port activities. Accordingly, the data analysis result (Table 4.3) showed mean value of 3.53 revealing most respondent's agreement on the effect of Djibouti port management over vessel unloading delay. In fact this is the case occurring related to the old port where sugar cargo is unloaded as per interview conducted with senior expert at Maritime Authority.

In the mean time, the result on delay of vessels because of port congestion disclosed a mean value 3.47. This revealed most of the respondents agreed that vessel delay caused port congestion. This consequently delayed lead time of sugar import.

Sugar bag tally (surveying) is conducted by recognized and licensed international surveying companies to check the sugar mass balance. This is to mean checking whether the material is loaded and discharged as per the contract agreement specifically focusing on mass balance. As per research data analysis result, mean value of 3.31 (Table 4.3) certified respondent's agreement on the impact of sugar bag tally in delaying vessel discharge.

The other aspect that the researcher tried to investigate was the magnitude of vessel delay after the ship sent notice of readiness. The consent of respondents was analyzed and the result gave mean value of 3.59 and standard deviation of 0.766 .This result disclosed that most of the respondents gave their consent for less than one week vessel waiting time at anchorage area .Meanwhile, the mean score of 3.36 on vessel demurrage counter confirmed the above result by getting consent of most respondents on sugar cargo carrying vessels staying at demurrage for less than one week on usual circumstances .

As per the analysis result on Table 4.3 the most influential factors that impact port congestion are shortage of trucks, limited berth availability and inefficient vessel arrival scheduling. Besides sugar carrying vessels stayed at anchorage area for less than a week after port call on usual basis and consequently vessels could request a demurrage charge up to one week. The presence of port congestion because of the above factors resulted in delay of sugar import logistics lead-time .

Table 4.3 Descriptive statistics analysis result on port congestion

Descriptive Statistics on Port Congestion			
	N	Mean	Std. Deviation
The shortage of trucks causes vessel delay and consequently port congestion	106	4.09	.640
The limited berth availability at port of Djibouti causes vessel delay and consequently port congestion	106	3.75	.731
There is inefficient vessel arrival scheduling that causes port congestion at port of Djibouti	106	3.71	.883
There is slow sugar cargo off loading at port of Djibouti	106	3.67	.983
The competency of port labor contributes to vessel delay at port	106	3.65	.916
Shortage of storage facility causes vessel delay at port of Djibouti	106	3.57	.956
The cargo handling facility at port of Djibouti contributes to vessel delay at the port	106	3.55	.770
The Djibouti port management overall efficiency causes vessel delay and consequently port congestion	106	3.53	.918
Sugar carrying vessels are delayed because of port congestion problem at port of Djibouti	106	3.47	.928
Sugar bag tally (surveying) and re-bagging process causes vessel delay	106	3.31	.930
Sugar carrying vessel encounters demurrage for (usual case) Less than one week	106	3.36	.896
Sugar carrying vessel encounters demurrage for (usual case) Between one week and two weeks	106	3.24	.911
Sugar carrying vessel encounters demurrage for (usual case) Between two weeks and one month	106	2.94	.659
Sugar carrying vessel encounters demurrage for (usual case) Longer than one month	106	2.85	.778
After port call chartered sugar carrying vessel stay at anchorage area for (usual case) Less than one week	106	3.59	.766
After port call chartered sugar carrying vessel stay at anchorage area for (usual case) Between one week and two weeks	106	3.20	.970
After port call chartered sugar carrying vessel stay at anchorage area for (usual case) Between two weeks and one month	106	3.00	.743
After port call chartered sugar carrying vessel stay at anchorage area for (usual case) Longer than one month	106	2.97	.654

Source: own survey

4.4.2. Truck Availability

The other variable that the researcher had been expected to prove its impact on the lead time of sugar import was truck availability . For example, if charter party states vessel should discharge 4000 ton of sugar per day then transporter is expected to provide 100 trucks with a capacity of 40 ton each .

In order to understand why truck availability affects lead time of sugar the researcher considered availability of sufficient truck ,impact of truck shortage ,impact of late hiring of transport companies, impact of sugar bag tally on availability of truck, impact of Djibouti port management practice on availability of truck and impact of road condition of Addis Ababa - Djibouti corridor on availability of truck as parameters that should be investigated and the detail is stated here under .

The failure of transport companies to avail truck as cause of truck shortage was analyzed based on data collected from respondents. Accordingly ,a mean value of 4.1 was revealed with standard deviation of 0.804 .This showed transport companies inefficiency is significantly affecting truck availability . As per interview result of senior expert at Sugar Corporation slow down had occurred at sugar discharge when some transporters received better pay rate and minimize their fleet at sugar vessel and move to other vessels such as aid cargo with a better rate.

Respondents were asked to give their consent concerning availability of sufficient truck at port of Djibouti to discharge sugar cargo from the vessel as per vessel discharging capacity ,the result of data analysis on these respondent's response revealed mean value of 4.04 and standard deviation of 0.661 (Table 4.4).This confirmed most respondent's agreement on unavailability of sufficient truck as per vessel discharging capacity at port of Djibouti .

Participants were asked to prove if there had been truck shortage that caused vessel discharging slowdown resulting in transit time delay of sugar cargo. Accordingly ,the data analysis result mean value of 3.98 and standard deviation of 0.884 proved the respondents consent that majority agreed on presence of shortage of truck that caused vessel discharging slow down (Table 4.4). This consequently caused longer waiting time of sugar carrying vessels at berth and delay of sugar import lead time .

The road condition along Addis Ababa –Djibouti corridor had been one of the parameter to be considered causing truck shortage at port of Djibouti .Accordingly , respondents were asked to express their consent on the same . As shown in (Table 4.4),mean value of 3.97 disclosed most respondents agreed that the road condition of Addis Ababa- Djibouti corridor caused shortage of sugar carrying trucks at port .It is known that if the road condition is bad ,trucks will be forced to move slowly resulting in increase of their cycle time.

The consent of the respondents on late hiring of transport service causing shortage of truck showed (Table 4.4) data analysis result mean of 3.86 confirming that majority of respondents agreed that late hiring of transport service caused shortage of trucks .

Sugar bag tally (surveying), as discussed previously , is checking the mass balance of sugar related to the contract .Respondents were asked to give their consent on sugar bag tally as cause of truck loading delay which consequently caused truck shortage at port .Consequently , data analysis result mean and standard deviation of 3.44 and 0.840 respectively confirmed that most respondents were agreeing to the same idea (Table 4.4).

The researcher tried to check how long vessel discharging was being interrupted because of shortage of trucks .Accordingly ,the mean value of 3.68 data analysis result confirmed that most respondents agreed on between one and two weeks sugar unloading interruption because of truck shortage on usual basis (Table 4.4) .

From the above analysis result it can be generalized that failure of transport companies to avail truck, the road condition from Addis Ababa to Djibouti and late hiring of transport services mainly caused shortage of trucks as per vessel discharging capacity resulting in vessel discharge delay. These consequently lead to delay in sugar import lead time by failure to avail trucks. Besides, vessel unloading interruption from a week to two weeks is very significant to affect sugar import lead time and also cost

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Table 4.4. Descriptive statistics result on analysis of truck availability

Descriptive Statistics on truck availability					
	N	Minimum	Maximum	Mean	Std. Deviation
Failure of transport companies to avail truck causes truck shortage at port of Djibouti	106	2	5	4.10	.804
There is no sufficient truck at port of Djibouti to discharge sugar cargo from the vessel as per vessel discharging capacity	106	2	5	4.04	.661
Truck shortage causes vessel discharge slow down causing transit time delay of sugar cargo	106	1	5	3.98	.884
The road condition from port of Djibouti to Addis Ababa causes truck shortage at port of Djibouti	106	2	5	3.97	1.055
Late hiring of transport service causes shortage of truck at port of Djibouti	106	2	5	3.86	.920
Sugar bag tally (survey) causes truck loading delay which consequently causes truck shortage at port.	106	1	5	3.44	.840
Djibouti port management practice causes truck shortage at port	106	1	5	3.25	.967
Vessel unloading is usually interrupted because of truck shortage for (usual case) Between one week and two weeks	106	1	5	3.68	.942
Vessel unloading is usually interrupted because of truck shortage for (usual case) Less than one week	106	1	5	3.45	.852
Vessel unloading is usually interrupted because of truck shortage for (usual case) Between two weeks and one month	106	1	5	3.37	.809
Vessel unloading is usually interrupted because of truck shortage for (usual case) Longer than one month	106	1	5	3.09	.775

Source own survey, 2020

4.4.3 Customs Process

Customs process as point of delay is a universal problem that governments under united nation are trying to overcome. Various options and systems are being developed and implemented globally. To assess the situation of customs process in the context of sugar import, questioners were distributed by the researcher .Related to this, the response of respondents was put here under .

The data analysis result on sugar cargo delay as a result of customs process disclosed mean value of 3.48 (Table4.6) indicating that most respondents agreed on cargo delay as a result of customs process .

The researcher also tried to investigate which customs process step affected the lead time of sugar import and found mean value of 3.46 on Ethiopian customs office approval at Djibouti port, mean value of 3.43 on Djibouti customs office approval , mean value of 3.43 on approved document transfer to Djibouti ,mean value of 3.38 on bank document collection, mean value of 3.34 on declaration and customs (Table 4.6). Accordingly Ethiopian custom's office at Djibouti was found to be a point where most delay occurred followed by Djibouti customs office approval.

The data collected on waiting time of sugar vessels(Table 4.6) proved that sugar carrying vessels waited less than one week to get berth because of customs process on usual basis. In the mean time it was proved that a truck had been waiting less than one day for scanning purpose (Table 4.6)

The researcher also tried to pick which customs check point along Addis Ababa-Djibouti corridor contributed to the most of the time delay .The respondents expressed their consent by mostly agreeing on Galafi to be between 3 to 6 hours, Mille between 1-3 hour, Awash 3-6hours,Kaliti between 6 hours and one day (Table 4.5). Therefore, Kaliti customs station was found to be the most delaying customs nodal point.

Table 4.5 Waiting time of trucks along Addis Ababa-Djibouti corridor

Galafi			Mille		Awash		Kaliti	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Less than an hour	6	5.6	5	4.7	14	13.1	2	1.9
Between 1 hour and 3 hour	17	15.9	65	60.7	11	10.3	9	8.4
Between 3 hours and 6 hour	55	51.4	16	15.0	59	55.1	43	40.2
Between 6 hours and one day	24	22.4	20	18.7	22	20.6	49	45.8
Between one and two days	4	3.7	106	99.1	106	99.1	3	2.8

Source: Own survey

Table 4.6 Descriptive statistics result on customs process

Descriptive Statistics on Customs process					
	N	Minimum	Maximum	Mean	Std. Deviation
Sugar cargo unloading is delayed because of customs process.	106	1	5	3.48	.918
Djibouti Ethiopian Custom office approval	106	1	5	3.46	.917
Djibouti custom office approval	106	1	5	3.43	.895
Approved document transfer to Djibouti	106	1	5	3.43	.905
Bank document collection	106	2	5	3.38	.822
Declaration and customs approval	106	1	5	3.34	.975
Sugar carrying vessel waits less than one week after port call to get berth because of customs process delay (usual case).	105	1	5	3.26	1.083
Sugar carrying vessel wait between one week and two weeks after port call to get berth because of customs process delay (usual case).	106	1	5	3.01	.910
Sugar carrying vessel wait between two weeks and one month after port call to get berth because of customs process delay (usual case).	106	1	4	2.75	.805
Sugar carrying vessel wait more than one month after port call to get berth because of customs process delay (usual case).	106	1	4	2.59	.814
A truck wait less than one day for scanning purpose	106	1	5	3.25	1.003
A truck waits more than two days for scanning purpose	104	1	5	2.74	.859
A truck wait between one and two days for scanning purpose	106	1	4	2.71	.792

Source: Own survey,2020

4.4.4. Warehouse Facility

Warehouse facility including sufficient warehouse space ,material handling equipment etc along with efficient and effective labor force was considered by the researcher to impact lead time of sugar import .The researcher conducted assessment on poor information flow ,many formalities to unload sugar cargo ,limited working hour of store keepers, unavailability of sufficient space for truck maneuvering, sugar bag counting and weighing ,unavailability of sufficient warehouse and unloading efficiency of labor at ware house.

The respondents expressed their consent with data analysis mean result of 3.76 and standard deviation of 0.787 confirming that most of them agreed on insufficient space for truck maneuvering delayed unloading of trucks carrying sugar cargo (Table 4.10) .

Limited working time of store keepers was the other parameter considered on this research to be proved as cause of warehouse operation delay and consequently contributing to overall lead time of sugar import .This also helped to disclose why warehouse facility was affecting sugar import .As discussed previously vessel unloading operation requires to avail many trucks at a time which implied many truck arrived at ware house at a time .This required extended operation hour of warehouse staff. In order to prove this the collected questioners were analyzed and the result showed mean value of 3.69 confirming most respondents agreed that ware house unloading was affected by limited working time of store keepers (Table 4.10).

As per interview with Executive officer sugar marketing division imported sugar bags were being counted in the ware house along with unloading process. Even those bags visually suspected to be under weight were checked whether they fulfill their expected weight(usually 50 kg). Respondents expressed their consent with mean value of 3.58 (Table 4.10). and this result confirmed most of the respondents agreed that sugar bag tally and weighing at sugar ware houses delayed sugar unloading operation which contributed to over all delay of sugar import.

The other parameter considered as proof for impact of ware house facility in sugar import lead-time was unloading efficiency of laborers at warehouses . The effectiveness and efficiency of these laborers significantly affected the operation of trucks unloading . The data analysis result with mean value of 3.54 (Table 4.10) proved that most respondents agreed on unloading efficiency of laborers causing cargo unloading delay at warehouse.

As per the result of interview with Executive officer of marketing division , lack of availability of ware houses specially at pick season when fertilizer, wheat, coal and other cargo arrived simultaneously at port had been a usual challenge. The mean value of 3.52 and standard deviation of 0.853 (Table 4.10) proved that most respondents agreed that unavailability of sufficient ware houses cause sugar cargo unloading delay which consequently caused delay in sugar import lead-time

Impact of many formalities to unload sugar cargo was forwarded to participants by questioner and additional interview for further clarification. The participants expressed their consent on presence of many formalities in delaying unloading of truck with data analysis mean result of 3.51 (Table 4.10). This indicated that most of the respondents expressed their consent as agreed. Therefore, the delay caused by presence of many formalities in the ware house for unloading of sugar cargo trucks was proved by the researcher.

The research conducted on impact of poor information flow disclosed mean value of 3.50 confirmed respondent's agreement on delay of unloading of trucks by presence of poor information flow (Table 4.10). This consequently increased lead time of sugar import by increasing cycle time of trucks.

The researcher also tried to investigate how many trucks arrived per day and 39.3% responded between 20 to 30 trucks, 30.8 % responded between 5 and 10 trucks, 20.6% responded between 10 and 20 trucks, 4.7% responded greater than 30 trucks, and 4% responded less than 5 trucks (Table 4.7). Therefore 20 to 30 trucks that got the highest percentage score was proved to arrive at a sugar ware house per day.

Table 4.7 Truck arrival rate at sugar warehouse

How many trucks arrive per day?		
	Frequency	Percent
Less than 5	4	3.7
Between 5 and 10	33	30.8
Between 10 and 20	22	20.6
Between 20 to 30	42	39.3
Greater than 30	5	4.7

Source : Own survey,2020

The response for how long it took to unload a truck showed that 59.8% responded less than 6 hours, 30.8% responded between 6 to 10 hours and 8.4% responded between 10 and 12 hours. Most respondents agreed on less than 6 hours (Table 4.8). Besides 76.6% respondents confirmed that no weigh bridge was being used at warehouses (Table 4.9).

Table 4.8 Truck unloading time at ware house

How long it takes to unload a truck?		
	Frequency	Percent
<6h	64	59.8
6- 10h	33	30.8
10- 12 h	9	8.4

Source: Own survey,2020

Table 4.9 Availability of weigh bridge

Do you use weigh bridge?		
	Frequency	Percent
YES	24	22.4
NO	82	76.6

Source :Own survey,2020

Table 4.10 Descriptive statistics analysis result on warehouse facility

Descriptive Statistics on Warehouse Facility					
	N	Minimum	Maximum	Mean	Std. Deviation
Unavailability of sufficient space for truck maneuvering (easily entrance and exit) causes sugar cargo unloading delay	106	2	5	3.76	.787
Limited working time of store keepers causes cargo delay	106	2	5	3.69	.809
Sugar bags counting and weighing causes unloading delay at ware house	106	2	5	3.58	.839
Unloading efficiency of laborers causes cargo unloading delay	106	1	5	3.54	.938
Unavailability of sufficient warehouse causes sugar cargo unloading delay	106	2	5	3.52	.853
Many formalities to unload sugar cargo causes ware house cargo unloading delay.	106	1	5	3.51	.949
Poor information flow (not being informed about arrival time of sugar cargo, number of trucks coming) causes unloading delay at ware house.	106	1	5	3.50	1.089

Source :Own survey,2020

4.5 Correlations

One of the techniques that researchers used to find relationship among variables is correlations. They are measure of the linear relationship between two variables. A correlation coefficient has a value ranging from -1 to 1. Values that are closer to absolute value of 1 indicate that there is a strong relationship between variables being correlated where as values closer to 0 indicates that there is little or no linear relationship. Besides by using correlation analysis the interdependence between the independent and dependent variables would be tested .Consequently, correlation was made among lead time of sugar import(the dependent variable) and the rest port congestion ,custom process, truck availability and ware house facility as independent variable .The resulting value (called “the correlation coefficient”) showed if changes in one item will result in changes in another item.

As it was disclosed in Table 4.11 , Medium correlation was obtained in the impact of port congestion on lead time of sugar import with correlation coefficient (r) of 0.414**. Besides ,

truck availability was correlated with lead time of sugar import and correlation coefficient (r) of 0.330** was obtained confirming medium correlation. While weak correlation coefficient(r) of 0.158 and 0.171 was found on custom process and ware house facility impact on lead time of sugar respectively. This further proved customs process and ware house facility had lesser impact on lead time of sugar import than port congestion and truck availability. Furthermore ,there was medium correlation between extent of impact of truck availability on lead time of sugar import with extent of impact of port congestion on lead time of sugar with correlation coefficient (r) of 0.448.

Table 4.11 correlation analysis result

Correlations						
		How likely do port congestion, truck availability, custom process and warehouse facility impact/affect lead time of sugar import	To what extent port congestion affect lead time of sugar import	To what extent truck availability affect lead time of sugar import	To what extent customs process affect lead time of sugar import	To what extent warehouse facility affect lead time of sugar import
How likely do port congestion, truck availability, custom process and warehouse facility impact/affect lead time of sugar import	Pearson Correlation	1	.414**	.330**	.158	.171
	Sig. (2-tailed)		.000	.001	.107	.080
To what extent port congestion affect lead time of sugar import	Pearson Correlation	.414**	1	.448**	.041	.171
	Sig. (2-tailed)	.000		.000	.675	.079
To what extent truck availability affect lead time of sugar import	Pearson Correlation	.330**	.448**	1	-.110	.104
	Sig. (2-tailed)	.001	.000		.261	.289
To what extent customs process affect lead time of sugar import	Pearson Correlation	.158	.041	-.110	1	.201*
	Sig. (2-tailed)	.107	.675	.261		.039
To what extent warehouse facility affect lead time of sugar import	Pearson Correlation	.171	.171	.104	.201*	1
	Sig. (2-tailed)	.080	.079	.289	.039	
**. Correlation is significant at the 0.01 level (2-tailed).						
*. Correlation is significant at the 0.05 level (2-tailed).						

Source: own survey, 2020

4.6. Discussion of Results

Impact of port congestion, truck availability, customs process and warehouse facility on lead time of sugar import had been assessed .The data analysis result showed port congestion and truck availability significantly affected the lead time of sugar import and customs process and warehouse facility moderately affected the sugar import lead-time along Djibouti-Addis Ababa corridor (Table 4.11).

Port congestion was mainly caused by shortage of trucks, limited berth availability and inefficient vessel arrival scheduling .While Djibouti port management practice had the least impact on port congestion in this study. Trucks availability was mainly affected by failure of transport companies to avail truck, road condition of Djibouti-Addis Ababa corridor, late hiring of transport service . Besides , unavailability of sufficient space for truck maneuvering ,limited working time of store keepers and sugar bag counting and weighing at ware house mainly affected sugar warehouse activity causing delay in sugar logistics lead time.

Table 4.12 extent of impact of port congestion , truck availability ,warehouse ,customs

Degree of impact of port congestion, truck availability, ware house and customs

	N	Minimum	Maximum	Mean	Std. Deviation
To what extent truck availability affect lead time of sugar import	106	1	5	4.00	.966
To what extent port congestion affect lead time of sugar import	106	1	5	3.52	1.123
To what extent warehouse facility affect lead time of sugar import	106	1	5	3.45	1.043
To what extent customs process affect lead time of sugar import	106	1	5	3.42	1.162

According to the study made by Kalkidan (2017),Djibouti port beurocracy was the highest in affecting logistics service quality in terms of delay followed by long discharge time of vessels and unplanned vessel arrival and poor port service was ranked third along Addis Ababa Djibouti corridor .Her study focused on containerized cargo that is indifferent from break bulk sugar

cargo in terms type of cargo ,operational steps, material handling equipment ,loading site and destination etc.. But the road condition is similar along Djibouti -Addis Ababa Corridor . Customs process of multimodal transport system and warehouse condition and demand for containerized cargo is different. Therefore, it is difficult to align the result of this study with that of (Kalkidan 2017).

According to the study made by Adebiyi (2011), port congestion in Nigeria was not caused by only inadequate berthing space but majorly by the operational inefficiency of the Port Managers and Operators coupled with long years of infrastructural development neglect. This is also in different from the result obtained by this research .

Chapter Five

5. Summary of Main Findings, Conclusions and Recommendations

Supply chain management play a vital role in day to day activity of commercial organizations .I can say if businesses fail in their supply they will fail in over all companies' achievement. We can take the current issue of Covid -19 epidemic that broke the supply chain network of the world and drowning the world economy at alarming rate .Almost all air planes are grounded which means no courier service for bank documentation transfer, very limited air cargo and passenger service .After containers arrived at dry ports but without bank document no one can clear customs and collect the containers. As a result factories and business are in difficult circumstances. This revealed that if supply chain activities are not managed in seamless and integrated pattern ,the consequence of failure is the worst.

5.1 Summary of Major Findings

The objective of this paper is to assess the impact of port congestion ,truck availability, customs process and warehouse availability on lead time of sugar import and forward recommendation on how to optimize the lead time based on research findings .The research findings are summarized here under:-

- The researcher tried to find out why port congestion was happening and later tried to prove its impact on overall lead time of sugar import . Accordingly, shortage of trucks ,inefficient vessel arrival scheduling ,slow cargo offloading from the vessel, competency of port labor, shortage of storage facility, cargo handling facility at port of Djibouti ,the cargo handling facility, Djibouti port management overall efficiency were found to cause port congestion at port of Djibouti. But out of these most influential impacts was caused by shortage of trucks, limited berth availability and inefficient vessel arrival scheduling .Most respondents also agreed sugar carrying vessels are delayed by port congestion with mean value of 3.47 which consequently delayed sugar import lead time.

- Sugar cargo is discharged from the vessel using vessel cranes that can deliver directly to trucks .If there is no truck alongside the vessel to receive the cargo ,the discharging operation will stop .To find out why truck shortage occurred and its impact logistics lead time , the researcher collected data on factors such as failure of transport companies to avail truck, truck availability as per discharging capacity of vessel ,road condition of Djibouti Addis-Ababa corridor, late hiring of transport service, sugar bag tally, and Djibouti port management practice . It could be summarized that failure of transport companies to avail truck, road condition of Djibouti-Addis Ababa corridor, late hiring of transport service by Sugar Corporation with mean value of 4.1,3.97 and 3.86 respectively contributed major role for truck shortage .Besides mean value of 4.04 and 3.98 seen on Table 4.4 confirmed truck shortage causing vessel discharge slow down .As per mean value data from respondents to know how long a vessel discharging interrupted ,vessel unloading was usually interrupted because of truck shortage between one week and two weeks.
- Data collection and analysis was made on customs process of sugar cargo .The result showed customs process affect lead time of sugar import with a mean value 3.48. The most delaying points were identified to be Ethiopian customs office at Djibouti followed by Djibouti custom office. Sugar carrying trucks waited less than one day for scanning purpose and Kaliti customs check point had been identified as the most delaying point . Sugar vessels were also delayed less than one week because of customs process which was a usual case.
- Out of the parameters considered for delaying sugar warehouses activity unavailability of sufficient space for truck maneuvering ,limited working time of store keepers and sugar bag counting and weighing at ware house with mean value of 3.76,3.69and 3.58 were the most significant cause for delay. Less than 6 hours vessel unloading time was agreed by most respondents and seems to be reasonable but when compared with 20 to 30 trucks arriving per day at ware house the impact is significant delay. Weigh bridges facilitate unloading operation at ware houses but 76.6 % of respondents confirmed that there were no weigh bridges at sugar warehouses.

5.2 Conclusions

After a thorough analysis of primary and secondary data the following conclusion is forwarded:-

- The researcher definitely answered the question on how port congestion affect the lead time of sugar import of Sugar Corporation along the corridor by identifying the most significant parameters that caused port congestion resulting in lead time delay. These are shortage of trucks , limited berth availability, and inefficient vessel arrival scheduling out of the remaining factors considered . The researcher concluded that port congestion considerably affected lead time of sugar import .
- The data analysis result answered to the question whether truck availability affect the lead time of sugar import by disclosing factors such as failure of transport companies to avail truck, road condition of Djibouti-Addis Ababa corridor, late hiring of transport service by Sugar Corporation as main contributors. It can be concluded that truck shortage significantly affected the lead time of Sugar Import and corrective measures should be taken as per recommendation.
- Customs process was found to delay sugar unloading which consequently delayed sugar import lead-time .In fact from the analysis result it can be concluded that customs process affected sugar import lead time moderately and corrective measure as per given recommendation should be implemented .
- From the research findings ware house facility is found to affect the sugar import lead time moderately and appropriate measure as per recommendation of the researcher should taken to mitigate the problem .

5.3 Recommendation

- The country is continuously facing port congestion because of vessels carrying fertilizer, wheat, sugar ,coal etc are arriving at a time .There should be one central body that should get information on procurement and vessel arrival schedule of each buying company and command for rescheduling of arrivals so as to mitigate the port congestion. Using state of the art information technology from procurement information till unloading at ware house

can also mitigate the problem. Besides using alternative ports such as Port Sudan, Berbera and Mombassa etc.. should be considered.

- Limited berth availability of old port should be solved by joint planning and action between Ethiopian and Djiboutian government. Access to rail service at old and new port is also another to be done agenda of the two governments.
- Shortage of trucks should be avoided as it significantly affected sugar unloading activity leading to port congestion and delay in lead time of sugar import. This implied vessel will stay at berth for extended time than agreed in the charter party and forcing other vessels to stay at anchorage area. Truck shortage can be avoided by entering into strict service procurement contract that will make the transporter liable for consequences to be faced and implementing it. Giving awareness to transporters on the impact of truck shortage on sugar import specifically and to the nation in general also mitigates the problem.
- Ethio-Djibouti railways can also be the other solution for sugar cargo coming along the rail way line .After constructing consolidation warehouses on selected nodal points trucks can collect from the warehouses to various destination points. This will have time and cost advantage as trains are cheaper and can hold large quantity of sugar cargo at a time .
- The customs documentation and check points were identified as most bottle necks such as Ethiopian customs office at Djibouti , Djibouti custom office and Kaliti customs check points .Action should be taken to facilitate customs activities on selected issues by concerned body. Integrating Djiboutian customs office with Ethiopian customs office through right information technology could be another option.
- Standards should be set for sugar warehouses so that construction or rent of ware houses should be strictly based on such standards. This will facilitate easy truck maneuvering and multiple truck unloading access. Besides using mobile loading and unloading conveyors can minimize the delay in lead time.
- Concerning ware house working time ,24/7 should be implemented specially at pick season when vessel unloading operation is being implemented . All necessary facilities and incentives should be provided during that season. Sugar bags counting and weight checking manually should be replaced by weigh bridges that can check weight of the bags which indirectly confirms bag counts on a truck. Even the whole line from port to ware houses

should be automatically measured by weigh bridges with periodic calibration inspection along the line. GPS supported tracking system of trucks should be implemented both for safety of cargo and lead time monitoring.

- Poor sugar packing bags quality had been increasing bursting of sugar bags during loading and unloading of sugar bags from the vessel using grabs of cranes .Besides sugar wastage ,re-bagging activities of sugar sweeps contributed to delay in sugar import logistics. The quality of sugar bags should be given special attention during procurement and logistics operation of sugar import .Surveyors at loading port should control the quality of the bags and this should be backed by Sugar Corporation's employees presence during loading operation of sugar at loading port.

5.4 Suggestion for Future Research

The impact of port congestion, truck availability, customs process and warehouse availability on lead time of sugar had been the focus of this research and further study can be conducted on cost impact of the delay on sugar import .As many sugar factories had been already completed and some are under construction ,the country is expected to export sugar .Therefore , impacts on sugar export lead time and cost can also be considered for future study. Besides, the influence of lack of logistic and supply chain management knowledge and skill on lead time of sugar import and export can be considered.

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ANNEX-1

Addis Ababa University School of Commerce

Department of Logistics and Supply Chain Management

Questioner

General Information

This research survey is designed to fulfill an academic requirement for M.Sc. degree program in Logistics and Supply Chain Management at Addis Ababa University. I can assure you that the research data will only be used for academic purposes. The name of institutions and personnel participated will be recorded confidentially. Your open and prompt response is highly appreciated. Please give your response for the questions here under by putting an “ x” mark at your appropriate choice or by putting your answers in the space provided. You may use the back side of the paper if the space provided is not sufficient.

For any clarification on this questionnaire, please contact me on 0911605924 (Aschalew Wondifraw).

Thank you in advance for your cooperation.

Company name -----

Part I: Demographic Information

1. What is your position in the Company?

☐ Executive officer/director and above ☐ Team leader ☐ Senior expert ☐ Expert

2. Year of experience in the area of your assignment

☐ < 2 years ☐ 2-5 years ☐ 5-10 years ☐ >10 years

3. Qualification

☐ Certificate ☐ BA/BSc
☐ Diploma ☐ MA/MSc and above

4. Your department /work unit_____

Part II: Measuring instrument for port congestion, truck availability, customs process and ware house facility

1. Port congestion

With regard to port congestion at Port of Djibouti, Truck availability, customs process ,warehouse facility please tick the appropriate column box to indicate the extent to which you agree or disagree with each statement .The measuring scale is a five point Likert scale types with 1=Strongly disagree , 2=Disagree ,3=Neutral , 4= Agree ,5=Strongly Agree

S.N.	Port Congestion	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable
		1	2	3	4	5	
1.1	Sugar carrying vessels are delayed because of port congestion problem at port of Djibouti						
1.2	There is slow sugar cargo off loading at port of Djibouti						
1.3	There is inefficient vessel arrival scheduling that causes port congestion at port of Djibouti						
1.4	The competency of port labor contributes to vessel delay at port						
1.5	The cargo handling facility at port of Djibouti contributes to vessel delay at the port						
1.6	The Djibouti port management overall efficiency causes vessel delay and consequently port congestion						
1.7	The limited berth availability at port of Djibouti causes vessel delay and consequently port congestion						
1.8	The shortage of trucks causes vessel delay and consequently port congestion						

S.N.	Port Congestion	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable
		1	2	3	4	5	
1.9	Sugar bag tally (surveying) and re-bagging process causes vessel delay						
1.10	Shortage of storage facility causes vessel delay at port of Djibouti						
1.11	After port call chartered sugar carrying vessel stay at anchorage area for (usual case)						
1.11.1	Less than one week						
1.11.2	Between one week and two weeks						
1.11.3	Between two weeks and one month						
1.11.4	Longer than one month						
1.12	If the vessel stays at anchorage area for more than agreed discharging days, then the vessel will be under demurrage. Sugar carrying vessel encounters demurrage for (usual case)						
1.12.1	Less than one week						
1.12.2	Between one week and two weeks						
1.12.3	Between two weeks and one month						
1.12.4	Longer than one month						
1.13	To what extent port congestion affect lead time of sugar import ?						

1.14 Please state other problems that cause delay

2. Truck availability

S.N.	Truck availability	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable
		1	2	3	4	5	
2.1	There is no sufficient truck at port of Djibouti to discharge sugar cargo from the vessel as per vessel discharging capacity						
2.2	Truck shortage causes vessel discharge slow down causing transit time delay of sugar cargo						
2.3	Late hiring of transport service causes shortage of truck at port of Djibouti						
2.4	Failure of transport companies to avail truck causes truck shortage at port of Djibouti						
2.5	Sugar bag tally (survey) causes truck loading delay which consequently causes truck shortage at port.						
2.6	Djibouti port management practice causes truck shortage at port						
2.7	The road condition from port of Djibouti to Addis Ababa causes truck shortage at port of Djibouti						
2.8	Vessel unloading is usually interrupted because of truck shortage for (usual case)						
2.8.1	Less than one week						
2.8.2	Between one week and two weeks						
2.8.3	Between two weeks and one month						
2.8.4	Longer than one month						
2.9	To what extent truck availability affect lead time of sugar import?						

2.10 If others ,please state

3. Customs Process

S.N.	Customs Process	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable
		1	2	3	4	5	
3.1	Sugar cargo is delayed because of customs process.						
3.2	The following customs processing point has significant delays to affect sugar cargo import.						
3.2.1	Bank document collection						
3.2.2	Declaration and customs approval						
3.2.3	Approved document transfer to Djibouti						
3.2.4	Djibouti custom office approval						
3.2.5	Djibouti Ethiopian Custom office approval						
3.3	Sugar carrying vessel waits less than one week after port call to get berth because of customs process delay (usual case).						
3.3.1	Sugar carrying vessel wait between one week and two weeks after port call to get berth because of customs process delay (usual case).						
3.3.2	Sugar carrying vessel wait between two weeks and one month after port call to get berth because of customs process delay (usual case).						
3.3.3	Sugar carrying vessel wait more than one month after port call to get berth because of customs process delay (usual case).						

S.N.	Customs Process	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable
		1	2	3	4	5	
3.4	Sugar carrying trucks are expected to pass through custom's scanning machine. Based on this fact please respond below:-						
3.4.1	A truck wait less than one day for scanning purpose						
3.4.2	A truck wait between one and two days for scanning purpose						
3.4.3	A truck waits more than two days for scanning purpose						
3.5	To what extent customs process affect lead time of sugar import?						

3.6 Which custom office takes more time?

☐ Djibouti ☐ Ethiopia's custom office at Djibouti

3.7 How long on average a truck wait at custom check points?

Galafi (border post) -----

Mille (Scanning) -----

Awash (weigh bridge) -----

Kaliti (Customs facility) -----

4. Warehouse

S.N.	Ware house	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable
		1	2	3	4	5	
4.1	Poor information flow (not being informed about arrival time of sugar cargo, number of trucks coming) causes unloading delay at ware house.						
4.2	Many formalities to unload sugar cargo causes ware house cargo unloading delay.						
4.2.1	Limited working time of store keepers causes cargo delay						
4.2.2	Unavailability of sufficient space for truck maneuvering (easily entrance and exit) causes sugar cargo unloading delay						
4.2.3	Sugar bags counting and weighing causes unloading delay at ware house						
4.2.4	Unavailability of sufficient warehouse causes sugar cargo unloading delay						
4.2.5	Unloading efficiency of laborers causes cargo unloading delay						
4.3	To what extent warehouse facility affect lead time of sugar import?						
4.5	How likely do port congestion, truck availability, custom process and warehouse facility impact/affect lead time of sugar import? (impact of four variables)						

4.6 How many trucks arrive at ware house per day?

4.7 How long it takes to unload a truck?

☐ <6h ☐ 6- 10h ☐ 10- 12 h ☐ >12 h

4.8 Do you use Weigh Bridge ?

☐ Yes ☐ No

4.9. If there are other warehouse problems, please state here under :-

5. What are the other impacts of cargo delay to Sugar Corporation in particular and the country in general ?

6. What problems your esteemed company face due to cargo delay?

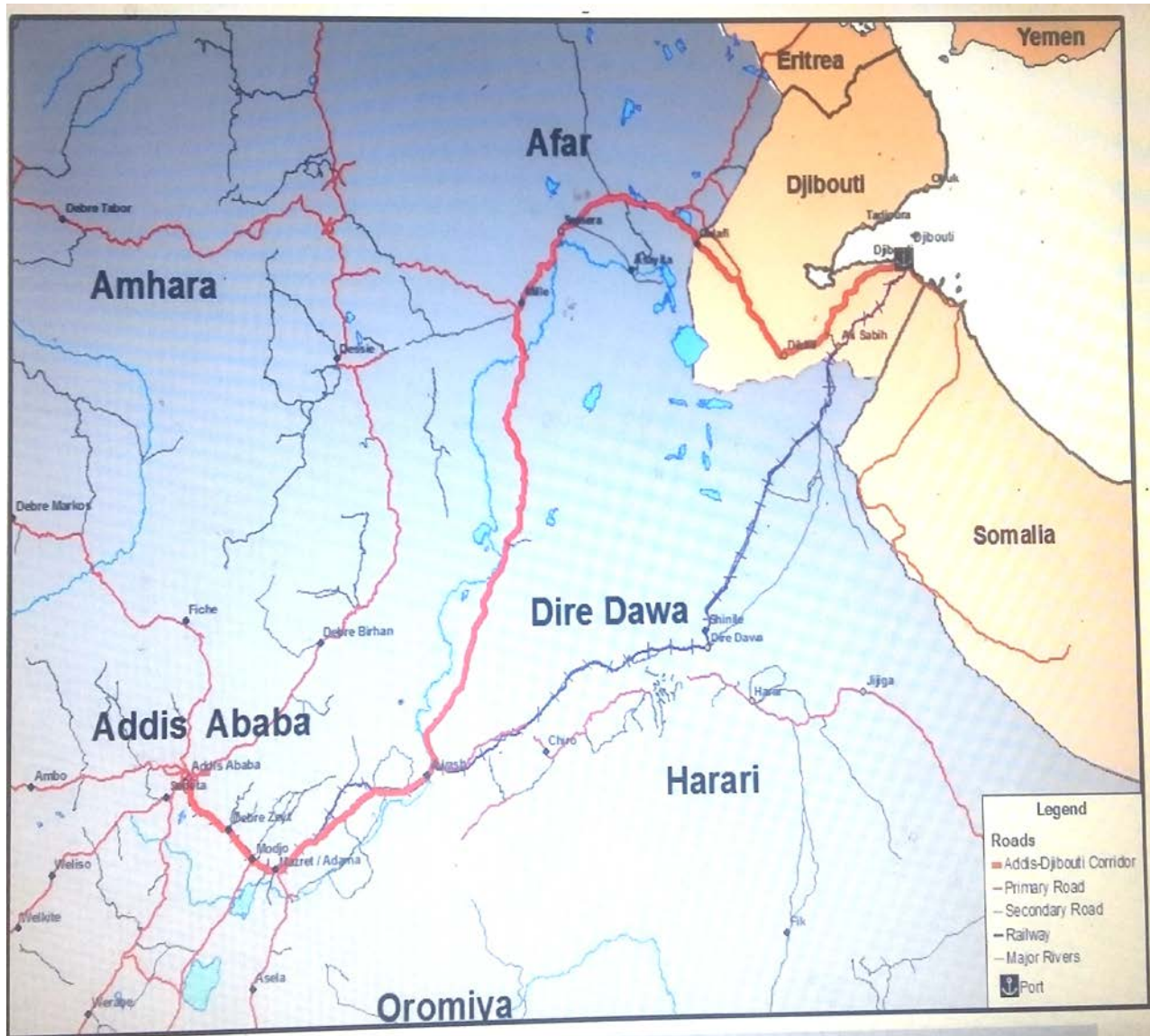
7. What do you think are the reasons for import sugar delays?

8. What are your recommendations regarding the minimization of delays?

Thank you

Annex 2

Fig.1.1 Djibouti-Addis Ababa corridor



Source: (UNDP, 2017)