



**The effect of Logistics coordination in the case of Green international logistics services PLC**

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## DECLARATION

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“I hereby declare that this research paper entitled “**The effect of Logistics coordination in the case of Green international logistics services PLC.**” is my own and I believe the full content of this paper if the first, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent that has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.”

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## LETTER OF CERTEFICATION

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I certify that Yonas Bayou has carried out his thesis work on the topic entitled “**The effect of Logistics coordination in the case of Green international logistics services PLC.**” under my guidance and supervision. Accordingly, I hereby assure that his work is well apposite and standard to be considered for the award of Master of Arts in Logistics and Supply Chain Management.

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## ACRONYMS

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**IATA:** International Air Transport Association

**IAM:** International Movers Association

**FIATA:** International Freight Forwarders Federation

**SCM:** Supply Chain Management

**CSCMP:** Council of Supply Chain Management Professionals

**LMB:** Logistics Management Board

**SCO:** supply chain orientation

**CSF:** critical success factors

**PPPs:** public-private partnerships

**B2B:** Business-to-Business

**LPI:** Logistics Performance Index

**VIF:** variance inflation factor

**MOA:** Ministry of Agriculture

**MOH:** Ministry of Health

**MIT:** Ministry of Innovation and Technology

**RTA:** Road Transport Authority

**FMHACA:** Food Medicine Health Care Administration and Control Authority

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## ABSTRACT

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*Logistics is part of supply chain which is mainly engaged in the positioning of things/materials at the right location, at the right time and in efficient and effective way. This activity has the potential to affect total cost and the availability of supply at the right time. The logistics service has been characterized by untimely delivery of consignments, un-traceability and costliness. So far, several attempts have been made to improve the efficiency of logistic activities and several improvements are achieved. Among the attempts is coordinating the activities with other independent parties. This research mainly focusses on the inefficiencies of logistic sector such as freight forwarders (logistic service providing firms) like Green International Logistics Services Plc., customs, and transportation companies. The research also focusses on showing the effects of Logistic coordination which is one way of resolving the issue of performance. Assessing the problems that create the inefficiency of these actors and overcoming it is a paramount importance. This research discussed the essence and effects of logistics coordination and tried to answer some of the major problems that logistics activities face. The research was conducted with the belief that one of the major problems of logistics activities is: - not having timely delivery, traceability of shipments, and costliness. The research focusses on the reasons behind untimeliness of deliveries and tried to assess the reasons behind this inefficiency. The major reason behind this untimeliness of deliveries is considered lack of coordination of the independent actors of the sector. The research also identified responsiveness by the consignee, responsiveness by Green International, Customs and Other government offices efficiencies as variables that affect timeliness. The goal of this research was to assess the factors that lead to unresponsiveness and challenges for timeliness of logistic activities of Green International Logistics Services Plc. These factors are believed to be the direct reflection of the lack of coordination within the industry. The research has collected data from questionnaire, conducted survey on daily customs clearance, freight forwarding activities, and observation of government E-service. The researcher designed a platform and recommends that by using this platform it will be easy to monitor shipments, achieve traceability and timeliness which ultimately leads to cost effectiveness and other aspects such as, job count, and manage forgery of documents (from start to end of all transaction) and minimize possible corruption.*

**Keywords:** *Logistics coordination, freight forwarding, performance, effects of logistics coordination, information management, custom clearance, permits processing, responsiveness*

## **Chapter One**

### **Introduction**

Logistics is part of supply chain which mainly engages in the positioning of things/materials at the right location, at the right time and in efficient and effective way. This activity has the potential to affect total cost and the availability of supply at the right time. So far, several attempts are made to improve the efficiency of logistic activities and several improvements are achieved. Among the attempts is coordinating the activities with other independent parties.

This chapter explain the general overview of Logistic Coordination with brief introduction about the subject company Green International Logistics Services plc, and its level of coordination with government entities such as customs, airline cargo terminal, dry ports, and seaport. The topic also discusses about the presence and level of key elements of coordination that are timeliness, traceability and less costliness.

#### **1.1. Background of the study**

For a country that depends mostly on imported goods, smooth and efficient operation of customs clearance and freight forwarding activities is of at most importance. The national logistics strategy manual of Ethiopia clearly declares that there is a huge problem of timely delivery of consignments. The government of Ethiopia has clearly set a national strategy to build infrastructure and set directives with the intent to resolve this issue. This chapter introduces the current customs clearance and freight forwarding processing situations as well as the roles that the efficiency of customs clearance and freight forwarding activities plays in the overall logistics performance. The chapter also entails the actors in the industry and what logistics coordination help achieve both at macro and micro level. Later in the research objectives of the research and research questions are prepared accordingly.

Logistics and its performance have been a huge issue for companies at micro level and for governments at the macro level. Carrying out efficient logistics activities enable firms to reduce cost, increase competitive advantage, and increase customer satisfaction and so on. As it is known logistics comprises of different activities. Among the activities is freight handling which includes activities such as customs clearance and the physical transportation of materials. In order to carry out these activities, logistics activity depends

on the performance of independent entities such as port authorities, customs, Government permit issuing offices, shipping companies, airlines cargo service and inland transportation companies.

The government of Ethiopia aimed its goals at attaining and securing fast economic growth and ensure that the people are benefitted out of the growth. As the result of this goal the country has been achieving economic growth for the past consecutive years that lead to a dynamic increase of local and international business activities. Therefore, launching efficient logistics system is the key activity to guarantee the continuation of the economic growth the country has been achieving. On the contrary the current logistics system is found at the lowest performance level when measured from the perspectives of timeliness and costliness. The inefficiency of the logistics sector has led to increased transit time, long stay of cargoes at port, and poor port clearance and freight forwarding activities which ultimately result in huge loss to the country. (National Logistics Strategy p. 1)

Logistics coordination is a concept to create mutual or common goal for logistic actors with the intent to achieve efficiency in placing things/material. The objectives of the logistics coordination are to improve delivery time (Timeliness), create transparency of operation by creating traceability and lowering costs. Logistics coordination is an act of properly combining (relating, harmonizing, adjusting, aligning) a number of objects (actions, objectives, decisions, information, knowledge, funds) for the achievement of the chain goal. (Togar et al., 2002).

Tracking daily sales helps suppliers to distinguish popularly from slow-moving goods and respond quickly to either replenish or discontinue products in retail stores. Coordination among independent companies, such as suppliers of raw materials, producers, distributors, third-party logistics providers and retailers, is the key to achieving the necessary flexibility to enable them to increasingly develop logistics processes in response to rapidly changing market conditions. Poor coordination among members of the chain can lead to dysfunctional operating performance. Some of the negative impacts of poor coordination include higher production prices, longer delivery times, higher transport costs, higher failure and harm rates and poorer customer service (Lee et al., 1997). (Togar M. et al. 2002)

## **1.2. Background of the company**

Green International Logistic Services is a family owned; which is engaged in the business of Packing, Moving, Customs Clearing, Freight Forwarding, Transit, shipping, Industrial and Project Goods, Storing, Heavy Lifting, Goods Handling and Cargo Insurance for both household and industrial goods to and from every part of the world. Green's staff is well equipped with technical knowhow and with more than 30 years of industry experience and extensive education in Ethiopia, Belgium, the USA, and Canada.

The Head office is located near Bole; Green's insured warehouse and container depot (wide 7,000 square meters) is located around Kaliti near the Ethiopian Customs Authority Terminal with general storage and self-storage facilities. Plus, two general cargo warehouses for goods waiting to be shipped one for air shipments and another for sea shipments and a container terminal.

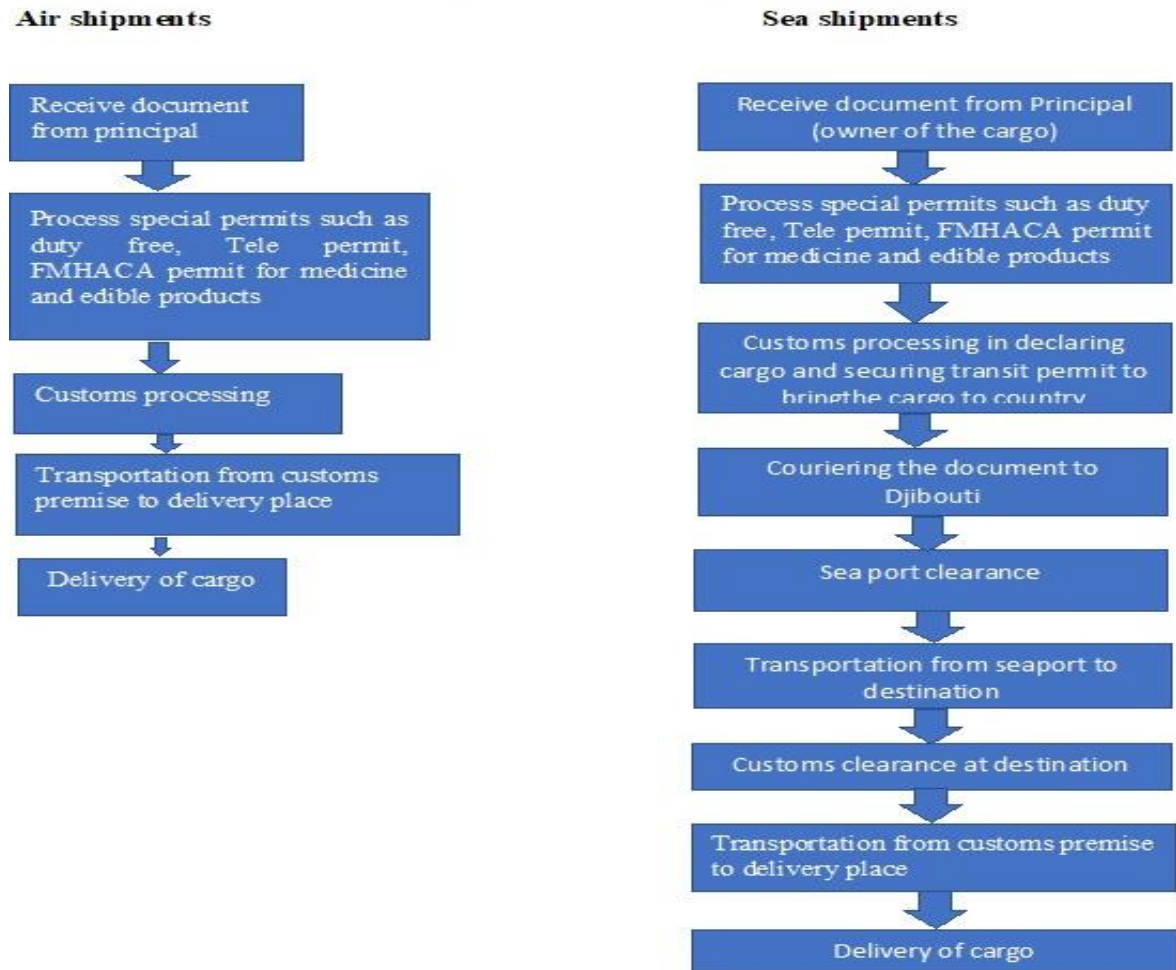
They have several trucks and vans closed for safe and secure movement of goods. As well as cranes for lifting heavy freight from 2 to 20 tons so that the most special types of cargo can load and unload.

Green International Logistic Services is a registered member of IATA (International Air Transport Association), IAM (International Movers Association) and FIATA (International Freight Forwarders Federation), affiliated agents worldwide. They use state-of-the-art packaging materials to ensure customer's products are safe. Because of the industry's changing nature, the organization also actively invests in sending its employees to trainings and workshops around the world to learn contemporary methods to deliver the best and most up-to-date and productive services used in the industry. Green International Logistics Services providers are proud to maintain a great reputation among Ethiopia's most respected organizations, with over 30 years of logistics industry experience. Among the activities which Green International Logistics PLC is engaged in; this research paper will only focus on the customs clearance and delivery of activities of the company which is shown in the figure (Fig.1.) below.

Green International Logistics is one of the biggest market share holders in the sector of freight forwarding and moving activities. Green International Logistics handled a total of 1,022 consignments within the year 2019. Out of which 644 consignments were air shipments which Green has done customs clearance and transportation up to cargo owner's

premise; 258 consignments were sea shipments which Green had done customs clearance, port clearance and freight forwarding from Djibouti to Ethiopia and then from customs premise to cargo owner's premise; and 120 consignments for moving the cargo with in Addis Ababa and storage service.

Figure 1. Process flow for Customs Clearance and Freight Forwarding of shipments



### 1.3. Statement of the Problem

International Organizations including the World Bank emphasized that logistics activities of different countries in the world must be improved in order to enhance economic growth. They indicated that developing countries have poor logistics performance. These countries have revealed poor logistics activities such as poor traceability of shipments, failure to

deliver shipments in a specified time frame (timeliness) and costliness. These International Organizations strongly advice Governments to provide adequate infrastructure and national logistic strategy for better performance. Ethiopian Government is highly concerned for the improvement of logistics performance. As the result the Government has set a clear national logistics strategy. Despite the government's efforts, the country's logistics performance still shows problems of untimeliness, lack of traceability, and costliness of deliveries of consignments.

The inefficiencies of logistic sector are the direct result of the inefficiency of logistic actors, such as freight forwarders (logistic service providing firms) like Green International Logistics Services Plc, customs, and transportation companies. Logistic coordination is one way of resolving the issue of performance if the independent and dependent entities coordinate to achieve better performance. Assessing the problems that create the inefficiency of these actors and overcoming it is a paramount importance.

This study addressed the problems of the logistics actors from the perspectives of problems of meeting time frames with which shipments can be delivered to consignees' premise within the scheduled or expected delivery time (timeliness). By focusing on the timeliness indexes the researcher assessed the performance of the logistics activities of Green International Logistics Services plc. The research took a thorough look into the company's activities of port & custom clearance as well as freight forwarding activities. Through analysis of timeliness of delivery of consignments/ shipments, the research tried to assess existence of coordination between Green International, Governments bodies, and transport companies. The level of coordination is shown through part of the processing that took shorter time and also responsiveness of parties is taken as a measure for coordination which accounts for timeliness.

#### **1.4. Research question**

Logistic activities are carried out to ensure that products or services are delivered to the right person at the right place and at the right time. But ensuring this has been a huge challenge ever since the conception of the idea of logistics. With different entities being engaged for each activity and increasing demand for timeliness and with most firms

adopting just in time inventory methods, logistic coordination play a vital role in achieving better performance.

This research discussed the essence of logistics coordination and tried to answer some of the major problems that logistics activities face. The research was conducted with the belief that one of the major problems of logistics activities is not having co-ordination. The research specifically answered the following questions: -

- a. What logistics coordination practices does Green International have with other concerned parties?
- b. What factors affect the logistics performance of the country?
- c. What are the reasons for poor logistics performance?
- d. What factors affect the Logistics Coordination practices?

### **1.5. Objectives of the study**

Logistic performance depends on how well all members work together and not on how well each member performs separately. The general objective of this study was to formulate a framework of the knowledge of coordination. Unify the different actors in the logistics activities which are required to coordinate and in their activities. To show that through coordination logistics actors can achieve timeliness and efficiency. It is argued that, the entities who play role in Logistics must maintain their competitive edge by innovation throughout the Logistic network. Doing so will help the creation of shared context for improvement. Answered the question how to achieve the best performance by being responsive and keeping timeliness. Keeping the tasks of different players completed in a manner consistent with the mutual goal.

The research also had the following specific objectives: -

- i. To show level of responsiveness of the company under study
- ii. To show level traceability of consignments
- iii. To show the level of timeliness of delivery of cargoes and services by the company.
- iv. To show the effects of coordination

### **1.6. Significance of the study**

The researcher believed that the result of this research paper will have the following significance

- i. It will serve as source of information to other researchers
- ii. The study will help the concerned parties to assess the impacts and benefits of logistics coordination and synchronization of logistics activities.
- iii. It will give information to business firms interested to engage in business activity in setting up strategies.
- iv. It will help improve the knowledge for readers.

### **1.7. Scope of the Study**

The goal of this research was to assess the factors that lead to unresponsiveness and challenges for timeliness of logistic activities of Green International Logistics Services Plc. These factors are believed to be the direct reflection of the presence of coordination within the industry. Green International is engaged in packing, inbound and out bound moving of cargo and in freight forwarding activities. This research focused on the major areas where activities are perceived to be unresponsive and lack timeliness which are in the freight forwarding activities. The scope of this research assesses how well the company is coordinated in its activities in clearance and cargo forwarding of air shipments and surface (sea) shipments both incoming and outgoing shipments. The research covered performance of the company from customer's perspective and tried to assess the coordination of the company with concerned parties through assessment of timeliness and responsiveness the entities.

The study assesses and evaluates the impacts of logistics coordination through analysis and interpretation of necessary information obtained from interview, questionnaires, company's daily customs & port clearance activity report and other records. This research mainly focuses on the coordinated activities of Green International Logistics Services plc, which is engaged in the logistics activities.

## 1.8. Definition of Terms

**Logistics:** - means ensuring the right: provision of goods, quantity, and condition, at place, time and cost for the customer. (Togar et al., 2002)

- Logistics is a network of services that support the physical movement of goods, trade across borders, and commerce within borders. (LPI 2018)
- Logistics management is part of supply chain which focuses on the management of scheduling, execution and reliability of the chain through effective forward and reverse distribution as well as storage of products, services and related information between the point of origin and the point of consumption to meet the requirements of customers. ([https://cscmp.org/CSCMP/Academia/SCM\\_Definitions\\_and\\_Glossary\\_of\\_Terms/CSCMP/Educate/SCM\\_Definitions\\_and\\_Glossary\\_of\\_Terms.aspx?hkey=60879588-f65f-4ab5-8c4b-6878815ef921](https://cscmp.org/CSCMP/Academia/SCM_Definitions_and_Glossary_of_Terms/CSCMP/Educate/SCM_Definitions_and_Glossary_of_Terms.aspx?hkey=60879588-f65f-4ab5-8c4b-6878815ef921))

**Logistics Coordination:** - can be viewed as an act of properly combining (relating, harmonizing, adjusting, aligning) a number of objects (actions, objectives, decisions, information, knowledge, funds) for the achievement of the chain goal. (Togar et al., 2002)

**Logistics Synchronization:** - means recognizing and concerting improvement initiatives that significantly contribute to value creation in the acquisition, consumption and disposition of products and services in today's rapidly changing markets. (Togar et al., 2002)

- is the observable and quantifiable phenomenon which represents the temporal coupling and performance-related coupling of different system elements or processes due to direct or indirect interaction. This phenomenon can occur within a single logistics system or between multiple logistics systems. (Chankov. et al 2014)

## 1.9. Limitation of the study

The study assessed the effects of Logistics Coordination on the operational performance of the logistic actors on the customs clearing and freight forwarding activities of the company

under study. The study focused on the activities of Customs commission, government offices issuing permits, and port clearance activities and transport companies activities. The research focused mainly on customs clearance and freight forwarding activities and the factors that affect the timely deliveries of consignments. This research based on uni-modal sea transportation service. Therefore, generalizing the results of this sector on the multimodal service sector is questionable.

### **1.10. Organization of the paper**

The organization of the final research will incorporate 5 chapters. Chapter one provides a general introduction to the topic of the study- “The impact of Logistics coordination in the case of Green International Logistics Services plc”. The chapter will give discussion on the background to the study, to be followed by the statement of the problem of the study, research questions, objective, scope, significance, as well as the limitations of the study.

Chapter two will review the existing literature on the topic of the study. The theoretical framework considered the existing literature on the definition of logistics, importance of logistics coordination, major dimensions of logistics coordination, and logistics coordination challenges. The empirical framework will review actual research works that have been done in similar research topics. The conceptual framework is a schematic model used to create a vibrant pictorial impression of what the research seeks to achieve and how it is conducted.

Chapter three will presents the research methodology. It will discuss the research approach, research design, population of the study, the sample frame, sample size and sampling procedure, instruments used as well as data collection procedure. The method of data analysis will also be discussed in this chapter.

In chapter four data collected will be analyzed by using statistical and other data analysis tools. The findings of the research will also be presented and discussed in this chapter.

In chapter five conclusion and recommendations will be made based on the findings of the study and suggestion for future study will also be made.

## Chapter Two

### Review of related Literature

#### 2.1. Introduction

Coordination between independent companies, such as raw material suppliers, producers, distributors, third-party logistics providers and retailers, is the key to achieving the required flexibility to allow them to increasingly develop logistics processes in response to rapidly changing market conditions.

Poor coordination among members of the chain can lead to dysfunctional operating performance. Some of the negative consequences of poor coordination include higher production prices, longer delivery times, higher transport costs, higher loss and damage rates and poorer service to customers (Lee *et al.*, 1997). (Togar *et al.*, 2002)

An established definition of logistics as given by Plowman states that "Logistics means ensuring the availability of the right goods, in the right amount, in the right condition, at the right place, at the right time for the right customer at the right costs". This so-called concept of "seven Rs" implicitly characterizes logistics, because it defines the outcome of effective logistics activities as a given state. From an active viewpoint, the definition requires logistics to coordinate space-time activities, meaning a certain amount of coordination is a prerequisite for effective logistics operations. Moreover, the following logistics principles developed in both literature and practice are directly associated with synchronization. The tact time in a paced assembly line is extracted from the customer demand per time unit and is then used to decide when each of the assigned tasks is to be performed on the line. This so-called cycle time for all stations is the same and thus means that the goods travel "in sync." The accelerated assembly line can therefore be considered to act as a role model for a highly synchronized logistics system. (Togar *et al.*, 2002)

Despite the critical importance of coordination, few researchers tended to develop and test the principle of Supply Chain coordination. Senge (1990) popularized systems thinking that can be used to grasp the logistics reality and organize the participants of the chain to create collective knowledge. Konijnendijk (1994) looked at organizational and operational management processes. Stank *et al.* (1999) studied inter-firm coordination processes in the

food supply chains, characterized by effective communication, information exchange, partnering and performance monitoring. Lee et al. (1997) proposed channel coordination, operational efficiency and information sharing to improve overall performance in the supply chain. To construct taxonomy of different modes of coordination, the notions of mutuality and concentration of coordination are adopted. The concept of mutuality refers to a mixture of efforts between independent companies (MacNeil, 1980). (Togar et al., 2002)

Supply chain management's main concern is how to organize the individual players to work together as a whole to achieve the shared goal of chain sustainability in changing market conditions. Malone and Crowston (1994) generally define teamwork as the act of managing interdependencies between activities carried out to achieve a goal. Coordination can be seen in the context of the supply chain as an act of properly combining (relating, harmonizing, adjusting, aligning) a number of objects (actions, goals, decisions, information, knowledge, funds) for achieving the chain objective. Since the existence of a coordinating object differs, a separate coordination mode is needed to manage a particular object. While the chain participants implicitly apply different modes of communication to help one another handle systems, resources and knowledge in response to market uncertainty, little attention has been paid to separating and unifying them. This section provides a detailed coordination taxonomy that aims to distinguish and identify different modes of coordination with a view to obtaining better clarity. (Togar et al., 2002)

Coordination mutuality can be identified as the underlying values of responsibility among partners, with a strong emphasis on maintaining relationships to create successful goal achievement. Social contract literature has recognized that any partnership between business partners will lead to an environment of mutuality (see Campbell (1997) for a theoretical framework of reciprocity in business relations). MacNeil (1980) argues that some degree of mutuality is important in order to reinforce the closeness of the relationship resulting in better-coordinated trading partners activities. The mutuality norm suggests that each partner contributes to significant values and has the right to a fair distribution of the exchange results. For the partners to share shared accountability in achieving better results, collective responsibility is important. For example, the retailer and the distributor share responsibility for implementing the Rapid Response Initiative as a strategy for minimizing

lead times and increasing the pace of product market launch. In addition to joint responsibility for value creation, all partners share the mutual benefits resulting from prompt response such as reduced transportation costs and increased profit. (Togar et al., 2002)

## **2.2. Theoretical perspectives**

### **2.2.1. Supply Chain Management vs. Logistics Management**

Considering concepts of SCM and logistics management, one of the most cited sources is the definitions provided by the Council of Supply Chain Management Professionals, CSCMP (former Logistics Management Board, CLM). SCM is defined as follows in a document on CSCMP homepage: “Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all Logistics Management activities. Importantly, it also included coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. Supply Chain Management integrates supply and demand management within and across companies.” ([https://cscmp.org/CSCMP/Educate/SCM\\_Definitions\\_and\\_Glossary\\_of\\_Terms.aspx](https://cscmp.org/CSCMP/Educate/SCM_Definitions_and_Glossary_of_Terms.aspx)).

Mentzer et al. (2001) make a valuable contribution to SCM's understanding when they argue that a reason for the ambiguity and many SCM meanings is that writers tend to include two different things within the same concept. Mentzer et al. (2001) differentiate between SCM as a theory of management, on the one hand, and the actions undertaken to understand the concept, on the other, to sort out the somewhat ambiguous meaning. The management theory, called supply chain orientation, SCO, is suggested to be a requirement for SCM, which should be defined as actions taken by participants in a supply chain to understand the SCO. SCO is defined as “the recognition by an organization of the systemic, strategic implications of the tactical activities involved in managing the various flows in a supply chain” (Mentzer et al., 2001, p. 11).

SCM in turn, is defined as “the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term

performance of the individual companies and the supply chain as a whole” (Mentzer et al., 2001, p. 18). (Erik Sandberg 2005)

As mentioned in the two definitions of SCM above, the SCM expression can include all kinds of business functions in a company. Following these concepts, one aspect of SCM's logistics management (as clearly stated in the CSCMP definition) is. Throughout their definition of logistics management, CSCMP points out once again explicitly that SCM is seen as a broader definition: “Logistics management is that part of supply chain management that plans, implements and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between point of origin and the point of consumption in order to meet customer’s requirements. Logistics management activities typically include inbound and outbound transportation management, fleet management, warehousing, materials management, order fulfillment, logistics network design, inventory management, supply/demand planning, and however, the relationship between SCM and management of logistics is not always easily understood and there are different opinions on what they really involve. SCM and Logistics management are sometimes described in the same way and are thus often used interchangeably in literature.”

([https://cscmp.org/CSCMP/Educate/SCM\\_Definitions\\_and\\_Glossary\\_of\\_Terms.aspx](https://cscmp.org/CSCMP/Educate/SCM_Definitions_and_Glossary_of_Terms.aspx))

(Erik Sandberg 2005) However, the relationship between SCM and management of logistics is not always easily understood and there are different opinions on what they really involve. SCM and Logistics management are sometimes described in the same way and are thus often used interchangeably in literature. (Erik Sandberg 2005)

### **2.2.2. Logistics collaboration**

Even if the distinction made by Mentzer et al. (2001) between SCO and SCM leads to a better understanding of the SCM expression, the SCM description provided in the previous section is still very ambiguous and therefore needs to be further clarified and interpreted.

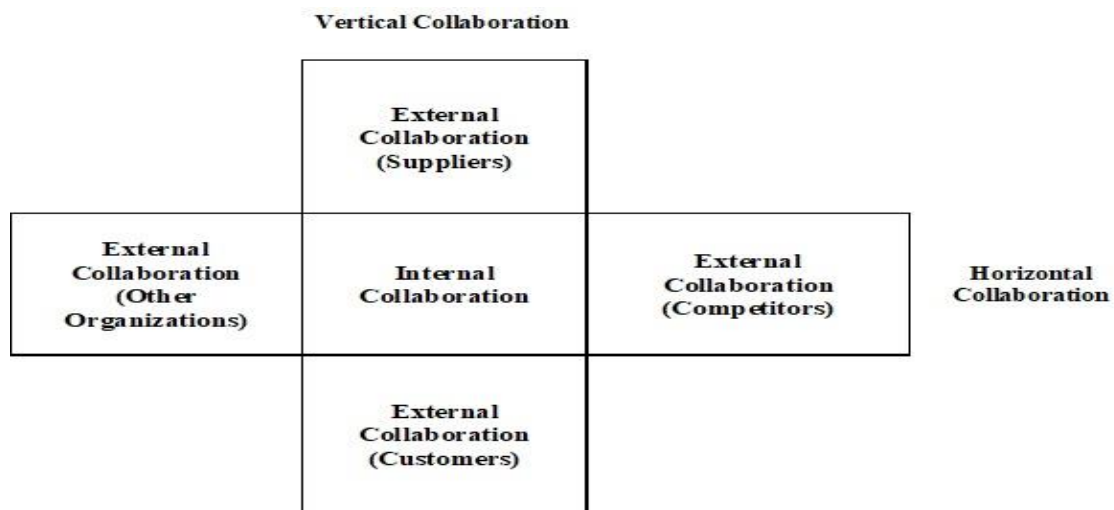
Most scholars find the importance of inter-organization cooperation and integration as main tasks for SCM. But if, e.g. Mentzer et al. (2001) notes that SCM is about "coordinating traditional business functions and strategies across these business functions," what is suggested then?

Most authors respond that cooperation and integration is accomplished by collaboration between actors in the supply chain. In reality, (Horvath, 2001) argues that collaboration is a prerequisite for achieving SCM; SCM cannot exist without collaboration. Barratt (2004) distinguishes between internal and external collaboration and vertical or horizontal collaboration see Figure 2 below.

Note that collaboration is not equal to SCM. In fact, collaboration can be considered as a broader expression. In the figure, this study only deals with external collaboration in a vertical direction, i.e. collaboration with suppliers and customers.

In this analysis this vertical, external partnership can be translated as SCM. Notice that SCM also contains internal questions according to the discussion above. These are not included in this analysis, however, and therefore SCM in this research is equivalent to the vertical, external collaboration. (Sandberg, Erik 2005)

Figure 2. Different Types of collaboration



The interpretations of collaboration made by scholars as well as column writers in business magazines are not incongruous, nor are they ever the same; creation of a general one-sentence concept of collaboration seems extremely difficult (Barratt, 2004).

Similar to the interpretation of SCM by Mentzer et al (2001) as two different things covered by the same description, collaboration in this study should be considered to include two components. First, collaboration can be defined as some type of relationship between independent companies (compare with Mentzer et al's expression of supply chain orientation, 2001). (Sandberg, Erik 2005) Secondly, collaboration often includes activities carried out in partnership by the participating actors (to be contrasted with SCM according to Mentzer et al, 2001). The collaborative partnership is defined by transparency and confidence between the parties involved (Lee & Billington, 1992; Ireland & Bruce, 2000; Moore, 2003), where win - win cooperation and mutual understanding are a precondition for each other's business. There also needs to be a desire and determination among all the parties involved. (Skjoett-Larsen et al., 2003; Ireland & Bruce, 2000; Lee & Whang, 2000; Speakman et al., 1998). For a further discussion of these issues, see chapter 2.4.4 in the frame of reference about SCO. (Erik Sandberg 2005)

The literature suggests a wide range of activities concerning the actions undertaken in the partnership and these will be further explored in this analysis together with the SCO. It could be argued, on a general level, that collaboration is about companies that share information and negotiate and discuss something of common interest together. That implies a two-way communication with targets, generally decided upon. Because collaboration should lead to changes in the supply chain, the ability for both parties to influence collaboration is important; otherwise there is a danger that both the win - win situation and significant opportunities for improvement may be lost. (Cooper et al., 1997a; Ireland & Bruce, 2000; Cooper et al., 1997b; Ireland & Bruce, 2000). (Erik Sandberg 2005)

### **2.2.3. Logistics Coordination**

To optimize the potential for turning competitive advantage into profitability, a firm needs to develop successful coordination within and beyond its borders (Dyer and Singh, 1998). Coordinating the order fulfillment rate to meet actual consumption is good from the customer's point of view, if it contributes to fulfilling the delivery date of a consumer and reduces logistics costs. (Togar M. et al 2002)

Tracking daily sales helps suppliers to distinguish popularly from slow-moving goods and respond quickly to either replenish or discontinue products in retail stores. Coordination

among independent companies, such as suppliers of raw materials, producers, distributors, third-party logistics providers and retailers, is the key to achieving the necessary flexibility to enable them to increasingly develop logistics processes in response to rapidly changing market conditions. Poor coordination among members of the chain can lead to dysfunctional operating performance. Some of the negative impacts of poor coordination include higher production prices, longer delivery times, higher transport costs, higher failure and harm rates and poorer customer service (Lee et al., 1997). (Togar M. et al. 2002)

The concept of coordination in the supply chain tended to be developed and tested by few researchers considering the critical importance of coordination. Senge (1990) popularized systems thinking that can be used to grasp the logistics fact and to organize the participants of the chain to establish collective knowledge. Konijnendijk (1994) analyzed the coordination process in engineer-to-order (ETO) companies at tactical and organizational levels regarding product design, quantity, mix, and lead times between sales and manufacturing. Stank et al. (1999) studied inter-firm collaboration processes, characterized by effective communication, exchange of information, partnering and monitoring of success in the food industry supply chains. Lee et al. (1997) suggested channel management, operational efficiency and information sharing to improve overall performance in the supply chain. (Togar M., et al 2002)

## **2.2.4. Modes of Logistic Coordination**

### **2.2.4.1. Logistic Synchronization**

Logistics synchronization management is responsible for ensuring consistency between logistics process activities to deliver products and services to meet consumer needs and wishes (Fisher, 1997). (Togar M., et al., 2002)

This traditional coordination refers to a supply chain's market mediation role which aims to balance the variety of products that enter the market with consumer needs and wants (Fisher, 1997). Knowing customer demand and managing inventory management, facilities and transport between partners help to achieve dramatic improvements in forms of rapid response to customer requirements, lower production costs, increased product availability, reduced obsolescence and minimal variation of any unforeseen events, such as forecasting errors and delays that interfere with chain efficiency. (Togar M. et al., 2002)

Logistics Synchronization means recognizing and organizing strategies for change that contribute significantly to value development in the purchase, use and disposal of products and services in today's fast-changing markets. This traditional coordination refers to a supply chain's market management feature, which seeks to balance the variety of products that enters the market with consumer needs and wants (Fisher, 1997). Logistics Synchronization often assists participating participants in resolving position disputes, so each member can perform specific tasks and assume some responsibility in ensuring chain productivity is achieved. The real challenges include concentrating on core tasks that give the consumer real value and subordinating other supporting activities to ensure the process of value creation. Analyzing the process of value creation throughout the supply chain can provide a road map for strategic strategies that explain specific roles for each participant involved. Govindarajan and Gupta (2001) propose three interrelated areas to ensure synchronization of logistics:

- I. Customer definition.
- II. Customer value identification; and
- III. Value creation process design.

If the chain leaders can radically redefine the customer base, reinvent the idea of customer interest, and overhaul the end-to-end value chain system, then from the customer's point of view they are likely to create competitive advantage. Most logistics integration approaches have been developed based on logistics management concepts—such as integrated logistics procedures, organizational efficiency, postponement of logistics and collaborative transport. The integrated logistics processes include joint decision-making, such as sales preparation, joint inventory management and replenishment. (Simchi-Levi et al., 1999).

#### **2.2.4.2. Information Sharing**

Coordinating information sharing helps to realize information coherence through actors communicating with each other and following rules of trans boundary dissemination of information (Lee, 2000). The organization of information sharing aims to provide the decision-makers with important, reliable and timely information (Lee, 2000). Network participants often have different private information that is often not shared with others—and supply chains are rooted in asymmetric information (Simatupang and Sridharan, 2002). (Togar M., et al., 2002)

Information technology (IT) such as the Internet, intranet, software application packages and decision support systems can be implemented to promote the sharing of information with customers and partners, and to improve supply chain efficiency. Consumer service IT services provide information facilities (e.g. online custom and standard product details, a detailed and frequently asked questions section, contact person, return policy, etc.) and transaction facilities (e.g. online order delivery, order adjustment, order verification, order monitoring, online payment protection and technical assistance).(Togar M., et al., 2002)

#### **2.2.4.3. Incentive alignment**

The management of reward alignment aims to provide different mechanisms for the allocation of benefits and risks associated with logistics functions in order to motivate individual actors to achieve productivity in the supply chain (Lee, 2000; Simatupang and Sridharan, 2002).(Togar M., et al., 2002)

Incentives determine how to compensate or penalize decision-makers for the choices that they make. Existing rewards affect the actions of individual members, and their relationship with other partners. Interest conflicts are likely to occur when existing incentives lead to acts that enhance personal gain but often reduce overall productivity (Clemons and Row, 1993).Current reward programs are often based on local prices and short-term compromises, which aim to fill the gap between company owners in inventory. Perverse incentives, such as local production prices, transportation costs, and lot-size-based quantity discounts, often do not help the value-creating cycle of enhancing customer service, as these incentives are related to the operation of reducing one stage of the supply chain internal expense. (Togar M., et al., 2002)

#### **2.2.4.4. Collective Learning**

Collective learning communication deals with how to tackle the problem of border-crossing information initiation and transmission coherence (Senge, 1990; Sawhney and Prandelli, 2000). (Togar M., et al., 2002)

Collective learning management deals with how to tackle the problem of coherence of information initiation and distribution across organizational boundaries (Sawhney and Prandelli, 2000).Specific emphasis is placed on practical learning from one another in order to understand and develop tacit capacity in the implementation of unique initiatives for

improving logistics. Mastering tacit skill requires intense dialog, experimentation and discussion of data, facts, and knowledge in order to achieve collective meaning making (Senge, 1990). The aim of collaborative learning collaboration is to expand the ability of each partner which is useful for continuous improvement. (Togar M., et al., 2002)

Coordinating collective learning means not only evaluating and synthesizing ongoing progress, but also how to ensure the buy-in of key partners during the implementation process. The main partners have to accept the changes necessary to implement the solution. The initiator of a transformative approach should be able to overcome barrier barriers for progress that consist of disagreement about the nature of the problem, disagreement about the direction of the solution, disagreement as to whether the solution will result in the desired effects that are necessary for the organization, disagreement as to whether or not the solution has disastrous side-effects, disagreement that the solution is viable in the environment, and universalized fear (Smith, 2000). By gaining buy-in, this systemic approach paves the way for the development, acceptance, and dissemination of useful knowledge to create commitment to change. There are various ways to share information to facilitate this process of change, including personal communication (meeting, telephone conversation, e-mail discussion, etc.), codified communication (reports, sketches, etc.), joint training and apprenticeship. (Togar M., et al., 2002)

### **2.2.5. Types of Logistic Coordination**

Coordination has also been referred to as two or more unconnected or competing groups working together to share their exclusive information or resources. (Kaynak et al, 2014)

**Horizontal coordination** concerns with the internal relationship, the coordination within an entity or a group or the cooperation between an organization and its competitors and non-competitors. (Kaynak et al, 2014)

**Vertical coordination** is defined as a link between two or more organizations sharing responsibilities, resources and performance information to serve relatively similar end-users. (Kaynak et al, 2014)

**Lateral, Diagonal or Synergistic Coordination** is the combination of both vertical and horizontal coordination.

Figure 3. The Coordination Matrix

	<u>Horizontal</u>		<u>Vertical</u>
	<u>Within duster</u>	<u>Among clusters</u>	
<b>Operational</b>	Organizations in a cluster cooperate in an operation	Cooperation among different clusters in an operation	Pipeline for an operation is coordinated among participants
<b>Tactical</b>	Organizations in a cluster cooperate at the regional level	Clusters cooperate at the regional level for storage, capacity	Storage and distribution from a regional level
<b>Strategic</b>	Global capacity building, standards for a cluster	Global assessments, inter-cluster standards	Purchasing, global stockpiles and pipelines to affected regions

The Coordination Matrix

### 2.2.6. Emerging Concept: Synchromodal Logistics

Synchromodality is an evolving and attractive logistics idea, developed and built during the last decade in the Benelux region. The main purpose of synchromodality is to reduce costs, pollution and delivery times while preserving the consistency of the supply chain service by using the available resources intelligently and synchronizing transport flows. Implementation of the principle of synchromodality and some research projects focused on this practice have already shown how different types of logistics objectives can be accomplished or significantly improved, including avoiding empty space, responding to disturbances and reducing truck transport in favor of railroads, ships and barges. (Riccardoo G. et al 2019)

The existing literature, however, lacks a clear, detailed, and commonly accepted concept of synchromodal logistics and their features. In the context of Riccardoo G. et al 2019 synchromodality is the provision of secure, effective, scalable and sustainable services through stakeholder collaboration and cooperation, and the synchronization of operations within one or more supply chains powered by ICT and ITS technologies. Until now, the characteristics considered in our description have not been collectively defined and there is not yet a shared vision on how to leverage them to support the new trends in supply chain management. The goal of the present study is to provide details of this concept, beginning with a critical survey of the existing scientific literature and real developments in synchromodal logistics. Our research actually goes beyond merely evaluating the state of

this transport system. Rather, this study highlights the strong relationships between synchromodal logistics critical success factors (CSFs) and enabling technologies, such as ICT and ITS. Having considered the synchromodality of CSFs at different decision rates, we define relevant stakeholders and enabling technologies needed for the practical implementation of synchromodalities. Finally, we suggest addressing the CSFs for each enabling technology group (outlining open research issues) and potential synergies that can be accomplished on a common platform. When stakeholders need teamwork, we also recognize an orchestrator (fifth-party logistics, 5PL) who can take on that role by creating and managing the common platform. (Riccardoo G. et al 2019)

#### **2.2.6.1. Features of Synchromodal Logistics**

Synchromodal logistics features that allow better use of available resources are real time information, flexibility, cooperation and teamwork, and synchronization. Data in real time is crucial to synchromodal logistics. In reality the other features rely heavily on information in real time. Ideally, stakeholders should be able to get a global view of their state of operation and activities impacting them in a synchromodal supply chain. With this information, successful re-planning strategies can be implemented, and unforeseen events responded immediately. For example, real-time information can be used to track and reschedule rail traffic (Corman et al., 2017) or to change fuel supply vessel routing and scheduling plans that support customer vessels outside ports (Christiansen et al., 2017). Flexibility is often associated with consumers who ease those shipping restrictions, thus allowing LSPs more flexibility. For example, a modal booking means customer do not choose the modes and routes for their shipments. This helps LSPs to maximize the capacities available and to respond efficiently when disturbances occur by switching modes automatically or prioritizing shipments. For example, freight of delayed shipments and that close to missing the due date (Nabais et al., 2015) or perishable goods at the risk of losing their freshness (Lin et al., 2016) could be allocated to different modes instead of the expected ones to meet demand. The more flexibility LSPs are provided, the more effectively they can respond to disturbances, thus increasing the ability to meet requirements by implementing synchromodal operations (e.g. rescheduling, re-routing, and modal shifting). In networks affected by disturbances, for example, versatile synchromodal

solutions and their cost-saving and environmental impact have been studied (Ambra et al., 2019).(Riccardoo G. et al 2019)

Cooperation and coordination between stakeholders are key to building a robust network and enhanced visibility of information. On the one hand, collaboration includes the integration of networks of stakeholders, to boost flow efficiency and increase overall capacity. This helps rising stakeholder, for example, to benefit from increased stability in the event of disruptions (van Riessen et al., 2015). However, as Tavasszy et al. (2017) pointed out, while only vertical integration is regarded in terms of intermodality (i.e., among stakeholders operating at different levels of the supply chain), horizontal integration is important in synchronomodality (i.e., among stakeholders doing similar activities, e.g., transportation services in different modes). But, as Tavasszy et al. (2017) pointed out, when only vertical integration in terms of in-termodality is considered. This will lead to increased overall quality and supply chain visibility. Giusti, R., et al. *Transportation Research Part E* 129 (2019) 92–11095 Instance, truck appointment systems can be used to organize and establish coordination between truck drivers in order to avoid empty truck trips and reduce emissions (Schulte et al., 2017). For this purpose, collaboration and data sharing must be coordinated so as to optimize benefits for all stakeholders without damaging the interests of others. (Riccardoo G. et al 2019)

As the name suggests, the aspects just discussed are essential in order to achieve the main feature of this model, that is, operations synchronization. This must always be taken into account throughout the supply chain in order to optimally use the available resources. One example that could help us understand the value of coordinated activities is linked to the practice of slow steaming, i.e. running ships at slightly below their maximum speed of travel to reduce emissions (Cariou, 2011; Lee et al., 2015). Slow steaming can be improved in synchronomodal transport networks to become smart steaming (Sea Digital Multichannel Network Motorways, 2017; MJC2, 2017), leveraging dynamic vessel speed changes based on real-time port congestion and weather information. For example, preparation services that run at medium speed help accelerate speed when a ship is late due to poor sea conditions or decelerate speed in order to avoid arriving at a congested port with many hours of waiting time. In addition, synchronization is a term that, besides transport, should also be applied to the entire supply chain such as inventory management and production

scheduling (Dong et al., 2018). In addition, to achieve win - win solutions, coordination between stakeholders and alignment of their resources need to be considered. For example, Guo et al. (2017) studied the implementation of synchronomodality into the global cold chain to understand its effect with regard to specific requirements (strict time constraints and temperature-controlled logistics operations, for example). To sum up, it is important to build a supply chain in which stakeholders collaborate and share information at different levels, allowing for more flexibility when delays occur to meet demand. The maximum use of available resources is the coordination of activities across the entire supply chain. Clearly, running a synchronomodal network instead of single entities working alone requires a great deal of effort and collaboration between stakeholders and synchronization of resources, even as it brings benefits such as improving efficiency, reliability, sustainability and revenue. Nevertheless, such features as teamwork and data exchange are considered crucial factors for improving efficiency and taking logistics to a higher level, thus helping to make synchronomodality an important precondition for efficient and sustainable transport in the future (Pleszko, 2012). (Riccardoo G. et al 2019)

#### **2.2.6.2. Critical success factors**

Pfoser et al. (2016) identified the key CFSs relating to synchronomodal logistics based on literature reviews and interviews with experts in the transport sector. They are as follows:

**Network, collaboration, and trust:** Because cooperation in synchronomodality is important, stakeholders can better integrate their networks to maximize the benefits. Building trust between players and managing their operations seems a challenge, especially when complete supply chain management relies on a third party (e.g. 4PL service provider). In this scenario, the main objective is to strike the right balance between competition and cooperation between stakeholders participating in the same company. (Riccardoo G. et al 2019)

**Sophisticated planning:** Increasing network complexity and real time data require dynamic network structure-based planning. From strategic to operational levels, when new information is available, maximizing decision-making needs to address such factors as user preferences, dynamic allocation of available resources, forecasting, and recalculation. In

addition, the design of infrastructure and services, as well as resource allocation and re-planning will consider the synchronomodality characteristics to create a robust network with a high level of flexibility and synchronization. (Riccardoo G. et al 2019)

- **ICT/ITS technologies:** The flow of information plays a key role in synchronomodal logistics, requiring complex ICT / ITS processes to gather and share data from the various parties following common standards. Data must be protected, and accessibility rights for all data have to be established for each stakeholder. Data should be collected automatically in a context strongly guided by data, where possible, and other technologies should provide the best use of data. (Riccardoo G. et al 2019)
- **Physical infrastructure:** Infrastructure network configuration needs to be reorganized to create smart hubs and corridors. The location of terminals and manufacturing sites alongside infrastructure design is critical for achieving synchronomodality objectives. (Riccardoo G. et al 2019)
- **Legal and political framework:** A key issue that may also affect other CSFs is the control of the new dynamics generated by synchronomodal logistics. For example, as there may be an unexpected modal change in synchronomodal networks, there should be a clear understanding of who is responsible in the case of any failure, disruption or delay. Information sharing should also be regulated to safeguard sensitive information. (Riccardoo G. et al 2019)
- **Awareness and mental shift:** In synchronomodal logistics, consumers will focus solely on simple decisions such as where to ship, estimated time of arrival and prices, thus allowing LSPs more flexibility to provide more reliable services in exchange. All supply chain stakeholders are therefore required to make a mental shift in order to understand the value of the sustainability and efficiency of the entire network so that they can respond when disruptions occur. (Riccardoo G. et al 2019)
- **Pricing/cost/service:** Because of the versatility needed in a synchronomodal network, which often offers advance information on the modes to be used, pricing services are more complicated, because prices are proportional to the modes chosen. In fact, synchronomodality pursues a higher quality of services while reducing, or at least keeping, comparable costs. (Riccardoo G. et al 2019)

From our perspective, given the importance of all of the CSFs mentioned, ICT / ITS technologies take on the role of a meta-CSF, allowing for any other. Those technologies were also identified in other studies as a prerequisite for other CSFs (see, e.g., Singhet al., 2016). For this purpose, we review the key enabling technologies for achieving synchromodal logistics in detail in the next section. R. Giusti, et al. Transportation Research Part E 129 (2019) 92–11096. (Riccardoo G. et al 2019)

### **2.2.6.3. Enabling technologies**

We selected six groups of technologies that have a relevant impact on CSFs. They are as follows:

**Traceability:** It is the identification and compilation of trade items and the documentation of the transit and operations carried out. (Riccardoo G. et al 2019)

**Intelligent systems:** work at merging the physical and digital worlds. They help people make informed decisions by offering features such as data analysis, optimization, and simulation. (Riccardoo G. et al 2019)

**Data analytics:** an important aid in taking informed decision. Predictive analytics can be used in the field of supply chains to predict patterns in the flow of goods as well as in terms of costs and service levels. (Riccardoo G. et al 2019)

**Optimization:** it mainly addresses the optimal use of resources at different levels, that is, strategic, tactical, and operational, and real-time. (Riccardoo G. et al 2019)

**Simulation:** it has the purpose of defining and simulating scenarios as a support for decision making. (Riccardoo G. et al 2019)

**Integration platforms:** they are intended to allow stakeholders to communicate, share data, and exchange business interactions, also embedding the previous technologies as services. (Riccardoo G. et al 2019)

However, before analyzing the benefits of the enabling technologies, we believe that a brief discussion about possible barriers to their adoption by companies is needed. Analyzing the technological trends in multimodal transportation Harris et al. (2015) have found three

categories of barriers to ICT implementation: user-related, technology-related, and policy-related. The first category includes economic, operational, and managerial barriers, such as the cost of implementing and maintaining technology solutions, the lack of ICT specialists, and the uncertainty about the return on investment. The second category encompasses incompatibility issues between ICT applications, the lack of ICT standards, security, and data protection. The last category concerns the lack of policies meant to facilitate new ICT adoptions, to coordinate and harmonize regulations on a national and continental level, and to define standards. (Riccardoo G. et al 2019)

## **2.3. Empirical Review**

### **2.3.1. Logistics Performance**

Almost everywhere, the successful logistics sector is now known as one of the core development enablers. It is believed that better policy execution leads to better results in the logistics. Policies include, for example, regulation of services; provision of transport infrastructure; introduction of controls, especially for foreign goods; and improvement of the quality of public-private partnerships (PPPs). (World Bank LPI 2018)

The policy emphasis has grown since the first LPI report came out in 2007. Logistics policies have previously tended to focus on facilitating trade and reducing border bottlenecks. Today, the interweaving of international logistics with domestic logistics is increasing. Policy makers and stakeholders handle a wide array of policies. Growing concerns include strategic planning; training skills and resources; supply chain sustainability in environmental, social, and economic terms; and supply chain resilience to disruption or catastrophe (physical or digital). (World Bank LPI 2018)

Overall, since the 2007 version, the score profile of the whole collection of over 160 countries has remained consistent, an indication of the robust nature of the underlying data. The modest convergence of scores from 2007 to 2014 was clarified in the 2014 edition by a perceived increase in low-and middle-income countries ' trade-supporting infrastructure and, to a lesser extent, their logistics.

For most countries being listed, this rationale seemed to be largely true. Nevertheless, in 2016 the difference continued to expand between the top and the bottom, with the highest

average score ever for the top 10 countries (4.13 on a scale from 1 to 5) and the lowest score since 2007 for the bottom countries. The gap between top and bottom performers again narrowed in 2018.

The average score fell to 4.03 for the top 10 countries, while the top 10 countries achieved an all-time high of 2.08. In 2018, high-income countries ranked in the top 10, eight in Europe plus Japan and Singapore countries that have historically dominated the supply chain industry. Germany are at the top, having scored 4.20.

The following nine countries ' scores are at a close interval, with Sweden in 2nd with a score of 4.05 and Finland in 10th with a score of 3.97. The 10 countries below are mainly low-income and low-middle-income countries or isolated areas in Africa. Some are weak, armed conflict-affected societies, natural disasters, and political unrest.

Others are landlocked countries that are naturally challenged in connection with global supply chains by geography or economies of scale. With a ranking of 1.95, Afghanistan ranks 160th, followed by Angola (2.05), Burundi (2.06) and Niger (2.07). Big economies like India (44th with a score of 3.18) and Indonesia (46th with a score of 3.15) and emerging economies like Vietnam (39th with a score of 3.27) and Côte d'Ivoire (50th with a score of 3.08) stand out as top performers among the low-middle-income countries. Most of these countries either have access to the sea or are in the vicinity of major transport hubs. (World Bank LPI 2018)

With China (26th with a score of 3.61), Thailand (32nd with a score of 3.41), and South Africa (33rd with a score of 3.38) leading the group, the composition of the top-performing upper-middle-income economies has changed marginally. They also improved their rankings in Romania, Croatia and Bulgaria. In this year's version, those in East and West Africa lead among the low-income countries. (World Bank LPI 2018)

Reliability in the supply chain is key to achieving logistics efficiency. Consignors in a global environment need a high degree of certainty about when and how deliveries are to take place. In general, reliability is far more important than speed, and many shippers are willing to pay a premium. In other words, the predictability of the supply chain is not only a matter of time and cost but also a part of shipment quality. (World Bank LPI 2018)

In the top quintile of the LPI, just 13 per cent of shipments fail to meet the same proportion of client efficiency requirements as in 2014 and 2016. By contrast, the two bottom quintiles fail to meet these requirements by two to three times as many shipments, and the consistency standards appear to be less strict in low-performing countries than in high-performance ones. This result highlights the unresolved logistics deficit from an overall perspective of quality and reliability in the supply chain. (World Bank LPI 2018)

The varying rate of change is also seen in the domestic trade and transportation infrastructure scores, where respondents were asked to assess how much these have changed since 2015. Satisfaction with quality of the infrastructure varies by form of infrastructure, as in previous surveys. Nonetheless, for the first time, the perceived change in the bottom quintile is higher than in the top, though the gap in the center of the distribution is lower. In all LPI quintiles respondents are highly satisfied with the infrastructure of information and communications technology (ICT). The infrastructure gap continues to narrow, particularly between the top and the bottom where the rate of improvement tends to be significantly faster. Improvement in middle quintiles is on a par with what was previously observed. Unlike ICT, rail infrastructure is still eliciting general dissatisfaction. Similar patterns appear when the World Bank region disaggregates the domestic LPI data on infrastructure, excluding high-income countries. ICTs in all regions are ranked top or very close to top. (World Bank LPI 2018)

The provision of good quality services is key to successful operations and their significance is that. The LPI has shown that quality of service drives logistics efficiency in virtually every economy. Nonetheless, the creation of specialized infrastructure, such as third-party or fourth-party logistics, involves pursuing a complex policy agenda, partially because those systems cannot be produced from scratch or developed solely at home. Manufacturers and retailers already outsource many of their simple logistics activities to third-party providers in logistics-friendly countries and concentrate on pursuing their core business while handling more complicated supply chains issues. This hand-off is reciprocal: the more reasonably priced these specialized services are available, the more shippers outsource their logistics. Nevertheless, the less efficient and robust services are available, the more in-house logistics will be handled by shippers. (World Bank LPI 2018)

The 2018 LPI survey shows demand for efficient supply chain management goes hand in hand with the success of the logistics. This is particularly true for environmentally sustainable (green logistics) services. 28 per cent of respondents suggested in the top quintile of LPI performers that shippers often or almost always ask for environmentally friendly choices. The share drops to 14 percent in the second highest quintile and falls gradually in the third quintile (9 percent), fourth (7 percent) and fifth quintile (5 percent). (World Bank LPI 2018)

The Connecting to compete report offering LPI ratings has pushed trade logistics squarely onto the policy agenda since its launch in 2007, even for countries that had not previously considered it. The findings of LPI were also used in many policy studies and articles prepared by multilateral organizations or the consultants they engaged. The results provide a general benchmark for logistics industry and logistics users around the world. The academic community has accepted the LPI findings, as demonstrated by the extensive use of LPI data in research reports, journal articles, and textbooks. The findings were also used in teaching, and the LPI has been cited by thousands of these at all stages. (World Bank LPI 2018)

Logistics is a logistics network that facilitates the physical movement of goods, cross-border trade and cross-border commerce. Logistics covers a variety of transportation-beyond operations including warehousing, storage, express shipping, and critical infrastructure facilities such as terminals. Competing international networks of increasingly multi-service logistics providers offer increasingly diversified solutions for transport, trade, and development. Nonetheless, the annual turnover that these global networks produce reaches 4.3 trillion USD. (World Bank LPI 2018)

Logistics ' position in the global economy is more accepted today than it was 10 years ago. Good logistics companies cut down on export costs. Logistics success is about how supply chains link businesses to domestic and international opportunities in an effective manner. The LPI attempts to capture how logistically open a nation is, or how well connected to the physical internet of global logistics is. It integrates several dimensions to be defined in the report. (World Bank LPI 2018)

Logistics is Business-to-Business (B2B): its operations are carried out mainly for private companies. For this reason, the LPI relies heavily on the expertise of the worldwide logistics professionals. Yet logistics success in every economy depends on the actions and policies of the public sector— that was the main message of the initial 2007 LPI report, and it remains true today. Public characteristics include regulation; transport infrastructure; the implementation of controls, particularly for international goods (such as trade facilitation); and the quality of public private partnership and dialogue. Past Connecting to Compete studies emphasized that better policies lead to better results in the logistics. (World Bank LPI 2018)

Since the introduction of the LPI, performance differences between low-performance and high-performance countries have continued, mostly in Europe and East Asia, where logistics has developed into a major service field. The importance of logistics-related policies in enhancing performance is more recognized today than in 2007, and the policy focus has evolved. Logistics strategies initially focused on promoting trade and eliminating border bottlenecks. Today it is difficult to separate these foreign logistics problems from domestic ones. Yet policymakers yet stakeholders are grappling with a wider range of initiatives, with stability and sustainability constantly in mind. The evolving policy issues include strategic planning, greening the supply chain and improving the supply chain's resilience to disruption or (physical or digital) disasters. And more focus has recently been given to the skills and training resources. (World Bank LPI 2018)

Holistic policies are called for by the growing reach of logistics success and increasing appreciation of its contribution to growth and economic integration. More and more countries, particularly emerging economies, see logistics as an economic sector that cuts across traditional logistics areas requiring consistent policy making. Past LPI studies related to many countries that have developed national strategies or dedicated logistics advancing organizations, such as Canada, China, France, Indonesia, Morocco, the Netherlands, and Thailand. (World Bank LPI 2018)

The World Bank's Logistics Performance Index (LPI) analyzes countries through six indicators:

1. The efficiency of customs and border management clearance.
2. The quality of trade- and transport-related infrastructure.
3. The ease of arranging competitively priced international shipments.
4. The competence and quality of logistics services.
5. The ability to track and trace consignments.
6. The frequency with which shipments reach consignees within the scheduled or expected delivery time.

The components were selected based on theoretical and empirical research and the practical experience of international freight forwarding logistics professionals. The figure maps the six LPIs into two main categories:

- Areas for policy regulation, indicating main inputs to the supply chain (customs, infrastructure, and services).
- Supply chain performance outcomes (corresponding to LPI indicators of time, cost, and reliability, timeliness, international shipments, and tracking and tracing).

The LPI makes use of common statistical techniques to combine the data into one predictor. A single metric can be used to compare different nations, regions and classes of income. Since on - the-ground operators are better able to assess critical aspects of logistics efficiency, the LPI relies on an online survey of logistics professionals from the companies responsible for moving goods around the world: global freight forwarders and big express carrier. Freight forwarders and express carriers are best placed to determine how countries are doing. Their views matter as they directly affect the selection of shipping routes and gateways, thereby affecting firms ' decision to locate production, select suppliers and select target markets. Hence their presence is essential to the consistency and reputation of the LPI. (World Bank LPI 2018)

High-income countries, most of which are in Europe, have held the top 10 slots in the LPI rankings over the last several years. Not shocking, as these countries were historically dominant in the supply chain industry. The composition of the 15 best performing countries has also not changed significantly. Yet significant changes in Japan, Denmark, the United Arab Emirates and New Zealand's LPI scores since 2012 are worth highlighting.

The bottom 10 ranking countries are mostly low-and lower-middle-income countries in Africa or isolated areas. These are either vulnerable economies plagued by armed conflict, natural disasters, and political unrest or landlocked countries inevitably hindered in connecting with global supply chains by geography or economies of scale. With China, Thailand, and South Africa leading the group, and Croatia and Bulgaria raising their LPI rankings, the overall group composition among the top-performing upper-middle-income economies has slightly changed. Big economies like India and Indonesia, and emerging economies like Vietnam are among the low-middle-income countries that stand out as top performers. Most of them either have access to the sea or are located near major transport hubs. Countries in East and West Africa are leading performers among the low-income countries in the 2018 Survey.

As in previous reports, the LPI scores are divided into four categories, consistent with the score quintiles used in all Connect to Compete editions:

- Logistics-unfriendly: Includes countries with severe logistics constraints, such as the least developed countries (bottom LPI quintile).
- Partial performers: Includes countries with a level of logistics constraints most often seen in low- and middle-income countries (third and fourth LPI quintiles).
- Consistent performers: Includes countries rated better on logistics performance than most others in their income group (second LPI quintile).

## **2.3.2. Dimensions of logistics coordination with Performance**

### **2.3.2.1. Mutuality Mode of coordination**

Coordination mutuality can be identified as the underlying values of responsibility among partners, with a strong emphasis on maintaining relationships to create successful goal achievement. (Togar M., et al., 2002)

The mutuality norm implies that each partner contributes significant values and is entitled to a fair distribution of the proceeds of the exchange. If the partners share shared accountability in achieving a better performance, collective responsibility is important. For example, the retailer and the distributor share common responsibility

for implementing the rapid response program as a strategy for reducing lead times and increasing the pace of product delivery to the market. In addition to joint responsibility for value creation, all partners share the mutual benefits resulting from prompt response such as reduced transportation costs and increased profit. (Togar M., et al., 2002)

Coordination mutuality is required to allow chain members to share clear understanding of the overall picture of end-to-end supply chain processes and progress emphasis (Goldratt, 1994). The visibility of demand details, for example, lets the chain members remove excessive inventories and supply goods and services according to actual demand (Simchi-Levi et al., 1999). (Togar M., et al., 2002)

Coordination mutuality can be divided into two main aspects, which is process complementarity and understanding coherence. (Togar M., et al., 2002)

#### **2.3.2.2. Complementarity of processes**

Complementarity refers to how the chain leaders collectively handle the value-creating interdependencies between the logistics activities. Interdependence is the degree to which one process relies on the other to attain the processes of producing total value. The complementarity concerns the control of distribution systems along the supply chain and the removal of economic obstacles such as benefit misalignment. (Togar M., et al., 2002)

Complementarities between activities lead to an increase in shared interests, such as increased sales and reduced logistical costs that the participating members will share. Likewise, both participants profit greatly from the complementarity of logistics systems across the supply chain. When chain leaders synchronize value creation decision making to ensure a smooth flow of goods and services, and organize the profit sharing associated with enhancing logistics, they are likely to form complementarity. (Togar M., et al., 2002)

### **2.3.2.3. Coherency of understanding**

Coherence refers to the degree of consistency of thinking by diffusion of common understanding across organizational boundaries. The chain members need to exchange information and knowledge that can be used to make sense of process interdependencies and handle challenges along the supply chain to meet the requirements for coherence. Lissack and Roos (2001) Verify that companies need to find ways to make sense of their position in a chaotic environment in order to create a consistent outlook and practice. Coherence can be seen as aligning meaning, point of view, intent and behavior to achieve the shared goal through information sharing and mutual learning. For example, when market and technology awareness is distributed in meaningful ways, chain members may manage product development processes to get new products launched on time. (Togar M., et al., 2002)

### **2.3.2.4. The Focus of Coordination**

Coordination relies on both operational and organizational linkages. Linkages occur when actions performed by one chain member influence other chain member's activities or outputs. Thus, relations are the interfaces between companies where members of the chain need to coordinate their joint decisions. Operational linkages concentrate on incorporating interdependent systems and flows of knowledge that provide stakeholders with ways to carry out logistics preparation and regular transactions. Recognizing institutional linkages helps chain members to contribute to the organizational decision-making process and become involved. Organizational linkages consist of interconnected actors who interpret and contend in carrying out collective action over their own interests. Enhancing organizational linkages helps us to understand collaboration practices and resolve facts. Both linkages provide the basis for successful teamwork. (Togar M., et al., 2002)

### **2.3.3. Overview of Logistics Sector**

Economic growth of Ethiopia has resulted in an increase in the demand for import of goods for Investment, trade, and development projects. Local trade has also been increasing in

the same ratio as the economic growth. In the same manner the importance of effective logistics is becoming a great importance. Although it is believed that logistics performance is of a great importance; Ethiopia has been losing quite a huge sum of money due to inefficiency of the logistics performance. The government of Ethiopia is the huge importer of selected commodities into the country. The government pays more than 6 billion birr to purchase fertilizer, crops, coal and sugar. The stated sum includes port dues, port clearance and haulage fees into Ethiopia. But due to logistics performance the government is forced to pay 25 – 40 million birr for port storage (Demurrage fee). It has been evidently seen that logistic inefficiency leads to huge cost. (F.D.R.E. National Logistics Strategy 2011 – 2020E.C.)

The logistics of our country is going through a rough road due to the nature of the logistics system the country is following. This path has been the sole source for the inefficiency of logistics operation. The logistics problem has emerged from the national logistics policy, logistics infrastructure, and logistic actors operating problems, the inefficiency of logistics service users and other reasons. The Ethiopian Government is working to resolve these problems which arise from inefficiency of actors and unnecessary bureaucracy of the system. The government has planned to build better infrastructure better operating system and set policy and procedures that boost the logistics performance. The government has also given greater emphasis for the implementation of logistics coordination. And set national logistics strategy to create logistics coordination within the actors in the logistics industry. (F.D.R.E. National Logistics Strategy 2011 – 2020E.C.)

#### **2.3.3.1. Logistic Coordination of Ethiopian Logistics Sector**

Ethiopian National Logistics Strategy manually clearly states that the country's logistics sector has a serious problem. Due to the inefficiency and problems of the logistics sector, the country is and has been losing a huge sum of money. The major problem stated in the document are bureaucratic system, poor infrastructure, and lack of coordination among the operators and the government bodies including in efficient customs procedure. Overall, the logistics nationally strategy clearly states that there is no horizontal coordination between government bodies that operate within the logistics sector. And these government offices

have also lacked the capacity to give efficient service. (F.D.R.E. National Logistics Strategy 2011 – 2020E.C.)

Despite lack of coordination among the operating bodies in the logistics sector. The logistics sector has the following problems: shortage of transportation and inefficient management, poor road infrastructure, shortage, and lack of information management infrastructure. The Ethiopian Government has set strategic goals to resolve the problems by building infrastructures, training better and competent employees and setting better system to operate the sector. (F.D.R.E. National Logistics Strategy 2011 – 2020E.C.)

#### **2.3.4. Literature Gap**

Different researches have been conducted on the logistics Coordination focusing on the logistic activities of firms. But no research is conducted on emphasizing the freight forwarding and customs clearing sector. Consequently, the aim of this study is to further develop the understanding of the effect and relationship between logistics coordination and operational performance in the freight forwarding industry.

#### **2.4. Conceptual framework of the study**

The purpose of this study is to assess the impact of logistics coordination in the case of Green International Logistics services plc. This research aims at evaluating the logistics activities of the company with specific focus on the customs clearance and freight forwarding activities of the company under case study. The intention of the research is to:

- Critically review and identify the key generic factors that affect the performance of the activities that are customs clearance and freight forwarding activities of the firm.
- Critically review and identify the existence of coordination among interacting parties with the firm.
- Set direction as to how stake holders and independent parties in the area coordinate towards achieving better performance.
- Carefully evaluate measure and analyze the dependent and independent variables of the research that are shown in the below figure (Figure4).

The mode of inquiry utilized for this paper is interpretative, the methodology is both quantitative and qualitative research disclosure and the method consists of literature review, Survey reports and critical self-reflection as actors in the logistics sector.

Figure 4. Proposed Conceptual Framework

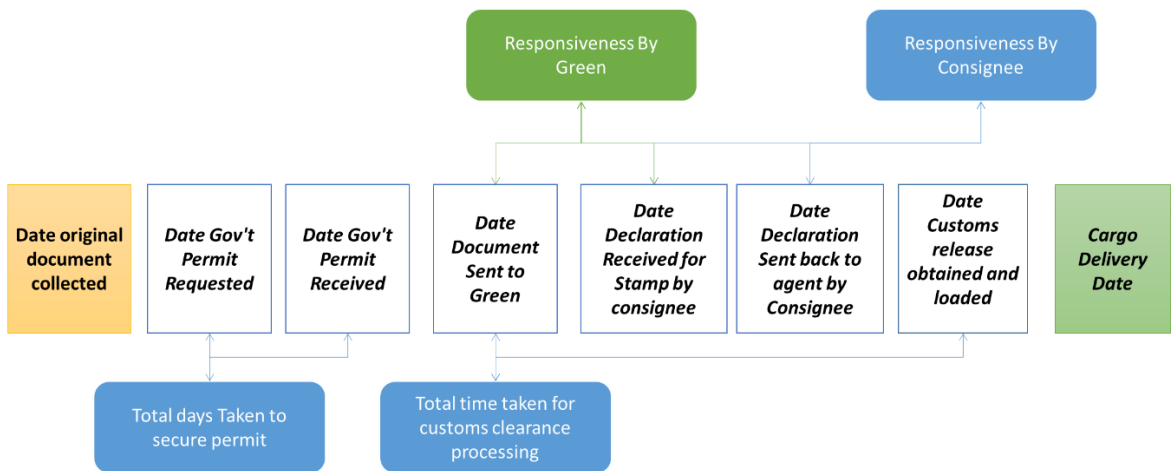
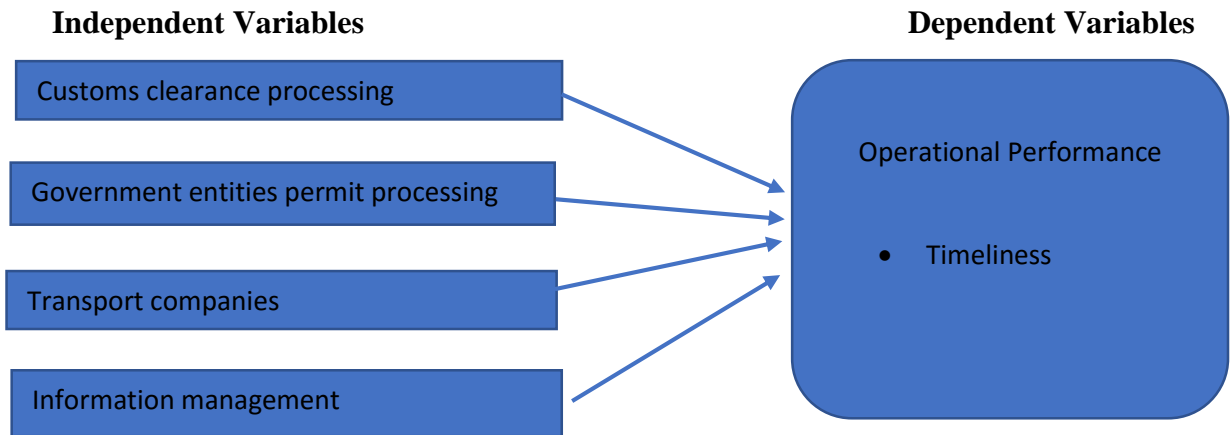


Figure 5: Air Shipment survey data content

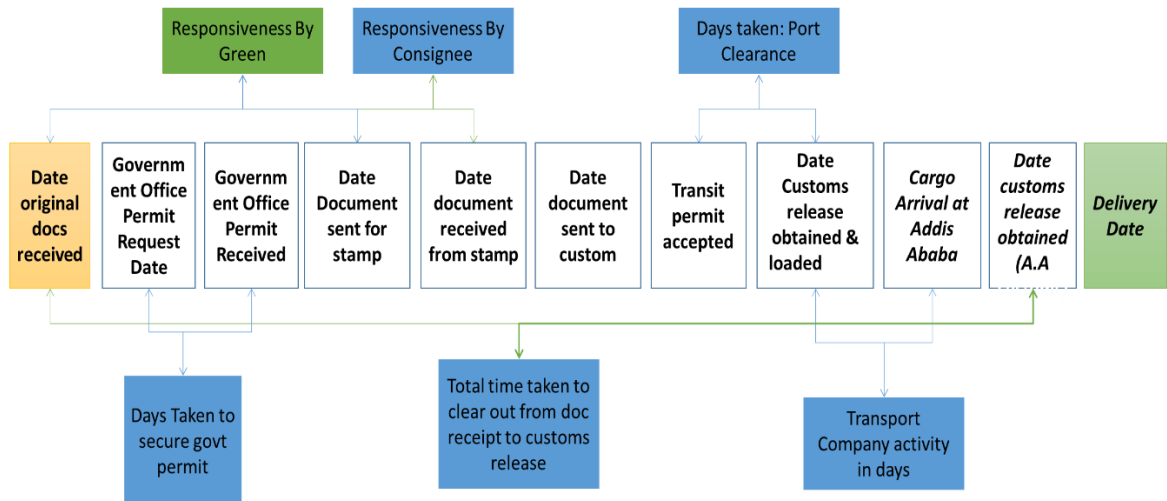


Figure 6: Sea Shipment survey data content

## 2.5. Hypothesis

Effects and level of coordination of customs commission, government offices that give their permit for the fulfillment of customs clearance activities, transport companies and port processing have been analyzed through survey result.

### 2.5.1 Coordination with government offices

Government office that give permits to fulfill requirement for customs clearance processing play a crucial role in the logistics activity. It is assumed that efficiency of government offices has a direct impact on the timely completion of customs clearance of cargoes. Level of coordination of government offices with each other is measured through days Taken to Secure Permit from Government offices as requirement for clearance processing. Therefore, days required to secure permit from government offices has direct positive relationship to timely completion of clearance processing of consignments.

**H1 = Days required to secure permit has direct effect on the Total days required to complete the task.**

### 2.5.2. Coordination with Customs Commission

Customs commission coordination with Green international is measured through the total days it takes to finalize customs clearance of consignments/shipments. It is assumed that customs commission's smooth operation will enable Green International to finalize

customs clearance processing on timely manner. Days required to finalize customs clearance processing has direct impact on total days taken to complete customs clearance task.

**H2 = Days required for customs clearance processing has direct effect on the Total days required to complete the task.**

#### 2.5.3. Coordination within Green

In order to perform well Green International must organize and coordinate itself for accomplishment of better performance and timeliness. It is assumed that internal coordination of Green has direct effect on total days taken to complete customs clearance task.

**H3 = Internal Coordination with in green and consignee has direct effect on the Total days required to complete the task.**

#### 2.5.4. Responsiveness by consignee

Responsiveness of the consignee is measured with the intent to check the effect on the total days taken to complete customs clearance task. The contribution of the consignee on the customs clearance processing is endorsing of document (Customs Declaration) and returning it to Green International on time. Since this action can be done instantaneously it is believed that responsiveness by the consignee has no direct effect on total days taken to complete customs clearance task.

**H4 = Responsiveness by consignee has direct effect on the Total days required to complete the task.**

#### 2.5.5. Responsiveness by Green International

Responsiveness of the Green International is measured with the intent to check its effect on the total days taken to complete customs clearance task. The contribution of Green International on the customs clearance processing is receiving of documents from consignee, preparing and sending customs declaration document, collection of endorsed declaration from consignee and following up with customs. It is believed that responsiveness by the consignee has no direct effect on total days taken to complete customs clearance task.

**H5 = Responsiveness by green has direct effect on the Total days required to complete the task.**

#### 2.5.6. Coordination with Transport Companies

Activities of Transport Companies are significant in the sea shipments as their service is the haulage of shipments from Djibouti to customs check point with in Ethiopia. It is believed that the activities of transport companies has direct impact on total days taken to complete customs clearance task.

**H6 = Transport Company required date has direct effect on the Total days required to complete the task.**

#### 2.5.7. Coordination with Port

Port Authorities are considered an independent actors in the logistics industry. Since all sea shipments pass through port clearance processing. It is assumed that dates required for port clearance has direct effect on the total days required to complete the task

**H7 = Dates required for port clearance has direct effect on the total days required to complete the task**

## **Chapter Three**

### **Methodology of the study**

#### **3. Introduction**

As discussed in the previous parts of this paper; logistic coordination is a mandatory process in the logistics activity. For both Macro and micro level achievements logistic coordination plays vital role. With the quest to fulfill the intents of this study; this chapter gives a clear path on how to walk through each step of gathering data, analyzing it and interpreting by also clearly showing the research area, approach and design.

#### **3.1. Description of research area**

Ethiopia is a landlocked country with its most of its import and export sea shipments using sea port located in Djibouti. Due to the recent economic growth of the country, business activities has shown significant increase which took the government attention to work on boosting the performance of the logistics sector. Currently the countries logistics performance is poor which is characterized by mainly untimeliness, unable to trace shipments and costliness.

This research is a case study assessing the logistics activities of Green International Logistics plc. The company understudy is a firm engaged in customs clearance, freight forwarding, packing and moving of cargoes within the country as well as to abroad destinations. This research covered the area where the company under assessment is engaged in freight forwarding activity. The remaining activity of the company was not covered in the assessment. Therefore, the research area was on the analysis of these activities through questionnaire and survey of custom clearance and freight forwarding operations of Green International.

#### **3.2. Research Approach**

This research takes use of both qualitative and quantitative approach as it bases its analysis based on statistical data, statistical analysis methods and analysis of findings from questionnaires which were quantitative approach. The research focused on survey results

that show how the logistics activities of the company under case study perform its logistical activities especially in the freight handling/ forwarding activities.

Through statistical analysis of data, the research tried to show the impacts of logistics coordination, develop framework for coordination activities, and show how firms can attain efficiency by coordinating its logistical activities.

### **3.3. Research Design**

Research design is the framework of research methods and techniques chosen by a researcher. The design allows researchers to improve in on research methods that are suitable for the subject matter and set up their studies for success. (<https://www.questionpro.com/blog/research-design/>)

Among the types of research designs the researcher found descriptive design the most appropriate design for the subject case study. In a descriptive design, a researcher was solely interested in describing the situation or case under their research study. It was a theory-based design method which was created by gathering, analyzing, and presenting collected data. This allowed the researcher to provide insights into the why and how of research. Descriptive design helps others better understand the need for the research as well. Therefore, descriptive research design was chosen for this case study. (<https://www.questionpro.com/blog/research-design/>)

This study employed descriptive research design, because it aims to show the what, how and why of the reasons behind the untimeliness of delivery of shipments. The study carefully selected the variables that affect the logistics performance and tried to clarify the sequence of set of stages.

### **3.4. Population**

The research aims to assess the impacts of logistics coordination by analyzing the activities of the selected company (Green International Logistics Plc.). For this purpose, data was collected from managers or supervisors of customers of the Green International through questionnaire, and survey of customs clearance and freight forwarding has been conducted. The research activities conducted survey and observes 143 air and sea shipments (carried

under uni-modal service) that Green International Logistics custom cleared and forwarded cargoes from Djibouti. In order to back up some outcomes; questionnaire was collected from managers/supervisors of customers of Green International. Population of this research questionnaire comprise of customers who had been served by Green International with in time frame from January 01, 2019 up to December 31, 2019. A total of 62 companies have been found to be serviced by the company in the specified time frame. These customers are customers that have consigned their shipment to be custom cleared, forwarded freights and cargoes moved by the company under study. The researcher aimed to measure and analyze the existence and degree of coordination of the logistics activities of the company under study.

In the research process the researcher gave priority to questions that were closer to logistics coordination activities.

### **3.5. Data sources & types**

Data is collected from both primary and secondary source.

Primary data: - is collected through questionnaire, and survey report.

Secondary data: - included company internal reports or daily customs clearance and freight forwarding activities reports.

### **3.6. Data Collection Procedures**

The research focused on collecting quantitative data in order to assess the impacts of logistics coordination. For this, the research based on the assessment of survey reports, company records and feed backs on questionnaires from customers. The information/data needed for the research were the time taken to perform each logistics activities from receipt of documents of assigned jobs from clients to custom clearing and delivering of the cargo to clients. In order to collect this data, the research used survey report which was referring on daily custom clearance and freight forwarding activities of Green International, company records and also feedbacks on questionnaires from managers/supervisors of customers of the company.

### **3.7. Ethical Consideration**

From the ethical consideration point of view all the information that was collected from the survey and interview was consumed for this academic purpose and it will not by any

means be transferred to the third party. The analysis of the data was maintained based on the scientific and empirical findings without any biasness.

### **3.8. Data Analysis**

The researcher employed descriptive data analysis method to analyze the collected data. The data collected through questionnaire was analyzed by SPSS version 20. The data collected from field work through questionnaires and survey data collected from customs clearance and freight forwarding activity reports mainly involved six major activities namely, data preparation, counting, grouping, and statistical testing (descriptive statistics). The analysis was carried out depending on each specific objective.

## **Chapter four**

### **Analysis and Discussion of Results**

#### **4.1 Introduction**

As stated in the previous part of this thesis, this chapter presents the results and related analysis of the data on the effects of Logistics Coordination on the operational performance of Green International Logistics Services Plc. In addition, this chapter presents the findings of the study and discussions on the outcomes. The findings are intended to answer the study's research questions. The data analysis is conducted using a triangulation of techniques: descriptive analysis, correlation matrix, and linear regression analysis. The data was analyzed using Statistical Package for Social Science (SPSS v.20). Based on the methodologies, research design and tools of the study the questionnaire data was collected from 48 respondents. A total of 56 questionnaire were distributed and only 48 were returned, this represented an 85% response rate. This is a reliable response rate for data analysis as per Mugenda (2003, p.91) pointed that for generalization a response rate of 50% is adequate for analysis and reporting, 60% is good and a response rate of 70% and over is excellent. Additionally survey data collected from company's daily activity report for 143 Air and Sea shipments clearance processing is analyzed.

#### **4.2 Response Rate and Demographic Data**

Including demographic profile of respondents on the questionnaire or in the collected data helps to make sure whether the respondents represent the target population. It also enables to validate reliability of the data collected. For the stated reason, respondents were required to give their gender, age, their educational status, their occupational level within the organization, their year of experience with the company under study and the like. The findings are processed by SPSS and summarized as follows. Hence, this section presents the respondents demographic profiles from the 48 questionnaires gathered.

##### **4.2.1. Gender of the respondents**

Gender of respondents was considered in the data gathering. As perception to things differ among genders. The researcher included gender with the intention to differentiate the effects of gender toward perception of the surrounding.

The results from the below Table 1. Indicates that majority of the respondents 60.42% are Male, whereas 39.58% of the respondents are Female.

Table: 1 Gender of respondents

	Frequency	Percentage	Valid Percent
<b>Male</b>	29	60.42	60.42
<b>Female</b>	19	39.58	39.58

#### 4.2.2. Age group of respondents

Respondent's age was considered in the data gathering. The researcher included the age group in the study with the intent to see whether age group difference affects judgment to surrounding situations.

The result from Table 2, indicate that majority of the respondents 47.91% (n=23) are between the age group 35 and 45, whereas age group between 25 – 35 years of age respondents are second highest result gathered with result 33.33%(n=16). While the remaining 17% (n=8) is between the age group 45 - 55 and one respondent is above 55 years of age.

Table 2. Age group of respondents

	Frequency	Percentage	Valid Percent
<b>25 - 35</b>	16	33.33	33.33
<b>35 - 45</b>	23	47.91	47.91
<b>45 - 55</b>	8	17	17
<b>&gt; 55</b>	1	2.08	2.08

### 4.2.3. Education level of respondents

Respondent's educational level is another demographic data that was collected in the data gathering. The researcher included educational level in the study with the intent to check the capacity of respondents with regard to their educational status.

The result from the Table 3, indicate that majority of the respondents 62.5% (n=30) are Bachelor degree holders, whereas respondents with Master's degree holder are 18.75% (n=9), while the remaining 14.58% (n=7) are diploma level and 4.17% (n=2) are doctorate level. It can be inferred from the finding that respondents are well educated to understand the aim of the research and value of the questions to the research and believed to give reliable and valid response to the questionnaire.

Table 3. Educational level of respondents

	Frequency	Percentage	Valid Percent
<b>Diploma or Less</b>	7	14.58	14.58
<b>Bachelor degree</b>	30	62.5	62.5
<b>Master's Degree</b>	9	18.75	18.75
<b>Doctorate degree</b>	2	4.17	4.17

### 4.2.4 Position of the respondents in the organization

Job position of participants is one demographic variable which was considered in the study. The researcher included the job position in the study to make sure that respondents belong to managerial position.

The result from Table 4, indicated that the majority of the respondents 47.92% (n=23) were Middle level, whereas 31.25% (n=15) were Lower/Supervisory level. The rest of the participants were High level position 20.83% (n=10). In terms of the respondent's position in the sector, the majority of the respondents were middle level. Consequently, the respondents were appropriate to collect data about the day to day activities of Green International's operation performance as they know how long it takes to process clearance and at what level or place processing takes long time as well as other factors such as responsiveness.

Table 4. Position of the respondents in the organization

	Frequency	Percentage	Valid Percent
<b>High Level</b>	10	20.83	20.83
<b>Middle Level</b>	23	47.92	47.92
<b>Low/Supervisory Level</b>	15	31.25	31.25

#### 4.2.5 Respondents direct job relation with Green

The researcher requested respondents to indicate if their job has direct contact with Green International in the organization they are working. As portrayed on the below Table 5. Majority (95.83%) of the respondent's job was at a position that directly makes them work with Green International, 4.17% (2) respondents do not work directly with Green International. This implies that all respondents that were targeted by the study were involved while the remaining few do not work directly with Green.

Table 5. Respondents department

	Frequency	Percentage	Valid Percent
<b>Yes</b>	46	95.83	95.83
<b>No</b>	2	4.17	4.17

#### 4.2.6 Years of Experiences of the Respondents with Green

Respondents experience is critical to obtain a wise and objective response. The table 6 below depicts the years of experience of respondents with Green International. The majority of the respondents worked with Green International for 6 to 10 years, comprising 43.74% (n=21) of the total participants, twenty (20) respondents i.e. 41.67% has worked with Green International for 5 and less years, whereas only 14.59% (n=7) worked with Green International for 11 to 15 years and no respondent has worked with Green for more than 15 years.

Table 6. Experiences of the Respondents

	Frequency	Percentage	Valid Percent
<b>&lt;= 5 years</b>	20	41.67	41.67
<b>6 - 10 years</b>	21	43.74	43.74
<b>11 - 15 years</b>	7	14.59	14.59
<b>&gt; 15 years</b>	0	0	0

### 4.3 Results or Findings

#### 4.3.1 Data editing and coding

Following data collection from the customers of Green International at different level editing of the data was undertaken to avoid omission, completeness, and ensure consistency of the data. Editing is part of the data processing and analysis (Zikmund 2003, p.53). There were no missing data for all measurement items in the constructs for the conceptual model and general information section. Coding was used to allocate numbers to each answer (Malhotra 1996, p.39) and facilitates the transfer of data from the questionnaire to SPSS version 20. Coding can be done before the questionnaire is answered (pre-coding) or after (Devaus 1995, p.23). In this thesis, the coding procedure was conducted by establishing a data file in SPSS, and all measurement items were all pre-coded with numbers (see survey questionnaire in Appendix 1).

#### 4.3.2 Data screening

In order to avoid inappropriate solution/results that could occur due to the estimation methods used to assuming specific conditions and the violation of these assumptions; data screening is done prior to the main statistical analysis (Kline 2010, p.19). In this section, data screening was conducted from two perspectives namely missing data analysis and Outliers & normality.

##### 4.3.2.1. Outliers and normality

Correlation analysis and regression analysis both require variables to be normally distributed. Therefore, the data were assessed to determine normality of distribution. (Hair et al. 2010, p.124).

Examination results portray the normal probability plots of the residuals which depict a normal distribution of the values and meet the assumption of normality. The data was further assessed to check the presence of outliers. Hair et al., 2006, p.64 defined outliers as data results that have a unique combination of characters which makes them distinctly identifiable from among other observed results. These outliers could also be divided into two different categories as uni-variate outliers and multivariate outliers (Hair et al., 2006). Since the questionnaire used Likert-Scale in which all variables are on ordinal scales with five intervals uni-variate outliers do not exist in this study.

The gathered data were assumed to be normally distributed. However, tests have been made to confirm the assumption is correct. Basically normality can be measured by two indicators which are skewness and kurtosis test results. Skewness results portray whether the distribution of responses are heavily concentrated on one end of the scale or not. Deviation from the normality of distribution can be determined using skewness and kurtosis. Skewness means the measure of evenness of a distribution and mostly the comparison is made with regards to a normal distribution. While Kurtosis is a different mode of measure that enables to check of a distribution is flat or peaked. Datas that are either tightly or distantly distributed around the mean have kurtosis issues.

**Table 7. Skewness and kurtosis result**

	<b>N</b>	<b>Std. Deviation</b>	<b>Skewness</b>	<b>Kurtosis</b>	<b>Standard Error</b>
Information Management	47	1.02137132	-0.381929	-0.36456063	0.14742225
Customs clearance processing efficiency	47	1.05305724	-0.74686557	0.155523506	0.15360419
Gov't bodies permit processing	47	0.98365498	-0.3401253	-0.31616826	0.14197837
Transport company service performance	47	1.02137132	-0.381929	-0.36456063	0.14742225

The data was further assessed for any skewness and kurtosis in the distribution. The best way to check the skewness and kurtosis is to examine results with Fishers skewness and kurtosis coefficient (kellar and kelvain 2012, p.56). If the result falls between -1.96 and 1.96, it suggests that the distribution is not significantly different from normal distribution

(kellar and kelvain 2012, p.87). Table 7 show that, the study result lies between -1.96 and 1.96Fishers coefficient of skewness and kurtosis. Therefore the data is free from any skewness and kurtosis issues. A variable with an absolute value of Kurtosis index greater than 10.0 indicates there is a problem with normality and values greater than 20.0 indicate a more serious normality problem (Kline 2005, p.11). Therefore, the acceptable absolute value of skewness and kurtosis should not exceed three and ten respectively and the study results were also in the acceptable range.

#### 4.3.2.2 Reliability analysis

After uni-dimensionality is determined, reliabilities can be estimated for each construct. The scale reliability feature of SPSS version 20 was used to determine reliabilities for each construct using Cronbach's alpha. Table 8 shows the reliabilities of final constructs.

**Table 8. Cronbach's Alpha result of all items**

Cronbach's Alpha	N of Items
0.9306	21

The Cronbach's Alpha result of 21 items was 93 % and it has alpha value on acceptable reliability range.

Cronbach's Alpha	Internal Consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

Table 9. Cronbach's Alpha result of variables

	<b>Cronbach's Alpha</b>	<b>N of Items</b>
Information Management	0.8670	7
Customs clearance processing efficiency	0.7937	5
Gov't bodies permit processing	0.8429	4
Transport company service performance	0.8819	5

The information management has reliabilities of 0.867 which are above the recommended value of alpha (0.7) , custom clearance processing efficiency have reliabilities of 0.79, Gov't bodies permit processing has reliability of 0.8429, and Transport company service performance has reliability of 0.8819 which makes all acceptable.

### **4.3.3 Results**

This section explains and discusses the results of findings based on the analysis done on the survey data. The results of the study were discussed by analyzing the different source of results: questionnaire results, and survey data review results. Consequently, this section investigates and analyzes the necessary assumptions for further statistical analysis and then presents the results of descriptive analysis and ANOVA analysis. The discussion attempts to accomplish the objectives of the study and answer the research questions.

Descriptive statistics is the term given to the analysis of data that helps to describe, show or summarize data in a meaningful way. It is very important because if we simply presented our raw data it would be hard to visualize what the data was showing, especially if there was a lot of it (Kline 2010). Descriptive statistics therefore enable us to present the data in a more meaningful way, which allows simpler interpretation of the data.

Measures of central tendency describe the central position of a frequency distribution for a group of data (Kline 2010). The central position is described by using a number of statistics, including the mode, median, and mean. Measures of spread helps to summarize a group of data by describing how spread out the scores are. To describe this spread, a number of statistics are available to us, including the range, quartiles, absolute deviation, variance and

standard deviation. The study was focused on mean and standard deviation to describe central position and data spreading pattern.

As indicated in the previous chapter, the research aims at analyzing the actual customs clearance and freight forwarding processes from the daily activity reports of the company and survey was done to back up the findings from the data. This process is adopted by the study to investigate the level and effect of logistics coordination between Green and concerned parties. To this end, the results obtained from the survey were analyzed using Statistical Package for Social Sciences (SPSS Version 20.0) program through descriptive statistics and inferential statistics such as correlation and regression. The descriptive statistics part was analyzed using means, standard deviation, and percentage.

#### **4.3.4. Descriptive Analysis of Questionnaire**

To assess the effect of logistics coordination on operational performance, respondents were requested to rate the level of agreement using a Five-point Likert scale (1=strongly disagree, 2= Disagree, 3= neutral, 4= Agree and 5= strongly agree. The mean statistical values of the items were based on the 5 point Likert scale and illustrated through the following assumptions: if the mean (M) score is below 2.5 it implies that the respondents disagree with the statement, if the mean score is equal to 2.5 it indicates that the respondents prefer to stay Neutral, and finally if the mean score is above 2.5 it implies that the respondents agree with the statement. A standard deviation of  $>0.9$  implies a significant difference on the supply chain integration practices of the variable among the respondents. The tables below summarized the mean scores of the variables of supply chain integration practices. Accordingly, the mean scores have been computed for all the three supply chain integration dimensions that includes external integration, information integration, internal integration and also the dependent variable operational performance by equally weighting the mean scores of all the items under each dimension. The average mean results of each supply chain integration dimension together with their respective variables was separately presented, analyzed, and interpreted as follows.

##### **4.3.4.1. Information management**

Table 10 summarize respondents' level of agreement on information management of the organization (Green International Logistics). Most of the respondents responded that, the

organization's departments involved in the engagement of customs clearance and freight forwarding processes by a mean score of 4.021 and SD of 0.9667 which is the highest of all information management to sudden change response. The respondents also agreed that the organization has strong coordination with customs and other government offices; moreover, it constantly sends reports and updates of status of shipments (M=3.936 and SD=1.030). Most of the respondents agree that Green has common and computerized data base system, which gives transparent service to the customers by a mean score of 3.425 and SD of 1.1748 and Green has competent and professional employees, and constantly works to improve its service by conducting surveys and analysis on its efficiency (M=3.872 and SD=0.9694). Green International finalize clearance processes and delivers with in fixed time frame M=3.765 and SD=1.0675.

Generally, the sector need to be further coordinated to take the issue of information management to its optimal improvement. As it difficult to achieve best quality of service with the observed few scores higher than average value given for information management analysis.

Table: 10 Mean value of information management

	<b><u>N</u></b>	<b><u>Mean</u></b>	<b><u>SD</u></b>
Green International has strong coordination with customs and other government offices;	48	3.93617	1.030
Green International constantly sends reports and updates of status of shipments clearance status	48	3.76595	1.067
Green International finalize clearance processes and delivers with in fixed time frame	48	3.87234	0.969
Green has competent and professional employees,	48	4.02127	0.966
Green International constantly works to improve its service by conducting surveys and analysis on its efficiency	48	3.42553	1.175
Green is highly responsive to sudden changes	48	3.89361	1.026
Green has common and computerized data base system, which gives transparent service to the customers.	48	3.27659	1.136
<b>Mean of Mean</b>		<b>3.74164</b>	

#### 4.3.4.2. Customs clearance processing efficiency

The other dimension that coordination level is assessed is by analyzing the level of coordination with customs. Efficiency in the customs clearance processing is the direct reflection of the coordination between Green and customs commission. The research has analyzed the coordination between consignee, government offices, and Green international. The research takes four perspectives to assess the level of coordination of customs with Green by taking awareness of customs policy and procedure changes ahead of time and for Green passing through eased customs clearance processing.

Table: 11 Mean value of Customs clearance processing efficiency

	<u>N</u>	<u>Mean</u>	<u>SD</u>
Green International is aware of customs policy and procedure changes ahead of time and passes through eased customs clearance processing	48	3.9362	1.030
Green International passes through eased customs clearance processing	48	3.7659	1.067
Green constantly finishes customs clearance and processing at uniform and standard time period	48	3.8723	0.969
Green International instantly solves issues and problem encountered with customs regarding customs clearance processing of shipments	48	4.0213	0.966
Customs commission is keen to hold meetings with freight forwarders and importers	48	3.4255	1.175
<b>Mean of Mean</b>		3.8042	

The table 11 above shows that the respondents agree the existence of awareness of customs policy and procedure changes ahead of time with the mean score of (M=3.936 and SD=1.030). Correspondingly, the respondents agree on finishing customs clearance at uniform and standard time (M=3.766 and SD= 1.067). The respondents also expressed their agreement on the problem solving which is encountered with customs clearance processing (M=3.872 and SD=0.969). Finally, it is found out that respondents agree on customs commission keen interest in holding meetings with Green and other counterparts (M=4.021 and SD=0.966).

The overall finding on the customs clearance processing efficiency show that there is communication flow both ways between Green and Customs commission and there is eased, uniform and standard time period to finalize clearance processing and problems are easily solved and there is keen interest between parties to hold meetings and address their issues. As It is known Customs commission set firm directives and policies in its operation procedure and companies such as green are required to abode and follow the route. The researcher believes that the results achieved could be the direct result of the firm standing policies and procedures set by Customs Commission.

#### **4.5.1.3. Government Bodies permit processing for fulfillment of customs commission clearance process requirement**

The next independent variable on the study is to assess the coordination between Green and other government bodies that give their permits for customs clearing processing. And days required securing permit from gov't bodies. Every shipment require permit from gov't offices. Proper information utilization and staffing will lead to greater coordination and optimized solution that result to growing impacts on the timely delivery (speedy processing).

Table 12. Mean value of Government bodies permit processing for fulfillment of customs commission clearance process requirement

	<b>N</b>	<b>Mean</b>	<b>SD</b>
Green International processes and finalizes permits in standard and uniform time frame with Government bodies	48	3.458	0.824
There is information exchange between Customs Commission, Other Government Bodies that issue permits and with Green/ freight forwarding companies	48	3.354	0.999
There is linkage and effective communication with customs commission, other government bodies and Green International or similar freight forwarders	48	3.25	1.021
Government Bodies permit processing is traceable at all levels	48	2.562	1.089
<b>Mean of Mean</b>		<b>3.156</b>	

The table above depicts that respondents give positive feedback on timely and uniform processing of permits with Government bodies (M=3.458333333, SD= 0.824061899). They agreed that there is information sharing between customs and other concerned government bodies (M=3.354166667, SD=0.999778344). They also responded that there is effective communication with customs, other government bodies and freight forwarding companies such as Green International (M=3.25, SD=1.02105494) and permit processing with Government Bodies is traceable at all levels (M=2.5625, SD=1.089724736).

Generally, respondents give positive feedback on Permit processing with Government Bodies for fulfillment of customs clearance processing. The effectiveness in issuing permits by government bodies positively affects in shortening the total time customs clearance processing takes. And information sharing and good communication between government bodies and between freight forwarders will play a vital role in solving unusual events that may block or hold up the customs clearance processing. Enabling traceability of permit processing will also play a huge role as concerned parties can estimate and work to minimize time spent in processing. So far, the respondents feedback show that they believe these things are present.

#### **4.3.4.3. Transport Companies Service Performance**

As it is clearly stated on the previous parts this research focuses on the activities of Green International from the point cargo arrives at the destination airport and cargo arrival at discharge seaport (Djibouti). The research tries to assess the challenges and setbacks that result in the inefficiency of Green's customs clearance and freight forwarding activities. One of the participants in the stated activity are Transport companies. Transport companies are one of the major contributors in the freight forwarding and delivery of shipments. Therefore, coordination with these companies play a crucial part in the logistics operation performance. With this intent the research tries to assess the existence of logistic coordination and level of coordination the researcher collected the following response results.

The below Table shows that respondents agree Transport Companies provide uniform service and deliver cargoes in specified time (M=3.458333333, SD=1.009704683).

Regarding transport companies' coordination with Green International; respondents agree that there is coordination (M=3.75, SD=0.887262105). Respondents agree that Transport Companies Service level is Traceable at all levels which means that trucks' location can be traced at any point between origin and destination (M=3.166666667, SD=1.078480675). Respondents give positive feedback on the Transport Companies initiation and hard work to reduce delays (M=3.25, SD=1.041684397). They also positively responded that Transport companies provide service in accordance with local and international regulations (M=3.5625, SD=1.089724736).

Table 13. Transport Companies Service Performance

	<b>N</b>	<b>Mean</b>	<b>SD</b>
Transport companies provide uniform service and deliver consignments at designated destination in specified time period	48	3.458	1.0097
Transport companies have strong coordination with Green International	48	3.75	0.8872
Transport companies' services are traceable at all levels before completion of service up on arrival at designated destination	48	3.166	1.0785
Transport companies work hard to reduce delays	48	3.25	1.0417
Transport companies are committed to provide service in accordance with local and international regulations	48	3.562	1.0897
<b>Mean of Mean</b>		3.437	

#### 4.3.4.4. Survey Report Review

On this analysis two survey documents were reviewed. These are sea shipments which are handled under unimodal service and air shipment. These documents are survey records of customs clearance and freight forwarding operation reports showing what activities were carried on with corresponding dates consumed to accomplish the tasks.

From the data the researcher took the following variables from the survey: Date original document collected by Green, Date Government offices permit requested, Date government office permit received, date full document sent to Green, Date Declaration received for stamp by consignee, Date Declaration sent back to agent by consignee, Date Customs release obtained and loaded at airport. These data have been collected from air shipment customs clearance processing activity report documents. While reviewing sea

shipment the research used the following data for analysis; Date original documents received, gov't office request date, gov't office permit received, days taken to secure gov't permit, date document sent for stamp, date document received from stamp, date documents sent to custom, transit permit accepted, date customs release obtained & loaded, arrived in Addis Ababa, and date customs release obtained at Addis Ababa.

According to government policy air shipments must be cleared out of customs premise within 10 days after arrival of the cargo. When it comes to sea shipment 12 days will be required at max as per the national logistics strategy. Therefore, by simple mathematics it is easy to obtain additional data for processing. These are total days taken to secure permit, total time taken for customs clearance processing, responsiveness by green, responsiveness by green, other reasons that delay, and total days from the beginning until cargo is released from customs terminal.

Table 14. Data from Air shipment

	<b><u>N</u></b>	<b><u>Mean</u></b>	<b><u>SD</u></b>
Total days taken to secure permit	94	7.925	5.764
Total time taken for customs clearance processing	94	8.298	6.557
Other reasons that delays	94	1.978	4.389
Responsiveness By Consignee	94	0.776	1.156
Responsiveness By Green	94	3.627	3.607
Total Days from the beginning	94	18.202	9.842
<b>Mean of Mean</b>		<b>6.8014</b>	

According to the data from air shipment reviewed mean of total days to secure permit is more than the policy set by government which is by 2 days. But, according to the document reviewed the mean is 7.925 ~ 8 days. Total days from the beginning have mean value 18.202 which is more than 10 that has been set on the gov't policy. When it comes to Responsiveness by Consignee results show that it has no significant impact once clearance processing has been started.

Table 15. Data from Sea shipment

	<b>N</b>	<b>Mean</b>	<b>SD</b>
Days Taken to secure gov't permit	49	9.592	6.187
Transport Company activity in days	49	3.877	1.393
Responsiveness by Consignee	49	3.143	2.372
Responsiveness by Green	49	8.102	8.970
Dates to Port Clearance	49	10.367	13.462
Total time taken to clear out from doc receipt to customs release	49	33.755	15.151
<b>Mean of Mean</b>		<b>11.473</b>	

According to the data from sea shipment reviewed mean of total days to secure gov't permit is more than the policy set by government which is 2 days. But, according to the document reviewed the mean is 9.592. Total days from the beginning have mean value 33.755 which is more than 12 that has been set on the gov't policy. When it comes to Responsiveness by Consignee results show that it has no significant impact after clearance processing activity has started.

#### **4.4 Interpretation and Discussion**

The overall result observed from the questionnaire show that all the variables have more than average mean results. Therefore, the researcher inclined to using the results from the data gathered from survey documents (daily customs clearance and freight forwarding activity report on the selected shipments).

From sea shipment the variables considered are Days Taken to secure gov't permit, Transport Company activity in days (haulage from Djibouti to Addis Ababa customs check point), Responsiveness by Consignee (Consignee is required to sign on customs declaration and put stamp. Days considered are from the date consignee is informed to sign on the customs declaration to the date consignee responded), Responsiveness by Green, Dates to Port Clearance, and Total time taken to clear out from doc receipt to customs release. Among the variables the variable 'Total time taken to clear out from doc receipt to customs release' is dependent on the rest of the variables.

From air shipment we have variables Total days taken to secure permit, Total time taken for customs clearance processing, other reasons that delays, Responsiveness by Consignee, Responsiveness by Green, and Total Days from the beginning. Among the variables the variable ‘Total Days from the beginning’ is dependent on the rest of the variables.

Table 16. Summary of Dependent and independent variables on Air shipment

	<b><u>N</u></b>	<b><u>Minimum</u></b>	<b><u>Maximum</u></b>	<b><u>Mean</u></b>	<b><u>SD</u></b>
Total days taken to secure permit	94	1	40	7.925531915	5.764629564
Total time taken for customs clearance processing	94	1	44	8.29787234	6.557979277
Other reasons that delays	94	0	27	1.978723404	4.389573971
Responsiveness By Consignee	94	0	5	0.776595745	1.156136087
Responsiveness By Green	94	0	21	3.627659574	3.606994527
Total Days from the beginning	94	3	71	18.20212766	9.842392168

Table 17. Summary of Dependent and independent variables on Air shipment

	<b><u>N</u></b>	<b><u>Minimum</u></b>	<b><u>Maximum</u></b>	<b><u>Mean</u></b>	<b><u>SD</u></b>
Days Taken to secure gov’t permit	94	0	27	9.591836735	6.18775123
Transport Company activity in days	94	2	9	3.87755102	1.39392511
Responsiveness by Consignee	94	0	13	3.142857143	2.37170825
Responsiveness by Green	94	0	54	8.102040816	8.97042571
Dates to Port Clearance	94	0	68	10.36734694	13.4624383
Total time taken to clear out from doc receipt to customs release	94	13	85	33.75510204	15.1513622

As can be inferred from the above tables for both air shipment and sea shipments the mean value for total days taken to clear out cargoes from terminal is greater than the dates indicated in the previous part. These dates are 10 days for clearance of shipments from cargo terminal for air shipment and an average of 22 days for clearance of sea shipment. The results depicted from the above tables back up the argument that there is no coordination between concerned parties which means parties are operating independently (they are independent parties) regardless of the time limit given or regardless of timeliness.

#### 4.4.1 Correlation Analysis

The bivariate Pearson’s coefficient of correlation is a measure of the degree of relationship between two variables and is denoted by  $r$ . Basically, a Pearson product-moment correlation attempts to draw a line of best fit through the data of two variables, and the Pearson correlation coefficient was conducted to examine the relationship between variables,  $r$ , indicates how far away all these data points are to this line of best fit (how well the data points fit this new model/line of best fit). The Pearson correlation coefficient,  $r$ , can take a range of values from +1 to -1. A value of 0 indicates that there is no association between the two variables (B. Burns & R. Burns 2008, p.69).

Interpretation of correlation coefficient ( $r$ ) size is as follows: if the correlation coefficient falls between 0.1 to 0.20, it is slight correlation or small; if it is between 0.20 to 0.40 is low correlation or weak relationship, if it lies between 0.40 to 0.70 moderate; if it falls along 0.70 to 0.90 high correlation or substantial relationship and if it is within 0.90 to 1.00 it is very high correlation or very strong correlation between variables (B. Burns & R. Burns 2008, p.69).

Table 18. Pearson’s coefficient of correlation/ air shipment data

	<i>Total days taken to secure permit</i>	<i>Total time taken for customs clearance processing</i>	<i>Other reasons that delays</i>	<i>Responsiveness By Consignee</i>	<i>Responsiveness By Green</i>	<i>Total Days from the beginning</i>
Total days taken to secure permit	1					

Total time taken for customs clearance processing	-0.1331	1				
Other reasons that delays	0.0517	0.15299	1			
Responsiveness By Consignee	-0.0767	0.47687	0.2957	1		
Responsiveness By Green	-0.1265	0.51840	-0.0976	0.00046	1	
Total Days from the beginning	0.5201	0.65658	0.5783	0.40466	0.22778	1

Correlation is significant at the 0.01 level (2-tailed).

Hence, in the study Bivariate Pearson Coefficient ( $r$ ) was used to examine the relationship between the six variables by using a two-tailed test of statistical significance at the level of 99% significance,  $P < 0.05$ . The correlation coefficients on the main diagonal are always 1.0, because each variable has a perfect positive linear relationship with itself.

The correlation coefficient can range in value from  $-1$  to  $+1$ . The larger the absolute value of the coefficient, the stronger the relationship between the variables. For the Pearson correlation, an absolute value of 1 indicates a perfect linear relationship. A correlation close to 0 indicates no linear relationship between the variables.

The sign of the coefficient indicates the direction of the relationship. If both variables tend to increase or decrease together, the coefficient is positive, and the line that represents the correlation slopes upward. If one variable tends to increase as the other decreases, the coefficient is negative, and the line that represents the correlation slopes downward.

According to the table above, Total days taken to secure permit has inversely related to Total time taken for customs clearance processing, responsiveness by Consignee, and responsiveness by Green. The variable 'other reasons that delays' has to 'responsiveness by green' has inversely related. The rest the variables related positively which tend to increase or decrease together.

The dependent variable 'Total days from the beginning' has strong relation with 'Total days taken to secure permit' and 'Total time taken for customs clearance processing' which is 0.5201, 0.65658 respectively.

Table 19. Pearson's coefficient of correlation/ sea shipment data

	<i>Days Taken to secure gov't permit</i>	<i>Transport Company activity in days</i>	<i>Responsiveness By Consignee</i>	<i>Responsiveness By Green</i>	<i>Dates to Port Clearance</i>	<i>Total time taken to clear out from doc receipt to customs release</i>
<u>Days Taken to secure gov't permit</u>	1					
<u>Transport Company activity in days</u>	0.1801	1				
<u>Responsiveness By Consignee</u>	0.0495	0.2134	1			
<u>Responsiveness By Green</u>	0.2913	-0.0756	-0.1828	1		
<u>Dates to Port Clearance</u>	-0.3998	0.0235	-0.1021	-0.1447	1	
<u>Total time taken to clear out from doc receipt to customs release</u>	0.1020	0.1593	-0.0123	0.5166	0.6945	1

Correlation is significant at the 0.01 level (2-tailed).

The dependent variable 'Total time taken to clear out from doc receipt to customs release' has very strong relation to 'Dates to port clearance' which is 0.694. It means both variables tend to increase or decrease together, the coefficient is positive, and the line that represents the correlation slopes upward.

#### **4.4.2. Regression Analysis**

Regression analysis is concerned with the distribution of the average value of one random variable as the other variables which need not be random can take different values. A linear regression model was applied.

##### **4.4.2.1. Multi-Collinearity**

Multi-collinearity is the extent to which a particular construct can be explained by other constructs in the analysis (Hair et al. 2006, p.42). It occurs when the variables that appear distinct and unrelated, measure the same thing.

The other method can be to use tolerance or variance inflation factor (VIF).

$$\text{VIF} = 1 / \text{Tolerance}$$

$$\text{VIF} = 1 / (1 - R \text{ square})$$

Table 20. Multi-Collinearity

Co-linearity Statistics for air shipment		
	Tolerance	VIF
Total days taken to secure permit	0.971358143	1.02948640271802
Total time taken for customs clearance processing	0.498450993	2.00621528126059
Other reasons that delays	0.890772981	1.12262048920516
Responsiveness by Consignee	0.658982919	1.51749001481432
Responsiveness by Green	0.637310376	1.56909417693274

Co-linearity Statistics for sea shipment		
	Tolerance	VIF
Days Taken to secure govt permit	0.741312566	1.34895865238471
Transport Company activity in days	0.902881621	1.10756490910286
Responsiveness by Consignee	0.90869743	1.10047631621339
Responsiveness by Green	0.86645799	.15412404525316
Dates to Port Clearance	0.818370493	1.22194043975293

Table 20 indicated that the VIF values are less than 10 and the tolerance values are more than 0.2. This indicates that there is no multi-collinearity within the independent variables of the study.

#### 4.4.2.2. REGRESSION MODEL

The table below depicts that when regressing the three independent variables of Logistics coordination dimensions against dependent variable operational performance. R<sup>2</sup> shows the fitness of the model for multiple regressions and explains the variance of independent variable on dependent variable.

Table 21. Model summary on air shipment

<i>Regression Statistics</i>	
Multiple R	0.898223676
R Square	0.806805773
Adjusted R Square	0.802559746
Standard Error	4.373393108
Observations	94

Table 22. ANOVA Air shipment data

ANOVA					
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	7268.641952	3634.321	190.0143	3.25637E-33
Residual	91	1740.517623	19.12657		
Total	93	9009.159574			

Since R<sup>2</sup> is 47.16% then the independent variable can explain 47.16% of variance on dependent variable, since (R<sup>2</sup>=47.16, F=2.43E+32, Sig.=0.000). Consequently, few null hypothesis are accepted and most null hypothesis are rejected and the alternative hypothesis is accepted, which states that the independent variable has direct impact on the total days required to finish the task, at ( $P\text{-value} \leq 0.05$ ).

Table 23. Multiple Regression Analysis on Air shipment

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.631446056	1.015571019	0.621765	0.535651
Total days taken to secure permit	1.055923512	0.079375482	13.30289	4.65E-23
Total time taken for customs clearance processing	1.10895007	0.069773055	15.89367	5.39E-28
Other reasons that delays	1.193969998	0.180795404	6.603984	2.72E-09
Responsiveness by Consignee	5.85949E-17	3.0092E-16	0.194719	0.846062
Responsiveness by Green	-6.38296E-17	9.80791E-17	-0.6508	0.516873

The regression model specifically connects the average values of Y for various values of the X-variables. A regression equation is in no way a mathematical linking two variables but serves as a pointer to questions to basically, the regression analysis is used in two distinct ways; (1) as a means of considering data taking into account any other relevant variables by adjustment of the random variable; and (2) to generate mathematical forms to

be used to predict the random variable from the other (independent) variables. The regression model for air shipment was as follows:

$$Y = 0.631 + 1.056X_1 + 1.109X_2 + 1.193X_3$$

Where: Y: is the dependent variable (Total days required to finish the task),

X<sub>1</sub>: is Total days taken to secure permit

X<sub>2</sub>: is Total time taken for customs clearance processing

X<sub>3</sub> is Other reasons that delays

According to the regression equation established, taking all factors (Total days taken to secure permit Total time taken for customs clearance processing, and Other reasons that delays) constant at zero, total days required to finish the task will be half a day as a result of these independent variables. The data findings analyzed also showed that taking all other independent variables, a unit increase in total days taken to secure permit will lead to a multiple of 1.056, total time taken for customs clearance processing will lead to multiple of 1.109, and other reasons that delays will lead to a multiple of 1.193 increases in total days required to finish the task. Similarly, Hult et al. (2002, p.71) mentioned that IT and process innovation can contribute significantly to shorten total days required to finish the task.

Table 24. Model Summary on Sea Shipment

<i>Regression Statistics</i>	
Multiple R	0.989743746
R Square	0.979592683
Adjusted R Square	0.97721974
Standard Error	2.286814939
Observations	49

Table 25. ANOVA on sea shipment

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	5	10794.19175	2158.838	412.8174847	3.62525E-35
Residual	43	224.8694702	5.229523		
Total	48	11019.06122			

Since R<sup>2</sup> is 97.9% then the independent variable can explain 97.9% of variance on dependent variable, since (R<sup>2</sup>=97.9, F=412.817, Sig.= 3.62525E-35). Consequently, the

null hypothesis is rejected, and the alternative hypothesis is accepted, which states that the independent variable has direct impact on the total days required to finish the task, at ( $P\text{-value} \leq 0.05$ ).

Table 26. Multiple Regression analysis on sea shipment

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	1.3589358	1.202921826	1.129696	0.264867019
Days Taken to secure gov't permit	0.6314812	0.061955073	10.19257	4.82303E-13
Transport Company activity in days	1.1359645	0.249204313	4.558366	4.23748E-05
Responsiveness by Consignee	0.9940760	0.145995506	6.80895	2.43463E-08
Responsiveness by Green	1.0268371	0.039529707	25.97634	6.47691E-28
Dates to Port Clearance	1.0118911	0.027102646	37.33551	2.10679E-34

The regression model specifically connects the average values of Y for various values of the X-variables. We already discussed the two distinct ways to analyze regression. The regression model for air shipment was as follows:

$$Y = 1.3589 + 0.6314X_1 + 1.1359X_2 + 0.9940X_3 + 1.0268X_4 + 1.0119X_5$$

Where: Y: is the dependent variable (Total days required to finish the task),

X1: is Days to secure gov't permit

X2: is Transport company activity in days

X3 is Responsiveness by Consignee

X4: is Responsiveness by Green

X5: is Dates to port clearance

According to the regression equation established, taking all factors (Days to secure gov't permit, transport company activity in days, responsiveness by consignee, responsiveness by green, and dates to port clearance). The data findings analyzed also showed that taking all other independent, a unit increase in total days taken to secure permit will lead to a multiple of 0.631 (most of the time permit processed earlier), transport company activity in days will lead to multiple of 1.1359 (there might be problem on the road), responsiveness

by consignee will lead to multiple of 0.9940, responsiveness by Green will lead to multiple of 1.0268 and Dates to port clearance will lead to a multiple of 1.0119 increases in total days required to finish the task. Similarly, Hult et al. (2002, p.71) mentioned that IT and process innovation can contribute significantly to shorten total days required to finish the task.

Therefore, the regression model indicates that the dependent variable can be predicted under normal circumstances. This indicates that there should be systematic coordination mechanism.

#### 4.4.3. Discussion on Hypothesis Testing

Table 26 of sea shipment specified that there is a positive direct impact of independent variables on dependent variables, since ( $p < 0.05$ ), the null hypothesis is rejected and the alternative hypothesis is accepted, which indicates that the independent variables has a significant effect on operational performance at ( $p \leq 0.05$ ).

Table 23 of air shipment specified that there is a positive direct impact of independent variables on dependent variables, since ( $p < 0.05$ ), the null hypothesis is rejected and the alternative hypothesis is accepted, which indicates that the independent variables has a significant effect on operational performance at ( $p \leq 0.05$ ). However, on the independent variable Responsiveness by Consignee and Responsiveness by Green has  $p\text{-value} \geq 0.05$ . Therefore, the null hypothesis is accepted.

Table 27. Overall outcome of the research hypothesis based on air shipment

Hypothesis	Result	Reason
H0: Days required to secure permit has no direct effect on the Total days required to complete the task.	H0: Rejected	p-value= 4.65E-23 $p < 0.05$
H1. Days required to secure permit has direct effect on the Total days required to complete the task.	H1: Accepted	
H0. Days required for customs clearance processing has no direct effect on the Total days required to complete the task.	H0: Rejected	p-value= 5.39293E-28 $p < 0.05$

H1: Days required for customs clearance processing has direct effect on the Total days required to complete the task.	H1: Accepted	
H0: Internal Coordination with in green and consignee has no direct effect on the Total days required to complete the task.	H0: Rejected	p-value= 2.72427E-09 p<0.05
H1: Internal Coordination with in green and consignee has direct effect on the Total days required to complete the task.	H1: Accepted	
H0: Responsiveness by consignee has direct effect on the Total days required to complete the task.	H0: Accepted	p-value=0.834788371 p >0.05
H1: Responsiveness by consignee has direct effect on the Total days required to complete the task.	H1: Rejected	
H0: Responsiveness by green has direct effect on the Total days required to complete the task.	H0: Accepted	p-value= 0.516872988 p >0.05
H1: Responsiveness by green has direct effect on the Total days required to complete the task.	H1: Rejected	

Table 28. Overall outcome of the research hypothesis based on sea shipment

Hypothesis	Result	Reason
H0: Days required to secure permit has no direct effect on the Total days required to complete the task.	H0: Rejected	p-value= 4.82303E-13 p<0.05
H1. Days required to secure permit has direct effect on the Total days required to complete the task.	H1: Accepted	
H0. Transport Company required date has no direct effect on the Total days required to complete the task.	H0: Rejected	p-value=4.23748E-05 p<0.05
H1: Transport Company required date has direct effect on the Total days required to complete the task.	H1: Accepted	

H0: Responsiveness by consignee has no direct effect on the Total days required to complete the task.	H0: Rejected	p-value=2.43463E-08 p<0.05
H1: Responsiveness by consignee has direct effect on the Total days required to complete the task.	H1: Accepted	
H0: Responsiveness by green has no direct effect on the Total days required to complete the task.	H0: Rejected	p-value=6.47691E-28 p <0.05
H1: Responsiveness by green has direct effect on the Total days required to complete the task.	H1: Accepted	
H0: dates required for port clearance has no direct effect on the total days required to complete the task	H0: Rejected	p-value=2.10679E-34
H1: dates required for port clearance has direct effect on the total days required to complete the task	H1: Accepted	p <0.05

**4.4.4. Ethiopian E-service Observation**

E-services is an IT solution that is launched by the Ethiopian Government with the intention to give public services through online solution. As per the e-services plat form the Government intends to enable the public to start processes through online. To state some of the service included in the E-Service are related to service given by the Ministry of Foreign affairs, services given by Road Transport Authority such us import permit for vehicles.

Even if it has been more than a year since the E-services is launched most of the Government office have not started using it. The researcher looks thoroughly on the platform from the customs side and have found the following issues as a weakness of the platform.

**4.4.4.1. Observed weak points on Government E-Services:**

The platform requires account holder to make inquiries for service. But the platform is open for any user to create account in the system. For example, to inquire vehicle import

permit from RTA anyone may create an account with phone number and submit the application. But in order to import vehicle one needs business license. The only requirement to create an account in the system is to give the system name of person or entity and give it phone number.

Despite its openness to anonymous user the platform does not link government offices with each other. It also does not show status of processes. Once request is made it does not show what steps the process will go through before approval. It does not show time needed to finalize the processing of the permit or any processing. Even if the inquiry is made through registration of inquirer the system does not give feedback or update the account holder (Inquirer). The platform does is not inclusive of all government offices, such as MOA, MOH, MIT, and Customs Commission.

#### 4.5. Data Presentation Tools

When conducting a residual analysis, a "**residuals versus fits plot**" is the most frequently created plot. It is a scatter plot of residuals on the y axis and fitted values (estimated responses) on the x axis. The plot is used to detect non-linearity, unequal error variances, and outliers.

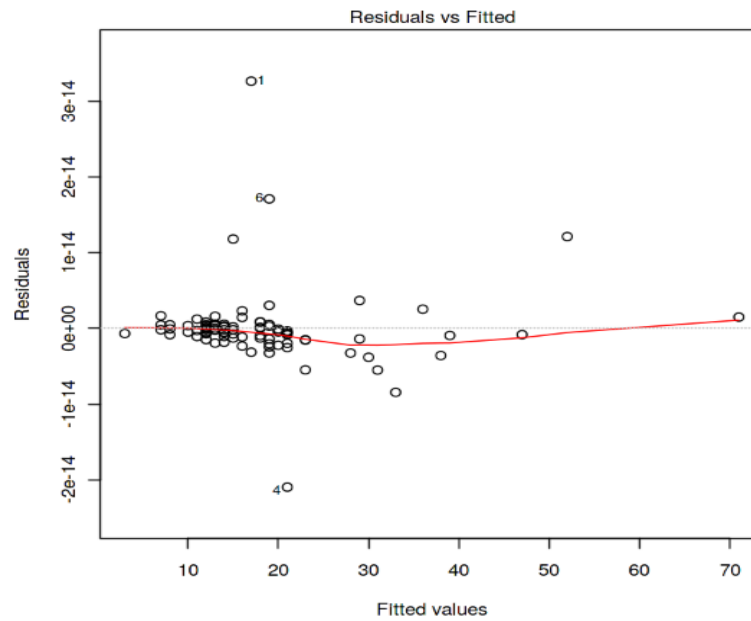


Figure 7. Plotted chart

As can be seen on the above graph the red line indicates the regression model, y axis is residuals and the x axis is model fit value. The first plot (residuals vs. fitted values) is a simple scatterplot between residuals and predicted values. It should look more or less random. And it is obvious that, with the exception of a single outlier in the bottom right corner the plot show random distribution of variables.

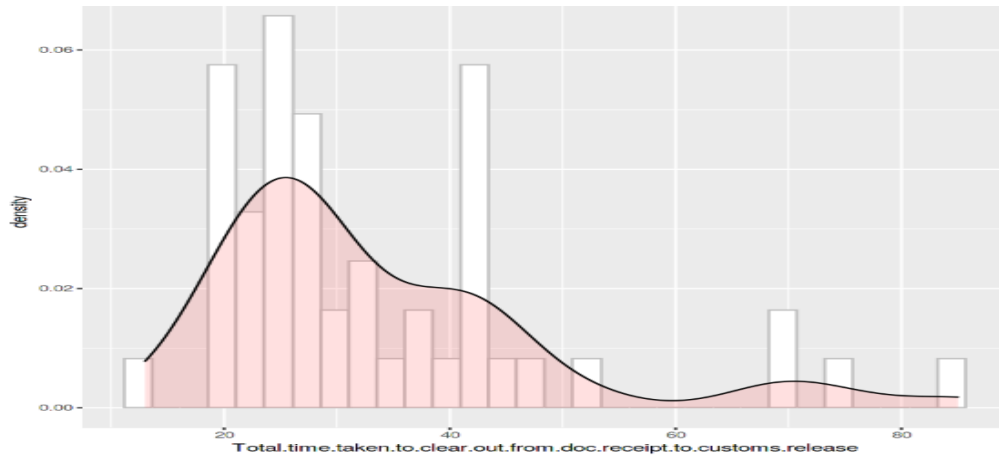
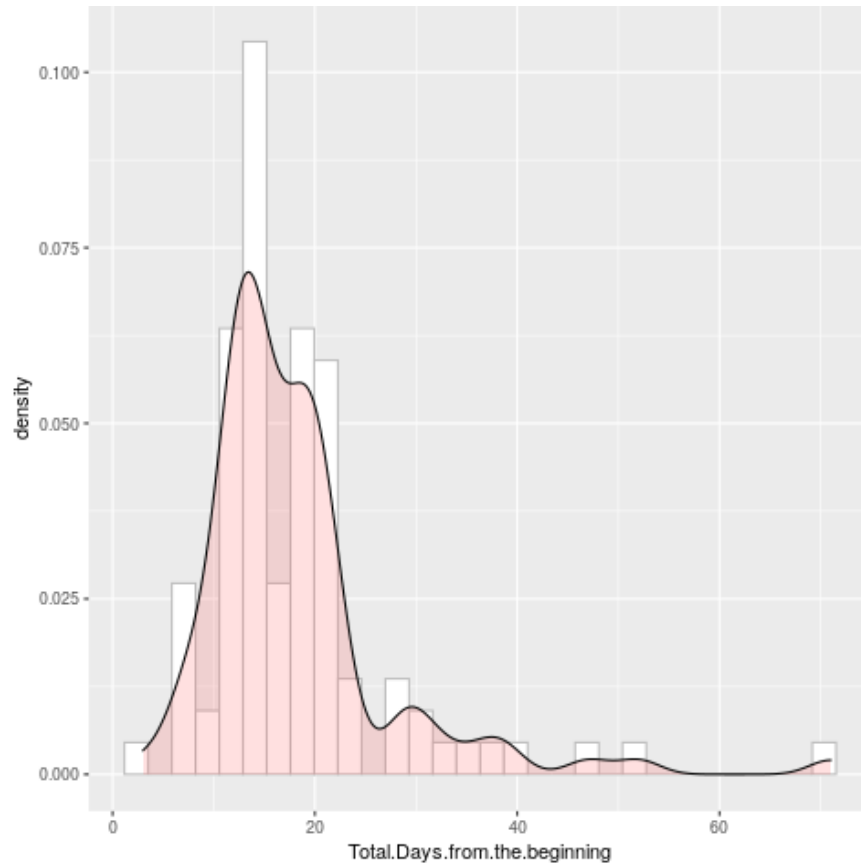


Figure 8: sea shipment data histogram

The chart above is sea shipment customs clearance processing including freight forwarding from Djibouti port to Addis Ababa Customs branch office transaction density. The x axis indicates the total time taken to clear out cargo beginning from receipt of full document up to the process clearance is finalized at Addis Ababa customs branch office. While the y axis is the value of distribution density. It is clearly seen from the interpretation of the transactions has higher distribution density from 20 to 40+. Under normal circumstance the air shipment will lie in the higher distribution range.



*Figure 9: air shipment data histogram*

The above chart shows the transaction distributed density for air shipment. The above Histogram shows density on Y-axis and the X-axis shows the total days from the beginning. It is clearly seen than Total days from the beginning of the transaction has higher distribution on days from 7 to 23. Under normal circumstances the transaction will lie in the higher distribution range. .

## **Chapter Five:**

### **Summary, Conclusion and Recommendations**

#### **5.1 Introduction**

This chapter presents the summary of the data findings on the effects of logistics coordination on operational performance of Green International Logistics Services Plc. Based on the findings conclusion and recommendation are drawn accordingly. The chapter is therefore structured into summary of findings, conclusions, recommendations of the study.

#### **5.2 Summary of Findings**

It is found that what seems coordination is achieved through implementation of firm policy and procedures not real coordination. It means it depends on the implementer in most cases. Since every government office operates independently and does not communicate with each other.

##### **5.2.1 Days required to secure permit**

Different government bodies give permits for cargoes related with their line of duty. To mention some; Ministry of Foreign affairs give duty free permits for diplomatic and aid cargoes, Ministry of Innovation gives permits related to telecom devices, Ministry of agriculture give permit for diary, and farm products, FMHACA gives permits for Medicine and related shipments. These government bodies individually set regulations and permit issuing time requirement. Some permits may be issued based on documents submitted and others may be issued after inspection of the cargo. This research has considered these permits as one variable that affect the total time it takes to finalize and clear out cargoes from customs premise. Two working days is set as the time required to process these permits with the corresponding offices. But as per the data gathered from the activity report it is evident that most permits time taking is unpredictable. According to the analysis this permit processing takes around eight days at an average for air shipment and around 10 days at an average for sea shipment. The results clearly show lack of coordination between

government permit issuing offices. The researcher believes that with coordination platform these offices can perform better and issue permits more efficiently.

### **5.2.2. Days required for port clearance**

As it is known Ethiopia is a land locked country due to this sea shipments are subject to double clearance processing. All sea shipments that came under unimodal service are subject to port clearance processing. After securing transit permits with customs office in Ethiopia; documents will be sent to Djibouti and port clearance will commence up on arrival of documents.

The first process in port clearance is getting delivery order from shipping company (carrier). Shipping companies are the ones that bring shipment through their ships to Djibouti and discharged the cargo. After getting the delivery order then agents will take the delivery order with other documents to the port authority. At the port authority, Djibouti customs will inspect documents in the agent's hand with documents they receive from the ship master then they will issue permit. Up on securing the permit the agent will go on to processing gate. Then the agent will give the gate pass to the transporter and process entrance of the truck into the port to load the container (container). When at times port is congested the truck will be subject to queue at the port to load the cargo then after loading it will depart the port. It usually takes 2 working days at the port congestion occurs. This activity is considered port clearance activity. As can be inferred from the finding on the analysis of data port clearance takes 10 days. The researcher believes that with coordination, port clearance time can be reduced.

### **5.2.3. Days required by transport companies**

The role of transport companies that are considered in the data analysis is the part that cargoes are loaded on to the truck at the port up to the arrival date at the customs check point. Regarding the time frame to bring cargoes from Djibouti to Addis Ababa or any other customs branch within the country customs commission set a time frame of 3 days trucking time. Any delay to the time frame the transporter is required to back up with evidence from police. As can be inferred from the result of the data analysis it takes an average of 4 days which is tolerable by customs.

### **5.3. Conclusions:**

Under ideal condition Green International Logistics service would have a vertical coordination with Customs Commission and a horizontal coordination with Transport companies. From the analysis of questionnaire data researcher tried to assess the information management coordination of Green International with customs and other government bodies and transport companies. It can be concluded from the responses that there is some level of information management coordination. The research also assesses the customs clearance processing efficiency with the intent to assess the coordination of Green international with customs commission. It can be concluded from the responses that there is some level of coordination between Green International and Customs commission. The researcher also tried to assess the coordination of Green with other Government bodies that give permit for customs clearance requirement. It can be concluded that there is some level of coordination. The other aspect the researcher tried to assess is the level of coordination between Green International and Transport companies. Normally Green is the one who gives the job to Transport companies as they choose which truck to load cargoes based on their agreement. The result from the questionnaire shows that there is some level of coordination between Green and Transport companies.

It can be concluded from the overall results of the feedback from the questionnaire that there is coordination between Green, Customs Commission, Concerned Government bodies and transport companies. Since this does not answer the research questions the researcher lean on the findings and results from the analysis of the survey.

The data on the survey (Activity report) researcher selected Total days taken to conclude customs clearance processing as an independent variable which can show timeliness of the processing. By measuring timeliness of the processing, the researcher believed that the research could show the existence and level of coordination between Green and other concerned parties. The researcher took days taken to secure permit from Government bodies, transport company activities, consignee and Green 's responsiveness, and dates to port clearance as an independent variables' and made the analysis. From the results it can be concluded that Government bodies permit processing and port clearance strongly affect total dates taken to finalize customs processing.

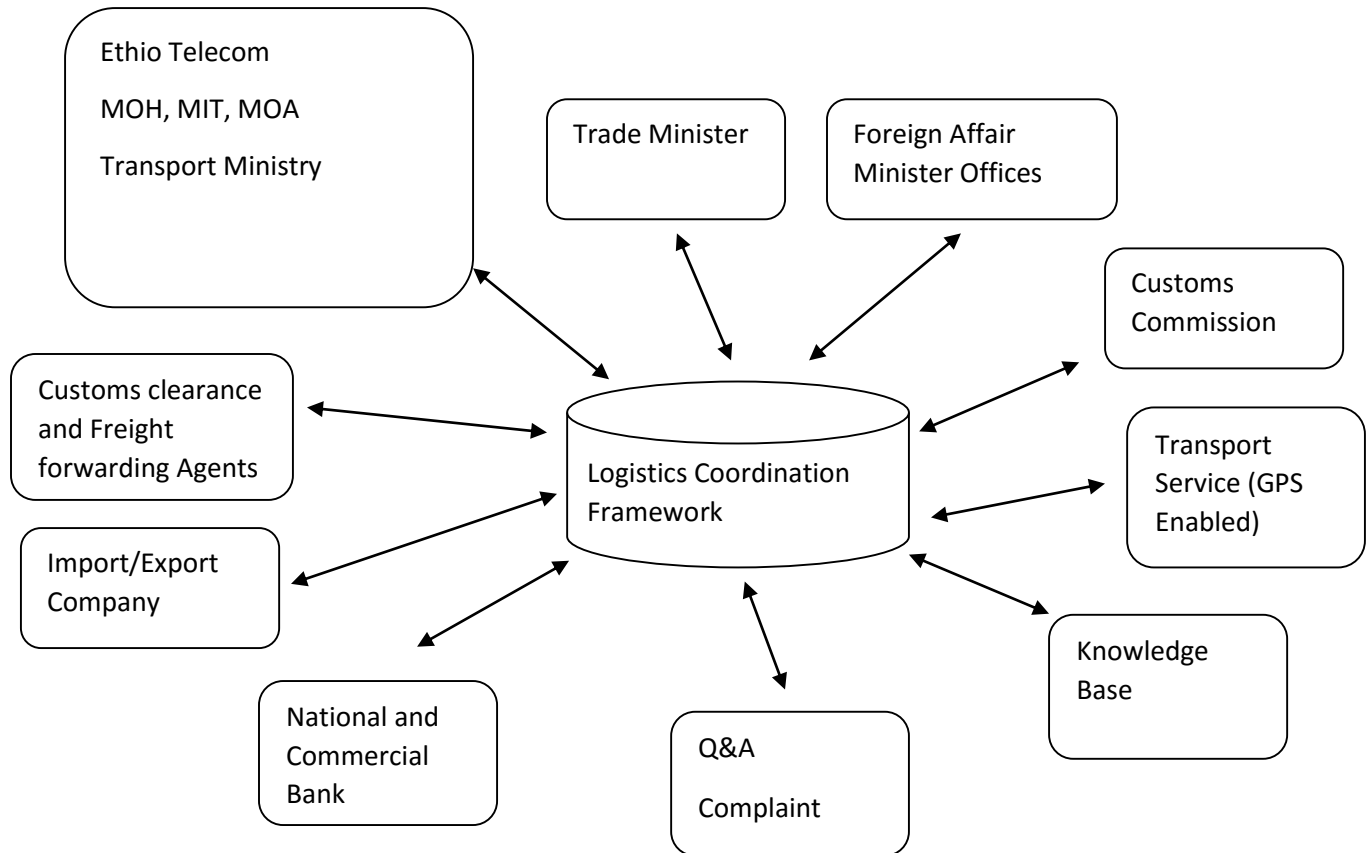
Therefore, the analysis from the survey clearly shows that there is lack of logistics coordination between the concerned parties. It is evident that Government bodies operate independently by setting their own goals and priorities to achieve it. The researcher believe that these independent government bodies does not take enhancing logistics performance by reducing time taken to finalize customs cargo clearance processes as one of their goal.

#### **5.4. Recommendation:**

The World Bank logistics performance index shows that our country has poor logistics performance. It is with this intention that the researcher tries to assess the performance of Green International Logistics Services plc. Which is the best performing company within Ethiopia in the logistics industry. The researcher believes that the challenges Green is facing are the same reasons that affects the national logistics performance of the country. The researcher strongly recommends that coordination among concerned parties is a crucial part in boosting the logistics performance. To have better coordination there must be a framework that incorporates all offices.

The researcher designed a platform and recommends that by using this platform it will be easy to monitor shipments, achieve traceability and timeliness which ultimately leads to cost effectiveness and other aspects such as, job count, and manage forgery of documents (from start to end of all transaction) and corruption.

While designing this platform the researcher reviewed gov't e-Service portal and found that it needs many improvements. Therefore, the researcher recommends the designed platform can be supported by ICT to easily enable and monitor coordination between offices.



#### 5.4.1. Permit and service giving parties on the Framework

In this section Government offices that are entitled to giving their permit prior to the import and export of shipments will be coordinated to sharing their data and information partially. These parties will be given the privilege to edit and process data within their line of work.

- **Ministry of Trade and Investment:** registers data of import and exporters as well as other entities. The data from this government body will be used to notify legitimacy of the importer and exporters. This government body will also know from the platform which of the licensed and registered firms are operating well.
- **Ministry of Foreign Affairs:** Monitors and records Diplomatic Missions, gives duty free permits for Embassies, Diplomats, Aid organizations. Easily monitors shipments corresponding to each permits it gives.
- **Ministry of Agriculture:** gives permit for import and export of farm products. Pulls data from Trade and Investment Ministry and Banks. Records, processes and edits its own part of the permit.

- **Ministry of Health:** Through FMHACA gives permits related to Medicine, Medical Laboratory supplies and the like. It pulls data from Trade and investment ministry and Banks to check eligibility of the request. Edits its own permit and relevant records.
- **Ministry of Innovation and Technology:** gives permit with in its own line of duty. Pulls data from Ministry of Trade and Investment and from Banks.
- **Ministry of Transport:** Monitors the performance of the logistics coordination and assess for any problems. Gives relevant permits. Enforce, transport companies such as Ethiopian shipping & logistics service Enterprise and Ethiopian Airlines to register and update cargo bookings both import and export shipments on the platform.
- **National and Commercial Banks:** register and edit bank permits they gave to importers and register export contracts and permits. They pull data from Ministry of trade to process the permit. And their permit will also be accessible to other concerned offices such as customs commission, road transport authority.
- **Customs Commission:** checks on the availability of relevant documents and permits as well as arrival of cargoes. Process cargo inspection and transit permit processing. Pulls data from all relevant bodies' records.
- **Transport Companies (Associations):** These parties mainly give transportation service within the country or transportation from Djibouti or other ports to in country destinations especially customs branch offices. They will update list of trucks under their company or association. They will mount GPS tracking device on the trucks.

#### 5.4.2. Service Inquiring Parties of the Framework

In this part of the framework, Importers, exporters, investors, and other bodies that are entitled to import good and commodities into the country are considered as inquiring parties. These parties initiate permit or service inquiries to the service and permit giving parties stated previously:

- **Importer & Exporters:** These are parties that import and export commodities. In order for their import and export processing they need to process permits and also

customs clearance services. These office usually initiate inquiries to the relevant government office with regard to the type of commodity they import or export. They will be allowed to have an account on the platform by giving their credentials such as business license. And they will be allowed to trace status of their inquiry, give reminders on the platform and, they will know where their cargo is at.

- **Investors:** With regards to their status they are allowed to import goods for their investment. And since they are duty exempt, they will process the duty-free permit requires through the platform. They inquire permit and customs clearance processes. They will be able to open an account on the platform make inquiries and check status their request.

#### 5.4.3. Operation/Policy of the Framework package

- **Data Analysis:** checks for outstanding requests. Gives reminder to the concerned party for processing, reports to higher management if request is not addressed within given period. Makes analysis weekly, monthly, and quarterly on the performance of each service giver.
- **Knowledge Base:** this package is included for educational and decision-making purposes. It will keep record of special issues and show the trend how it was handled. It can also be used to train new employees. The package grows with the uniqueness of the transaction.
- **Q&A/ Compliant:** package is included to give information and lesson for new users and to receive complaints from service inquirers.

#### 5.4.4. Enforcement Policy of the framework

- Each permit or service giver will have a designated room on the framework. The parties' requirements and regulation will be displayed on the framework. And the system itself will check on the fulfillment of the requirements. Failure to fulfill the required and provide documents will result on rejection of the inquiry.
- Every permit must be approved via the framework in a specified period of time. The framework will give appointment according to the queue list. In case of high priority duty, the custom office needs to assign lower load employee to do this task.

- The framework assigns task for the employees according to the work load they had previously. Framework identifies weekends and public holidays.
- If job is kept unprocessed for more than the specified date, the framework will inform the team supervisor that the task has not been handled. If situations continue the system will continue to report to higher managers according to the hierarchy.

## 6. References

- Allen, J.; Bektas, T.; Cherrett, T.; Friday, A.; Mcleod, F.; Piecyk, M.; Piotrowska, M.; Austwick, M.Z. Enabling the Freight Traffic Controller for Collaborative Multi-Drop Urban Logistics: Practical and Theoretical Challenges. *Transp. Res. Rec. J. Transp. Res. Board* 2017, 2609, 77–84.
- Cao, M.; Zhang, Q. Supply chain collaboration: Impact on collaborative advantage and firm performance. *J. Oper. Manag.* 2011, 29, 163–180.
- Cleophas, C.; Cottrill, C.; Ehmke, J.F.; Tierney, K. Collaborative urban transportation: Recent advances in theory and practice. *Eur. J. Oper. Res.* 2018.
- D.Y. Golhar, C.L. Stamm, The just-in-time philosophy: A literature review, *Int. J. Prod. Res.* 29 (1991) 657–676.
- Eckartz, S.M.; Hofman, W.J.; Van Veenstra, A.F. A Decision Model for Data Sharing. In *Electronic Government, Proceedings of the International Conference on Electronic Government, Dublin, Ireland, 1–3 September 2014*; Springer: Berlin/Heidelberg, Germany, 2014; Volume 8653, pp. 253–264.
- Erik Sandberg 2005, *Logistics Collaboration in Supply Chains – A Survey of Swedish Manufacturing Companies*
- Fern, L. 2008, *Coordination in urban firefighting: A critical incident analysis*, MSC, The Ohio State University,
- Gansterer, M.; Hartl, R.F. Collaborative vehicle routing: A survey. *Eur. J. Oper. Res.* 2018.
- Gonzalez-Feliu, J.; Morana, J. Collaborative Transportation Sharing: From Theory to Practice via a Case Study from France. Available online:
- Guajardo, M.; Rönnqvist, M. A review on cost allocation methods in collaborative transportation. *Int. Trans. Oper. Res.* 2016.
- G. V. Osipov, J. Kurths, C. Zhou, *Synchronization in Oscillatory Networks*, Springer, Berlin, 2007.

Hair, J, Black, W, Babin, B, Anderson, R & Tatham, R 2010, *Multivariate Data Analysis*, 7<sup>th</sup> edn, Prentice Hall Upper Saddle River, NJ.

H. ElMaraghy, G. Schuh, W. ElMaraghy, F. Piller, P. Schönsleben, M. Tseng, et al., Product variety management, *CIRP Ann. - Manuf. Technol.* 62 (2013) 629–652.

Hezarkhani, B.; Slikker, M.; Van Woensel, T. A competitive solution for cooperative truckload delivery. *OR Spectr.* 2016.

Kline, R 2010, *Principles and practice of structural Equation Modeling*, 2nd edn, The Guilford Press, New York

Liao, S.H.; Kuo, F.I. The study of relationships between the collaboration for supply chain, supply chain capabilities and firm performance: A case of the Taiwans TFT-LCD industry. *Int. J. Prod. Econ.* 2014, 156, 295–304.

Maghsoudi, A. 2015, *Inter-organizational factors coordination mechanism initiatives and performance: study of humanitarian supply chains*, PHD, University Sains Malaysia

M. Holweg, S. Disney, J. Holmström, J. Småros, Supply Chain Collaboration, *Eur. Manag. J.* 23 (2005) 170–181.

Morana, J.; Gonzales-Feliu, J.; Semet, F. Urban consolidation and logistics pooling: Planning, management and scenario assessment issues. In *Sustainable Urban Logistics: Concepts, Methods and Information Systems*; Springer: Berlin/Heidelberg, Germany, 2014; pp. 187–210.

Mugenda, O, & Mugenda, A 2003, *Research Methods: Quantitative and Qualitative Approaches*, Acts, Nairobi, Kenya.

Okdinawati, L.; Simatupang, T.M.; Sunitiyoso, Y. Modelling Collaborative Transportation Management: Current State and Opportunities for Future Research. *J. Oper. Supply Chain Manag.* 2015, 8, 96–119

Riccardo Giustia, Daniele Manerbaa, Giorgio Bruno, Roberto Tadei 2019, *Synchromodal logistics: An overview of critical success factors, enabling technologies, and open research issues*

- Sandberg, E. 2005, Logistics Collaboration in Supply Chains – A Survey of Swedish Manufacturing Companies, Linköpings universitet, esis No. 1180, No.93, Licentiate Thesis LiU-TEK-LIC 2005:35
- S.H. Strogatz, Sync: How Order Emerges from Chaos In the Universe, Nature, and Daily Life, Hyperion Books, New York, 2003.
- T. Becker, S.M. Chankov, K. Windt, Synchronization Measures in Job Shop Manufacturing Environments, *Procedia CIRP*. 7 (2013) 157–162.
- Togar M. Simatupang, Alan C. Wright and Ramaswami Sridharan, 2002, The Knowledge of Coordination for Supply chain Integration
- Vargas, A.; Boza, A.; Patel, S.; Patel, D.; Cuenca, L.; Ortiz, A. Inter-enterprise architecture as a tool to empower decision-making in hierarchical collaborative production planning. *Data Knowl. Eng.* 2016, 105.
- Vargas, A.; Boza, A.; Patel, S.; Patel, D.; Cuenca, L.; Ortiz, A. Risk management in hierarchical production planning using inter-enterprise architecture. In *Risks and Resilience of Collaborative Networks*, Proceedings of the Working Conference on Virtual Enterprises, Albi, France, 5–7 October 2015; Springer: Cham, Switzerland, 2015; Volume 463.
- Vargas, A., Shushma, P., Patel, D., 2018, Towards a Business Model Framework to Increase Collaboration in the Freight Industry, London, MDPI Logistics,
- W.A. Miller, R.P. Davis, Synchronization of material flow to aid production planning in a job shop, *Eng. Manag. Int.* 5 (1989) 179–184.
- Wanke, P. 2012, Determinants of Scale Efficiency in the Brazilian Third-Party Logistics Industry from 2001 to 2009, Rio de Janeiro, *Brazilian Administration Review*.
- World Bank 2018, Connecting to Compete 2018 Trade Logistics in the Global Economy, The Logistics Performance Index and Its Indicators
- Wu, L., 2017, An Integrated Logistics Performance Measurement System for Logistics Management, MSC, University of Missouri-Columbia
- Zice, S., Zhengping, L., Runtao, Q., & Mansor, S., 2001, Agent-based Logistics Coordination and Collaboration, Singapore, SIMTech Technical Report (AT/01/011/LCI)

Zikmund, W 2003, Business Research methods, 8th edn, Cincinnati, Ohio: Thomson/  
South-Western

([https://cscmp.org/CSCMP/Academia/SCM\\_Definitions\\_and\\_Glossary\\_of\\_Terms/CSCMP/Educate/SCM\\_Definitions\\_and\\_Glossary\\_of\\_Terms.aspx?hkey=60879588-f65f-4ab5-8c4b-6878815ef921](https://cscmp.org/CSCMP/Academia/SCM_Definitions_and_Glossary_of_Terms/CSCMP/Educate/SCM_Definitions_and_Glossary_of_Terms.aspx?hkey=60879588-f65f-4ab5-8c4b-6878815ef921)) (accessed on 12 March 2020).

**Annex**

Questionnaire

**ADDIS ABABA UNIVERSITY FACULTY OF BUSINESS AND ECONOMICS  
SCHOOL OF COMMERCE**

Dear Participants,

I would like to extend my deep appreciation for your time in responding to the research questions provided below. I'm a postgraduate student at Addis Ababa university school of commerce under the department of logistics and supply chain management. The title of my thesis is: Impact of Logistics Coordination and Synchronization in the case of Green International Logistics Services plc. I humbly request your cooperation in answering the questions as truthfully as possible and guarantee you that your response will be highly confidential. This questionnaire will only be used for a student thesis work purpose only. Your participation in this survey is completely voluntary.

**SECTION A: Demographic information**

- 1. Gender:      Male    Female
- 2. Age (years):  25 – 35    between 35 – 45    between 45 – 55    above 55
- 3. Education:  Diploma or less    Bachelor Degree    Master Degree      Doctorate Degree
- 4. Position:    High level    Middle level    Supervisors
- 5. Do you work directly with Green:  Yes    No
- 6. Years of experience with Green:    Less or equal 5    6 – 10    11 – 15    Above 15

**SECTION B: THE EFFECT OF LOGISTICS COORDINATION IN THE CASE OF GREEN INTERNATIONAL LOGISTICS SERVICES PLC**

The following 18 items tap into Logistics Coordination and synchronization. Please, answer these questions based on actual and current situation and not on beliefs.

**1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree** based on how you feel about the statement.

S/No.	Please indicate the extent of integration of your enterprise. (1=strongly disagree;2=disagree;3=neutral ;4=agree;5=strongly agree)	1	2	3	4	5
<b>Information Management</b>						
1	Green International has strong coordination with customs and other government offices;					
2	Green International constantly sends reports and updates of status of shipments clearance status					

3	Green International finalize clearance processes and delivers with in fixed time frame					
4	Green has competent and professional employees,					
5	Green International constantly works to improve its service by conducting surveys and analysis on its efficiency					
6	Green is highly responsive to sudden changes					
7	Green has common and computerized data base system, which gives transparent service to the customers.					
<b>Customs clearance processing efficiency</b>						
8	Green International is aware of customs policy and procedure changes ahead of time and passes through eased customs clearance processing					
9	Green International passes through eased customs clearance processing					
10	Green constantly finishes customs clearance and processing at uniform and standard time period					
11	Green International instantly solves issues and problem encountered with customs regarding customs clearance processing of shipments					
12	Customs commission is keen to hold meetings with freight forwarders and importers					
<b>Government Bodies permit processing for fulfillment of customs commission clearance process requirement</b>						
13	Green International processes and finalizes permits in standard and uniform time frame with Government bodies					
14	There is information exchange between Customs Commission, Other Government Bodies that issue permits and with Green/ freight forwarding companies					
15	There is linkage and effective communication with customs commission, other government bodies and Green International or similar freight forwarders					
16	Government Bodies permit processing is traceable at all levels					
<b>Transport Companies Service Performance</b>						
17	Transport companies provide uniform service and deliver consignments at designated destination in specified time period					
18	Transport companies have strong coordination with Green International					
19	Transport companies' services are traceable at all levels before completion of service up on arrival at designated destination					
20	Transport companies work hard to reduce delays					
21	Transport companies are committed to provide service in accordance with local and international regulations					

**Annex****survey review on air Shipment**

<b>Total days taken to secure permit</b>	<b>Total time taken for customs clearance processing</b>	<b>Other reasons that delays</b>	<b>Responsiveness by Consignee</b>	<b>Responsiveness by Green</b>	<b>Total Days from the beginning</b>
7	10	0	0	8	17
2	44	6	5	2	52
5	6	4	0	4	15
4	11	6	2	5	21
3	14	6	2	5	23
1	18	0	4	14	19
8	8	5	2	2	21
8	15	0	4	5	23
6	1	9	1	0	16
8	2	0	1	1	10
22	7	0	0	1	29
3	7	1	3	3	11
3	6	1	0	2	10
3	5	20	3	1	28
7	4	0	1	1	11
3	3	1	0	0	7
8	5	1	1	1	14
5	7	6	1	2	18
6	6	0	2	1	12
1	6	0	0	5	7
5	14	0	4	3	19
16	5	0	0	5	21
7	7	0	1	2	14

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8	1	4	0	0	13
26	7	6	0	5	39
6	7	0	0	3	13
6	10	0	1	8	16
6	6	0	0	2	12
9	5	0	1	3	14
7	12	1	0	8	20
7	5	0	1	3	12
8	5	0	1	3	13
5	5	3	1	3	13
6	6	0	0	4	12
6	6	0	0	1	12
6	5	8	0	4	19
8	6	4	0	2	18
7	11	0	1	6	18
7	12	0	0	7	19
1	15	1	0	14	17
8	3	1	0	1	12
9	5	0	4	1	14
9	5	0	0	2	14
9	11	1	0	8	21
5	25	1	2	14	31
8	12	1	1	5	21
2	5	0	0	1	7
10	20	0	0	15	30
5	6	1	1	2	12
10	5	0	0	4	15
4	10	0	0	4	14

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7	5	0	0	1	12
4	10	0	1	5	14
1	12	0	1	3	13
6	10	2	0	0	18
7	6	0	0	3	13
8	6	0	0	2	14
8	6	0	0	2	14
15	5	0	1	0	20
17	2	0	0	1	19
40	7	0	1	1	47
7	8	0	1	2	15
6	7	0	0	6	13
7	7	7	0	6	21
8	8	20	1	1	36
12	5	1	0	2	18
9	4	0	0	3	13
6	5	1	0	5	12
8	6	1	0	3	15
17	12	0	1	4	29
20	24	27	4	2	71
1	7	0	0	5	8
8	3	0	0	0	11
7	6	7	0	5	20
7	5	7	0	5	19
13	6	0	0	5	19
4	3	1	1	1	8
9	5	7	0	5	21
1	2	0	1	0	3

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3	7	2	1	0	12
7	12	0	0	3	19
9	6	0	1	1	15
12	6	0	1	1	18
12	8	0	0	2	20
4	8	0	0	1	12
1	6	1	0	5	8
7	6	1	1	3	14
7	9	0	0	6	16
13	10	0	0	8	23
1	31	1	1	3	33
9	28	1	1	21	38
19	1	1	0	0	21
14	2	0	0	2	16
15	6	0	3	1	21

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## Annex

### Survey review on sea shipment

Days Taken to secure gov't permit	Transport Company activity in days	Responsiveness by Consignee	Responsiveness by Green	Dates to Port Clearance	Total time taken to clear out from doc receipt to customs release
13	3	2	8	2	28
6	6	1	4	68	85
5	2	1	7	13	28
12	4	0	13	11	40
6	4	1	6	8	25
6	3	1	6	10	26
12	4	1	11	0	28
3	4	2	4	7	20
2	3	3	3	14	25
4	4	1	10	8	27
0	4	2	16	11	33
20	3	2	21	0	43
27	3	1	27	0	43
9	4	4	10	5	32
10	4	6	11	0	26
2	3	2	2	17	26
4	3	1	4	9	21
4	3	3	4	7	21
13	3	2	14	10	42
17	3	1	54	0	74
3	3	3	2	16	27

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14	7	5	7	4	37
14	2	2	7	0	19
9	3	1	1	0	13
20	4	6	2	0	22
15	8	3	4	0	26
16	3	5	2	17	43
19	5	5	2	0	23
21	4	7	9	0	37
16	6	4	3	1	30
21	6	2	2	0	23
10	4	2	6	7	29
5	3	1	3	8	20
6	3	4	3	6	22
11	3	3	1	1	19
11	3	2	18	10	44
1	4	2	7	12	26
6	4	4	2	3	19
6	3	4	5	9	27
7	3	3	8	20	41
8	3	4	11	26	52
12	3	4	3	13	35
5	4	3	0	57	69
10	3	4	1	30	48
5	5	6	23	30	69
4	4	1	10	22	41
11	9	5	11	6	42
5	4	13	5	5	32
4	4	9	4	5	26

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