ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

ANALYSIS OF FACTORS AFFECTING SUPPLY CHAIN MANAGEMENT EFFICIENCY: A CASE STUDY ON ETHIOPIAN CONSTRUCTION WORKS CORPORATION

By: SOLOMON ALEMU

May, 2017

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ID No SGS/0307/2008A

A THESIS SUBMITTED TO ST. MARY'S UNIVERSTIY COLLEGE SCHOOL OF GRADUATE STUDIES IN PARTIAL FULFLILMENT OF THE REQUIREMNTS FOR THE DEGREE OF MASTER OF BUSINESS ADMINSTERATION (GENERAL-MBA)

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ACKNOWLEDGEMENTS

Acronyms and Abbreviations

ERCC   Ethiopian Road Construction Corporation

EWWCE   Ethiopian Water Works Construction Enterprise

ECWCEthiopian Construction Works Corporation

SC   Supply Chain

SCM   Supply Chain Management

SCME   Supply Chain Management Efficiency

SPSS   Statistical Package for Social Science

IT   Information Technology

PSA   product and service agreement

HR   Human Resource

Abstract

The efficiency of supply chain management is very important for the competitiveness and profitability of any organization. Therefore, the purpose of this study was to analyze the factors affecting supply chain management efficiency at Ethiopian Construction Works Corporation. It also aimed at finding out the extent to which the corporation gives focus on such issue in order to enhance its employees' skills to reach its goals and visions as one national organization working on huge and giant projects. Besides, the major problems that hinder the achievement on supply chain management in the company were explored. In this study, mainly explanatory research design and quantitative research approaches were employed as it focused on identifying casual relationship and finding facts. For this purpose, purposively simple random sampling techniques and structured likert scale data collection instruments and interview were used. Self-administrative questionnaires were used to gather data. Out of the total 125 questionnaires distributed to the respondents 104 (83.2%) were filled out properly and returned. Quantitative data obtained through questionnaire were analyzed by using both inferential and descriptive statistical data analysis methods, processed through SPSS. A significant regression model were formulated at $F_{(7,96)} = 196.977$, $P < 0.000$), the coefficient of determination(R square) value of the model was 0.935 and its adjusted R^2 was 0.930. The regression results showed that it was found that the first and the most influencing variables were distribution channel, the second supplier selection, the third procurement process, the fourth information sharing, the fifth inventory management, the sixth information technology and finally staff training.

Key Words: Construction, Supply chain management, Supply chain management efficiency.

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CHAPTER ONE

INTRODUCTION

This chapter includes background of the study, company background statement of the problem, research questions, objectives of the study, significances of the study, definition of key terms, limitations of the study, delimitation/scope of the study, and organization of the study.

1.1 Background of the study

The construction industry is essential to economic progress a country. The end product of a construction industry services it offers to its customers. Infrastructures such as road sector need huge amount of resources such as capital, machinery, labor, etc. Most of infrastructures of a country are carried out by the government. The government gives contracts to different foreign and internal contractors. ECWC is one of the contractors which is government Development Corporation. To remain competitive, service providers must render quality service, at the right time, at the right cost, employing the latest technology to enhance efficiency, etc., are some of the competing methods used. This is done by SCME, which manages cost, time, quality, enough quantity and of supply is a key success of the organization. Moreover, understanding and meeting customers' expectations and subsequently being different from competitors are important to the sustainability and profitability of the organization. All the above mention facts are addressed by proper implementation of SCM. Therefore, adopting a more integrated approach to supply chain (SC) relationship management has been increasingly viewed as a way of meeting changing customer needs (Eyong, 2009).As it was mentioned by (Neeley, 2006) that Forrester was the first researcher who gave the concept that would eventually become Supply Chain Management. Forrester's theory of distribution management was introduced in 1950's. This theory was about an understanding of inter-organizational relationships and coordination. Supply chain management (SCM) has raised the interest in the past years as organizations started to realize that, the actions taken by one member of the chain actually have an influence

on the profitability of other members in the chain. This scheme generated the act of competing as a part of supply chain against the other supply chains instead of competing as a single firm against other individual firms (Silver *et al.,* 1998). This is due to the fact that, nowadays the new source of business competition lies outside the walls of organizations, and it is determined by how efficiently companies link their operations with their supply chain partners such as suppliers, manufacturers, distributors, wholesalers, retailers and end customers (Silver*et al.,* 1998). Therefore, Supply chain management offers a management philosophy to manage activities and integrate with down-streams, up-streams as well as firms internal supply chain operations (Ross, 1998). With the growth of inter-network competition, individual business may no longer compete solely as independent company but must do as supply chains. Companies associated in the same network require efficient supply chain integration in order to optimize their collective performance. Moreover, numerous companies have started to appreciate that, as SCM plays a major role in building a sustainable competitive edge for their products or services in highly competitive markets (Jones, 1999). Because of the collaboration between members of the chain, SCM gives significant opportunities to the firms involved in terms of cost reductions, revenue enhancement, flexibility, customer satisfaction, speed and economy of time (Forrester, 1958 cited in Neeley, 2006). (Morten, 2003) concluded the general understanding of the business environment in most industries as, competition has been increasing and the condition under which business is running becomes more difficult. By understandably this, many companies are now focusing on improving and developing their supply chain processes because it can play a significant role in customer service and their profitability. Currently, the Ethiopian business environment is becoming customer driven, competitive and technology based. The current practices of Ethiopian construction industries with regard to supply chain management is traditional in that, partners involved across the supply chain act independently in planning, designing, developing and executing strategies with minimum effort made to align strategies with the partners doing business with them particularly suppliers, whole sellers, distributors, and customers. (Russell, 2006) as a coping up strategy suggests that the relationship with suppliers and other partners should be supported with an appropriate level of collaboration, sharing of information, information technology, integrated and efficient system. Therefore, the

investigator will conduct a study on the efficiency of SCM in ECWC and forward possible suggestions that would enable the company to be competitive.

1.2 Company Background

The History of Ethiopian Construction Works Corporation (ECWC)

The Ethiopian Construction Works Corporation (ECWC) is a newly published public enterprise with the authorized capital of Birr 20.3 billion; on December 18, 2015 based on council of Ministers Regulation No. 366/2015. ECWC is governed by the Public Enterprises Proclamation No. 25/1992. Its supervising authority is The Ministry of Public Enterprises and its Policy-making body is the Board of the Corporation whose members are appointed by the government selected from different organizations. The head quarters of the corporation is located in the city of Addis Ababa, around Gurd Shola. It is headed by a Chief Executive Officer (CEO).

The corporation is the result of the amalgamation of the two formerly independent public enterprises, namely the Ethiopian Road Construction Corporation (ERCC) and the Ethiopian Water Works Construction Enterprise (EWWCE).While it's a recent phenomenon, which is established on Dec. 18,2015, its history part of the history of the above mentioned former enterprises and hence can be traced back to the late 1940s and early 1950s.

At the time of the imperial government of Ethiopia was convinced to establish a Road Agency solely responsible for rehabilitating/ restoring and expanding the road network throughout the country. Accordingly, in 1951 the Imperial Highway Authority (IHA) was established to plan, design, construct and maintain roads.

The water sector, like the road sector, restructured many times. For many years this water works construction sector undertaking construction of dams, irrigation and drainage networks; water supply and sewerage networks; construction of roads and buildings; land and reclamation; sea ports and many other different activities.Especially starts from 1994 38 portable water projects, 8 road construction projects, 13 dam and irrigation projects, 4 buildings and 6 different civil work construction projects have been constructed by the former of Ethiopian Construction Water Works Construction Enterprise.

The corporation currently engaged in foreign and internal Road, Bridge, Rail Road, sanitation water bridge, Dam and Irrigation, Port and Airfield projects and maintenance, Buildings, Construction works maintenances. In addition, administers Deep-water dam and Irrigation dam which were done by federal state budget. Corporation plays a very important role in the development of a nation by modernizing the construction sector.

1.3 Statement of the Problem

The efficiency of SCM plays a very important role in the competitiveness and sustainability of any organization. Suppliers play an important role in achieving the objectives of the SCM. Therefore, better supplier selection criteria and specific selection procedures are needed. This would have an effect on product or service delivery or lead time irregularities, product qualities and inventory management. Therefore, supplier selection is a problem that cannot be easily overlooked as the purchasing department's ability to contract the best suppliers of the organization could lead to significant cost reductions (David Jonathan and Samuel, 2012). Despite the fragmented approach and viewpoints to supply chain management and supply chain efficiency, researchers have noted a number of problems regarding supply chain activities (Sridharan *et al.*, 2005). It is observed that either the system or sub component of the supply chain is malfunctioned or poorly designed (Spen & Bersk 2002). (Mentzer et al., 2001) and (Fawcett et al., 2005) findings are consistent with (Sridharan *et al.* 2005) that supply chain efficiency is inhibited by barriers within or with the chain. These barriers according to (Fawcett et al, 2008) range from poor supply chain planning and design, misaligned supply chain processes and structures, supply chain partner culture differences, thrust and ethics, information technology deficiency.

There were a number of researches carried on in different countries such as in Keniaon the title "Factors influencing effective and efficient delivery of road construction projects in Kenya" (by Benjamin Kahura Njenga, 2014)area focused here information technology and time schedule,in Ghana on the title "Supply chain management practices of road construction firms in Ghana" (by Kyei Philip Kwasi, 2014).Information sharing for continuous flow of communication among supply chain members is not addressed by and areas covered under

this study were in Supply chain management practices in road construction sector (KYEI, 2014).

In our country also there were a number of researches conducted on this area, among this a thesis submitted to AAU on the title "Supply chain management practices and firm performance in case of Awash Tannery Plc" (Mustefa Mohammed, 2014).

From the studies conducted in Ethiopia most of them measure firm's performance by using descriptive statistics rather than explanatory research design. In addition to this, the research study area and population study were different Hence, I found that there was research gap on this particular topic on the construction sector in general and in Ethiopian Construction Works Corporation in particular.

According to the interview held with the supply chain manager during the study, there is lack of application of information technology and information sharing within the supply chain members due to this we cannot get better suppliers easily for standardized quality and reasonable price of the item and this information is vital for decision making purpose. All this have an impact on the accomplishment of the short term and long term plans and objectives. In addition to the above interview, through observation there are obsolete items that are not removed from the ware house, due to this it doesn't have enough space for the current items and there is no proper record keeping status for the spare parts that are changed or replaced. This open room for theft or corruption that is sells the new item and replaced by the old/served one.

Moreover ECWC purchasing manual is set in 2005 E.C., it isn't current and it is not update through time. In this globalized world, everything is changed with in a very short period of time, in order to become competitive, it must cope up with this phenomena.

All the above mentioned factors are highly affects the efficiency of SCM, in order not to improve efficiency of the supply chain of the company as a whole. In today's business environment, all international business organizations in general and construction industries in particular depend on to a large extent on the degree to which these industries are able to satisfy their customers demand through the provision of on time delivery, high quality and minimum cost services by reducing the supply chain better than their ultimate competitors. In

order to become competitive with in the industry this study aimed at to assess all the above mentioned factors that affects supply chain management efficiency. I am very initiate to investigate the problem behind this and to recommend the solutions as much as possible.

1.4 Research Questions

This study was aimed at answering efficiency of SCM practices in ECWC. To find answers to the following basic research questions.

- What are the main factors that can affect supply chain management efficiency of ECWC?
- Which factors comes first, second, third, etc… in the supply chain management efficiency?

1.5 Objective of the study

1.5.1 General objective

- The main objectives of this study were to test the seven hypotheses whether it has a positive relationship or not in SCME in ECWC.

1.5.2 Specific objective of the study

The study aims addressing the following specific objectives.

- To identify the factors that can affects the supply chain management efficiency in ECWC.
- To prioritize the factors that affects supply chain management efficiency in ECWC.
- To recommend the potential solutions for easing the factors that affects supply chain management efficiency in ECWC.

1.6 Research Hypothesis

There are a number of researches conducted in supply chain management area. Based on this review I developed seven hypothesis that were examined the factors that affect efficiency of supply chain management in ECWC.

H1: SCME and Supplier Selection have a strong relationship.

H2: SCME and Procurement Process have a strongrelationship.

H3: SCME and Inventory Management have a strongrelationship.

H4: SCME and Information Sharinghave a strongrelationship.

H5: SCME and Distribution Channelhave a strongrelationship.

H6: SCME and Staff Competencyhave a strongrelationship.

H7: SCME and Information Technologyhave a strongrelationship.

1.7 Significance of the study

Efficient use of SCM ensures delivering of the right product/service, at the right time, at the right quality, at the right cost. Knowledge gained in this study were help corporate managers to focus on its factors and efficiency on SCM work collaboratively with stakeholders in and outside the company and then provide better service for their customers by completion of projects on time, its quality and cost. Studies to identify SCME factors which affect the healthiness of the Corporation to contribute a lot to decision makers. In addition to this to give prioritizes for decision making purpose in order to use scarce resources efficiently and effectively. Furthermore, this paper was helping other researchers to conduct further studies on these areas.

1.8 Definition of Key Terms

Supply Chain: Supply chain is the group of manufacturers, suppliers, distributors, retailers and transportation, information and other logistics management service providers that are engaged in providing goods to consumers (Chow, Heaver and Henriksson 1999).

Supply Chain Management: Supply chain management is the integration of business processes from the original suppliers to the end user through that provides products, services and information that add value to customers (Galaskiewicz Joseph, 2011).

Supply Chain Management Practice: are sets of activities undertaken in an organization to promote effective managements of supply chain (Beamon, 1998).

Asset Management Efficiency: is an internally focused supply chain performance attribute describing the ability to efficiently utilize assets (SCC, 2010).

Order Fill Rate:is purchase orders filled as per request. (USAID / DELIVER PROJECT, Task Order 1, 2006).

Delivery Lead Time: is the time interval between when new stock is ordered and when it is received and available for use (USAID /DELIVER PROJECT, Task Order1, 2011).

A Variable: is a characteristic, number or quantity that increases or decreases over time, or takes different values in different situations.

Dependent variable: is a variable whose value depends upon independent variable.

Independent variable: is a factor or phenomenon that causes or influences another associated factor or phenomenon called a dependent variable.

1.9 Limitation of the Study

Because of the limited time and resources, questionnaire and interview were used to get responses of the company. In addition to this, information regarding suppliers in the supply chain management was obtained from ECWC to limitation of contact with supplier. According to this response the researcher were try to work hard for the validity of the research.

1.10 Scope of the study

All foreign and most of internal procurements are direct, regulate, coordinate and carried out centrally at the head office level and others are at the project level and district level with specified amount of the transaction and routine tasks. The scope of this paper is limited to supply chain management efficiency on the road sector due to time constraint not to cover other sectors such as sanitation and building sector.

1.11 Organization of the Study

The paper is organized in to five chapters. The first chapter deals with the paper by providing the basis of the entire research. Chapter two constructs the theoretical frame work

of the paper by revising relevant literature. Chapter three presents the methodological and procedural map of the research. Chapter four deals data analysis and presentation and then chapter five summary, conclusion and recommendation.

CHAPTER TWO

REVIEW OF THE LITERATURE

This chapter includes: the review of related literature, conceptual review, evolution of supply chain management, objectives of supply chain management, benefits of supply chain management, efficiency in the supply chain, factors affecting efficiency in the supply chain, supply chain management practices, supply chain management strategy and empirical findings on SCM practices.

2.1 Conceptual Review

Organizations are facing different kinds of challenges in their effort of competing in today's dynamic global markets. The new paradigm in modern business management is that, competition is no longer among individual business organizations, but rather among inter-networks in the supply chain (Lambert et al., 1998; Drucker, 1998). The supply chain is becoming more critical these days due to a number of factors like resource constraint, price change, and globalization of market economies (Beamon, 1998).

Supply chain (SC) is a linked set of resources and processes that begins with the sourcing of raw materials and extends through to the delivery of end items to the final customer. Supply Chain (SC) is a linked set of resources and processes that begins with the sourcing of raw materials and extends through to the delivery of end items to the final customer (Trkman Stemberger, Faklic, & Groznic, 2006). That is, various business entities (suppliers, manufacturers, distributors and retailers) are expected to work together to deliver the right product or service at the right time. It is a network that begins with the sourcing of raw materials and extends to the delivery of end items to the final customer. The supply chain constitutes all functions within and outside the industry, which enable the value chain to make products and provide services to customers. That is, SC involves and requires collaboration of value chains within and outside the industry to make products and provide services to customers (Beamon, 1998). Nowadays, supply chain is receiving significant attention because it is an integral part of a firm's strategy and supply chain costs as a percent sales (revenues) are significant (Heizer, 2011).

Supply chain management is management of activities in the SC including procurement of materials/services, transformation into intermediate goods and final products, and delivery through a distribution system. The major processes involved in the supply chain include: production planning, inventory control, distribution and logistics processes. These processes interact with one another to produce an integrated supply chain (Heizer, 2011).

SCM also defined as a sourcing technique that involves proactive relationship between a buyer and supplier and the integration is across the whole SC, not just first-tier suppliers (Cox, 2004).

In general, SCM encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics Management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, SCM integrates supply and demand management within and across companies (Ballou, 2007).

As can be seen above, different authors defined the SCM differently. Some in operational terms involving the flow of products and information, some viewed it is a management philosophy, and some viewed it in terms of a management process. These different perspective suggested a multi-dimensionality of SCM that covers set of activities and processes from upstream, firm's internal operations to downstream of the supply chain. Successful SCM requires an integration of internal operational level activities along with external suppliers and customers to attain supply chain performance goals like reliability, responsiveness, agility, cost effectiveness (Samarnayake, 2005). Performance and efficiency improvement initiatives through SC integration are now becoming important factor in maintaining competitive advantage over competitors. Specifically, SC integration programs do mostly focus on information flow and management, inventory planning and/or partnership (Dannese & Romano, 2011). (Chopra, sunil & Meindl, 2004) defines a supply chain as including all functions involved in receiving and fulfilling a customer request. Similarly, Hertz (2001) defines a supply chain as a network that supplies a specific product from raw material to final product. (Hertz, 2001) goes further to state the common objective of any supply chain as efficiency & effectiveness. Efficiency is an internal standard of performance

while effectiveness is an external standard of fit to various groups' demands (Pfeffer & salancik, 1978). For the purpose of this study the researcher will focus on efficiency.

Main objectives for implementing SCM include reducing cost of operations, improving inventory, lead-time and customer satisfaction, increasing flexibility and cross-functional communication and remaining competitive (Tummala et al., 2006). The main goals of having efficient SC system are to offer good service to the final customer, while keeping costs and lead times low (Trkman et al., 2006). Enhancing competitiveness and profitability of the whole supply chain network are among the main objectives of the SCM (Cooper, Lambert, & Pagh, 1997). According to (Habib, 2011); the major purposes, benefits and reasons for SCM include operation efficiency, better outsourcing, profit maximization, enhancing customer satisfaction, improving product/service quality, tackling competitive pressures, increasing importance of E-commerce, and grow complexity of supply chains. It is now being seen as a means of generating innovations which can generate performance (Burgress & Sing, 2003). There are many factors and reasons in relation to suppliers and customers that have raised interest in the supply chain. Greater differentiation, competition, changing operating environment, product quality improvement, shipping products in cost effective manner.

2.2 Evolution of Supply Chain Management

2.2. 1 The Past

During this time to introduce the concept of SCM and logistics. During this period, logistics is a term to describe procurement, maintenance, and transportation of military facilities, materials and personnel. 1950-1960 was an era where manufacturing firms started recognizing physical distribution management as a separate organizational function. The importance of total cost approach rather than individual transportation cost was highlighted. But, inbound movement goods and purchasing were not considered as such. The concept of physical distribution and logistics has emerged in 1960s. Here, business logistics is relatively broader concept encompassing physical distribution and inbound of goods in the manufacturing firm. In conclusion, even though physical distribution and logistics management activities were recognized to be critical for product flow in the supply chain, the

coordination among the core functions (procurement, production and physical distribution) was minimal. And, the coordination by itself affects product flow a lot (Ballou, 2007).

2.2. 2 The Present

During this period integration issues Such as enterprise resource planning (ERP), electronic data interchange (EDI), etc. are raised among the supply chain members. These channel members are suppliers, intermediaries, third party service provider and customers (Trkman et al., 2007).

2.2.3 The Future

Now, issues are globalized in order to become competitive in this globalized world, according to Ballou (2007), designing and operating the supply chain in order to enhance maximization of revenues. SCM has much more relation with the sustainability and profitability of the company. Specialization issues are given attention. Here, issues such as production or manufacturing outsourcing to supply chain members through integration and service providers come to the supply chain members. Such as transportation brokerage, insurance companies, inventory management.

2.3 Objectives of SCM

Supply chain management objective is "to maximize the overall value generated rather than profit generated in a particular supply chain" (Hussain and Mohammed, 2010 pp 51).

Besides, Different author described that; the objective of the supply chain management is to enhance the "profitability" of a firm and supply chain members, and also to increase "competitiveness" (Lambert et al., 1998 pp 4). On the other hand, E.B. Baatz (1995 pp46-52) classified the objective of SCM in to two as short term and long term objective. Consequently, "the short term objective is primarily to increase productivity and reduce inventory and cycle time, while the long term objective is to increase customer satisfaction, market share and profits for all members of the supply chain". SCM can strengthen performance through effectively utilizing the internal and external capabilities of the supplier. This on the other hand leads to "inter-supply chain competition" from "inter- company competition" (Tan et al., 1998 pp 3).

2.4 Benefits of SCM

Supply chain management is used Improve customer satisfaction, to minimize operational costs, improve customer satisfaction and competitive advantage SCM is used in reduction of costs, sustaining high quality standards, in improving customer service and adapting environmental pressures (Michael Q. 2006, pp 106).

Despite the benefits of the supply chain management, there is limited empirical research on how practitioners evaluate their suppliers and implement SCM practices and how these practices affects organizational performance (Tan et al 2002 pp 616).

2.5 Efficiency in the Supply chain

According to Christopher (1998) will the future market leaders be the ones that have sought and achieved the twin peaks of excellence. They should have gained both cost leader ship and service leader ship. The purpose of Supply Chain Management is to support the company to earn as much money as possible. This means as low cost as possible and at the same time sell (revenue) as much as possible. Low cost means that the Supply Chain Cost shall be as low as possible. To achieve a low Supply Chain Cost the companies need to have best possible internal and external performance. Internal performance can be for example revenue, cost efficient distribution system, procurement plan, production lead-time. External performance is affecting the customers and suppliers. Examples of parameters for external performance are delivery precision, lead-time, customer service and price. To achieve market leadership in the world of networks competitors have to focus on network management as well as upon internal processes according to Christopher (1998). To remain competitive in the new global environment companies will have to seek ways to lower cost and service enhanced in accordance with (Christopher, 1998). This means that Supply chain efficiency and effectiveness will become even more critical. Effectiveness is defined by Mentzer (1991) as the extent to which goals are accomplished. Efficiency is the measure of how well the resources expended are utilized according to (Beamon, 1999). Efficiency in this thesis is used as describing how well a company optimizes the Supply chain to maximize profitability. The overall objective of any logistics system is to maximize profitability writes (Dornier, 1998). When having an excellent Supply chain the company can provide products to its customers

that are of high quality (De Meyer *et al*., 1989), at low cost (Goonatilake, 1990), within short lead-times (Haug, 1985) and give the requested customer support, (Hoover *et al*., 2001).

Collin (2003) says that it can be concluded that the success of Supply chains are composed of three different dimensions:

1. Customer service,

2. Capital employed,

3. Total cost

Customer service and cost are opposite poles, which have to be balanced to get the best result for a company. Cutting cost in the Supply chain can result in for example a longer lead-time due to that the company cannot have buffer stock. Improvements of lead-time can be done by putting up a buffer stock, but this cost money both in tied-up capital and risk of scrapping. It is very important for a company to find the balance between Supply Chain Cost and performance.

Towards the customers. There is no general balance that can be used for all companies and all products. Each company has to find their own balance to maximize the profit for the company. Some companies have different balance situations for their product portfolio. Some customers require very high customer service and are willing to pay for that. For other customers is the cost the most important factor and these companies tolerate reduced customer service.

2.6 Factors Affecting Efficiency in the Supply chain

2.6.1 Procurement process in the supply chain

Procurement as defined by (Hoekman, Ptrois & Mavroids, 1997) is the whole process of acquiring property or services. (Thai, 2001) defines the goals of a procurement system as being divided into two: - procurement goals, to include quality, timeliness, cost and integrity and non-procurement goals to include economic, social and green procurement goals. Both these goals must be achieved to create value to citizenly of any nation.

2.6.2 Supplier selection in the supply chain

Supplier selection is very important in the supply chain management. Therefore, buyers must consider before and after transaction commitments and agreements such as availability of maintenance, availability of credit facility, flexibility of agreement, quality, and timely response to deliver the item and it reduces maintenance cost (Liu & Hai, 2005). Therefore, an efficient supplier selection is a critical step in the procurement process which affects the supply chain management.

2.6.3 Distribution system in the supply chain

(Keskinocak & Tayur, 2001) in an analysis of supply chains identifies distribution as a core subsystem within the entire supply chain that defines whether the supply chain objectives will be achieved. Distribution is an element of the marketing mix; others include product, pricing and promotion that are defined as making products or services available for use by consumers using direct or indirect means (Kotler, Keller & Burton, 2009). (Kotler et al., 2002) further asserts that distribution takes place by means of channels, which can be classified according to the number of intermediaries between source (producer) and consumer. A level zero channels has no intermediary. (Burton, 2008) identifies three types of distribution in various channels: intensive distribution where products are stocked widely in many outlets, selective distribution where producers rely on few intermediaries and exclusive distribution where producer relies on very few or one intermediary. (Chopra, Sunil & Meindl, 2001) explains that while customer service consist of many components, response time, product availability and variety, and customer experience are most directly influenced by the structure and capability of the distribution design in a supply chain.

2.6.4 Information sharing in the supply chain

Information Sharing is very important for ease of communication with the supplier's availability of materials, its quality, quantity, price, ordering, return, credit facility and transportation. The timing and type of information is also very important for decision making purpose within the functional unit of the organization and different supply chain members outside the organization. This increases the overall performance of the organization and its supply chain members.

2.6.5 Staff Training in the Supply Chain

Ideally, a paradigm shift in work allocation should be considered to have more administrators, qualified in supply chain issues, running service facilities. Assigning qualified persons in the proper position and giving short term, long term and diversified skill training increasesefficiency of supply chain management. In this globalized world, things continuously change in order to cope up these change continuous training needs particularly those involved in directly in the supply chain.

2.6.6 Information Technology in the Supply Chain

In the realms of supply chain management, use of IT refers to the use of inter organizational systems that are used for information sharing or processing across organizational boundaries (Subramani, 2004). According (Subramani, 2004), besides internal IT systems such as Enterprise Resource Planning's (ERPS).

Includes all other information systems such as distribution resource planning, capacity planning systems as well as other tools such as RFID, barcodes, and EDI platforms that are used in supply chain transactions to enhance processing and communication. Supply chain management emphasizes on long term benefit of all parties on the chain through cooperation and information sharing. This affirms the importance IT in the supply chain (Jiang & Jiang, 2007). Research demonstrates that information technology use in managing purchasing in the supply chain is widely utilized in a variety of procurement applications including communication with vendors, checking vendor price quotes, international sourcing over internet and negotiations (Tippins, 2003). Information technology increases information processing capabilities of suppliers, thereby enabling or supporting greater relationship in addition to reducing uncertainty (Yu Z. *et al*., 2001). As such, it leads to reduced cycle time, cost of procurement and errors in the processing orders. Information technology has been applied to logistics and distribution: for example tracking systems in transportation, and distribution planning systems. This creates better visibility of the distribution channel as well as allows better control of the logistics systems (Zhu, 2006). Additionally, it tools such as RFID, barcodes, and EDI platforms have enabled firms be more proactive in the management of inventory in the supply chain. Ultimately, IT can lower coordination costs, and in supply chain context, can substantially improve transactional efficiencies through increased

information sharing and communications capabilities, resulting in improved supply chain performance (Jiang & Jiang, 2007), (Drucker, 1985).

2.6.7 Inventory management in the Supply Chain

To reduce the company costs and expenses, inventory management is very important for controlling ordering of in flow and outflow of materials, proper handling and inventory management systems. Moreover proper allocation of scarce resources to different working unit, current balance and status is essential in order to plan and execute proper supply chain management system.

2.7 Conceptual frame work

This is a diagrammatic representation of the study showing the relationship between the dependent variable supply chain management efficiency and the independent variables which are: supplier selection, procurement process, inventory management, information sharing, distribution channel, staff training and information technology.

Independent variables   **dependent variable**

| Procurement Processes |

| Supplier selection |

| Distribution channels |

| Staff training |

| Level of Information sharing |

| Information Technology |

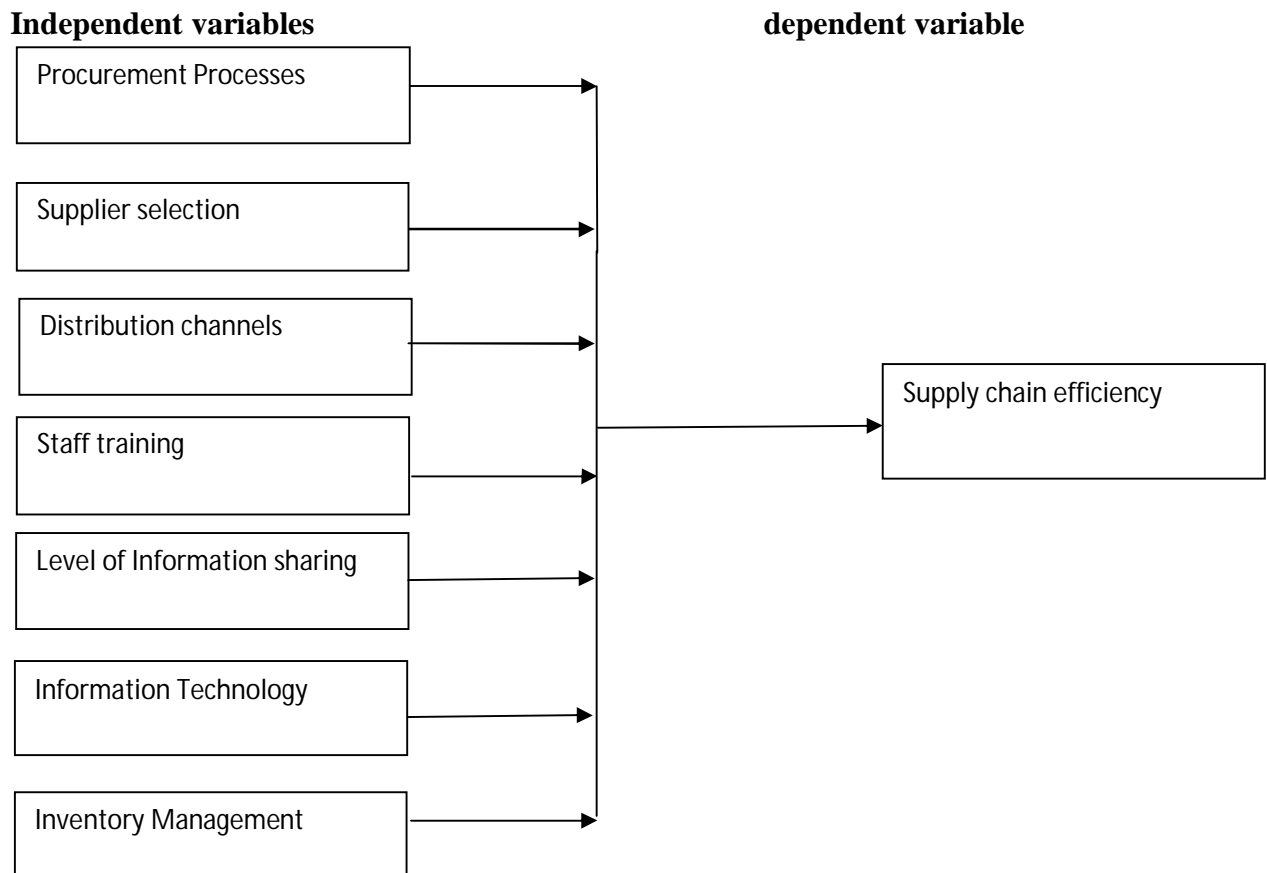| Inventory Management |

| Supply chain efficiency |

Fig. 2.1 Conceptual framework developed by author 2017

2.8 Supply Chain Management Practices

SCM practices can be defined as a set of activities undertaken in an organization to promote effective management of its supply chain. Supply chain management is now recognized as a critical business process for companies manufacturing or distributing products. This is because customers' demand for most products are ever more demanding in response time, in choice and in seeking more competitive prices and thanks to globalization, customers can choose from an increased number of suppliers (Lazarevic, Sohal, & Baihaqi, 2007).

The SCM practices of an organization could be described in terms of their supply strategy to source raw materials and a set of interlinked activities under production planning, inventory control, distribution and logistics. The detail activities under these processes include raw material scheduling and acquisition, manufacturing process design and scheduling (process focus, repetitive focus and product focus), material handling design and control, design and management of storage policies and procedures/work in process /final product inventory retrieval, transportation and final product delivery (Beamon, 1998).

Cox (2004) has described four sourcing options for buyers which guide the focus of relationship with suppliers and the level of work scope with suppliers and supply chain. Supplier selection and supply chain sourcing are reactive sourcing strategy whereby, suppliers from one or many tiers are chosen among many competing ones. The relationship management with these sourcing options is arm's length or non-collaborative. Supplier development and supply chain management are pro-active sourcing strategy whereby, buyers and suppliers at the first or many tiers collaborate more on long term basis. The relationship management with these sourcing options is collaborative.

Relationship management as an organizational core process is comprised of strategic and operational components. The strategic process provides the structure for integrating the firm with suppliers. This is to identify key suppliers for organizational success and to decide on development and maintenance of the relationship. The organizational process is to segment suppliers based on their value overtime and identify opportunities for long term relationship. The operational teams will be responsible to develop the standard and tailored product and service agreement (PSA) to different supplier segments (Lambert, & Schwieterman, 2012).

Information sharing practice among companies', customers and suppliers is an important component required to improve visibility of information to achieve seamless integration within the supply chain. The practice could be described in terms of type (quantity), quality and level of participation. The type of information to be shared could vary depending on the level of relationship and vision alignment. It could be strategic, operational, market, consumer and/or logistics. Forecast, product related satisfaction and logistics related information is the most commonly shared information among the supply chain partners (Zailani & Rajagopal, 2005; Huang, Sheoran and Wang, 2004).

Information and communication technology (ICT) being process and product communication enabler is very important strategic factor for SC integration. It will help a company lot in streamlining communication and developing efficient responsive system. The most important issue to consider while implementing ICT is extent of coordination with SC partners and compatibility with other relevant technologies used in the SC system. Major types of ICT used in interaction with suppliers and customers include e-mail/fax, bar-coding/scanning, EDI, WWW, e-commerce, internet, intranet, ERP (Tummala *et al*., 2006). ICT implementation should go along with the required process changes and redesign activities executed through incremental processes (Power, 2005).

In general, SCM practices of an organization could be described in terms of sourcing options and relationship management with suppliers, internal operations and logistics, information sharing practices, ICT implementation, and network structure.

2.9 Supply Chain Management Strategies

Supply chain management strategies include two or more firms in a supply chain entering into a long term agreement; the development of mutual trust and commitment to the relationship; the integration of logistics events involving the sharing of demand and supply data; the potential for a change in the locus of control of the logistics process" (La Londe & Masters, 1994). Manufacturers are able to develop alternative conceptual solutions, select the best components and technologies, and assist in design assessment by involving suppliers early in the design stage, (Burt & Soukup, 1985). Similarly Brammer *et al*. (2011) identified the strategies for SCM as establishing code of conduct to ensure that expectations are met throughout the supply chain process; certification using screening device in the selection and

development of suppliers; selection which is the primary process of reducing supply risks; and monitoring and auditing to ensure compliance with expectations.

2.10 Empirical findings on SCM Practices

Evangelista, Mogre, Perego, Rospagliesi and Sweeney (2012) have used resource based perspective to describe and understand the relationship between IT adoption, logistics capabilities and companies' performance. Accordingly,

- There is a positive correlation between information technologies and organizational performance. By using information technology we can get competitive suppliers easily. Due to this the right quality, at the right time, with optimum price.

- There is a positive correlation between transactional capabilities (such as order management) performance measures in relation to asset utilization efficiency.

- There is a positive correlation between level of information sharing and organizational performance. Updated information is vital in a competitive business environment in order to become profitable by minimizing its cost.

- There is a positive correlation between data gathering technologies (EDI, barcode, radio frequency, and RFID) and performance related to efficiency (asset utilization improvement), effectiveness (operation improvement, customer service improvement and flexibility improvement), and transactional capabilities (order management).

- Variables such as supply management, supplier involvement and selection issues have a positive correlation were addressed in Supply chain management practices in road construction sector (KYEI, 2014). Supply chain integration as described by integration of supplier, customer, internal planning and operation do have positive influence on supply chain performance. These performances are described in terms of raw material purchasing cost, transportation cost, distribution cost, asset turnover and inventory holding cost (Patrck, 2013).

- Implementation and usage of IT/tools in the company is found to be weak. Information sharing practices within and outside the corporation is weak. And finally, SCM efficiency is very important the level of customer satisfaction and to crate competitive advantage.

CHAPTER-THREE

RESEARCH DESIGN AND METHODOLOGY

This chapter deals with the research design, source of data and study area, data collection method, sampling method and sample size and data analysis and interpretation.

3.1 Research Design

In order to address transaction factors that were affect SCME the research design to be used were mainly explanatory orcasual research design but there was also descriptive. Explanatory research designhelped to test the hypothesis that showscasual relationship of a situation factors that were affect SCME. The main objectives of the study were to test the seven hypotheses whether it has a positive relationship or not in SCME in Ethiopian Construction Works Corporation. In answering the research questions, this paper was using both quantitative and qualitative approaches are used for measuring SCME effects on the overall efficiency of the organization. This study was carried out to ascertain the implications of each independent variable such as supplier selection, procurement process, inventory management, information sharing, distribution channel, Staff training and information technology towards SCME in Ethiopian Construction Works Corporation. The mathematical model formed was the following form:

SCM Efficiency (SCME) = f(Supplier selection(SUPS), Procurement process (PROP), Inventory management (INVM), Information sharing (INFS), Distribution channel (DISTC), Staff training (STFT), Information technology (INFT)).

Symbolically this mathematical model expressed as:

$SCME = \beta_0 + \beta_1*SUPS + \beta_2*PROP + \beta_3*INVM + \beta_4*INFS + \beta_5*DISTC + \beta_6*STFC + \beta_7*INFT$.

Where: $\beta_0$is the constant which is the intercept of SCM Efficiency (Y-intercept) and $\beta_1,\beta_2,\beta_3,\beta_4,\beta_5,\beta_6$ and $\beta_7$are the regression coefficients ofSupplier selection(SUPS), Procurement process(PROP), Inventory management(INVM), Information sharing(INFS),

Distribution channel(DISTC), Staff training (STFT), Information technology(INFT) respectively.

3.2 Source of Data and Study Area

In this study both primary and secondary data sources were used. Primary data were taken by using questionnaire and interview, secondary data were taken from the organizational observation. The participants of this study in ECWC were relevant professionals that are related to the SC working at different levels in Ethiopian Construction Works Corporation SC system.

3.3 Data Collection Method

Both structured and unstructured questionnaire were disseminated to gather primary data were usedto address relevant officials. Primary data were gathered through the use of highly structured self administrative questionnaires. The reason why self-administered questionnaire used will help as a prompt and relatively low cost strategy for obtaining information in the context that will likely to establish a good rapport with respondents and easier to answer for the respondents. In addition to this self administrative questionnaire, interview questions were also used. The questionnaires would be distributed after the expected participants have been selected and informed about the purpose of the research by researcher.

3.4 Sampling Method and Sample Size

The sample frame that were focused on key areas in ECWC supply chain such as Procurement and material Management Directors, Central Planning, Central warehouses, project and District managers, Finances, Procurements, Maintenance Team Leaders, Purchasers and Warehouse man were the study area in federal and regional state of ECWC employees. The reason of selection is that purposively based on accessibility of information. From the total number of ten Districts (i.e. Alemgena, Adigrat, Dire Dawa, Combolcha, D/Markos, Gonder, Jimma, Shashemene, Nekempt, and Sodo District) and ten Projects (i.e. Dimma-Rad, Jinka-Mender, Adama awash,Awash-Mille, Kong Bugundi, Hadero-Mazoria, Dulecha-Awash, Shire Airport port, Chancho derba poject), one Project and one District would be selected from decentralized level and the Head Office will be selected from the centralized level by using simple random technique (lottery system) because all have equal chance.

3.4.1 Sample Size Determination

Mathorta and Peterson, (2006) stated that, larger the sample size of a research, the more accurate data generated but the sample size were different due to different situation. Due to time and financial limitations and the nature of the population sample determination method developed by (carvalho, 1984) is applied to determine a sample size.

Table 3.1 sample size determination.

Population size	Small	Medium	Large
51 – 90	5	13	20
91 – 150	8	20	32
151 – 280	13	32	50
281 – 501	20	50	80
501 – 1200	32	80	125
1201 – 3200	50	125	200
3201 - 10,000	80	200	315
10,001 – 35000	125	315	500
35001 – 150000	200	500	800

Source carvalho (1984)

Therefore, based on (carvalho,1984) Sample size determination method, for this study to increase the accuracy of the data, a large sample size is selected. Accordingly out of total population (520) the selected sample size 125 employees who participated in this particular study.

3.5 Methods of Data Analysis

Statistical analysis were used to mainly inferential statistics (Regression, correlation, t-test)by using statistical package of social sciences (SPSS) software the analyzed data. In addition to inferential statistics, descriptive statistics techniques were used to analyze quantitative data by calculating frequency distribution, percentage tables, graphs were used to analyze the data gathered by using questionnaire. Qualitative data were analyzed and presented by using statements. The studies variables were supplier selection, procurement process, inventory management, information sharing, distribution channel,staff training&information technologywere used to determine factors affecting SCM efficiency in Ethiopian Construction Works Corporation.

3.6 Ethical Considerations

The primary responsibility of the researcher were confirming strictly its confidentiality and guarantying their privacy during treating the information given by respondents. The purpose of the research was explained to respondents before conducting the research. It was also more concerned not to violate the self-esteem and self-respect of the subject as well. Data and study results are confidential, secured, not disclosed to any one; it is solely used for academic purpose.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

This chapter shows results and discussion of the collected data. It consists of two sections. The first section treats the characteristics of respondents in terms of sex, age, educational qualification, position and work experience. The second section discusses the main part of the study, the analysis and interpretation of data that were collected through questionnaire and interview.

4.1 Demographic Information of the Respondents

The first part of the questionnaire consists of the demographic information of the respondents. This part of the questionnaire requested a limited amount of information related to personal and professional characteristics of respondents. Accordingly, the following variables about the respondents were summarized and described in table 4.1 below. Out of the total 125 questionnaires distributed to the respondents 104 (83.2%) were filled out properly and returned. These variables include: gender, age, and the highest educational level achieved, the number of years the worker worked with in the corporation.

TABLE 4.1 SUMMARY OF RESPONDENT PROFILE BY AGE, GENDER AND ACADEMIC QUALIFICATION

| Variables	Responses	Frequency	Percentage
Gender	Male	63	60.6
	Female	41	39.4
	Total	104	100
Age	Below 25	2	1.9
	25-35	46	44.2
	36-45	26	25.0
	46-55	20	19.2
	Above 55	10	9.6
	Total	104	100
Qualification	Below High School	2	1.9
	High School	6	5.8
	Diploma	21	20.2
	Degree	69	66.3
	Masters and above	6	5.8
	Total	104	100
Experience	2-5 years	26	25.0
	6-10 years	12	11.5
	11-15 years	16	15.4
	Above 15 years	50	48.1
	Total	104	100.0

Source: Own survey, 2017

Table 4.1 above shows that in terms of gender majority of the respondents were male who response the questionnaire requested by the researcher. Regarding the age of the respondents, majority of the respondents 48(46.1%) are under age 35, 26(25%) are between 36-45 and the remaining 30(28.8%) are above age 45. This implies that ages of the respondents were young enough which is on productive age. Regarding academic qualification of the respondents about 75(72.1%) were degree and above and 29(27.9%) of the respondents' qualification was diploma and below. This implies that the respondents were highly qualified and

knowledgeable in their work area which enables them to perform their job efficiently and they were also competent enough to achieve the corporation's objective. In terms of experience majority 66(63.5%) of the respondents were 11 years and above, 12(11.5%) are between 6-10 years and the remaining 26(25%) were below 5 years in their work experience. This implies that majority of the respondents were highly experienced that helps them to perform their job with error free and reduce cost of hiring of new employees by the corporation.

4.2 General supply chain management issues

GRAPH 4.1PROCUREMENT TYPE
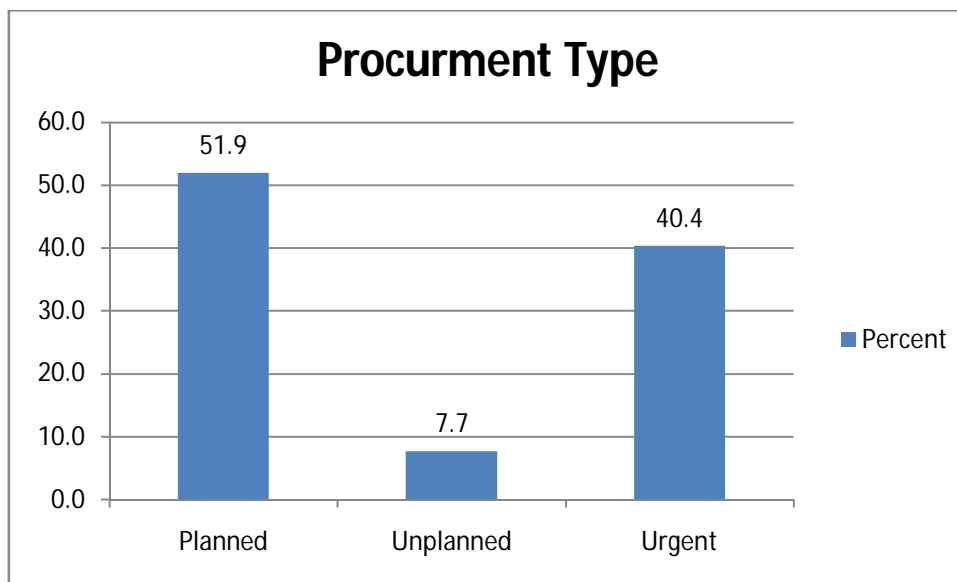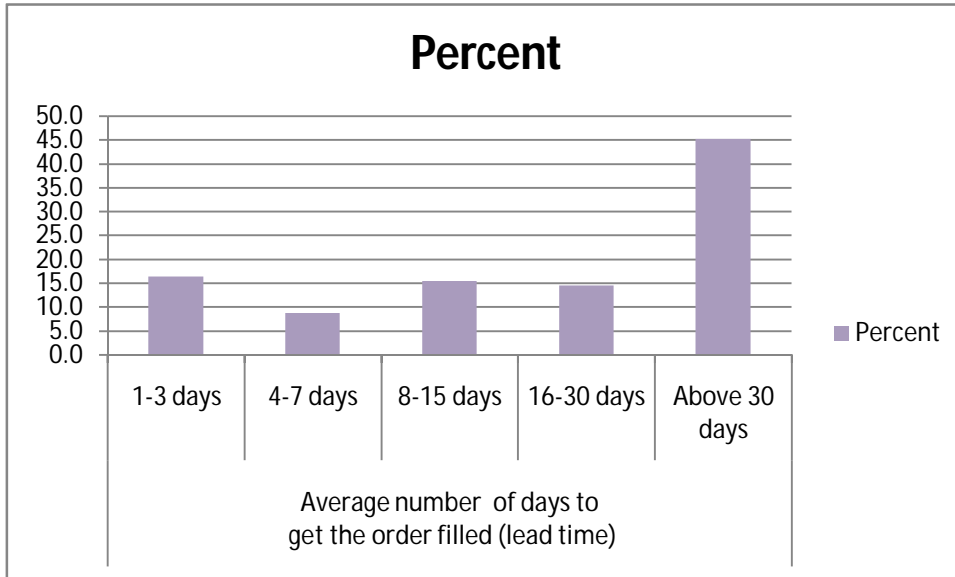

Source: Own survey 2017

Graph 4.1 above shows that majority of the respondents 54(51.9%) are planned type procurement, 42(40.4%) are urgent based procurement and the remaining 8(7.7%%) unplanned. This implies that most of the procurement type happened by the corporation is planned whereas quite considerable procurements were made on urgent when immediate consumption arises upon approval.

GRAPH 4.2 AVERAGE NUMBER OF DAYS TO GET THE ORDER FILLED (LEAD TIME)

Source: Own survey 2017

Garph 4.2 above shows that majority of the orders given by the company were supplied with more than a month (30 days) as per the respondents response 47(45.2%) are said that the orders stayed for more than 30 days, 15(14.4%) said for 16-30 days, 16(15.4%) for 8-15 days and the rest 26(25%) were delayed only for less than a week. This implies that orders were much delayed which has an adverse impact on the operation of the corporation. Therefore the company should think of improvement of orders receivable.

4.3 ANALYSIS OF DATA PERTAINING TO THE STUDY

4.3.1 SECTION II: CLOSE ENDED QUESTIONS FOR EMPLOYEES

In this section, based on the information gathered from employees on the issues of efficiency on supply chain management the researcher tried to discuss on the variables such as supplier selection, procurement process, inventory management, information sharing, distribution channel, staff competency and information technology.

The questionnaires were designed using Likert five point scale where almost all the statements were measured on a five point scale with 1= Strongly Disagree; 2= Disagree; 3= Neutral; 4= Agree; and 5 = Strongly Agree (Sharma, R. 2000 & Kumar, Y.S. 2007).To make easy interpretation the following ranges of values are assigned to each scale: 1.50 or less =

Strongly Disagree; 1.51 - 2.50 = Disagree; 2.51 - 3.50 = Neutral; 3.51 - 4.50 = Agree and 4.51 and above Strongly Agree.

4.3.2 Descriptive Statistics of variables

1. Supplier selection

From the respondents (N=104) the range of mean score of likert scale anchored by 5= strongly agree and 1=strongly disagree was 2.5, the maximum and minimum mean score were 4.5(strongly agree) and 2 (disagree), respectively. The grand mean was 3.2951 at a standard error of 0.029 andSD 0.7790(Table 4.2 below). This implies that the supplier selection had affected the efficiency of supply chain management the grand mean likert score 3.2951 falls between 3(undecided/neutral) and 4(agree). Supplier selection was therefore, indifferent among the key constraints to the corporation; it showed that it is classified as the first major constraints to the efficiency of SCM.

2. Procurement process

From the respondents (N=104) the range of mean score of likert scale anchored by 5= strongly agree and 1=strongly disagree was 2, the maximum and minimum mean score were 4(agree) and 2 (disagree), respectively. The grand mean was 2.9875 at a standard error of 0.049 and SD 0.6049(Table 4.2 below). This implies that the procurement process had affected the efficiency of supply chain management the grand mean likert score 2.9875 falls between 2(disagree) and 3(undecided/neutral). Procurement process wasless than the average therefore, among the key constraints to the corporation; it showed that it is classified as the fifth major constraints to the efficiency of SCM. Because majority of the respondents are neutral with the corporations' commitment in the procurement process.

3. Inventory management

From the respondents (N=104) the range of mean score of likert scale anchored by 5= strongly agree and 1=strongly disagree was 2, the maximum and minimum mean score were 4(agree) and 2(disagree), respectively. The grand mean was 3.0223 at a standard error of 0.049 and SD 0.5182 (Table 4.2 below). This implies that the inventory management had

affected the efficiency of supply chain management the grand mean likert score 3.0223 falls between 3(undecided/neutral) and 4(agree). Inventory management was therefore, indifferent among the key constraints to the corporation; it showed that it is classified as the fourth major constraints to the efficiency of SCM.

4. Information sharing

From the respondents (N=104) the range of mean score of likert scale anchored by 5= strongly agree and 1=strongly disagree was 1.83, the maximum and minimum mean score were 3.83(agree) and 2(disagree), respectively. The grand mean was 2.9380 at a standard error of 0.069 and SD 0.5144 (Table 4.2 below). This implies that the information sharinghad affected the efficiency of supply chain management the grand mean likert score 2.9380 falls between 2(disagree) and 3(undecided/neutral). Information sharingwasless than the average therefore, among the key constraints to the corporation; it showed that it is classified as the six major constraints to the efficiency of SCM.

5. Distribution channel

From the respondents (N=104) the range of mean score of likert scale anchored by 5= strongly agree and 1=strongly disagree was 2, the maximum and minimum mean score were 4(agree) and 2(disagree), respectively. The grand mean was 2.9375 at a standard error of 0.075 and SD 0.5131 (Table 4.2 below). This implies that the distribution channel had affected the efficiency of supply chain management the grand mean likert score 2.9375 falls between 2(disagree) and 3(undecided/neutral). Distribution channelwasless than the average therefore, among the key constraints to the corporation; it showed that it is classified as the last major constraints to the efficiency of SCM.

6. Staff Training

From the respondents (N=104) the range of mean score of likert scale anchored by 5= strongly agree and 1=strongly disagree was 3, the maximum and minimum mean score were 5(strongly agree) and 2(disagree), respectively. The grand mean was 3.0735 at a standard error of 0.042 and SD 0.6602 (Table 4.2 below). This implies that the staff competency had affected the efficiency of supply chain management the grand mean likert score 3.0735 falls

between 3(undecided/neutral) and 4(agree). Staff competencies were therefore, indifferent among the key constraints to the corporation; it showed that it is classified as the second major constraints to the efficiency of SCM.

7.Information technology

From the respondents (N=104) the range of mean score of likert scale anchored by 5= strongly agree and 1=strongly disagree was 2, the maximum and minimum mean score were 4(agree) and 2(disagree), respectively. The grand mean was 3.0230 at a standard error of 0.062 and SD 0.5649 (Table 4.2 below). This implies that the information technology had affected the efficiency of supply chain management the grand mean likert score 3.0230 falls between 3(undecided/neutral) and 4(agree below). Information technologies were therefore, among the key constraints to the corporation, it showed that it is classified as the third major constraints to the efficiency of SCM.

Efficiency Measuring

From the respondents (N=104) the range of mean score of likert scale anchored by 5= strongly agree and 1=strongly disagree was 2.2, the maximum and minimum mean score were 4.2(agree) and 2(disagree), respectively. The grand mean was 3.1961and SD 0.6231 (Table 4.2 below). This implies that most of the respondents are neither agree nor disagree in their performance in supply chain management.

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
SCME	**104**	**2.2000**	**2.0000**	**4.2000**	**3.196154**	**.6231650**	**.388**
SUPS	104	2.5000	2.0000	4.5000	3.295192	.7790185	.607
PROP	104	2.0000	2.0000	4.0000	2.987500	.6049854	.366
INVM	104	2.0000	2.0000	4.0000	3.022308	.5182087	.269
INFS	104	1.8300	2.0000	3.8300	2.938077	.5144534	.265
DISTH	104	2.0000	2.0000	4.0000	2.937500	.5131641	.263
STFT	104	3.0000	2.0000	5.0000	3.073558	.6602426	.436
INFT	104	2.0000	2.0000	4.0000	3.023077	.5649952	.319

Source: Own Survey, 2017

4.4 Inferential Statistics Analysis

4.4.1 Pearson's Product Moment Correlation Coefficient (PPMCC) Matrix

Pearson's correlation matrix were used for data to see the relationship between variables. In this study Pearson's Product Moment Correlation Coefficient (PPMCC) was computed (Table 4.3 below) to determine whether there is significant relationship matrix relationship between supplier selection (SUPS), procurement process(PROP), inventory management(INVM), information sharing(INFS), distribution channel(DISTH), staff training (STFC), information technology(INFT) and supply chain management efficiency(SCME). The study result indicated that the correlation coefficients for the relationships between SCM Efficiency and its predictor variables were linear and positive ranging from substantial to strong correlation.

The correlation coefficient value close to one considered perfect correlation and close to 0.7 considered strong correlation and less than 0.3 considered weak correlation. He further explained that the correlation coefficient 0.001-0.19 is "very weak", 0.20-0.39 is "weak", 0.40-0.59 as "moderate", 0.60-0.79 as "strong" and 0.80-1.0 as "very strong". Pearson's

product moment correlation (PPMC) analysis revealed that there was a very strong positive correlation between SCME and PROP (r=0.848, p=0.000), SCME and INFS (r=0.870, p=0.000), SCME and DISTH (r=0.900, p=0.000) and finally SCME and INFT (r=0.842, p=0.000). The correlation between SCME and SUPS (r=0.705, p=0.000), SCME and INVM (r=0.767, p=0.000) and SCME and STFC (r=0.732, r=0.000) was strong and significant correlation. Overall, the correlations between dependent variable (SCME) were statistically significant at p < 0.01 two tailed and N=104 (table 4.3 below).

TABLE 4.3 PEARSON'S CORRELATION COEFFICIENT MATRIX

		SCME	SUPS	PROP	INVM	INFS	DISTH	STFC	INFT
SCME	Pearson Correlation	1							
	Sig. (2-tailed)								
SUPS	Pearson Correlation	.705**	1						
	Sig. (2-tailed)	.000							
PROP	Pearson Correlation	.848**	.654**	1					
	Sig. (2-tailed)	.000	.000						
INVM	Pearson Correlation	.767**	.445**	.672**	1				
	Sig. (2-tailed)	.000	.000	.000					
INFS	Pearson Correlation	.870**	.519**	.712**	.708**	1			
	Sig. (2-tailed)	.000	.000	.000	.000				
DISTH	Pearson Correlation	.900**	.595**	.769**	.659**	.851**	1		
	Sig. (2-tailed)	.000	.000	.000	.000	.000			
STFC	Pearson Correlation	.732**	.345**	.548**	.623**	.753**	.699**	1	
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		
INFT	Pearson Correlation	.842**	.449**	.719**	.711**	.790**	.826**	.759**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	
**. Correlation is significant at the 0.01 level (2-tailed).									

Source: Own survey 2017

Table 4.3 above shows that correlation also existed between dependent variable which is statistically significant at p < 0.01 two tailed. For instance supplier selection and inventory management has a moderate positive correlation. However, diagnosing for multicollinearity by co linearity statistics (Tolerance and variance inflation factor, VIF), eigenvalues and the conditional index of the model there was no multicollinearity problems for the model. If any of the VIFs exceeds 5 or10, it is an indication that the associated regression coefficients are poorly estimated because of multicollinearity. The result (table 4.4 below) showed the maximum VIF was 5.643 and tolerance was much greater than zero. This indicates that there was no multicollinearity that exists to create a problem. The other diagnostic method is eigenvalue is close to zero, then multicollinearity does exist. The condition index also measures the existence of multicollinearity that if one of its values exceeds 100then there exists multicollinearity. The result (Table 4.4 below)indicated that   multicollinearity was not a problem for the multiple regression model.

TABLE 4.4 REGRESSION COEFFICIENTS

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-.523	.106		-4.943	.000		
	SUPS	.171	.029	.214	5.966	.000	.526	1.900
	PROP	.178	.049	.173	3.610	.000	.295	3.391
	INVM	.157	.049	.130	3.180	.002	.403	2.483
	INFS	.207	.069	.171	2.983	.004	.207	4.842
	DISTH	.293	.075	.241	3.895	.000	.177	5.643
	STFC	.082	.042	.087	1.977	.051	.349	2.867
	INFT	.141	.062	.128	2.298	.024	.218	4.588

a. Dependent Variable: SCME

Source: Own Survey, 2017

Respondents' predicted efficiencyperformance (Table 4-4 above) is equal to -0.523 + 0.171*Supplier selection(SUPS) + 0.178*Procurement process(PROP) + 0.157*Inventory management(INVM) + 0.207*Information sharing(INFS) + 0.293*Distribution channel(DISTC) + 0.082*Staff training(STFT) + 0.141*Information technology(INFT)), where predictor/explanatory and dependent variables were coded or measured 5=strongly agree to 1=strongly disagree and mean of likert items score were taken.

A multiple linear regression was calculated to predict efficiency performance based on predictor variables supplier selection, procurement process, inventory management, information sharing, distribution channel, staff training& information technology. A significant regression equation was found ($F(7,96)=196.977$, $p < .001$), with an R^2 of 0.935 and adjusted R^2 of 0.930. This indicates that the regression model was accounted for 93.5% of the variations of SCM efficiency (Table 4.5 below).

TABLE 4.5 MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.967[a]	.935	.930	.1646831	.935	196.977	7	96	.000

a. Predictors: (Constant), INFT, SUPS, INVM, STFC, PROP, INFS, DISTH

b. Dependent Variable: SCME

Source: Own Survey, 2017

The business performance measurement increased by 0.171 for each supplier selection likert items mean score, 0.178for each procurement process likert items mean score, 0.157for each inventory management likert items mean score, 0.207for each information sharing likert items mean score, 0.293for each distribution channel likert items mean score, 0.082for each staff training likert items mean score, 0.141for each information technology likert items mean score.

All the seven hypothesized factors supplier selection, procurement process, inventory management, information sharing, distribution channel, staff training, information technology variables were significant predictors of SCM efficiency (Table 4.4 above).

Model: SCME = -0.523 + 0.171*SUPS + 0.178*PROP + 0.157*INVM + 0.207*INFS + 0.293*DISTC + 0.092*STFT + 0.141*INFT.

Beta (standardized regression coefficients) is a measure of how strongly each predictor variables such as supplier selection, procurement process, inventory management, information sharing, distribution channel, staff competency, information technology influences the dependent variable i.e. SCM Efficiency. It is used to comparing the effects of predictor variables on dependent variables (Lin Lin, 2007). The beta is measured in units of standard deviation. A change in one standard deviation (SD) in the supplier selection, procurement process, inventory management, information sharing, distribution channel, staff training, information technology variables results in a change of 0.214, 0.173, 0.130, 0.171, 0.241, 0.087 and 0.128 in SCM Efficiency respectively. The higher the beta value the greater the impact of the predictor variable on the criterion variable. (Table 4.4 above)

TABLE 4.6 RANKS OF PREDICTOR VARIABLES BASED ON THEIR STRENGTH TO INFLUENCE IN EFFICIENCY OF SCM

S. No.	Predictor variables	Beta value (standardized coefficient)	Rank based on influence
1.	Supplier selection (SUPS)	0.214	2nd
2	Procurement process (PROP)	0.173	3rd
3.	Inventory management (INVM)	0.130	5th
4.	Information sharing (INFS)	0.171	4th
5.	Distribution channel (DISTC)	0.241	1st
6.	Staff training (STFT)	0.087	7th
7.	Information technology (INFT)	0.128	6th

Source: Own Survey,2017

This indicates that distribution channel were the most influential predictor variable for SCM efficiency followed by supplier selection and procurement process. Information sharing, inventory management, information technology and staff training were at the fourth, fifth, six and seventh position respectively in terms of its strength in influencing efficiency of supply chain management.

4.4.2 Hypothesis testing (t-calculated)

Regression analysis used to estimate the relationship that exist between dependent and independent variables in order to determine the effect of each independent variables on the dependent variable and predict the value of dependent variable for a given value of the dependent variable.

1. Supplier selectiont – value of 5.966 which were greater than 1.8 which means the variables positively correlated and significantly affects the efficiency of supply chain Procurement process t – value of 3.610 which were greater than 1.8 which means the variables positively correlated and significantly affects the efficiency of supply chain management.

2. Procurement processt– value of 3.610 which were greater than 1.8 which means the variables positively correlated and significantly affects the efficiency of supply chain management.

3. Inventory management t – value of 3.180 which were greater than 1.8 which means the variables positively correlated and significantly affects the efficiency of supply chain management.

4. Information sharing t – value of 2.983 which were greater than 1.8 which means the variables positively correlated and significantly affects the efficiency of supply chain management.

5. Distribution channel t – value of 3.895 which were greater than 1.8 which means the variables positively correlated and significantly affects the efficiency of supply chain management.

6. Staff training t – value of 1.977 which were greater than 1.8 which means the variables positively correlated and significantly affects the efficiency of supply chain management.

7. Information technology t – value of 2.298 which were greater than 1.8 which means the variables positively correlated and significantly affects the efficiency of supply chain management.

4.5 Qualitative Analysis

4.5.1 How does your organization strategy in order to create efficient supply chain management system?

- The corporation process the suppliers agreement for a given material and buying material from the manufacturers directly, it's not enough or good strategy in efficient supply chain management.
- By planning for one year (each year planning).
- I don't have a clear idea to suggest about supply chain management system of our organization because the organization is newly established.

4.5.2 What kind of system does your organization implement to control the occurrence of corruption on purchasing?

- We using list price system by using proforma collection.
- Once a year there is a training to fight for corruption on purchasing area.
- Internal audit checking the document and rechecking the purchase process by collecting other Performa from different suppliers and compare the previous purchase material document and analyze the current price and evaluate them.

4.5.3 What are the major challenges implementing efficient supply chain management system?

- There is a lack of information sharing or reporting in efficient supply chain management.
- Lack of availability supply and quality of materials.
- Lack of awareness of the importance of supply chain management.
- Lack assigning employees in a proper position.
- Emphasis is not given to supply chain management.
- Lack of commitment of employee's.
- Lack of skilled manpower.
- Lack of belongingness.

- Lack of transparency.
- Lack of work plan.
- Bulk purchase order (Unplanned purchasing system).
- Most of the supply chain areas are not supported by information technology.

4.5.4 Do you have supply chain management plan, if your answer is yes, then what are your strategic plans to achieve your supply chain management plan? Do you believe that the plan is efficient?

- Yes, the corporation have supply chain management plan, but it's no properly implemented. So it is not efficient.
- Yes, the corporation have supply chain management plan, but it's not well organized it's not supported by information technology.
- Yes, there is SCM plan. SCM is not efficient due to lack of proper implementation and communication.
- Yes, the corporation have supply chain management plan. To fulfill the work program of the corporation there is annual planning system but most of the time our works is on the spot, so we couldn't achieve our plan
- There is no supply chain management plan in the corporation.

4.5.5 Does the organization currently have enough capital to accept all the supplies without any preconditions? If your answer is no, what is the reason?

- No, the corporation does not have enough capital (finance). There is a shortage of money at the national level, currently our country engaged in so many projects including renaissance dam.
- No, the corporation does not have enough financial capacity. It doesn't have future oriented quality plan.

4.5.6 What is your organization's strategy in order to create procurement and property work discipline among employees?

- The corporation does not have well organized strategy on this area.
- Creating awareness to its supply chain members.
- Provide continuous training on its supply chain members.

- Proper set up and implementation of rules and regulation by evaluating the current one.

4.5.7 Is there any important point about supply chain management system of your organization, which is not discussed in this interview?

- Revise the supply chain management strategy.

- It needs continuously follow up.

- Creating awareness for the importance SCM to its employees and managements.

- Update business process and usage of information technology.

- Supply chain management must be supported by information technology.

- I don't have clear idea to suggest about supply chain management system for our organization because the organization is newly established.

- Application of information technology, information sharing between the concerned bodies or departments.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

In this chapter the findings are summarized, conclusion drawn and recommendations made based on the data observed from the questionnaires and interview.

5.1 Summary of Findings

The following are the major Summary of the study:

- The variables in factors affect efficiency of supply chain management of ECWC are so manyamong them are supplier selection, procurement process, inventory management, staff training, distribution channel, information technology are some of them and distribution channel is the major one.The study used both descriptive and inferential analysis of the study.

- From the descriptive analysis of the study regarding the age of respondents 46.1% are under age 35 which is young enough on productive age.Regarding academic qualification of the respondents 72.1% are degree and above which is highly qualified and knowledgeable in their work area. Regarding work experience 63.5% of the respondents are highly experienced that help them to perform their job with error free and reduce the cost of hiring of new employees by the corporation.

- Regard to procurement type almost 51.9 % of the procurement types were planned. This implies that almost half of them were unplanned. Regarding average number of days to get the order filled or lead time 45.2% of the respondent's orders stayed more than 30 days. This implies that there were deliance of order in the procurement process.

- Regard tosupplier selectionfrom the respondents (N=104), the grand mean was 3.2951 and SD 0.7790. This implies that the supplier selection had affected the efficiency of supply chain management the grand mean likert score 3.2951 falls between 3(undecided/neutral) and 4(agree). Even though, supplier selection was indifferent among the key constraints to the corporation; it showed that it is classified as the first major constraints to the efficiency of SCM.

- Regard to Procurement process from the respondents (N=104),the grand mean was 2.9875 and SD 0.6049. This implies that the procurement process had affected the efficiency of supply chain management the grand mean likert score 2.9875 falls between 2(disagree) and 3(undecided/neutral). Procurement process was less than the average therefore, among the key constraints to the corporation; it showed that it is classified as the fifth major constraints to the efficiency of SCM. Because majority of the respondents are neutral with the corporations' commitment in the procurement process.

- Regard to inventory management from the respondents (N=104),the grand mean was 3.0223 and SD 0.5182. This implies that the inventory management had affected the efficiency of supply chain management the grand mean likert score 3.0223 falls between 3(undecided/neutral) and 4(agree). Inventory management was therefore, indifferent among the key constraints to the corporation; it showed that it is classified as the fourth major constraints to the efficiency of SCM.

- Regard to information sharing from the respondents (N=104), the grand mean was 2.9380 and SD 0.5144. This implies that the information sharinghad affected the efficiency of supply chain management the grand mean likert score 2.9380 falls between 2(disagree) and 3(undecided/neutral). Information sharingwas less than the average therefore, among the key constraints to the corporation; it showed that it is classified as the six major constraints to the efficiency of SCM.

- Regard to distribution channel from the respondents (N=104), the grand mean was 2.9375 and SD 0.5131. This implies that the distribution channel had affected the efficiency of supply chain management the grand mean likert score 2.9375 falls between 2(disagree) and 3(undecided/neutral). Distribution channel was less than the average therefore, among the key constraints to the corporation; it showed that it is classified as the last major constraints to the efficiency of SCM.

- Regard to staff Training from the respondents (N=104), the grand mean was 3.0735 and SD 0.6602. This implies that the staff competency had affected the efficiency of supply chain management the grand mean likert score 3.0735 falls between 3(undecided/neutral) and 4(agree). Staff competencies were therefore, indifferent

among the key constraints to the corporation; it showed that it is classified as the second major constraints to the efficiency of SCM.

- Regard to information technology from the respondents (N=104), the grand mean was 3.0230 and SD 0.5649. This implies that the information technology had affected the efficiency of supply chain management the grand mean likert score 3.0230 falls between 3(undecided/neutral) and 4(agree). Information technologies were therefore, among the key constraints to the corporation, it showed that it is classified as the third major constraints to the efficiency of SCM.

- Regard to efficiency, the grand mean was 3.1961 and SD 0.6231. The efficiency of supply chain management the grand mean likert score 3.1961 falls between 3(undecided/neutral) and 4(agree). This implies that the efficiency of supply chain management were not in a good position.

- With regard to the inferential analysis of the studyshowed that there were strong positive correlations between SCME and procurement process, SCME and information sharing, SCME and distribution channel, SCME and information technology. Moreover, there were moderate positive correlation between SCME and supplier selection, SCME and inventory management, SCME and staff training

- With regard to the multiple linear regression analysis of the study a significant regression model was found that $(F(7,96)=196.977, p< 0.001)$, with an R-square 0.935 with an adjusted R-square 0.930. This indicates that the regression modelwhich were 93.5% of the variations of SCME due to these variables.

- With regard to t – test all the seven variables that is supplier selection, procurement process, inventory management, information sharing, distribution channel, staff training, information technology t–value greater than 1.8 which means all the variables had positive values and significantly affects the efficiency of supply chain management.

- Efficiency of SCM based on the standardized beta value distribution channel were the most influential predictor variable which were beta value of 0.421, followed by supplier selection which were beta value of 0.214 and procurement process which were beta value of 0.173. Information sharing which were beta value of 0.171, inventory management which were beta value of 0.130, information technology which

were beta value of 0.128 and staff training which were beta value of 0.087 were at the fourth, fifth, six and seventh position respectively in terms of its strength in influencing efficiency of supply chain management.

5.2 Conclusion

The efficiency of supply chain management is affected by many factors such as supplier selection, procurement process, inventory management, information sharing, distribution channel, staff training, and information technology. Among these distribution channel is the major one.

In the corporation there are also different internal problems that reduce the efficiency of supply chain management. Among the internal problems of the corporation that reduce the efficiency of supply chain management were lack of finance, lack of integration with in departments and working units, unnecessarily bureaucracy in the procurement process, lack of transparency and accountability. All the hypothesized variables significantly affect the efficiency of supply chain management of Ethiopian Construction Works Corporation.

Regarding

- Age, academic qualification and experience of employees are in a very good position.With regard to procurement type there must be consider planned, unplanned and urgent type of procurement for immediate consumption because it is a construction company.

- Due to order deliance there is a negative impact on operations of the corporation. Moreover, most of the orders are delayed (45.2%) above 30 Days; there are also deliance of deliver of purchase order at the right time. The management must pay attention and as much as possible minimizes the deliance of orders by the corporation.

- Supplier selection most of the respondents are agreed on moderate significant effect on efficiency of SCM. Lack of commitment of suppliers to supply quality materials, sustainability after sales service, availability of credit facility,supplier commitment, giving training or maintenance.In credit facility section, the result indicates that credit facility given by suppliers, this is an opportunity to solve financial problem on supplying materials at the right time and quantity. This increases the efficiency of

supply chain management.Most of them issue raised in supplier selection werenot in a very good position, but it needs in flexible agreement on cancelation of an order when a very long lead time. The corporation gives very much attention on the supplier selection.

- Procurement process most of the respondents are agreed on strong significant effect on the efficiency of SCM. There was lack of purchase order at the right time, quality and quantity, lack oftechnical expert participation, lack of well organized procurement plan, lack of commitment of the buyer but disagree with purchase of quality material and purchase order at the right time, quality and quantity.Procurement process is very important for organizational efficiency of supply chain management.

- Inventory management section, the result indicates that moderate significant effect on the efficiency of SCM. There were lack of proper recording of inventory, lack of proper inventory control method and dead stock inventory management.Inventory management is very important for organizational efficiency of supply chain management.

- Information is power. Therefore, quality and timely information are very important for decision making purpose for different levels of the corporation. Quality and timely information must be exchange among departments in the corporation such as sections, warehouse, finance, maintenance, insurance, HR, and engineering department, among sections or projects, among districts or projects, between head office and districts or projects, etc. In order to make short term and long term decisions quality and timely information must be exchange on time.

- Distribution channel result indicates that strong significant effect on the efficiency of SCM.There were lack of availability of better transportation,lack of availability of well organized delivery system, lack of cost efficient distribution system and lack of considering shipment arrangement of the suppliers while purchasing.Distribution channel affects the efficiency of SCM and there must be given proper attention by the management.

- Training is very essential to support employees in improving their job performance.In relation with staff training, even though more qualified and experienced employees were there, there was a deficiency in short term, long term and diversified skill

training in order to update employees in their carrier. In Staff training and job performances should strongly connected with the efficiency of supply chain management.

- Success of the Corporation cannot guarantee without the proper implementation of information technology particularly in SCM and the whole activity of the corporation in general. The corporation should work all activities carried within and outside the corporation must be supported by information technology. It is strongly necessary for the corporation to prioritize and consider all its operation must be supported by information technology.

- In general, distribution channel were the most influential predictor variable for SCM efficiency followed by supplier selection and procurement process. Information sharing, inventory management, information technology and staff training were at the fourth, fifth, six and seventh position respectively in terms of its strength in influencing efficiency of supply chain management. The corporation priorities the above variables and work on it in order to increase efficiency of supply chain management.

- In order to build financial capacity the corporation collect payment certificates on time, select suppliers the one who have credit facility, lending from financial institutions such as banks.

5.3 Recommendations

The recommendation addressed here presents some option for the management to improve the efficiency of supply chain management in order to ensure the competitiveness and profitability of the corporation and customer satisfaction service delivered by the corporation.

In order to become competitive in this globalized world efficiency of supply chain management strongly affect the working conditions of the corporation. This indirectly affects customer satisfaction in the supply chain management. Hence, this paper recommends that there has to be a balance between procurement and supply in order to ensure profitability and its competitiveness of the corporation by satisfying customers' needs.

- Supplier selection the corporations pay attention on those suppliers that had credit facility, flexible agreement, quality, timely response to deliver inquires compensation system and promised delivery dates.This ensures accomplishment of projects on time and this increases customer satisfaction and competitiveness of the corporation.

- In procurement process the major focus area of the corporation here purchase order at the right time, quality and quantity. The bureaucracy must be assessed and eased to facilitatein the procurement process.Moreover, the corporation must focus on participation technical expert, setting well organized procurement plan, increase commitment of the buyer's by giving trainings, incentives etc.Plan, Budget, evaluate and execute for all types of procurement type whether planned, unplanned or urgent.

- In inventory management the corporation focus on using appropriate technology in inventory documentation of new and old items, applying proper inventory control method and dead stock inventory management.

- The corporation must focus on distribution channel in order to supply materials at the right time, quality and quantity. By providing well organized delivery system, cost efficient distribution system and considering shipment arrangement of the suppliers while purchasing.

- Proper attention must give by top management on short term, long term and diversified trainings to its employees on the efficiency of supply chain management are very important for profitability and competitiveness of the corporation. This helps to enhance the proper implementation of efficient supply chain management.

- The corporation must focus on information sharing in planning with the suppliers, application of software in SCM, focus quality and adequacy of information flow through the supply chain, timely information exchange between the suppliers and the corporation by implementing appropriate technology.

- Success of the Corporation cannot guarantee without the proper implementation of information technology particularly in SCM and the whole activity of the corporation in general. Usage of appropriate information technology and upgrading the HR skill to fit.

- To establish practical follow up and controlling system, Installation of transparency and accountability system, to develop rules and regulation and its implementation particularly in SCM and generally to the corporation.

Suggestions for future research

I suggest researchers by assessing additional variables including the above variables and/ordifferent populations study them.

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Appendix I

ST. MARY'S UNIVERSITYCOLLEGE
SCHOOL OF GRADUATE STUDIES
GENERAL –MBA PROGRAM

<u>**Questionnaire to Be Filled by Employees**</u>

This questionnaire is developed to gather all the necessary information regarding **Factors Affecting Supply Chain Management Efficiency in the case of Ethiopian Construction works Corporation**.

Dear Respondent: The research is purely for academic purpose; thus any response given will be kept confidentiality and wouldn't be used for any other purpose. So, your timely, genuine and frank response to the questionnaire is vital for the successfulness of the study. Accordingly, please take a few minute from your schedule and reply to the questionnaire.

Student Name:- Solomon Alemu Mob. 0911-102762   E-mail: leselomonalemu@gmail.com

Direction:

- No need to write your name.
- Please kindly put this sign (√) on the appropriate box or alternative given.
- In case you have ambiguities on any of the given questions, please don't hesitate to contact me via my address.

Thank you for scarifying your precious time in advance

Section I. **Respondents Background information**

1. Gender ☐ Male ☐ Female
2. Which of the following age categories describes you?
   - ☐ Below 25
   - ☐ 25- 35
   - ☐ 36- 45
   - ☐ 46-55
   - ☐ Above 55

3. Academic qualification

☐ Below High School

☐ High School

☐ Diploma

☐ Degree

☐ Masters and above

☐ Other _____

4. Work experience

☐ Less than 2 years

☐ 2-5 years

☐ 6-10 years

☐ 11-15 years

☐ Above 15 years

5. Your position in the corporation

☐ General Manager

☐ Project/District Manager

☐ Supply/Logistics Manager

☐ Team Leader manager (Specific team) _____

☐ Others (Specific title) _____

II. Questions about general Supply Chain management issues

6. Most of the procurement type is

☐ Planned   ☐. Urgent

☐ Unplanned   ☐. Other _____

7. Average number of days to get the order filled (lead time)

☐ 1-3 days   ☐ 16-30 days

☐ 4-7 days   ☐ > 30 days

☐ 8-15 days

Section III Questions related to Supply Chain Management Efficiency

Note: SDA= Strongly Disagreed	A= Agreed
DA = Disagreed	SA= Strongly Agreed
N= Neutral	

Description	Rating				
	(1)	(2)	(3)	(4)	(5)
1. Supplier Selection					
1.1 Commitment of suppliers to supply quality materials					
1.2 Sustainable of training on maintenance is made after sales service					
1.3 Availability of credit facility					
1.4 Possible to change or cancel an order when a very long lead time occurs or happens					
2. Procurement process					
2.1 The quality of materials purchased					
2.2 Level of participation of technical experts during procurement					
2.3 Commitment of buyer to buy quality of materials					
2.4 Purchase orders at the right time, quality and quantity					
3. Inventory management					
3.1 Inventory documentations of replaced items					
3.2 Inventory documentations of new items					
3.3 The level of inventory control method					
3.4 Availability of dead stock Management system (i.e. damaged or obsolete item)					
4. Information sharing/reporting					
4.1 The level of information sharing in planning with the suppliers in order to plan the supplies					
4.2 Availability of information system application software in supply chain management					

4.3 Quality and adequacy of information flow through the supply chain					
4.4 The level of information sharing within the functional units of the organization					
4.5 The level of information sharing with the suppliers about inventory quality of raw materials					
4.6 The level of timely information exchange between your organization and the suppliers					
5. Distribution Channel					
5.1 Availability of well organized delivery system					
5.2 Availability of better transportation facility(loading and unloading)					
5.3 Considering the shipment arrangement of the supplier while purchasing					
6. Staff Training					
6.1 The level of adequate training for managements on the areas of supply chain management					
6.2 The level of short term training to supply chain members					
6.3 The level of long term training to supply chain members					
6.4 Degree of providing diversified skill training for employees					
7. Information technology					
7.1 Documentations are supported by Information Technology					
7.2 Handling of in and out inventories are supported by Information Technology					
7.3 Information is readily available for planning purpose					
7.4 The level of Information Technology based ordering system					

Section V. Questions related Supply Chain Management Efficiency Measurements

Description	Rating				
	SDA (1)	DA (2)	N (3)	A (4)	SA (5)
1. MeasureEfficiency of supply chain management					
1.1 I'm satisfied with availability of well organized procurement plan					
1.2 I'm satisfied with speed of response to the delivery inquiries					
1.3 I'm satisfied with availability of cost efficient distribution system					
1.4 I'm satisfied with profitability of business					
1.5 I'm satisfied with according to order specification					

Other (additional) supply chain management system used in your organization

_____

_____

_____   _____

Thanks for your time!

Appendix II

ST. Mary's University

School of Graduates Studies
MBA Program

This interview is developed to gather all the necessary information regarding **Factors Affecting Supply Chain Management Efficiency in the case of Ethiopian Construction works Corporation**.

Dear interviewee: The research is purely for academic purpose; thus any response given will be kept confidentiality and wouldn't be used for any other purpose. So, your timely, genuine and frank response to the interviewis vital for the successfulness of the study. Accordingly, please take a few minute from your schedule and reply to the interview.

Student Name:- Solomon Alemu Mob. 0911-102762   E-mail: leselomonalemu@gmail.com
Direction:

- No need to write your name.
- Please kindly put this sign (√) on the appropriate box or alternative given.
- In case you have ambiguities on any of the given questions, please don't hesitate to contact me via my address.

Thank you for scarifying your precious time in advance

Interview Question

1. How does your organization strategy in order to create efficient supply chain management system?

2. What kind of system does your organization implement to control the occurrence of corruption on purchasing?

3. What are the major challenges implementing efficient supply chain management system?

4. Do you have supply chain management plan, if your answer is yes, then what are your strategic plans to achieve your supply chain management plan? Do you believe that the plan is efficient?

5. Does the organization currently have enough capital to accept all the supplies without any preconditions? If your answer is no, what is the reason?

6. What is your organization's strategy in order to create procurement and property work discipline among employees?

7. Is there any important point about supply chain management system of your organization, which is not discussed in this interview?

Thanks for your time!

Appendix III

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	INFT, SUPS, INVM, STFT, PROP, INFS, DISTH[b]	.	Enter

a. Dependent Variable: SCME

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.967[a]	.935	.930	.1646831	.935	196.977	7	96	.000

a. Predictors: (Constant), INFT, SUPS, INVM, STFT, PROP, INFS, DISTH

b. Dependent Variable: SCME

DECLARATION

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of Dr. Tesfaye Wolde. All source of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

_____   _____

             Name   Signature & Date

ENDORSEMENT

This thesis has been submitted to St. Mary's University College, School of Graduate studies for examination with my approval as a university advisor.

_____   _____

Advisor   Signature & Date