THE EFFECT OF SUPPLY CHAIN MANAGEMENT PRACTICES ON SUPPLY CHAIN RESPONSIVENESS AND COMPETITIVE ADVANTAGE OF THE FIRM - A CASE STUDY ON ETETE CONSTRUCTION, IN PUBLIC BUILDING PROJECTS

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JUNE, 2021

ADDIS ABABA

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A THESIS SUBMITTED TO St. MARY'S UNIVERSITY SCHOOL OF GRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIRMENT FOR THE DEGREE OF MASTER OF ART INPROJECT MANAGEMENT

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Declaration

I, Kidist Woreta hereby declare that this research thesis work entitled "Assessment of Supply Chain Management Practices and Effects on Supply Chain Responsiveness and Competitive Advantage of The Firm - A Case Study On Etete Construction, In Public Building Projects" is my original work and has not been presented for a degree in any other university, and that all sources of materials used for the study have been fully acknowledged. No section copied in whole or in part from any other source unless explicitly identified in quotation marks and with detailed, complete and accurate referencing.

Declared by:

Name_____

Sign_____

Date_____

Confirmed by Advisor:

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Date_____

Statement of Certification

This is to certify that Kidist Woreta has carried out her research work on the topic entitled **"Assessment Of Supply Chain Management Practices And Effects On Supply Chain Responsiveness And Competitive Advantage Of The Firm - A Case Study On Etete Construction, In Public Building Projects"** is her original work and is suitable for submission for the award of Masters of Art Degree in Project management.

Advisor: Shiferaw Mitiku (PhD)

_____

Date & Signature

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List of Acronyms

CA	Competitive Advantage of the Firm
CR	Customer Relationship
IS	Information Sharing
LPR	Logistic Process Responsiveness
OP	Operational Performance
OSR	Operation System Responsiveness
SCM	Supply Chain Management
SCMP	Supply Chain Management Practices
SCR	Supply Chain Responsiveness
SNR	Supplier Network Responsiveness
SSP	Strategic Supplier Partnership

Abstract

The study is intended to assess the supply chain management practice and their impact on SCM practice with supply chain responsiveness and competitive advantage of the firm, and last identified the factor affect the SCM practices of the firm. The study employed quantitative research and descriptive as well as explanatory research design judgmental sampling and survey questionnaires were sent to all public projects 101 respondent in number. The study tests the relationships between supply chain management practices, supply chain responsiveness, and competitive advantage of the firm using descriptive statistics such as (mean, Standard Deviation and percentage frequency) as well as inferential statistics correlation and regression analysis using SPSS (version 23). Both primary and secondary source of data were used for this study. Data were collected using Interview and questionnaire in the form of closedended question. The questionnaires were rated using five point's liker scale. The major finding indicated that, most of SCM practices were moderate practiced in ETETE Supply chain. The study found that the supply chain management practices have a significant positive impact on supply chain responsiveness and competitive advantage. The study recommend for Etete top management, supply and procurement department to have a strong quality and on time information sharing,Improving supplier partnership and client relationship to minimized cost and time overrunin order to increase profit of the firm..

Keywords: Supply chain management practices, Supply chain responsiveness, and competitive advantage of the firm (operational performance).

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Supply chain management deals with the management of materials and information resources across a network of organizations that are involved in the design and the production process. It recognizes the inter-connection between materials and information resources within and across the organization boundaries and seeks systematic improvement in the way these resources are structured and controlled (Trucker & Mohammed, 2001). The objective of supply chain management is to be able to have the right products in the right quantities at the right placeat the right moment at minimal cost.

Construction Supply Chain (CSC) is all the construction process, from the demands by the client, conceptual design, construction and maintenance and organizations, which are involved in the construction process, such as owner, designer, general contractors, subcontractors, suppliers, consultants, etc. CSC is not a chain of construction business with business-to-business relationships but a network of multiple organizations and relationships, which includes the flow of information, the flow of material services or products, and the flow of funds between client, designer, contractor and supplier (Xue, *et al*., 2007).

Construction contractors are increasingly engaged in supply of material from diverse sources around the world and this process starts with design and engineering pursued at manufacturer's workshop, and ends with a series of journeys from factories to the construction site. Planning such a long supply chain requires examining all the stages involved in terms of time and costs (Wegelius-Lehtonen, *et al*., 2001). Late delivery of construction materials and components has been identified as one of the main causes of delay in major industrial construction projects. Therefore, timely delivery of materials is essential to ensure meeting completion date of construction activities (Fallahnejad, 2013).

Supply Chain Management practices is defined as a set of activities undertaken in an organization to promote effective management of its supply chain (Li, 2005). The research

objectives were designed to investigate the effect of supply chain management practices in terms of strategic supplier partnership, customer relationship, andinformation sharing on supply chain responsiveness and to determine whether supply chain responsiveness has impact on competitive advantage of the firm. Within these objectives, there are three concepts that needed to be explored, to obtain an understanding of these objectives. These concepts are reviewed both supplier and customer (externally) and internally. These concepts are (1) supply chain management practices that encompasses supplier partnership, customer relationship and information sharing, (2) supply chain responsiveness that includes operation system responsiveness, logistic process responsiveness, and supplier network responsiveness, (3) competitive advantage of the firm (operational Performance). There exists evidence that firms are achieving flexibility (Tully, 1994), and thus responsiveness, through the use of SCM practices. Lie *et al* (2005, 2006); Thatte (2007) identified supply chain management practices in form of strategic supplier partnership, customer relationship, andinformation sharing

Strategic supplier partnerships including working closely with suppliers to design or redesign products and processes, solve problems, as well as prepare back-up plans is critical in attaining supply chain responsiveness (Storey *et al.,* 2005; Liu and Kumar, 2003. Customer relationship is essential for attaining supply chain wide responsiveness (Storey *et al*., 2005). Information sharing practice in a supply chain increases responsiveness to customer's needs (Martin and Grbac, 2003. Thatte *et al*. (2009) find that a higher level of information sharing practices will lead to a higher level of supplier network responsiveness. Sharing information (and data) with other parties within the supply chain can be used as asource of competitive advantage (Jones, 2008; Novack *et al*., 2005).

Public construction projects in Ethiopia are parts of the country's development initiative. It consumes considerable amount of the country's scarce financial resources since the construction industry is the highest recipient of government budget as part of government development program. Previous estimates showed that public construction projects consume an average annual rate of nearly 68.2% to 70%, of government's capital budget (MoUDHC, 2018 G.C); and the GDP contribution of the construction industry has risen to5.8% in 2018. However, most public projects are suffering from time and cost overrun.

Butno study has clearly showed which challenges have affected supply chain management that led to time and cost overrun. Hence, this research targets to identify the current practices and challenges that the construction supply chain is facing.

The focus and attention in this research are given to the materials since it forms a large portion of the total cost of a construction project. In addition, materials are essential for the daily progress of a construction project. The absence of materials when needed is one of the main causes of loss of productivity in a jobsite. Therefore, contractors have to manage their materials efficiently to lower cost in order to remain in business. They should select reputable suppliers, tracking the materials to identify when materials need to be ordered based on the actual usage of materials on site and progress of the work, dealing on site with materials handling, storage, misplacement and handling of materials surplus. Construction companies need new tools and technology in order to improve their supply chain to enhance quality, time, and cost performance. Consequently, the need for supply chain management cannot be emphasized.

The research area focus on Etete construction which is one of the BC 1 construction company in Ethiopia, they have a lot of public and private projects with a huge complicity and big contract amount in both inside and outside Addis Ababa. In Etete Company there are a lot of employees in both head office and projects. The staff structure in head office are deputy manager, Engineering head, operation department, supply chain and logistics department, finance department, administration department and tendering department. The project staff structure is engineering department, purchasing and store keeper, finance department, administration department.

Most of construction projects are delivered at least a few days or months or even years late. Working in Etete Construction Company, as officer Engineer can observe projects in different sites took a lot of time to be delivered, as long as two years and above, beyond expected completion time. Because of this, the stakeholders, the client, contractors, the society suffers a lot in terms of time and cost. Many reasons have been raised for project delay and cost overrun. For example, incomplete design, contractor’s capacity, design change order, climate condition, finance, etc. But, problems caused by poor supply chain management practices are not taken as one of the main reason for projects delay. Therefore,

all this reason given an opportunity to study influence of construction supply chain management practices and its performance measurement in Etete Construction, in relation to project delay and cost overrun.

1.2. Statement of the Problem

Current materials management practices in the construction industry are performed on fragmented basis with unstructured communication and no clearly established responsibilities between the parties involved. The highly fragmentation is a result of the separation of design and construction, lack of coordination and integration between various functional disciplines, poor communication, etc. Furthermore, dependency of the general contractors on other parties such as suppliers and subcontractors reinforces the construction industry fragmentation. All of these are the important factors causing performance-related problems such as delay in material ordering and receiving, low productivity, cost and time overrun, conflict and disputes. Despite the increased attention paid to SCM, the literature has not been able to offer much by way of guidance to help the practice of SCM that is applicable to every situation (Cigolini, *et al*., 2004).

Construction company are always under pressure from all sides to reduce costs and deliver excellent performance, while improving availability, reliability, safety and sustainability of its complex supply chain management is neglected. Companies which have recognized opportunities that exist there in the supply chain management and directed their effort towards developing a competitive supply chain based on speed, flexibility, innovation, quality & responsiveness had significant improve customer service and their profitability. Therefore, the primary goal of supply chain management is to enhance competitive performance by closely integrating the internal function within a company and closely linking them with external operation of suppliers, customers, and other channel member (Kim, 2006).

For seeking the efficient and effective cooperation between organizations of a supply chain, each chain member must seek not only to improve its own individual competitiveness (i.e., quality, cost, delivery lead time, and etc.) but also improve the competitiveness and performance of all enterprises in its supply chain. This improves sharing of information, working together to reduce costs, cut lead time and building total quality into all the stages

of the supply chain (Davis, 2003).

Thatte (2007) disclosed that, in order to make the SCM effective there must be effective implementations of the supply chain management practices, namely good supplier and customer relationship, information sharing. This would be applicable to the extent of expected degree when there is trust and honest among the supply chain members. Today one of the key challenges of domestic Construction Companies is the lack of managing supply chain effectively and efficiently. Therefore a realistic approach has to be developed taking in to consideration that the availability and managing effectively and efficiently its supply chain practices which let the company build up progressively to achieve required capacity and also to adapt the company towards their responsibility and function of construction contracts (Saad, *et al*., 2003).

Customer-supplier relationships in construction are generally of the arms-length type rather than being partnerships because the commonly used competitive tendering to procure projects assures that sub-contracting is provided by the lowest-price supplier with little or no guarantee (or even incentive) to future work. Traditionally, project information exchange between designers and contractors has been mainly based on paper documents. These documents come in the form of architectural and engineering drawings, specifications, and bills of quantities and materials. This practice is far from being satisfactory, with about two-thirds of construction problems being caused by inadequate communication and exchange of information and data. Although there is a need for integration of the various actors in construction sector and with the increasing complexity of construction projects, availability of inadequate support of information technology was another challenge in the industry (Tucker, Mohamed, Johnston, McFallan & Hampson, 2001).

A number of studies on SCM practices had been conducted in Ethiopia on various manufacturing industry. Admaw (2010) studied the practice of SCM for Ethiopian textile firms. It was found that, SCM practices in Ethiopian textile firms are weak and not considering SCM as a strategic tool for competition. Business managers of the textile firms didn't give attention for SCM theories and practices. Temesgen Tagesse (2017) study on supply chain management practice and impact on firm performance in the case of Yotek

construction plc. His study was focus on SCM practice and impact on firm performance that determined in terms of operational and organizational performance. Mintesinot Abay (2018) test if there is a relationship between SCM practices, supply chain responsiveness, and operational performance in manufacturing industry in Bahir Dar. Moges (2015) study Practice and challenge of SCM on Ethiopian Private Grade one Road Construction Companies by selecting five companies among the twenty three companies and select seven sample sizes from each company. His study was focus on the practice and challenge of SCM practice as well as assessing collaboration level within supply chain members.

Some of the SCM studies conducted in Ethiopia focus on the relationship between supply chain management and organizational performance (Mohammed, 2014) customer satisfaction (Hana, F. 2016), competitive position (Belay M., 2011) and in the other side some studies focused on supply chain management practice case study (Bogal A., 2015) & (Balda, 2011)), Supply Chain Performance by (H/Michael D. 2011). Specifically in the supply chain responsiveness (Ashish A. Thatte, Subba S. Rao, T. S. Ragu-Nathan, , 2013) studied and findings point out that higher level of SCM practices can lead to improved supply chain responsiveness and enhanced competitive advantage of a firm.

Even though they try to study the importance of supply chain management practice on firm performance there is a lack on the studies that link supply chain management practices with supply chain responsiveness and competitive advantage of the firm (operational performance) in Ethiopia specifically on construction industry, this study seek to contribute in fill this gap.

This study has focused on try to address the gaps of the previous study based on Ethiopia construction industry context; focusing on SCM practice and impact on firm performance measurement that determined in terms of supply chain responsiveness and competitive advantage of the firm (operational performance) . The study focus on Etete construction SCM practice and how this affect at SCM responsiveness on their operational performance by collecting the data from four basic participant of construction firms, this are client side, contractor side, consultant side and supplier side. And also there is gab in identify the factor affect the SCM practices for construction industry so in this research try to see the major factor affects the SCM practices of Etete construction

1.3. Research Question

1. How SCM is being practiced at Etete Construction?
2. What is the effect of supply chain management practices on supply chain responsiveness of thefirm?
3. What is the effect of supply chain management practices on competitive advantage of the firm?
4. What are the major factors affecting the supply chain management practice of Etete Construction?

1.4. Objectives of the study

1.4.1. General Objective

The main objective of the study is to investigate supply chain management practices of the firm and examining the effect of SCM practices on the firm performance in terms of supply chain responsiveness and competitive advantage of the firm. As well as identified the major factor affect the SCM practices.

1.4.2. Specific Objectives

The research has the following objectives:

1. To assess the current SCM practices of Etete Construction
2. To examine the effect of SCM practice on supply chain responsiveness
3. To examine the effect of SCM practice on competitive advantage of the firm
4. To identify the factor affecting the SCM practice of Etete Construction.

1.5. Significance of the Study

The study assess supply chain management practice and test the relationship between supply chain practice with supply chain responsiveness and operational performance. The Research contribute to the Etete construction company management to have effective and efficient supply chain management practice to maximize competitive advantage of the firm. The research will add knowledge to the construction participants on how to manage the supply chain system by having a good supply chain practices. And also help to identify the major factors affect the SCM practices and which factors affect most and how to avoid.

1.6. Scope of the Study

SCM is a vast area to be address. However, due to shortage of time, finance and manageability issue, the study is delimited to SCM practice and performance measurement: Supply chain management responsiveness and firm competitive advantage of the firm (operational performance) of the selected public project of ETETE Construction.

The conceptual scope of the research is also limited to areas of SCM practices such as supplier relationship, customer relationship, information sharing with related to supply chain management responsiveness and Competitive advantage of the firm (operational performance). It mainly focused on the construction stage and particularly on the flow (chain) of the material supply chain process from the client, main contractor, suppliers and consultant side.

The geographical scope of the research is on all mega public projects in Ethiopia. This are B+G+11 Nifas silk lafto sub city office building, the client is Nifas silk lafto sub city administration, B+G+7 40/60 saving house project, the client is Addis Ababa housing Agency, Federal Housing, 2B+G+7 mixed use apartment, the client is Federal Housing Corporation, B+G+11 Lideta Sub city Excusive Office Building, the client is Lideta S.C Executive Office, Alert hospital project, the client is Federal Minister of health/ Alert Hospital, Debre Birhan post graduate building project, Debre Birhan Dormitory Building project, the client is Debre Birhan University. Debre Markos post graduate building project, the client is Debre Markos University, Arbaminch university class room building project, the client is Arbaminch University. Addis Ababa cinema housing complex building project, the client is City administration of Addis Ababa construction bureau. Bahir Dar class room Building Project, the client is Bahir University.

The methodology scope of the study is using questioners and open ended questions interview. It is limited to 101 respondent that are related with construction who will be contacted using their social media like email and telegram and also some of them in person. This research period will last for a maximum of 4 months. Each respondent will be asked to complete a short questionnaire in order to evaluate the SCM practices of the firm.

1.7. Limitation of the Study

This research has significant theoretical and practical contributions and it also has some limitations. In this study it is difficult to cover entire domain of supply chain practices just in one study. The study sample didn't include all the supply chain practices; it used strategic supplier partnership, customer relationship, and information sharing. Future researcher should extend this study by incorporating additional practices. It is difficult to cover the entire supply chain actors with the limited time available for this study.

The survey data did not include all the supply chain participants such as suppliers and customers (client) just only interview with few employee due to time constraints, the findings couldn't be generalized to the company under investigation. Since we are in pandemic due to Covide-19 it's hard to send and collect all the data's in person and also the network is poor to collect in social media like telegram. Other limitation are among numerous projects being carried out in Etete construction, the study is limited to major public building construction projects.

1.8. Definition of terms

Definition of terms comprises of conceptual and operational definitions. Conceptual definitions of terms are definitions from the theoretical perspectives which requires descriptions of cites. Whereas, operational definitions is practical definitions given by the researcher as per the context of the text. Accordingly, for this thesis, conceptual definitions of words are used and are described below:

Supply chain management: - is the systematic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across business within the supply chain (Mentezer *et al*, 2004).

SCM practices are defined also as approaches applied in managing integration and coordination of supply, demand and relationships in order to satisfy consumers in effective and profitable manners Krause, D.R. and T.V. Scannell (2002).

Supply chain responsiveness (SCR): - it is the act of supply chain to respond the market change rapidly. For this study operation system responsiveness, logistics process

responsiveness, and supplier system responsiveness are used to measure Supply chain responsiveness, Thatte, (2007).

Competitive advantage of the firm (Operational performance): - is the system of producing great value product differently than the competitors. Cost, quality, flexibility, and delivery are used to measure operational performance, Thatte, (2007).

1.9. Organization of the study

Chapter 1 provides a brief introduction and objectives of this study. The importance of construction efficiency and the benefit of improving the construction performance with SCM are briefly reviewed. The aim and objectives, scope and limitation of this study as well as the overall structure of the thesis are also outlined in this chapter. Furthermore, it gives an overview of research and lists the research methodology in the supply chain management.

Chapter 2 is a literature review of some relevant important concepts, like SCM, SCM practices and performances measurements. It contain theoretical literature review, empirical literature review, conceptual framework and identified literature gap.

Chapter 3 covers the research methodology. The methodological approach consists of the overall research strategy; the research design, the analysis of the data and writing of the research paper.

Chapter 4 contains the discussion and analysis part. It contains the findings on the practice, characteristics, current applications and improving methods of SCM on public buildings

Chapter 5 presents summery, research conclusions, and recommendations. This will summarized a guideline to stakeholders in the construction industry.

CHAPTER TWO
RELATED LITERATURE REVIEW

2.1. Theoretical Literature Review

2.1.1. Definition and concept of Supply Chain Management

Different practitioners and researchers depending on the background where they come from define supply chain management. Generally, the following definitions can used as a working definition of supply chain and supply chain management.

First let's define Supply chain, **Supply chain** is the sequence of events that cover a product's entire life cycle, from the conception to consumption (Blanchard, 2010). Supply chain is defined to be a network of facilities that procure raw materials, transform them into intermediate goods and then final products, and deliver the products to customers through a distribution system (Lee, *et al*. (2005). Ganeshan *et al*., (2005) have yet another analogous definition: SC is a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers.

In general supply chain is a network of organizations involved, from the supplier of the supplier until the client of the client, on the different processes and activities that produce value in the form of products and services for the final client. Its major components are the suppliers' network, the transformation unit and the clients' network. The effective management of the supply chain is necessary for successful competition in today's global markets.

SCM is a philosophy that describes how organizations should manage their supply chains to achieve strategic advantages. Its goal is to synchronize the client requirements with the materials and information flows along the supply chain, until reaching a balance between the client satisfaction and the cost. It refers then to the coordination of the activities of all that participate in the supply chain, to knowing the production requirements with the

purpose of satisfying the client, to delivering of products of higher value and to reducing the costs of the organization that apply these principles.

Many definitions describe Supply Chain Management as the chain linking each element of the manufacturing and supply process from raw materials to end users, encompassing several organizational boundaries. This is well summarizing as, the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole (Chritopher, 2002). Another scholar defined SCM as the process of strategically managing the movement and storage (if necessary) of materials, parts and finished products from suppliers, through the manufacturing process and onto customers or end-users, as well as the associated information flows (Yeo, *et al*., 2002). A simple definition provided in the Handbook of Supply Chain Management is that SCM is about the design, maintenance and operation of supply chain processes for the satisfaction of end-users need (Ayers, 2006).

The supply chain encompasses all activities associated with the flow and transformation of goods from raw materials stage (extraction), through to the end user, as well as the associated information flows. Materials and information flow both up and down the supply chain. Supply chain management (SCM) is the integration of these activities through improved supply chain relationships, to achieve a sustainable competitive advantage. (Handfield, *et al*., 2009).

Construction Supply chain management comprised of the network of organization involved in the different processes and activities which produce the material, components and services that come together to design, procurement and deliver a building. It also consists of different organizations involved in the construction process including client/owner, designer, contractor, subcontractor and suppliers (Cox, *et al*., 2007).

A supply chain is the network of organization that are involved through upstream and downstream linkages, in the different processes and activities that produce value in the form of products services in the hands of the ultimate consumer‘ (Chritopher, 2005). Moreover, Christopher defines the objective of SCM in a relative manner as delivering superior value at less cost. In order to reflect the fact that there will normally be multiple suppliers and suppliers to those suppliers as well as multiple customers and customers to

be included in the total system, Christopher argues that the word chain should be replace by network (Christopher, 2005). He also argues that since the chain should be drive by the market, not by the suppliers, the phrase SCM should be termed demand chain management. A supply chain is a network of organizations to perform a variety of processes and activities to generate value in the form of products and services to end consumers (Christopher, 2005).

As Li *et al*. (2006) described, SCM is a concept which its goal is to integrate both information and material flows seamlessly across the supply chain as an effective competitive weapon. Li *et al*. (2006) also stated that SCM applies to show the collaborative relationships of members of different echelons of the supply chain and refers to common and agreed practices performed jointly by two or more organizations. The supply chain management has dual purpose, in one side is to improve the performance of an individual organization as well as that of the entire supply chain. In other side the supply chain management reduces organization total cost (Li *et al*, 2006).

Shapiro (2005) showed that the SCM combining concepts from different disciplines such as strategic management and theory of the formation of the company; logistics, production and inventory management; accounting management; scientific forecasting and marketing, and operations research. Supply chain management (SCM) is one of business strategy increasingly being used in the business world today and has become the focus of academic attention in recent years (Ballou, Gilbert & Mukherjee, 2004).

Construction projects take place where sites are very crowded; this situation is recurrent for projects located in urban areas. In big cities like Addis Ababa where virtually no storage space exists, a good management of supply chains in order to get materials, people, information, machines, and equipment to the workface in a Lean manner (Just-in-Time) is vitally important to project success (Mossman, 2007).

2.1.2. Supply Chain Management Processes

Increasingly, supply chain management is being recognize as the management of key business processes across the network of organizations that comprise the supply chain. While many have recognized the benefits of a process approach to managing the business and the supply chain, most are vague about what processes are to be consider, what sub-processes and activities are contained in each process, and how the processes interact with each other and with the traditional functional.

The Global Supply Chain Forum identified eight key processes that make up the core of supply chain management (Cooper, *et al*., 2007): this are: - Customer Relationship Management: the structure for how the relationship with the customer is developed and maintained, Customer Service Management: the single source of customer information, such as product availability, shipping dates and order status, Demand Management:- includes forecasting demand and synchronizing it with production, procurement, and distribution, Order Fulfillment:- integration of the firm‘s manufacturing, logistics and marketing plans, Manufacturing Flow Management:- deals with making the products and establishing the manufacturing flexibility needed to serve the target markets, Procurement (Supplier Relationship Management):- defines how a company interacts with its suppliers, Product Development and Commercialization;- developing new products quickly and getting them to the marketplace in an efficient manner is a major component of corporate success, Returns:- identifying productivity improvement opportunities and breakthrough projects.

2.1.3. SCM Practices

Supply Chain Management practices is defined as a set of activities undertaken in an organization to promote effective management of its supply chain (Li, 2005). SCM practice is conceptualized to be a multi-dimensional concept whereby it is viewed toward more comprehensive concept that included supplier side, internal side and customer side approach. Chopra and Meindl (2001) mentioned that SCM practices can help on improving organizational long-term performance and supply chains performance with the practices of combining the cooperation in between manufacturers, distributors, suppliers and customers.

The research objectives were designed to investigate the effect of supply chain management practices in terms of strategic supplier partnership, customer relationship, and information sharing on supply chain responsiveness and to determine whether supply chain responsiveness has impact on competitive advantage of the firm. Within these objectives, there are three concepts that needed to be explored, to obtain an understanding of these objectives. These concepts are reviewed both supplier and customer (externally) and internally. These concepts are (1) supply chain management practices that encompasses supplier partnership, customer relationship and information sharing, (2) supply chain responsiveness that includes operation system responsiveness, logistic process responsiveness, and supplier network responsiveness, (3) competitive advantage of the firm (operational Performance). Supply chain management practices as a multi-dimensional construct that encompasses upstream and downstream sides of supply chain (Li *et al*, 2006).

Donlon (2006) stated that outsourcing, supplier partnership, information sharing, cycle time, compression and continuous process flow, as a part of supply chain management practices. While Tan *et al* (2008) represented supply chain management practices in form of quality, purchasing, and customer relationship. Alvarado and Kotzab, in their empirical study focused on supply chain management practices on inter-organizational system used, core competences, and elimination of excess in inventory through postponement. The key aspect of supply chain management practices according to Tan *et al* (2002) were supply chain integration, information sharing, customer service management, geographic

proximity, and JIT capabilities. Lee (2004) focused on five practices at supply chain level that are a key to create supply chain responsiveness. They includes outsourcing, strategic supplier partnerships, customer relationship, information sharing, and product modularity. Chen and Paulraj (2004) also conduct the research regarding supply chain management practices, they investigated long-term relationship, cross-functional teams, supplier base reduction, and supplier involvement. The same with Chen and Paulraj, Min and Mentzer (2004) also examined in their study long-term relationship, information sharing, cooperation process integration and supply chain leadership underlying the supply chain management practices. Lie *et al* (2005, 2006); Thatte (2007) identified supply chain management practices in form of strategic supplier partnership, customer relationship, and information sharing.

In this research the same supply chain management practices (supplier partnership, customer relationship and information sharing). However, this study conducted in Ethiopia perspective. Li *et al* (2005); Thatte (2007) have developed a valid and reliable instrument to measure supply chain management practices. The similar instrument also adopted in this research. Three dimensions of supply chain management practices lead to supply chain responsiveness. These are strategic supplier partnership, customer relationship, and information sharing also identified. The purpose of this study to find out the effect of supply chain management practices such as strategic supplier partnership, customer relationship, information sharing and supply chain responsiveness. This study also investigates the effect of supply chain responsiveness in term of operation system responsiveness, logistic process responsiveness, supplier network responsiveness and competitive advantage of the firm. By improving competitive advantage of the firm, organization could improve its performance.

2.1.3.1. Strategical Suppler Partnership

Thatte (2007) stated that strategic supplier partnership as the long-term relationship between the organization and its supplier. Gunasekaran *et al* (2001) asserted that a strategic partnership emphasizes long-term relationship between trading partners and promote mutual planning a problem solving efforts. Strategic partnership between organizations promote shared benefits and ongoing collaboration in key strategic areas like technology, products, and market (Yoshino and Rangan, 2005; Thatte, 2007). Strategic partnerships

with suppliers lead organization working closely and effectively with a few suppliers rather than many supplier that have been selected on the basis of cost efficient. Many advantage of consisting supplier early in the product-design process are that suppliers can offer cost effective design alternative, assist in selecting better components and technologies, and aid in designing assessment (Tan *et al*, 2002; Thatte, 2007). In supply chain management strategies, supplier relationship activities play an important role (Wisner, 2003). Long-term relationships refer to intention that the arrangement is not going to be temporary (Chen & Paulraj, 2004). Through close relationship supply chain partners are willing to share risks and reward, & maintain the relationship on long term basis (Stuart, 2003; Thatte, 2007).

Strategic supplier partnerships including working closely with suppliers to design or redesign products and processes, solve problems, as well as prepare back-up plans is critical in attaining supply chain responsiveness (Storey *et al*., 2005; Liu and Kumar, 2003; Martin and Grbac, 2003; Gunasekaran and Yusuf, 2002; Sheth and Sharma, 1997; Tan *et al*, 1998; Araujo *et al*, 1999; Ghosh *et al*, 1997; Ellinger, 2000; Lambert and Cooper, 2000; Turner *et al*, 2000; Harris, 2005; Yusuf *et al*, 2004; Lee, 2004; Power *et al*, 2001; Narasimhan and Das, 2000; Martin and Grbac, 2003). Liu and Kumar (2003) observed that collaborative practices such as 3PL, VMI, and CPFR between supply chain partners led to increased supply chain responsiveness. In a special report of logistics and transport (2003), information sharing and strategic supplier partnership practices have been highlighted as the critical steps to being responsive.

2.1.3.2. Customer Relationship Management

Toni and Nassimbeni (2009) identified that a long-term perspective between the buyer and supplier increase the intensity of firm-supplier integration. Firms that integrate with customers including: planning, implementing, and evaluating a successful relationship between the provider and recipient of both upstream and downstream of the supply chain.

Therefore, customer relationship management (CRM) is not only focused on inbound customer relationships but also on outbound customer relationships in SCM. Customer relations related to the company's ability to communicate to the delivery of appropriate products and services to customers locally and globally in the right time, right place, and appropriate of quantity and quality. Customer linkage especially sharing product

information with customers, receiving customer orders, interact with customers to manage demand, after placing the order system, share the status of orders with customers on scheduling orders, and product delivery stage (Lee, *et al*, 2007). A firm's customer relationship practices can generate the organizational success in supply chain management practices efforts as well as its performance (Scott and Westbrook, 2011; Ellram, 2011; Turner, 2013). The success of supply chain management encompasses customer integration at the downstream and supplier integration at the upstream, considering that each entity in a supply chain is a supplier as well as a customer (Thatte, 2007).

In the competitive business, better relationship management with customers is crucial for organization success (Wines, 2006). Good relationship with business partners, including key customers are important role to success of supply chain management practiced by organization (Moberg *et al*, 2002; Tathee, 2007). Customer relationship recognized as an internal component of an organization's market strategy to increase sales and profits (Bommer *et al*, 2001; Thatte, 2007). Close customer relationship allow product differentiation from competitors, help sustain customer satisfaction and loyalty, and elevated the value provide to customer (Margaretta, 198; Thatte, 2007).

Customer relationship is essential for attaining supply chain wide responsiveness (Storey *et al*., 2005; Mitchell, 1997; Christine, 1997; Martin and Grbac, 2003; Sheth and Sharma, 1997; Tan *et al*., 1998; Araujo *et al*., 1999; Van Hoek, *et al*., 2001; Christopher, 2000; Harris, 2005).

2.1.3.3. Information sharing

Simatupang and Sridharan, (2002) defined information sharing as the access to private data between business partners thus enabling them to monitor the progress of products and orders as they pass through various processes in the supply chain. They identified some of element that comprise information sharing, consisting data acquisition, processing, storage, presentation, retrieval, and broadcasting of demand and forecast data, inventory status and location, order status, cost-related data, and performance status.

They also add thatinformation sharing pertaining to key performance metric and process data improves the supply chain visibility thus enabling effective decision making.

Information shared in a supply chain is of use only if it is relevant, accurate, timely, and reliable (Simatupang and Sridharan, 2005; Tathee, 2007). Information sharing with business partners enables organizations making better decisions and making action on the basis of greater visibility (Davenport, *et al*, 2001; Tathee, 2007). Lumnus and Vokurka (1999, cited in Thatte, 2007) stated that in order to make the supply chain competitive, a necessary first step is to acquire a clear understanding of supply chain concepts and be willing to openly share information with supply chain partners. In business competitive world nowadays, business organizationshould to develop their supply chain in order to get customer responses.

Sharing information (and data) with other parties within the supply chain can be used as a source of competitive advantage (Jones, 2008; Novack *et al*, 2005). Armistead and Mapes (2013) suggest that firms can improve product quality through information sharing with trading partners. Furthermore, Tompkins and Ang (2012) consider the effective use of pertinent, timely, and accurate information by supply chain members as a key competitive factor. Information sharing with suppliers has given Dell Corp. the benefits of faster cycle times (implying lower time to market), reduced inventory (implying reduced costs), and improved forecasts. Customers, for their part, have benefited by getting a higher-quality product at a lower price (Magretta, 2008; Stein & Sweat, 2008).

2.1.4. Performance measurement

Performance measurement can be defined as the process of quantifying the efficiency and effectiveness of an action (Neely, *et al.* 2005). Traditionally, financial performance has been the primary measure of success in most of the organizations. Traditional measures are providing a very limited and often misleading picture of the performance of the organization (Tarr, 1995). The shortcomings of early systems, particularly those based on traditional cost accounting principles, have been widely documented by Johnson and Kaplan (2007) and Kaplan and Norton, (2012). Most of these measures focus on return on investment, return on sales, price variances, and sales per employee and productivity as indicated by Dixon, *et al.* (2010). These measures lack flexibility, ignore customer requirements and place a greater emphasis upon productivity measures.

Performance measurement incorporating non-financial measures has been a topic of great interest throughout 1990s. This is mainly because non-financial measures overcome the limitation of just using financial performance measure. Schonberger (1986) observes that the best companies use customer–oriented performance measures at the corporate level. The performance elements like cost, environment, quality and delivery express the relation of the organization with suppliers and customers.

The other elements like productivity, flexibility, safety, morale, innovation are more associated with the internal system (Anantaraman *et al*. 2006). Performance measurement system must show the interdependencies of the different performance indicators. Several frameworks have been developed on performance measurement. Among these, the most popular is Balanced Scorecard (BSC) devised by Kaplan and Norton (2002). A measurement system based on balance scorecard uses four perspectives, namely financial perspective, customer perspective, innovation and learning perspective, internal business perspective. Brewer and Speh (2000) have developed a model for evaluating supply chain performance using balance scorecard. BSC and similarly balanced performance measurement systems prove to be superior to systems as compared to traditional measurement systems. Supply chain should be viewed as one single entity and managed as a whole, in which all the members are functionally integrated and synchronized with mutual goals. Many companies have not succeeded in maximizing their supply chain's potential because they have often failedto develop the performance measures and metrics needed to fully integrate their supply chain to maximize effectiveness and efficiency.

Gunasekaran, *et al.* (2001) developed a framework for measuring the strategic, tactical and operational level performance in a supply chain and presented a list of key performance metrics. The metrics are further distinguished as financial and non-financial so that a suitable costing method based on activity analysis can be applied. The emphasis is on performance measures dealing with suppliers, delivery performance, customer-service, inventory and logistics costs in a SCM. Later Gunasekaran, *et al*. (2004) developed a framework to promote a better understanding of the importance of SCM performance measurement and metrics.

Beamon (2009) presented a framework for the selection of performance measurement systems for manufacturing supply chains. Three types of performance measures are identified as necessary components in any supply chain performance measurement system such as resources, output and flexibility. Measuring theperformance of any system requires the determination of appropriate performance indicators.

Maltz *et al.* (2003) developed a performance evaluation frame work named dynamic multi-dimensional performance (DMP). DMP includes twelve potential baseline measures across five major success dimensions (financial, market, process, people and future) that can be examined as applicable to different firms and firm types. Perspective based measurement system presents six unique sets of metrics to measure performance of SCM. The six different perspectives are system dynamics, operations research/ information technology, logistics, marketing, organization and strategy (Otto and Kotzab 2002). Interface based measurement system aligns performance at each link with in the supply chain. The link-by-link approach provides a means for aligning performance from point-of-origin to point-of-consumption with the objective of maximizing shareholder value for the total supply chain as well as for each company (Pohlen and Lambert 2001).

Seth *et al*. (2006) highlighted the importance of quality of service in the supply chain and presented a conceptual modeling framework to measure service quality in supply chains based on gap analysis. Elif Kongar (2005) presented a green balanced scorecard approach that includes financial, customer, business processes, learning and growth, and environmental perspectives in its evaluation process. Felix Chan and Qi (2003) proposed a process based approach to mapping and analyzing the practically complex supply chain network. Via this approach, a process–based performance of activity is used to identify the performance measures and metrics.

According to Thatte, (2007) the sub-constructs for supply chain responsiveness includes operation system responsiveness, logistic process responsiveness and supplier network responsiveness.

2.1.4.1. Supply chain responsiveness

Companies with more supply chain responsiveness will be more adaptive to demand fluctuation and can overcome the environment uncertainty at a lower cost due to the shorter

lead time (Randall *et al*., 2003). Responsiveness without cost effectiveness is not a real competitive strategy. Thatte (2007) stated that supply chain responsiveness competitive advantage of the firm are positively related. Yusuf *et al* (2003) found high correlation between the responsiveness and time to market, dependability, product innovation and quality. Towill (2002) stated that the effective engineering of cycle time reduction will generate to significant improvements in manufacturing costs and productivity. Further he argued that reduction in lead times is the necessary condition for a responsive supply chain and which further reduces the time to market. Sharifi and Zhang(2001); Aitken *et al*. (2002), emphasize that responsiveness in the supply chain is a source of competitive advantage. (Allnoch, 2007) found that average companies required much more time to respond to changes in customer demand than did the leading manufacturers. In some cases, as much as eight times longer was required. Thatee, (2007) proposed that supply chain responsiveness shall reduce the costs, while leading to competitive advantage for firms on other dimensions as well.

Responsiveness concept enters SCM literature based on the needs to respond the rapid environment change and 21st century competition. Responsiveness in the beginning was more related with company's internal process; that every company need to have the ability to response to the changes of customers‟ needs and demands, particularly in industries that are highly affected by customers' preference such as fashion, PC, electronics, construction and vehicle industries (Reichhart, A., and Holweg, M., 2007). Responsiveness concept then developed not only on individual company level but also as supply chain responsiveness. A supply chain with high responsiveness level will be able to respond the demand and customers‟ preference change compared with unresponsive supply chain.

In other word, supply chain responsiveness will, in return, influence performance ((Thatte, 2007); (Roh, 2009)). Responsiveness in general defined as ability to react purposefully and within an appropriate time-scale to customer demand or changes in the marketplace, to bring about or maintain competitive advantage (Kritchanchai,., and MacCarthy, 1999). In supply chain context, responsiveness defined as the capability of promptness and the degree to which the supply chain can address changes in customer demand (Thatt, *et al* 2013). Responsiveness concept used in this research using (Thatt, *et al* 2013) suggestion,

which distinguish the supply chain responsiveness into three sub-constructs, namely: operation system responsiveness, logistic process responsiveness and supplier network responsiveness.

2.1.4.1.1. Operation system responsiveness

OSR is defined as the ability of a firm‟s manufacturing system to address changes in customer demand (Thatt, *et al* 2013). OSR includes both manufacturing and service operations. It would also include the ability to rapidly configure or reconfigure assets and operations of a manufacturing system to cope with consumer trends (Wu, 2001; Lummus, Duclos, and Vokurka, 2003), respond rapidly to changes in product volume, and effectively expedite emergency customer orders. As a supply chain responds to customer demand, the constituent organizations may be required to move quickly from producing one product to another, or quickly change production levels for a given product. From a manufacturing standpoint, the responsiveness of an operations system would be an ability of the manufacturing or production function to respond rapidly to unexpected events, and an ability to swiftly accommodate special or non-routine customer requests. Operations responsiveness at each node in a supply chain is an integral component of SCR, since each entity in a supply chain is required to deliver the product or service in a timely and reliable manner, to satisfy customer demand (Duclos, Vokurka, Lummus),
R. R., Duclos, L. K., and Vokurka, R. J, 2003)

2.1.4.1.2. Logistic process responsiveness

Logistic process responsiveness is the ability of company's outbound transformation, distribution and warehouse system to address changes in customer demand. Fawcett (2012) stated that the responsive in logistic process is a crucial component in the supply of a responsive supply chain strategy.

Logistics and distribution management encompasses the transformation activities of goods from suppliers to manufacturer to distribution centers to final point of end users (Duclos *et al*, 2003; Thatte, 2007). These activities include warehousing, packaging and shipping, transportation planning and management, management inventory, reserve logistics and order tracking and delivery. (Fuller, Conner and Rawlinson, R, 1993) Suggest that a firm's logistics system is instrumental in creating value for its customers.

This value creation implies ensuring logistics flexibility (Duclos, *et al* 2003; Lummus, *et al*, 2003) and speed within the supply chain to serve each distinct customer‟s needs. A typical response to uncertainty is to build flexibility into the supply (Simchi-Levi, Kaminsky, and Simchi-Levi, 2008). Organizations can minimize risk and stay competitive (Simchi-Levi, *et al*, 2008) if flexibility can be supplemented by an increased velocity of sensing and responding. This responsiveness in the logistic processes is a vital component in the success of a responsivesupply chain strategy (Fawcett, 2012).

The responsiveness components in the logistics system include - selecting logistics components that: accommodate and respond to wide swings in demand over short periods, adjust warehouse capacity to address demand changes, handle a wide range of products, vary transportation carriers, have the ability to pack product-in transit to suit discreet customers‟ requirements, and have the ability to customize products close to the customer. It is vital that a firm has easy access to and is able to utilize different modes of transportation to be logistically responsive (Prater, Biehl, and Smith, 2001). (Hise, 1995) States that companies need a capability and flexibility to adjust logistic systems quickly to respond to changes in market needs, and the necessitated product assortment.

Lummus, *et al*, (2003) put forth some of the critical logistics process flexibility aspects of a supply chain, which are vital for supply chain responsiveness. These criteria are adapted for the logistics process responsiveness dimension in this study, and are as follows: logistics system's ability to - rapidly respond to unexpected demand changes, rapidly adjust warehouse capacity to address demand changes, rapidly vary transportation carriers to address demand changes, accommodate special or non-routine customer requests, and effectively deliver expedited shipments

2.1.4.1.3. Supplier network responsiveness

SNR is defined as the ability of a firm's major suppliers to address changes in the firm's demand. A key to responsiveness is the presence of responsive partners upstream and downstream of the focal firm (Christopher & Peck, 2004). Reichhart and Holweg (2007) argue that suppliers' manufacturing systems' responsiveness can be treated as the supply chain's responsiveness. The ability of a firm to react quickly to customer demand is much dependent on the reaction time of its suppliers to address the firm's demand. Thus,

responsive firms should be able to select suppliers who can add new products and make desired changes, quickly. Supply chains should be capable and ready to address ripple effects caused by new technologies, terrorist threats (Walker, 2005) or increased competition. Slack (1991) argues that supplier networks are the essential building blocks of a flexible system. Some interviews with operations managers conducted at the European vehicle assembly plants of Volvo revealed that the lack of supplier network flexibility hampered the company's responsiveness (Holweg, 2005). Supplier network flexibility (Slack, 1991) and thus supplier network responsiveness is an important part of supply chain responsiveness. Holweg and Pil (2001) argue that flexibility in the supplier network is an important ingredient of being responsive to changes in customer demand.

It is well known that responsive suppliers are a vital resource of a firm when design (McGinnis and Vallopra, 1999; Burt and Soukup, 1985) and manufacturing of outsourced products are involved. Fisher, *et al*. (2000) found that for short lifecycle products, such as fashion apparel, retailers are most successful if they can work with suppliers who can provide initial shipments of products based on forecasts, but then rapidly increase production to the right style, color, size, etc. based on actual sales. They note that fast supply chains can produce products as they sell rather than worrying about accurate forecasts. These studies suggest that supplier selection based on product development capabilities and rapid deployment capabilities, positively impact delivery time for new products. Choi and Hartley (1996) found that the capability of suppliers to make product volume changes to be a significant factor in supplier selection in the automotive industry. In the electronics industry, for example, demand volatility poses a unique challenge to suppliers to vary output in line with demand. The increases or decreases in demand may come at a short notice and may need to be sustained over some time period. Some of the measures of supplier network responsiveness identified in this study are: major suppliers' ability to - change product volume in a relatively short time, change product mix in a relatively short time, consistently accommodate the customer-firm's requests, provide quick inbound logistics to its customer-firms, have excellent on-time delivery record, and effectively expedite emergency orders.

2.1.4.2. Competitive advantage of the firm

In the changing world, competitive advantage emerges from the creation of supplier competencies to create customer value and achieve cost and/or differentiation advantages, resulting in market share and firm profitability (Barney, 2011; Coyne, 2006; Day and Thatte, 2007). To obtain competitive advantage, firms need to set up barriers that make imitation difficult through continual investment to improve the firm advantage, making this a long-run cyclical process (Thatte, 2007). Souza and William (2000) suggested that cost and quality is a part of competitive advantage dimension. Thatte (2007) also suggested cost, quality, dependability and speed of delivery as some of the critical competitive priorities for manufacturing. (Vokurka *et al*., 2002; Fawcett and Smith, 2005; White, 2006; Skinner, 2005; Roth and Miller, 2010; Tracey *et al*., 2009, Thatte, 2007) described the competitive advantage dimensions included price/cost, quality, delivery dependability, and time to market.

In operational level, responsiveness will enable organizations to compete based on cost, quality, time to market, and delivery dependability; responsiveness of a firm's logistics (transportation and distribution) process will enable organizations to introduce new products faster than major competitors and also lead to greater ability of a firm to provide on time the type and volume of product required by customers (i.e. increasing delivery dependability); responsiveness of a firm's supplier network will improve - the ability of the firm to rapidly introduce new products and features in the market place (i.e. compete based on product innovation and time to market), as well as improve a firm's ability to provide on time delivery (i.e. increase its delivery dependability) as these firms will be endowed with responsive suppliers. Li, (2002) proposed that a supply chain characterized by quick responsiveness to customer will competitive in term of time and quality.

Thatte (2007) suggested that dimension of competitive advantage: price, quality, delivery dependability, time to market, and product innovation. These dimensions, author used in this research.

2.2 Empirical Literature Review

2.2.1. Supply Chain Management in Construction industry

2.2.1.1. Characteristics of Construction Supply Chains

The idea of construction SCM emerged because of the actual circumstance of the construction industry. Many researchers consider that the construction industry nowadays is highly fragmented and this could lead to significant negative impacts, low productivity, cost and time overruns conflicts and disputes, resulting in claims and time-consuming litigation (Latham, 2004; Egan, 2008).

SCM can be useful and effective in construction (O'Brien, 2009). SCM is a very promising approach to successfully achieve integration between internal and external suppliers, designers, vendors, contractors, subcontractors and internal and external clients.

The SCM concept has the potential, through information and communication technologies, to overcome some of the fragmentation problems. It has a critical role to play in improving the overall performance of construction, but its application remains at a very early stage of development (Saad, *et al*., 2002). However, the industry is becoming increasingly aware of the necessity to change the current working practices and the attitudes they represent (Pearson, 2009; Pryke, 2009).

Construction Supply Chain Management is more concerned with the coordination of discrete quantities of materials (and associated specialized engineering services) are deliver to specific construction projects. Construction supply chain (CSC) embodies all construction processes, which starts at the initial demands by the client/owner, to design and construction, maintenance, replacement and eventual demolition of the projects. It also consists of different organizations involved in the construction process, including client/owner, designer, contractor, subcontractor, and suppliers. (Vrijhoef, *et al*., 2000).

Most construction projects today struggle with the same problems that have faced the industry such as: - No centralized source of information and resource management, Multiple parties involved on each project resulting in constantly changing people and companies on each job-site, multiple projects occurring simultaneously resulting in redundant and costly duplication of processes and activities, multiple Customers even

different departments within the same organization can result in different rules being enforce on each project resulting in higher management and administrative costs. To balance improvements in costs and product quality with adequate delivery times, many companies, particularly in the manufacturing industry, have found it necessary to integrate areas of activity such as engineering, purchasing, operations and logistics in other words, internal integration (Chritopher, 2012). Companies have been force to become even more competitive and extend this integration beyond their boundaries, external integration is giving rise to the concept of SCM (Christopher, 2005).

SCM aims at improving both efficiency and effectiveness by extending traditional functional and intra-organizational activities (Tan, *et al*., 2008). Members of the SC can attain sustainable competitive advantages by developing much closer relationships with all other members, thus allowing for significant reductions in time expenditure and costs and increases in quality, provided, although, that there is proper management of the SC and the customer needs are adequately serve. Successful SCM is crucial to strengthening the competitive edge of companies in competitive environments (Kumar, *et al*., 2006).

The customer–contractor relationship is regard as the main relationship in the CSC, linking the entities involved in a project together into one SC (Love, *et al*., 2004). This relationship is central to Construction Supply Chain Management and, consequently, the relationships change from one CSC to another as customers change (Saad, *et al*., 2002; Fernie, *et al*., 2007). However, it is also important to pay attention to relationships upstream of the construction site, i.e. between contractors and their sub-contractors and suppliers (Dainty, *et al*., 2001; Humphreys, *et al*., 2003; Bankvall, *et al*., 2010). It is also argue that a change in the management of relationships among customers, contractors, sub-contractors and suppliers is compulsory to improve the effectiveness and efficiency of CSC (Fearne, *et al*., 2006).

SCM application has particularly found obstacles in construction sector as a consequence of its particular context of temporary multiple organization‖ (Cheng, *et al*., 2010) and because of the difficulties in managing networks of a large number of different companies, supplying materials, components and multiple services and with adversarial relationships (Briscoe, *et al*., 2001; Saad, *et al*., 2003). It stated that the existing manufacturing research

in SCM, although useful, could not be directly apply to a construction environment; because of the transient nature of production in construction projects (O'Brien, 2005).

Although effective SCM is a key element in reducing construction costs, it noted that very few studies have defined what SCM means within the construction process (Davis, 2008; Atkin, et al., 2005; Crespin-Mazet, *et al.,* 2007).

The CSC is not a real chain but a network of multiple organizations and relationships, which includes the flow of information, the flow of materials, services or products, and the flow of funds between client, designer, contractor and supplier (Xue, *et al*., 2007). Construction is a multi-organization process, which involves client/owner, designer, contractor, supplier, consultant, and so on. It is also a multi-stage process, which includes conceptual activities, design, construction, maintenance, replacement, and decommission. At first, it proposed an alternative SCM networked structure, to substitute the traditional vertical one, in order to support collaborating (Xue, *et al*., 2007; Karim, *et al*., 2005). This proposal seems to better fit the peculiarities of construction SC and align with the context of our discussion as presented in Figure 1.

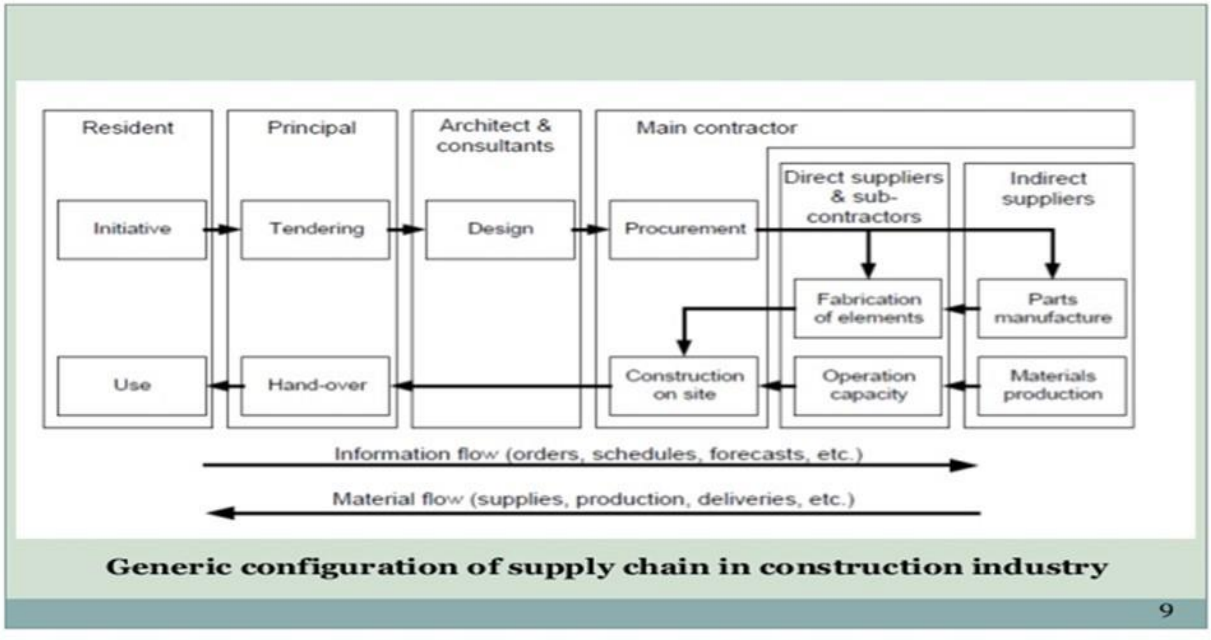

Figure 1 Generic configuration of a supply chain in Construction industry

2.2.1.2. Approaches of Supply Chain Management in Construction

Construction industry is characterize by its own distinctive features, which can heavily affect SCM application. They can be summarize as follows: - Production systems: Construction is a typical project production industry operating within an environment of considerable complexity and uncertainty (Fearne, *et al*., 2006). Customer influence: Customers wields great influence on the final product in relation to its physical aspects and to the value of logistic parameters (Kornelius, *et al*., 2008; Pesa¨maa, *et al*., 2009. Fragmentation: It refers to market fragmentation, as well process fragmentation (Baiden, *et al*., 2006). Number and type of stakeholders: The main subjects include: owners, designers, contractors and suppliers. However, a typical network involves multiple organizations and relationships, including the flow of information, the flow of materials, services and products, and the flow of funds between client, designer, contractor and supplier (Xue, *et al*., 2007). Buyer-supplier relationship: This is mostly of transactional nature, strained by conflict and mistrust (Lu, *et al*., 2007; Miller, *et al*., 2002). Moreover, it is widely known, especially among public sector clients, that in construction a tender price is the most significant parameter used for a bid evaluation. This focus on price is the main reason for project delivery problems (Hatush, *et al*., 2008; Hartmann, *et al*., 2010). Temporary configuration: Production at a temporary site by a temporary organization (Cheng, *et al*., 2010; Love, *et al*., 2002) leads to relationships focused on the short-term thinking, with actors attempting to leverage what they can out of the existing contract, resulting in an environment where opportunism reigns (Cox, *et al*., 2007; Kamann, *et al*., 2006). Change inertia: Construction organizations tend to be conservative referring to the need to change, because of the risks associated with the procurement of projects (Cheng, 2001; Love, *et al*., 2002; Kumaraswamy, 2005).

2.2.1.3. Problem of Construction Supply Chains

There are substantial difficulties in applying SCM in the construction industry (Saad, *et al*., 2002). Factors such as short-termism, lack of trust and adversarial relationships, the transient nature of construction projects and the considerable number of infrequent clients highlighted as the main problems associated with the implementation of SCM in construction. This section will address the main challenges associated with adopting SCM in the construction industry.

Customer focus, SCM may well help improve the construction industry with its poor relationships, fragmented processes and lack of internal and external customer focus. However, there remain a number of critical issues within the construction industry that need to be considered and rectified. A long list of problems could be itemized, including lack of trust and commitment, co-ordination problems and training problems, all of which are already well documented by reports (Latham, 2004; Egan, 2008). Consequently, scope for implementing SCM within construction could be limited (Saad, *et al*., 2003).

Much research work and real test cases analyses have assessed that construction is ineffective and many problems can be observed. Analysis of these problems has shown that a major part of them are supply chain problems, originating at the interfaces of different parties or functions, among which the following are few of them (Vrijhoef R., *et al*., 2011): Client/design interface: difficulties in finding out client‘s wishes, changes of client‘s wishes, long procedures to discuss changes. Design/engineering interface: incorrect documents, design changes, extended wait for architect‘s approval or design changes. Engineering/purchasing & preparation interface: inaccurate data, engineering drawings not fitting the use. Purchasing & preparation/suppliers interface and purchase & preparation/subcontractors interface: inaccurate data, information needs not met, adversarial bargaining and other changes. Suppliers/subcontractors interface and suppliers/site interface: deliveries not in conformance with planning, wrong and defective deliveries, long storage period, awkward packing, and large shipments. Subcontractors/site interface: subcontracted work not delivered according to main design, contract and planning. Site/completion of building interface: problematic completion due to quality problems. Completion of building/occupation interface: unresolved quality problems, delayed occupation due to late completion.

Table 2.1 Sources and causes of construction site material management problems

	Factor
Design	Changes made to the design while construction is in progress
	Lack of attention paid to standard sizes available on the market
	Designer‘s unfamiliarity with alternative products
	Complexity of detailing in the drawings
	Incomplete contract documents at commencement of project
	Selection of low quality products
Operational	Errors by tradespersons or laborers
	Damage to work done caused by subsequent trades
	Use of incorrect material, thus requiring replacements
	Required quantity unclear due to improper planning
	Delays in passing of information to the contractor on types and sizes of products to be used
Material Handling	Damages during transportation
	Inappropriate storage leading to damage or deterioration
	Material supplied in loss form
	Use of materials which are close to working place
	Unfriendly attitudes of project team and laborers
Procurement	Ordering errors
	Lack of possibilities to order small quantities
	Purchase products that do not comply with specification

Source Chain (2008:78)

Table 2.2 Methods for Materials managing and Minimization

No	Methods of material management
1	Purchasing raw materials that are just sufficient
2	Good coordination between store and construction personnel to avoid over ordering
3	Adoption of proper site management techniques
4	Training of construction personnel
5	Accurate and good specifications of materials to avoid wrong ordering
6	Checking materials supplied or right quantities and volumes
7	Employment of skilled laborers
8	Minimizing design changes
9	Change of attitude of workers towards the handling of materials
10	Accurate measurements of materials during batching
11	Access to latest information about types of materials on the market
12	Vigilance of supervisors
13	Careful handling of tools and equipment on site
14	Good construction management practice
15	Adherence to standardization

Source Chain (2008, 78)

2.2.2. Construction Supply Management in Different Countries of the World

Study done in Malaysian

Malaysian Construction Supply Chain management involves the management of activities in the chain to ensure best value for the customer and to achieve a sustainable competitive advantage. With the increment of competition and technology, it allows many firms transform to supply chain management, as a central part of strategic competence, which is believe would be able to create competitive advantage (Othman .A.A and Abd. Rahman, 2010). In practice, SCM is applied to prevent issues about abandoned projects and delays. This issues will cause the customer lose the project and project management that are not consistent with plans made before the start of construction is called a real plan only after the contractor gets the Letter of Acceptance. Besides that, practicing the SCM in construction site can be achieved an integrated supply chain for building and facility standards.

Study done in Portugal

In Portugal, a framework developed to automate the tendering, ordering, delivery, invoicing and payment processes of prefabricated house systems, equipment and services in its supply chain, whose members have different levels regarding information and communication technologies (Jardim-Gonclaves *et al*, 2000). This framework, together with an EDI communication infrastructure based on an inter-organizational workflow system, enables a better coordination between the supply chain partners, from the client, through to the contractor and suppliers. The developed tool coordinates the business and management information flows among participants in the various stages of the process of building prefabricated houses.

Study done in UK

Supply Chain Management in the UK Construction Industry is growing interest among major clients and contractors in the UK construction industry in developing collaborative relationships. So far these efforts have not been very successful, although, ―the search for more collaborative relationships has become a contemporary theme in the industry‖ (Cox, *et al*., 1997). SCM is considered as having replaced partnering as the latest buzzword of the UK construction industry (Pearson, 1999). He reports that a few major clients and contractors use SCM.

They are also involving suppliers in projects at an early stage, and managing them more effectively, for example, organizing structured development programs for them. Hence, contractors can reduce projects' contingency budgets; and suppliers are able to respond and adapt to the contractor's short- and long-term plans. In a study, contractors' opinions were surveyed because of their pivotal role in the construction supply chain (Akintoye, *et al*., 2000). The study reveals that contractors are more oriented towards clients rather than their product suppliers in the supply chain. Contractors seem to have more arrangements with clients than with suppliers and a higher proportion of the relationships with clients are contractual. Due to the aggressive business mentality of the industry and the non-trusting climate, contractors have the tendencies to pay more attention to clients who provide their workload (Akintoye, *et al*., 2000). Finally, the survey highlights that problems in implementing successful SCM within the UK construction industry are at present associated with an inappropriate traditional business culture and the unique individual features of the organizational structure. There are a number of problems within UK construction that might arguably be addressed through the use of SCM (Mortledge, *et al*., 2006). These are: fragmentation, adversarial relationships, and project uniqueness, separation of design and production and competitive tendering.

Study done in North America

Supply Chain Management in the North America Construction Industry: - Since 1999, Virtual Construction Group, Arup Computing and Arup Project Management have been investigating, analyzing and developing new systems that can enhance quality, quantity and speed of project information needed to perform construction tasks (Hudgins and Chang, 2000).

Ove Arup and Partners developed a Web-based Project Extranet Site (a website that allows controlled access to partners, vendors and suppliers or an authorized set of customers - normally to a subset of the information accessible from an organization's intranet) to be used as a communication and document-handling tool for their global operations. The Site streamlines the movement of information between all organizations involved on the project, wherever they may be, enhancing productivity and achieving cost savings through increased access, organization and exchange of project information. Over 20 different project sites, within the Arup Partnership, have successfully adopted the Project Extranet

Site (Hudgins and Chang, 2000).

Study done in Canada

In Canada, a Web-based communications framework was developed to operate as a document information center for project participants (Hammad and Alkass, 2000). This framework, entitled the Construction Project Document Information (CPDI) Center, offers a search facility as an integral part of other services such as document storage, retrieval, and general project information. It is also adaptable to any project organization or delivery method, and works for a single-site project as well as geographically dispersed projects.

2.2.3. Supply Chain Management in the Ethiopia Construction Industry

It is important to see the Ethiopian industry competitive forces using the (Porter, 1985)'s five competitive forces model (Mugher Cement Enterprise, 2010). This are: first, rivalry between established firms – few years ago there were few firms and could sell easily what they could produce. This time the number of cement factories has reached to about 11 and some others will resume operations very soon. Though rivalry is not now seemingly stiff as such, it is expected to come sooner at some other time. Second, new entrants- though the industry is capital intensive, there are major reasons that the industry may attract capable multinational companies. Government is promoting investors to enter into the construction industry due to the fact that it is becoming a bottleneck for its own infrastructural sector requirements. Economies of scale are very high as it is heterogeneous product that is produced in an integrated process. Due to this and high profit margin that the existing few companies are enjoying, it is a fertile ground to attract capable entrepreneurs. Third, bargaining power of customers – there is a high demand and supply gap in the market. The former supersedes the latter by far. Forth, Bargaining power of the suppliers – the main raw materials like lime stone, gypsum and pumice are found in the local market and most of the cement factories own the mining fields. However, spare parts, components, fuel, packing materials and main utilities are mostly owned by few or at times with sole suppliers where most of the time the suppliers do have a strong bargaining powers. Fifth, threat for substitute products – Material such as cement does not have perfect substitute.

SCM practices and challenges in different industry of Ethiopia were studied in different dissertations such as:

Admaw (2010) studied the practice of SCM for Ethiopian textile firms. It was found that, SCM practices in Ethiopian textile firms are weak and not considering SCM as a strategic tool for competition. Business managers of the textile firms didn't give attention for SCM theories and practices.

Dereje, (2012) studied the impact of SCM practices on the organizational performances in metal and engineering industries. The result of the study shows that the implementation of SCM in this industry is weak. Also the SCM practices don't have any relationship with organizational performances except internal lean practices.

Belay (2011) studied the practices of SCM in cement industries. The result of the thesis shows similar to other industries in the country i.e. the practice of SCM in cement industry is almost poor. There seems that since the demand outweighs the supply of the cement, which contributes for not using SCM as a competitive strategy.

Mesfin (2007) also studied the SCM and model development study as a case study of Mesfin Industrial Engineering plc. The result of this study shows that most of the employees of the company don't have awareness of SCM. The company also don't use supply chain cost analysis rather than using the traditional accounting system. Also there are problems in their warehouses. Besides to the above machine handling problem, ageing, poor preventive maintenance, lack of proper operation, and wear of spare parts are the main reasons for the breakage of machines in Mesfin Industrial Engineering.

Mogus (2015) studies Practice & Challenge of SCM on 11 Ethiopian Private G-1 Road Construction Companies. Major finding shows that; on the degree of relationship across supply chain characterized by less joint product planning with suppliers, but better relationship with customers; information sharing practice of SCM in the case companies is generally moderate, but poor information sharing on material forecast with suppliers; there is poor and absence of IT & information system within the case companies. Despite the increase of empirical research available on manufacturing sectors, only limited empirical studies undertaken on construction Industry, use of units of analysis, and approaches of performance measurement also varies.

Temesgen Tagesse (2017) study on supply chain management practice and impact on firm performance in the case of yotek construction plc. His study was focus on SCM practice and impact on firm performance that determined in terms of operational and organizational performance. Mintesinot Abay (2018) test if there is a relationship between SCM practices, supply chain responsiveness, and operational performance in manufacturing industry in Bahir Dar, the study indicate first there is a positive and significant relationship between supply chain management practices and supply chain responsiveness, second supply chain management practices i. e. strategic supplier partnership, customer relationship, and information sharinghas a direct positive impact on operational performance and the last the study finds the relationship between supply chain responsiveness and operational performance. The result states that supply chain responsiveness has positive and significant impact on operational performance. Mustefa (2014) also study on Supply Chain

According to the overall challenges of supply chain management, one can say that the practices of supply chain management Ethiopian construction industry are almost poor. To use the term Supply Chain Management‘ in the context of the current Ethiopia construction industry suggests that it is possible to adopt those practices, which have proved to be successful elsewhere, without significantly adapting them to reflect the particular nature of the industry and its culture (Mugher Cement Enterprise, 2010).

2.3 Research hypotheses

There exists evidence that firms are achieving flexibility (Tully, 2004), and thus responsiveness, through the use of SCM practices. SCM practices directly impact the operational flexibility and firms should use SCM practices to excel in attaining responsiveness (Narasimhan and Das, 2009).

Strategic supplier partnerships including working closely with suppliers to design or redesign products and processes, solve problems, as well as prepare back-up plans is critical in attaining supply chain responsiveness (Storey *et al.*, 2005; Liu and Kumar, 2003; Martin and Grbac, 2003; Gunasekaran and Yusuf, 2002; Ghosh *et al*., 2007; Ellinger, 2006; Lambert and Cooper, 2004; Turner *et al*., 2000; Harris, 2005; Yusuf *et al.*, 2004; Lee, 2004; Power *et al*., 2001; Narasimhan and Das, 2000; Martin and Grbac, 2003). Liu and Kumar (2003) observed that collaborative practices such as 3PL, VMI, and CPFR between supply chain partners led to increased supply chain responsiveness. In a special report of logistics and transport (2003), information sharing and strategic supplier partnership practices have been highlighted as the critical steps to being responsive. Close relationship with suppliers, has been empirically found to positively affect the volume flexibility, mix flexibility and new product flexibility dimensions of manufacturing flexibility (Suarez *et al.*, 2005).

Customer relationship is essential for attaining supply chain wide responsiveness (Storey *et al*., 2005; Mitchell, 2007; Christine, 2007; Martin and Grbac, 2003; Sheth and Sharma, 2007; Tan *et al*., 2008; Araujo *et al*., 2009; Van Hoek *et al*., 2001; Christopher, 2000; Harris, 2005).

Information sharing plays an important role in constructing a responsive supply chain network (Lau and Lee, 2000). Information sharing practice in a supply chain increases responsiveness to customer's needs (Martin and Grbac, 2003, Sheth and Sharma, 2007; Tan *et al*., 2008; Araujo *et al*., 2009; Van Hoek *et al*., 2001; Christopher, 2000). Lambert and Cooper (2000) argue and Thatte *et al*. (2009) find that a higher level of information sharing practices will lead to a higher level of supplier network responsiveness. Close relationship and open communication can lead to supplier responsiveness (Liker and Choi, 2004; Handfield and Bechtel, 2002; Treleven and Schweikhart, 2008). Open sharing

of information such as inventory levels, forecasts, sales promotion strategies, and marketing strategies reduces theuncertainty between supply chain partners (Andel, 1997; Lewis and Talalayevsky, 2007; Lusch and Brown, 2006; Salcedo and Grackin, 2000) thus enabling firms to respond rapidlyto unexpected events on either customer or supply side (Martin and Grbac, 2003; Handfieldand Nichols, 2002; Hult *et al*., 2006; Gosain *et al*., 2004; Tan *et al*., 2008). Based on the above arguments we state:

Hypothesis 1: Supply chain management practices are positively and significantly affects the supply chain responsiveness

SCM practices have empirically been found to positively impact competitive advantage by Li *et al*. (2006). The current study aims to test if supply chain responsiveness plays a key role in this relationship. Christopher (2002) states that, the greater the collaboration, at all levels, between supplier and customer, the greater the likelihood that competitive advantage can be gained by organizations. Extensive coordination and involvement with suppliers in thenew product development process has been known to reduce time to market (Vonderembseand White, 2004). A long-term relationship with the supplier will have a lasting effect on the competitiveness of the entire supply chain (Choi and Hartley, 2006; Noble, 2007; Kotabe *et al*., 2003).

Sharing information (and data) with other parties within the supply chain can be used as a source of competitive advantage (Jones, 2008; Novack *et al*., 2005). Armistead and Mapes (2003) suggest that firms can improve product quality through information sharing with trading partners. Furthermore, Tompkins and Ang (2009) consider the effective use of pertinent, timely, and accurate information by supply chain members as a key competitive factor. Information sharing with suppliers has given Dell Corp. the benefits of faster cycletimes (implying lower time to market), reduced inventory (implying reduced costs), and improved forecasts. Customers, for their part, have benefited by getting a higher-quality product at a lower price (Magretta, 2008; Stein and Sweat, 2008). The above arguments lead to:

Hypothesis 2: Supply chain management practices are positively and significantly affects the competitive advantage of the firm.

2.4 Conceptual framework

The literature depicts supply chain management practices from different perspectives with goal of improving competitive advantage of firm and supply chain responsiveness. By improving competitive advantage of the firm, organization could improve its performance. Three dimensions of supply chain management practices lead to supply chain responsiveness. These are strategic supplier partnership, customer relationship, and information sharing also identified.

According to Thatte, (2007) the sub-constructs for supply chain responsiveness includes operation system responsiveness, logistic process responsiveness and supplier network responsiveness. Operation system responsiveness is the ability of firm's manufacturing system to address changes in customer demand. Logistic process responsiveness is the ability of company's outbound transformation, distribution and warehousing system to address changes in customer demand. Fawcett (2002) stated that the responsive in logistic process is a crucial component in the supply of a responsive supply chain strategy. Supplier network responsiveness is the ability of the firm's major suppliers to address changes in the firm's demand. A key to responsiveness is the presence of responsive and flexibility partners upstream and downstream of the firm (Christopher & Peck, 2004).

Koufteros, *et al.* (2007); describe the following five dimensions of competitive capabilities: competitive pricing, premium pricing, value-to-customer quality, dependable delivery, and product innovation. Thatte (2007) suggested that dimension of competitive advantage: price, quality, delivery dependability, time to market, and product innovation. These dimensions, author used in this research.

Based on the above literature review, the following research framework can be drawn: Source; (Thatte, *et al* 2013, Miguel, Ledur Brito, 2011)

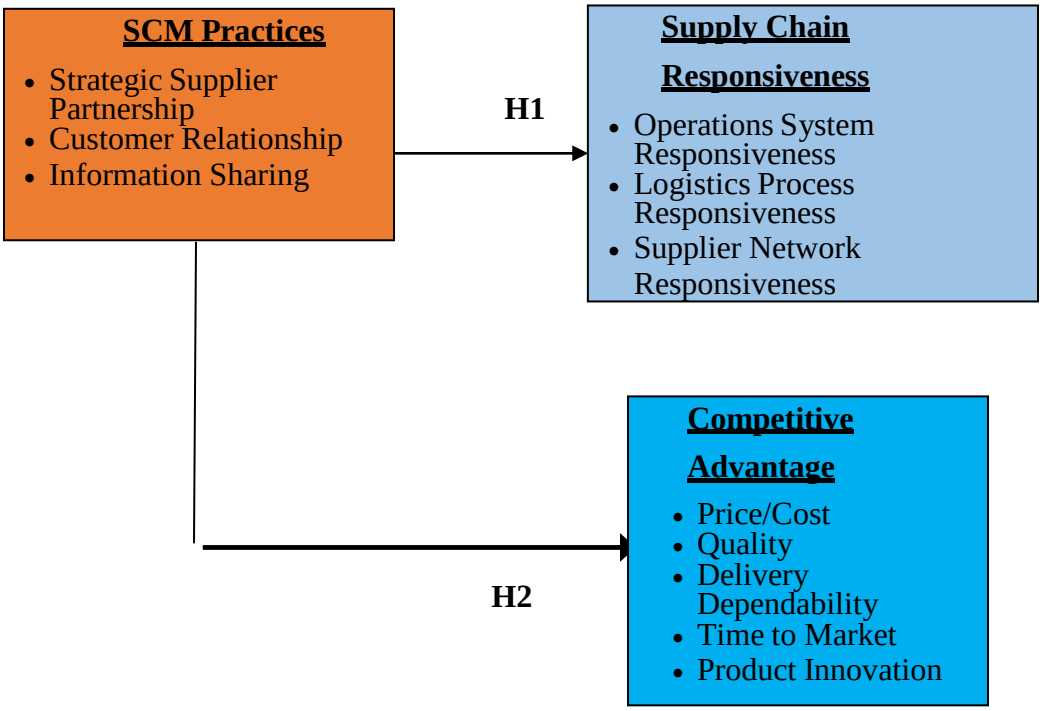

Figure 2. Conceptual Framework of the study

2.5 Research Gap

The focus of most of the existing research into construction SCM has been on specific aspects of the supply chain, such as client-contractor relations (Akintoye, Mclntosh and Fitzgerald, 2011), contractor, sub-contractor and supplier interface (Vrijhoef & Koskela, 2011), or rework (Love, Mandal and Li, 2009). Studies in the construction sector are also undertaken on aspects such as environmental performance (Ofori, 2011), design management (Khalfan *et al.,* 2011), service quality (Hoxley, 2001), and purchasing behavior (Dubios & Gadde, 2011). Barker, Hong-Minh and Naim (2011) argued that there is a clear gap in research that takes a holistic approach to SCM as applied to construction projects. Until now, in the construction industry, initiatives belonging to the domain of SCM have been minimal, covering a subset of issues (e.g., transportation costs) in a limited part of the construction supply chain (e.g., the construction site). Asplund and Danielson (2011) stated that in most cases, the issues are considered from a main contractor's point of view.

There is a lack of academic studies in terms of improvement of supply chain as a process. One of the first studies related to SCM metrics was presented by [Beamon, (2011)]. A framework that links supply chain processes and its levels was later presented by (Gunasekaran, *et al.,* 2004). The study brought a contribution to knowledge by relating the formal processes of supply chain, namely plan, source, make/assemble, and deliver. Such processes are then evaluated under different time perspectives, from the operational, tactical and strategic level. Another study was developed by (Vachon, *et al*., 2009) by revisiting the topic of competitive priorities and the deployment of metrics. The study had a positive response and was applied in the industry.

From the above discussion that most studies on SCM in the construction sector have been undertaken in developed countries for specific aspects of SCM. This research is an attempt to study the use of SCM in the context of Ethiopia (i.e., a developing country) construction industry in the case of Etete Construction. Further, this research on supply chain perspective has been attempted with a holistic view for Governmental infrastructure projects in the perspective of client, contractor, consultant, supplier and focus on how improving of supply chain process.

CHAPTER THREE
METHODOLOGY OF THE RESEARCH

3.1. Study Area

This chapter describes the methodology that used in this research. The methodology uses the following techniques: review of literature related to construction supply chain management practices, information about the research design, questionnaire design, research population, research sample size, content validity, instrument reliability and statistical data analysis, formulation of narrative and graphical representation of the supply chain process, evaluation of the supply chain process, conclusion and recommendations.

As supply chain management practices is a big conceptual framework and applied at the upper level of management, the respondents are identified as: - client, consultants, contractors both on head office and project office, Suppliers and to gather information on their general understanding of supply chain management practices, the major types of supply chain management practices encountered on the selected sites and the weather or not supply chain management is practiced in Etete Construction.

3.2. Research Approach

The research instruments employed in the study mostly are closed questioner approach. Questioner survey is the most preferred choice in logistics and supply chain survey research (Kotzab, 2005). Survey Research is the most fundamental tool for all quantitative outcome research methodologies and studies. Surveys used to ask questions to a sample of respondents, using various types such as online polls, online surveys, paper questionnaires, web-intercept surveys, etc.

In this study the survey sample comprised project managers, senior office Engineer, senior contract administration, clients, contractors and consultants to gather information on factors that affect, the challenges faced in Supply chain management practice, supply chain responsiveness and competitive advantage of the firm in the selected projects in Etete construction. The approach of the research is quantitative approach and quantitative approach andfor data collection closed-ended quantitative approach (questioner) is used. The potential suppliers for the study were identified after the response from the public bodies and contractors were received.

3.3. Research Design

Designing a study helps the researcher to plan and implement the study in a way that will help the researcher to obtain intended results, thus increasing the chances of obtaining information that could be associated with the real situation (Burns & Grove, 2001). This study is a basic research which designed to solve theoretical problem and used to contribute to the existing knowledge. The research design for this study was consists of a descriptive and explanatory research design, in the form of a questionnaire and interview. The researcher used cross-sectional field survey method to assess the relationship between SCM practices and supply chain responsiveness on one hand and SCM practices with operational performance, and finally the relationship between Supply chain responsiveness and operational performance of Etete Construction.

3.4. Research population size and Sample Design

3.4.1. Target Group

The target population is the total group of individuals from which the sample might be drawn. A sample is a small proportion of a population selected for observation and analysis. Sampling can also be defined as the process of selecting representative units of a population for the study in research investigation. The objective of the sampling is to provide a practical means of enabling the data collection and processing the components of the research to be carried out with ensuring that the sample provides a good representation of the population.

There are two target population for this study, the first one is the employees of Etete Construction Company who are working in Addis Ababa head office and public project sites that particularly working in the department related with supply chain management activities. For the purpose of this study, the researcher used judgmental sampling technique. Since the study focus on those people who have knowledge and awareness about different supply chain management practices, supply chain responsiveness and competitive advantage of the firm, such sampling techniques were used to collect the information through questionnaires from every concerned department or section.

The second one is supply chain members this are client (customers) and major suppliers. Etete Construction Company purchase row materials and equipment from various suppliers that produced the raw materials and equipment domestically and imported items from

distributers. Among so many suppliers in Etete the interview include few responsible management bodies of major suppliers and clients only in Addis Ababa projects , this major suppliers were Sador Aluminum technics Plc, Dejene Lemesa, MKAK trading Plc, Dangote cement Ethiopia Plc, Samaka trading. The interview were done with those major supplier to analyze the relationship between Etete Construction with suppliers.

Etete Construction PLC has various major customers in Addis Ababa and some of them were sub city office buildings, lot of university projects in different city, ministry of health. However, due to in accessibility to get information from all customers, interview were done only with those major customers found in Addis Ababa this are, B+G+11 Nifas silk lafto sub city office building, B+G+7 40/60 saving house project, Federal Housing, 2B+G+7 mixed use apartment, B+G+11 Lideta Sub city Excusive Office Building, Alert hospital project.

3.4.2. Population size

In the Census Survey it was considered all staff members those are directly participates in the Supply chain management in the five public project selected sites in Addis Ababa. Choosing the best and most experienced employee, the population size for conducting this research is decided to be in ten projects 101 respondents from both head office and project sites.

3.5. Data Source and Type

The main sources of data were primary and secondary data type used. The primary data are those that are gathered for the first time and therefore original in character. On the other hand, the secondary data are those already founded by someone else and passed through the statistical process.

3.5.1. Primary data collection

Questionnaire and interview were selected to collect the primary data, through structured Questionnaire and unstructured interview. The primary data conducted in the form of personal interview with project manager, office Engineers, procurement manager, supply chain manager, tendering manager and through questionnaires which is distributed to employees, was articulated and analyzed to produce conclusion inference. The researcher used the questionnaires to extract relevant information from the study participants. The questionnaire used close ended questions that is filled based on Liker's five-point scaling.

The questionnaires were designed are simple, more friendly and comprehensive to the study participants.

3.5.2. Secondary data collection

The selected construction companies working manuals, work procedures, process flow charts periodic reports, Supply management vouchers, internet web-sites, academic books and the likes have been the source of secondary data.

In addition to the answering instructions, the survey was structured in four sections with the following objectives:

- To obtain general information about the respondent companies, including type of company, area of work, annual operational volume and number of employees.
- To understand the relationships between companies and their suppliers.
- To understand the relationships between companies and their clients.
- To identify and understand the more relevant aspects of the relationships between construction companies' internal clients and suppliers especially between construction sites and the main office.

3.6. Data collection Procedure

There are various mechanisms useful to collect data. The main ones are questionnaires, interviews and observations (Greener & Martelli, 2015). In this research both primary and secondary sources of data was utilized through Questionnaires and literature review. The primary data was gathered particularly using survey questionnaire. For the purpose of this study a quantitative methodology involving a close-ended questionnaire were used as the measuring instrument. The close-ended questionnaires can be administered to groups of people simultaneously. The standard questionnaire used to collect the necessary information regarding the study was adopts from the work (Thatte, *et al* 2013) to measure supply chain management practice and supply chain responsiveness and (Miguel, Ledur Brito, 2011) measurement for operational performance. The Liker-type scale method a range of responses: strongly disagree, disagree, neutral, agree and stronglyagree applied to collect data from the sample respondents with a numeric value of 1-5, respectively.

The research also use interview in order to include sufficient information on supplier side and client (consultant) side. The researcher used social media for the interview due to current pandemic situation and try to participate the management bodies of the case companies on the research issues like SCM practice & performance measure.

3.7. Data Analysis Techniques

Before processing the responses, the completed questionnaires were edited for completeness and consistency. The data were analyzed by the help of two sets of statistics namely, descriptive and inferential statistics. Objective one which is assessing the supply chain practices and performance measure adopted by ETETE were analyzed using descriptive statistics such as mean and standard deviation. Inferential statistics was used to analyze objective two and three, which were the relationship of supply chain management practice with supply chain responsiveness and competitive advantage of the firm using Pearson's correlation coefficient and regression analysis. For objective four which is factor affect SCM practices using frequency and relative index. Specifically a dimension level analysis was also performed using regression analysis which was instrumental in indicating whether the independent variables of SCM practices significantly predict the dependent variable supply chain responsiveness as well as competitive advantage of the firm.

Regression model: $Y= a+b1x1+b2x2+b3x3$ where Y = Supply chain responsiveness or competitive advantage of the firm a= the y intercept when x is zero; b1, b2, b3 are regression coefficients of the following variables respectively; x1- strategic supplier management; x2- customer relationship management; x3- information sharing.

The results are analyzed from 101 questionnaires using MS Excel 2007 and SPSS version 23 software and the analysis and results are presented in form of tables as shown in Chapter 4. The results are prepared to present the information about the sample size, response rate and contracting companies' characteristics in Etete Construction in public projects. It also includes the ranking of factors affecting the perception of construction stakeholders on the benefits of SCM practices and the performance measurement and based on their relative index ranks.

3.8. Validity of the Research

Validity refers to the degree to which an instrument measures what it is supposed to be measuring. Validity has a number of different aspects and assessment approaches. There are two ways to evaluate instrument validity: content validity and statistical validity, which include criterion-related validity and construct validity.

Content Validity of the Questionnaire

Content validity test was conducted by consulting two groups of experts. The first was requested to evaluate and identify whether the questions agreed with the scope of the items and the extent to which these items reflect the concept of the research problem. The other was requested to evaluate that the instrument used is valid statistically and that the questionnaire was designed well enough to provide relations and tests between variables. The two groups of experts did agree that the questionnaire was valid and suitable enough to measure the concept of interest with some amendments.

Statistical Validity of the Questionnaire

To ensure the validity of the questionnaire, two statistical tests should be applied. The first test is Criterion-related validity test (Pearson test) which measures the correlation coefficient between each paragraph in one field and the whole field. The second test is structure validity test (Pearson test) that is used to test the validity of the questionnaire structure by testing the validity of each field and the validity of the whole questionnaire. It measures the correlation coefficient between one filed and all the fields of the questionnaire that have the same level of similar scale.

3.9. Reliability of the Research

The reliability of an instrument is the degree of consistency which measures the attribute; it is supposed to be measuring. The less variation an instrument produces in repeated measurements of an attribute, the higher its reliability. Reliability can be equated with the stability, consistency, or dependability of a measuring tool. The test is repeat to the same sample of people on two occasions and then compares the scores obtained by computing a reliability coefficient.

The researcher has made efforts in making the questionnaire clear and unambiguous to the participants by thoroughly clarifying them in detail. To test the internal reliability of the

questionnaire, Cronbach's alpha test was used.

Cronbach's Alpha Reliability test

According to (Bonett and Wright, 2015) Cronbach's alpha is one of the most widely used measures of reliability in the social and organizational sciences. Current practice is to report the sample value of Cronbach's alpha reliability, but a confidence interval for the population reliability value also should be reported. Reliability analysis is concerned with the internal consistency of the research instrument.

Table 3.1 Rule of Thumb of Cronbach's Alpha

Cronbach's Alpha	Description
>=.9	Excellent
>=.8 but< .9	Good
>=.7 but<0.8	Acceptable
>=.6 but<0.7	Questionable
>=.5 but<.6	Poor
<.6=.5	Unacceptable

Source: Zikmund, *et al*, 2010.

In this research multiple items in all constructs were used, the internal consistency/reliabilities of SCM practices, supply chain responsiveness (SCR), and competitive advantage (CA) were assessed with Cronbach's Alpha and the reliability values for all constructs are confirmed as greater than 0.7, which are considered acceptable. The following tables shows the summary of reliabilities of all constructs of supply chain management and the average Cronbach's alpha in the table below shows that 0.895 and Cronbach's alpha based on standardized items is 0.909 which is greater than 0.7, which confirms acceptability of the research instrument.

Table 3.2 Reliability statistics Result

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.896	.909	101

A reliability analysis was carried out on the perceived task values scale comprising 5 items. Cronbach's alpha showed the questionnaire to reach acceptable reliability, α =0.896.

Total Correlation column tells you how much each item correlates with the overall

questionnaire score. Correlations less that r = .30 indicate that the item may not belong on the scale. But here all the items correlation is greater than 0.30 therefore the items are reliable and belongs to the scale.

In the last column in the table Cronbach's Alpha if Item Deleted. As the name suggests, this column gives you the Cronbach's alpha score you would get if you removed each item from the questionnaire. Remember, our current score is α = .896. If this score goes down if we deleted an item, we want to keep it. But if this score goes up after the item is deleted, we might want to delete it as it would make our questionnaire more reliable. But all the items Cronbach's alpha scores a value above 0.7 and it is better to investigate the supply chain management practice, based on the items of strategic supply chain partnership, customer relationship(CR), information sharing (IS) as independent items and the supply chain responsiveness(SCR) according to operational system responsiveness(OSR), logistic process responsiveness(LPR), supplier network responsiveness(SNR) and competitive advantage (CA) according to elements of cost/price, quality and time to delivery as dependent variables.

3.10. Ethical considerations

All the research participants included in the study were duly informed about the purpose of the study and their willingness and the agreement was secured before the beginning of filling the questionnaire and conducting interview. Regarding the right to privacy of the respondents, the study maintained the confidentiality of the identity of each participant. In all cases, names are kept confidential and collective names such as 'the respondents,' the participants; the interviewees etc were used in the study.

CHAPTER FOUR
RESULTS AND DISCUSSION

This chapter presents the discussion and interpretation of data collected through questionnaires and interview. The discussion focuses respondent profile, the SCM practice, the Effects of supply chain practice on supply chain responsiveness, the Effects of supply chain practice on competitive advantage of the firm (operational performance), Effects of supply chain responsiveness on competitive advantage of the firm and the factor affecting the SCM practice of ETETE Construction.

For the assessment of supply chain management practices and effects on supply chain responsiveness and competitive advantage of the firm conducted in ETETE construction a total of 108 questionnaires distributed to targeted employee of the company and 101 (93.5%) were returned; all are valid and used for analysis. Moreover, a structured interview questions were administered by Email and other social media to in client/consultant side, supplier side and procurement and supply manager of the firm. The collected data were presented and analyzed using SPSS (version 23) statistical software

The study used descriptive statics by computing mean and standard deviation to assess the level of SCM practice. In addition, correlation analysis, specifically, Pearson correlation was used to measure the degree of association between SCM practices, supply chain responsiveness and the competitive advantage of the firm and also examine the effect of supply chain responsiveness on the competitive advantage . Furthermore, regression analysis was also used to test the effect of independent variable on dependent variable based on the research objectives. On last measuring the factor affecting SCM practice of the firm by using frequency and relative index. Thus, based on the responses obtained from survey data and interview of the respondents, data presentation and analysis were made as follows:

4.1. Descriptive Statistics

To examine the supply chain management practices of ETETE Construction, mean and standard deviation statistical analysis were performed using variable such as strategic supplier relationship customer relationship, and information sharing. Among these statistical analysis tools mean value is an important indicator to determine the extent of ETETE construction practice on each variable. The mean and group mean statistical values of approaching to 2.00 and indicates poor performance, 3.00 indicates average/moderate, while 4.00, and 5.00, indicate higher and very high/excellent performance respectively.

4.1.1 Demographic Profile of the Respondents

The demographic profile of the respondent's depicted in table 4.1 and their frequencies with the valid percentage of total cases according to age are 48.5% of females and 51.5% males, according to age 3% of below 25 years, 52.5% of 25-20 years, 34.7% of 31-35 years and 9.9% of 36-40 years, according to department 5.0% are from logistics and supply chain management, 56.4% are from office engineer, 7.9% are from project manager, 29.7% are from site engineer and 1% from tendering department head responded the questionnaires'. As illustrated on the table below the respondents have different service years or experiences such that 15.8% have above 10 years, 47.5% have 2-5 years, 3.0% have below 2 years, and 33.7% have 6-10 years of experiences as well as different qualification with 3% diploma, 76.2% first degree and the rest of 20.8% are second degree holders.

Table 4.1 Demographic data of the Respondents

Variables	Category	Frequency	Percent
Age	Below 25 years	3	3.0
	25-30 years	53	52.5
	31-35 years	35	34.7
	36-40 years	10	9.9
	Total	**101**	**100.0**
Sex	Female	49	48.5
	Male	52	51.5
	Total	**101**	**100.0**
Department	logistics and supply chain management	5	5.0
	Office Engineer	57	56.4
	Project manager	8	7.9
	Site Engineer	30	29.7

	Tendering Dep.Head	1	1.0
	Total	**101**	**100.0**
Qualification	Diploma	3	3.0
	First degree	77	76.2
	Second degree	21	20.8
	Total	101	100.0
Service Year	Above 10 years	16	15.8
	2_5 years	48	47.5
	Below 2 years	3	3.0
	6_10 years	34	33.7
	Total	**101**	**100.0**

(Source: Researcher's Survey Result on SPSS 23 2021)

4.1.2 Analysis of Supply Chain Management Practices

This research used descriptive statistical analysis based on the three components of the conceptual framework developed for this study to assess the supply chain management practice of ETETE construction under this investigation. The most common supply chain management practices are strategic supplier relationship, customer relationship, and information sharing. (Frederico, Guilherme Francisco, 2015) states that SCM's practices involve a set of activities undertaken by organization to promote effective management of their supply chain. And SCM lead to changes in the structure of the organization by integrating internal functions and linking these with the external operation of suppliers, customers and others stakeholders of the supply chain.

4.1.2.1. Strategic supplier partnership

Different SCM practices serve different purposes, for example, close partnership with the supplier is a practice that focuses on investing for the sake of integration with thesupplier (Aslam, *et al.*, 2021). Closer coordination of activities within and among firms throughout the supply chain creates flexible operating systems characterized by coordinated source, make, and deliver operations that drastically cut raw material to consumer cycle times, enabling the firm to respond to actual market needs rather than anticipate demand with inventory. From the supply perspective, supplier development, supplier partnerships, supplier involvement, and strategic sourcing all positively influence the buying firm's operational performance. In addition, supplier partnerships, supplier

development, and supply chain flexibility, all positively impact the buying firm's business performance (Lazalier, 2008).

Table 4.2 Descriptive Statistics of Strategic Suppliers Relationship (N=101)

S.No	Items	Mean	Std. Deviation
1	We consider quality as our number one criterion in selecting suppliers	4.26	.856
2	We consider price as our number one criterion in selecting Suppliers	4.59	.777
3	We consider on time delivery as our number one criterion in selecting suppliers	4.38	.915
4	We have a long-term relationship with suppliers	3.92	.924
5	We regularly solve problems jointly with our suppliers	3.34	.886
6	We have Supplier's performance measurement systems	2.16	.784
7	We give motivation and rewards for satisfactory suppliers	1.98	.860
	Group mean	3.52	

(Source: Researcher's Survey Result on SPSS 23 2021)

The most commonly known characteristics of strategic supplier's relationships that mentioned by different authors are: quality criterion in selecting suppliers, price as our number one criterion in selecting Suppliers, on time delivery as our number one criterion in selecting suppliers, a long-term relationship with suppliers, regularly solve problems jointly with our suppliers, supplier performance measurement and motivation and others. To measure ETETE Construction Company's orientation concerning the strategic Supplier Relationship (SSP), seven items were developed in this research.

Table 4.2 above indicates the level of relationship that exists between suppliers and the case ETETE Construction Company. Accordingly, the group means of supplier's relationship was 3.52 and it indicated average/ moderate performance level with respect to the overall measures taken into consideration. Especially the descriptive statistics of the supplier performance measurement system and motivation and rewards for satisfactory suppliers are 2.16 and 1.98 respectively. These mean values imply that ETETE Construction Company had poor practice on supplier performance measurement, give a motivation for satisfactory suppliers. In solving jointly with supplier, the descriptive statistics is 3.34 which is good but it's less than expected because there is

always a problem like wrong quantity and quality order, changing order after they buy and so on. This all problems affect the long term relation with supplier by causing trust and commitment issue, but still the firm have high performance level. On the other hand, the quality criteria, the price criteria,the timely delivery criteria and the long-term relationship have the descriptive statistics of 4.26, 4.59,4.38 and 3.92 respectively that indicates the indicate higher performance level.

From the interview response Date collect from company major suppliers. The research only take interview for Addis Ababa suppliers due to time, also due to the privacy of the supplier the research didn't mention there name just only code name. Some of the suppliers that respond the questions are: ***supplier Code 1*** *is major suppliers in suppling aluminum window and door and also aluminum frame with all accessors* **,** *according to interview response with code 1 marketing office, there were very good relationship with ETETE Construction Company. From there responds most of the time the firm give priority for quality but sometime also give for price due to the contract amount of the material and market price vary through time, they chose less price if they allow consultant unless it didn't affect the quality of the work. Code 1 also support ETETE by material forecasting and other information sharing about materials and equipment's cost during tender preparation for various projects and for project cost forecasting as joint planning effort. But in many year relationship the respondent have one big problems with Etete which is delay in payment that affect trust of the supplier to give other material for next order, in all means this affect the firm performance.*

Supplier Code 2 *is another major supplier of ETETE that provides cements for various projects in Addis Ababa. Interview response of code 2 Cement Ethiopia PLC Sales and Marketing Supervisors indicates that they have long-term relationship with ETETE. They big reason they chose us is due to our number one high quality cement in Ethiopia so Etete give a priority for quality than price. As the respondent say they sometime also give free delivery in emergence order.*

Supplier Code 3 *is major suppliers in suppling electrical material with all accessors***,** *according to interview response with code 3 marketing office, there were*

very good relationship with ETETE Construction Company. From there responds most of the time the firm give priority for quality but sometime also give for price due to the contract amount and current price in the market vary. Code 3 also support ETETE by material forecasting and other information sharing about materials and equipment's cost during tender preparation for various projects and for project cost forecasting as joint planning effort. Although there was strong relationship, effort to discussion to improve relationship and performance between. But they also said there is one big problems with Etete that is delay in payment which affect trust and commitment to the firm for the future.

Supplier Code 4 i*s major suppliers in suppling sanitary and finishing material respectively with all accessors**, according to interview response with both suppliers, there were very good and longer relationship with ETETE Construction Company. From there responds most of the time the firm give priority for quality, price and on time delivery. They also support ETETE by material forecasting and other information sharing about materials and equipment's cost during tender preparation for various projects and for project cost forecasting as joint planning effort. As other suppliers the big problems with Etete was not give a payment on time and miss information when they give order by size, quality and quantity of material which affect trust and reducing supply uncertainty for the future*

From all clients response the firm have a good criteria in selecting a great suppliers in terms of quality, cost and on time delivery but in material management and logistics management there is some gap, especially in logistics management there is problem in delay the material to site so this cause in un-satisfaction for client desire. Even if Etete didn't introduce a new design or system than competitor they have a good and modern equipment to facilitate the work during the construction phase.

4.1.2.2. Customer Relationship:

According to (Jones, 2005) all the practice for managing customer relationships could be source of competitive advantage. For example, managing customer complaints, building long-term relationships, and improving customer satisfaction are effective methods of managing customer relationship.

Table 4.3 Descriptive Statistics of Customer Relationship (N=101)

S.No	Items	Mean	Std. Deviation
1	We quickly report out of stock material to the consultant	4.40	.776
2	We quickly approve material to consultant	4.27	.706
3	We report to the client if there is a quality problem about the material that included in the contract document	4.33	.680
4	We quickly respond if client change the design	4.14	.722
5	We quickly respond if client change the material quality and quantity	4.32	.734
6	We frequently compliance with customer's demand delivery in- full and on time requirements	3.56	.654
7	We regularly monitor and evaluate customer/client satisfaction	2.75	.654
8	The firm has high level of cooperativeness with customers	3.49	.743
9	We frequently interact with customers to set reliability responsiveness, and other standards for us	3.20	.721
	Group Mean	3.83	

(Source: Researcher's Survey Result on SPSS 23 2021)

In general, as indicated in tables 4.3, average mean value of 3.83 showed that the company's performance with regard to customer's relationship was approach to high level. In special case up on report out of stock material to the consultant, approve material to consultant, report the quality problem to the client, respondent of the change in client design, material quality and quantity, have the mean of the performance 4.40, 4.27, 4.33, 4.14 and 4. 23 respectively. These indicates ETETE construction have high performances in the customers relationship. But in submission with customer's demand delivery, monitor and evaluate customer/client satisfaction, cooperativeness with customers, interact with

customers to set reliability responsiveness, and other standards for us the means are 3.56, 2.75, 3.49, and 3.20 respectively. That indicates the moderate performance in collaboration with the customers, and totally the customer relationship based on the group mean value of 3.83 it approaches to high level since 3.83 approximated to 4 with acceptable deviations.

From the interview response Date collect from company major customer (client). The research only take interview for Addis Ababa client due to time, also due to the privacy of the client employee the research didn't mention there name of the company just only code name. ***Customer Code 5 and Customer Code 6*** *was major customer of ETETE Construction. As interview finding with both Code 5 and Code 6 direct response manager have long term relationship, as they say most of the time Etete choices good quality and durable material but some time due to cost variation thru time the use lower quality but still good durable. Low information sharing practices cause ETETE not able to complete the project with expected time and quality on finishing works. Some of the reasons for such extended deliver time according to the Interview response was searching for raw materials at lower market price since they win the bid and entered construction agreement with very low price than the market. In addition, there were low level of cooperatives and lack of joint planning as well as low efforts to introduce new construction product and service to customers. As further mentioned during the interview, most of domestic contractor, including ETETE had lower performance on introduction of new construction products and service as well as joint planning through demand creation effort. These situations further affect long term relationship with customers and reduce customer's relationship and their loyalty.*

Both ***Customer Code 7 and Customer Code 8*** *was major customer of ETETE Construction. As interview finding with both client direct respondent manager have long term relationship, as they say most of the time Etete choices good quality and durable material but some time due to cost variation thru time the use lower quality but still good durable. Low information sharing practices cause ETETE not able to complete the project with expected time and quality on finishing works. Some of the reasons for such extended deliver time according to the Interview response was searching for raw materials at lower market price since they win the bid and*

entered construction agreement with very low price than the market. In addition, there were low level of cooperatives and lack of joint planning as well as low efforts to introduce new construction product and service to customers. As further mentioned during the interview, most of domestic contractor, including ETETE had lower performance on introduction of new construction products and service as well as joint planning through demand creation effort. These situations further affect long term relationship with customers and reduce customer's relationship and their loyalty. It's all the for ***Customer Code 9*** *project there is a delay due to low information sharing with both client and suppliers, take long time for approval of material, use less quality and durable material.*

4.1.2.3. Information Sharing

Information sharing is an important aspect in achieving perfect integration in a supply chain. Cross functional integration and inter organizational integration requires the visibility of information across the supply chain. Poor information sharing between partners in a supply chain will result in poor coordination that will lead to many serious problems such as high inventory levels, inaccurate forecasts, low resource utilization, and high production costs. Indeed, information sharing is highly considered as the way to reduce demand uncertainty (Impact *et al.*, 2011).

(Frederico, Guilherme Francisco, 2015) stated the maturity of SCM measured in Excellence in costs, total focus on client and high level of satisfaction, process totally integrated and structured, extensive use of information systems, sharing information with stakeholders, excellence on project management, extensive performance measurement, supply chain seen as a competitive factor among the competitors, responsive action before the demand variations caused by customers, extensive regulation and fomentation for credit lines.

Table 4.4 Descriptive Statistics of Information Sharing (N=101)

S.No		Mean	Std. Deviation
1	The firm has the practice of material supply forecast Information sharing with Project sites	4.09	1.184
2	The firm has the practice of material supply forecast Information sharing with suppliers	4.02	1.183
3	The firm has the practice of material required related Information sharing with suppliers	4.23	.915
4	The firm has the practice of material requirement related Information sharing by project sites	4.42	.852
5	Adequacy and quality of information sharing throughout the supply chain partners	3.66	.588
6	The firm makes efforts on Inter-organizational information coordination and sharing	3.48	.715
7	The firm build sense of trust, problem sharing & solving mechanism and skills transfer with partners	3.47	.558
8	The firm make Timely Information exchange between its supply chain partners	3.45	.714
	Group Mean	3.85	

According to information sharing the group mean scoring the value of 3.85 that is moderate information sharing according to the sense of trust, problem sharing & solving mechanism and skills transfer with partners as well as adequacy and quality of information sharing throughout the supply chain partners. This implied that trust and joint problem solving as well as quality of information sharing between ETETE Construction Company and among supply chain partners were moderate. In detail forecasting information sharing with project site, material supply forecast with suppliers, material requirement information sharing, adequacy and quality of material required, inter organizational information coordination and sharing, problem shearing and solving mechanism and timely information sharing mechanism scores the means of 4.09, 4.02, 4.23, 4.42, 3.66, 3.48, 3.47, and 3.45 respectively. From the result the firm has a good information sharing with the site, supplier in forecasting the material need for. But from result of timely information exchange b/n its suppliers it is less than expected. On the other side making effort with inter-organization coordinate like Engineering department and supply and procurement department, build sense of trust, problem sharing & solving mechanism and skills transfer with partners is

less, this affect the firm performance in terms of delay on site work due to wasting so many time to communicate with each other and on waiting the material to come. Generally from the results the group mean of 3.85 that gives the interpretation of approaching to the high level of information sharing.

According to the interview response with major suppliers of the company ***Supplier Code 1, Supplier Code 2, Supplier Code 3, Supplier Code 4****, due to strong and long relationship, relationship with ETETE, there is high level, adequate, timely and quality information sharing on material supply forecast and material required information with major suppliers. In addition, there was trusting relationship between them but in risk sharing when unforeseen things happen in the market is less because both the firm and suppliers are profitable company so it's hard to share risk. Similarly, as interview result indicates that information sharing between ETETE and code 2 on material supply forecast and material required related Information had better performance, there was adequate and quality information sharing.*

On the other hand from major client, Interview response with ***Customer code 5, Customer code 6, Customer code 7, Customer code 8 and Customer code 9*** *as a major customer indicated that ETETE could not able to deliver sufficient volume of the required amount of raw materials to the project sites at the right time, they purchased insufficient raw material and it takes time to deliver another amount. This in turn creates idle time, extra mobilization cost and longer project completion time. Moreover, there was inefficient utilization of construction project sites due to excess accumulation of few raw materials while with shortage of the other required raw materials. This showed occurrence of poor information sharing at project sites and procurement and supply decision makers and that was one of the reason for failure to delivery completed building on time for all public building projects.*

From ETETE Procurement and Supply department interview response there is big information gap between the engineering dep when they take quantity and material type from site orders and another information gab when they transfer the orders to the supply and procurement dep there will be a missing order and incorrect

material type according to the specification of BOQ in contract order. This all lead to miss information to the suppliers during purchase time, if it's already purchased it will cause loss of a of lot birr and if they try to return and change the material it will cause extra time, extra transportation which cause a delay. The big problem that all supplier respond is delay in payment which cause lot of conflict, big trust issue even up to decided not give any material anymore but due to they have a long year relationship they sometimes compromise the situation of the firm.

Summary of SCM practices in Etete construction

Table 4.5 summery of SCM practices (N=101)

SCM practices	No of Items	Group Mean
Strategical supplier Partnership	7	3.52
Customer Relationship	9	3.83
Information Sharing	8	3.85
Grand Mean		3.73

(Source: Researcher's Survey Result on SPSS 23 2021)

4.2. The frequency and relative index analysis

4.2.1. The mean and standard deviation SCM practice of ETETE construction

In general, as indicated in the below tables 4.15, average mean value of 4.345 showed that the effect of the client on the SCM of ETETE construction was approach to high level. In special case the payment from client, design change, alternative product, exchange of product, the incorrect document, and dalliance, 4.49, 4.59, 4.08, 4.34, 4.32, and 4. 25 respectively. These indicates client side is the most affecting constraint the supply chain management (SCM) practice of ETETE construction.

Table 4.6 The client side effect on the SCM practice of ETETE construction

S.No	Items	Mean	Std. Deviation
1	Late payment from client	4.49	.923
2	Design change	4.59	.666
3	Designer ‘s unfamiliarity with alternative products	4.08	.857
4	Difficult for substitute product	4.34	.637
5	Incorrect document	4.32	.937
6	Delays in passing of information to the contractor on types and sizes of products to be used	4.25	.699
	Group Mean	4.345	

In tables 4.6 below the mean and standard deviation of the contractor side effect on the SCM of ETETE construction is depicted, and the group mean value of 4.195 showed that the effect of the contractor on the SCM of ETETE construction was approach to high level.

Table 4.7 The contractor side effect on the SCM practice of ETETE construction

S.No	Items	Mean	Std. Deviation
1	Late and incorrect payment to suppliers	4.56	.699
2	Incorrect price during bidding process	4.79	.408
3	Extended time wait for architects/consultant approval	4.72	.568
4	Inaccurate data from project site	4.46	.781
5	Wrong and defective deliveries, long storage period	3.95	.698
6	Incorrect packing and large shipment	3.98	.848
7	In accurate data & information needed for site	4.39	.812
8	Purchasing raw materials that are just sufficient	3.48	.844
9	Good coordination between store and construction personnel to avoid over ordering	3.71	.535
10	Employment of skilled laborers and training of construction personnel	3.87	.744
11	Accurate and good specifications of materials to avoid	4.35	.607

	wrong ordering		
12	Checking materials supplied quantities and volumes	4.08	.757
	Group Mean	4.195	

In tables 4.7 below the mean and standard deviation of the supplier side effect on the SCM of ETETE construction is depicted, and the group mean value of 4.8 showed that the effect of the supplier on the SCM of ETETE construction was approach to high level.

Table 4.8 The contractor side effect on the SCM practice of ETETE construction

S.No	Items	Mean	Std. Deviation
1	Deliveries not in conformance with planning	4.15	.669
2	Unresolved quality problem	4.45	.655
3	Access to latest information about types of materials on the market	4.12	.496
4	Lack of attention paid to standard sizes available on the market	4.00	.678
	Group Mean	4.18	

4.2.2. The factor affecting the SCM practice of ETETE Construction.

Supply chain management practices is applied by companies across the globe due to its demonstrated results such as delivery time reduction, improved financial performance, greater customer satisfaction, building trust among suppliers and others Companies resort to supply chain practices to improve their performance. Thus, it is important to first understand how their supply chains practices work and what parties of the SCM practices that affect the stakeholders like client, supplier and contractor (Quesada and Gazo, 2012). Therefore in this research work the factor affect the SCM practice client side, the contractor side and the supplier side are analyzed in table 9, 10 and 11 respectively according to frequencies.

Table 4.9 The factor affect the SCMP of Etete construction in client-side

Factors affecting SCM of ETETE construction	The range of responses on each questioner from 1 up to 5,	Responses		Percent of Cases
		Frequency	Percent	
the client-side effect on SCM of ETETE Construction	Very Low(1)	0	0	0
	Low (2)	18	3.0	17.8
	Average (3)	76	12.5	75.2
	High (4)	192	31.7	190.1
	Very High (5)	320	52.8	316.8
Mode		5		

According to the results generated from SPSS version 23 on descriptive frequencies of the client-side effect low (2) responded by 18 or 3.0% of the samples, average (3) responded by 76 or 12.5% of the samples, High (4) responded by 192 or 31.7% and very high (5) 320 or 52.8% of the total 101 samples multiplied by the number of questions that are 6 which is 606 responses are observed. And from this result the low and average effect of the client side is too minimum and in percent of cases is 75.2% in comparisons with the high and very high responses that are 190.1% and 316.8% respectively in total case. This indicated that the client side highly affects the supply chain management practice of ETETE construction.

Table 4.10 the Contractor effect on the SCM of ETETE construction

Factors affecting SCM of ETETE construction	The range of responses on each questioner from 1 up to 5,	Responses		Percent of Cases
		Frequency	Percent	
The contractor side effects on SCM practices of ETETE Construction	Very low (1)	3	0.2	3.0
	Low (2)	36	3.0	35.6
	Average (3)	171	14.1	169.3
	High (4)	514	42.4	508.9
	Very High (5)	488	40.3	483.2
Mode		4		

The contractor side effect on the SCM of ETETE construction, depicted in the above table have different level of responses from the total of 12 questioners entry with the total sample of 101, and for each questioners all the 101 samples responded and total of 1212 responses are depicted in the total row of table. Then up on observation of the frequencies 0.2% (3)

samples responded very low(1), 3.0%(36) samples responded low(2), 14.1%(171) samples responded average (3), 42.4 % (514) samples responded high(4) and 40.3%(488) samples responded very high(5). This result shows that the number or frequency of respondents that give high level and very high level is larger than the frequencies of very low, low and moderate. From this observation it is possible to construe that the problem on contractor side highly affect the supply chain management practices of ETETE construction.

Table 4.11 The factor affect the SCMP of ETETE construction in the supplier side

Factors affecting SCM of ETETE construction	The range of responses on each questioner from 1 up to 5,	Responses		Percent of Cases
		Frequency	Percent	
The supplier side effects on SCM of ETETE Construction	Very low(1)	0	0	0
	Low (2)	3	0.7	3.0
	Average (3)	46	11.4	45.5
	High (4)	231	57.2	228.7
	Very High (5)	124	30.7	122.8
Mode				

Like the client and the contractor side the supplier side effect on the supply chain management analyzed with the 101 sample for the four questionaries' each and the total of 404 responses were observed. From the total of 404 responses 3(0.7%) given on the low (2) Level, 46(11.4%) given on the average (3) level, 231(57.2%) given on the high (4) leveland 124(30.7%) given on very high (5) level. From this observation the frequency of responses for the average (3) level, 231(57.2%), high (4) level and 124(30.7%) given on very high (5) level are too large compared with the responses 3(0.7%) given on the low (2) level. These show that the other factor affecting the supply chain management (SCM) is the supplier side. Therefore, it is possible to infer that the supplier side highly affect the SCM of ETETE construction.

Relative index (RII)

The Relative Importance Index (RII) approach used to describe the relative importance of the specific causes and effects based on the likelihood of occurrence and effect on the project using the Likert scale of five scales. In addition, the higher value of the index of relative importance (RII) is the critical cause or impact component and is determined by equation below (Kassem, Mukhtar A. Muhamad Azry Khoiry, 2020).

$$R_{II} = \frac{\sum W}{(A \times N)}$$

Where RII – is Relative Importance Index, W is the is the weight given to each factor by the respondents from 1, 2, 3, 4 and 5 for very low, low, moderate, high and very high, respectively A is the highest weight (i.e., 5 in this case), and; N is the total number of respondents. $W = 5 \times n5 + 4 \times n4 + 3 * n3 + 2 \times n2 + 1 \times n1$ Where n is the number of respondents for each level. Up on the utilized formula the index analysis for the factors affecting the supply chain management, are depicted below. Table 12 below shows the ranking of the risk factors according to the relative importance index and depends on the frequency of occurrence and the effect of the factor to obtain a balanced result of the factors effect that can be relied upon; accordingly, the risk cannot be analyzed by the probability of occurrence only without putting the risk factors impact into account. According to the (Kassem, Mukhtar A. Muhamad Azry Khoiry, 2020) the higher value of the index of relative importance (RII) is the critical cause or impact component.

Table 4.12 The relative important index analysis of the factors affecting SCM

Factors affecting SCM of ETETE construction	Range of responses (1-5)	Responses of the cases		
		Frequency	Percent	RANK
The client side	Very low(1)	0	0	1
	Low (2)	18	3.00	
	Average (3)	76	12.50	
	High (4)	192	31.70	
	Very High (5)	320	52.80	
Mode	5			
The contractor side	Very low (1)	3	0.20	2
	Low (2)	36	3.00	
	Average (3)	171	14.10	
	High (4)	514	42.40	
	Very High (5)	488	40.30	
Mode	4			
The Supplier side	Very low	0	0	3
	Low (2)	3	0.70	
	Average (3)	46	11.40	
	High (4)	231	57.20	
	Very High (5)	124	30.70	
Mode	4			

Based on the relative index table the mode is depicted for all the three factors such as client side, contractor side, supplier side that is the mode is 5, 4 and 4 respectively. The ranking depicted in the last columns and based on the mode 5 if repeated more often in client side, and 4 is more repeated in contractor and supplier side, therefore, the client side affect the supply chain management practice of the ETETE construction and ranked as 1 and the contractor and the supplier side are the second most affecting factors and are ranked 2 and 3 respectively.

4.3. Correlation analysis

Correlations are the measure of the linear relationship between two variables. A correlation coefficient has a value ranging from -1 to 1. Values that are closer to the absolute value of 1 indicate that there is a strong positive relationship, closer to -1 strong negative correlation between the variables being correlated whereas values closer to 0 indicates that there is little or no linear relationship. As described by Andy (2006), the correlation is a commonly used measure of the size of an effect: values of ± 0.1 represent a small effect, ± 0.3 is a medium effect and ± 0.5 is a large effect. The relationship between supply chain management practices and firm performance, in terms of supply chain responsiveness and competitive advantage of the firm (operational performance) and also relationship between supply chain responsiveness and competitive advantage of the firm (operational performance) was investigated using correlation analysis. This provided correlation Coefficients which indicated the strength and direction of relationship. The p-value also indicated the probability of this relationship's significance.

4.3.1. Correlation between supply chain management practice and supply chain responsiveness

Table 4.13 Correlation matrix between constructs of SCM practices and SCR(N=101)

Correlations

		SSP	CR	IS	SCR
SSP	Pearson Correlation	1			
	Sig. (2-tailed)				
CR	Pearson Correlation	.810**	1		
	Sig. (2-tailed)	.000			
IS	Pearson Correlation	.543**	.451**	1	
	Sig. (2-tailed)	.000	.000		
SCR	Pearson Correlation	.705**	.580**	.624**	1
	Sig. (2-tailed)	.000	.000	.000	

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

Abbreviation key: - supply chain responsiveness, according Strategic supplier partnership (SSP), customer relation (CR), information sharing (IS) and supply chain responsiveness (SCR)

In table 4.13 the Pearson correlation between the supply chain management and the supply chain responsiveness, according Strategic supplier partnership (SSP), customer relation (CR), and information sharing (IS). And from the output of the SPSS version 23 the relationship between Strategic supplier partnership (SSP) and the supply chain responsiveness (SCR) is significant with the correlation coefficients 0.705(r=0.705) and the significance p value is less than 0.001 and for the relationship between customer relation (CR) and supply chain responsiveness (SCR) is also significant since the correlation coefficient is 0.580(r=0.580) and the significance p value is also less than 0.001. And finally there is a significant positive relationship between information sharing (IS) and supply chain responsiveness (SCR) with the correlation coefficient of 0.624 with the significance p value less than 0.001.

Pearson correlation test was conducted between SCM practices (collective representative of three constructs of SCM practices) and Supply chain responsiveness (SCR) and the results are presented in the table below. Hence, there was significantly strong correlation between SCM practices and Supply chain responsiveness (SCR). In other words, SCM practices and Supply chain responsiveness (SCR) have strong positive relationship with correlation coefficient of 0.748 (r=0.748) and significance value less than 0.001.

Correlation (N=101)

Correlations

		SCR	SCM
SCR	Pearson Correlation	1	.748**
	Sig. (2-tailed)		.000
SCM	Pearson Correlation	.748**	1
	Sig. (2-tailed)	.000	

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

4.3.2. Correlation between supply chain management practice andcompetitive advantage.

Table 4.14 Correlation matrix between constructs of SCM practices and CA(N=101)

Correlations

		SSP	CR	IS	CA
SSP	Pearson Correlation	1	.		
	Sig. (2-tailed)				
CR	Pearson Correlation	.810**	1		
	Sig. (2-tailed)	.000			
IS	Pearson Correlation	.543**	.451**	1	
	Sig. (2-tailed)	.000	.000		
CA	Pearson Correlation	.909**	.732**	.568**	1
	Sig. (2-tailed)	.000	.000	.000	

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

Abbreviation key: - supply chain responsiveness, according Strategic supplier partnership (SSP), customer relation (CR), information sharing (IS) and competitive advantage (CA).

The Pearson correlation test depicted in table 4.14 represents the correlation between the supply chain management and the competitive advantage. Therefore, as observed from the result of the SPSS version 23 analysis 101 entry, there is a positive significant relationship between strategic supplier partnership (SSP) and the competitive advantage, and also, there is a positive significant relationship the customer relationship (CR) and competitive advantage (CA) with the correlation coefficient of 0.909 (r=0.909) and 0.732(r=0.732) respectively, the significance value of p of both correlation is less than 0.001 and also, the supply chain management (SCM) practice level increases according to information sharing (IS) the level of competitive advantage (CA) level increases. This means there is a positive significant relationship between information sharing (IS) and competitive advantage (CA) with the coefficient of relation 0.568(r=0.568) and the significance value of p less than 0.001.

Correlation (N=101)

Correlations

		SCM	CA
SCM	Pearson Correlation	1	.846**
	Sig. (2-tailed)		.000
CA	Pearson Correlation	.846**	1
	Sig. (2-tailed)	.000	

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

Pearson correlation test was conducted between SCM practices (collective representative of three constructs of SCM practices) and competitive advantage (CA) and the results are presented in the table above. Hence, there was significantly strong correlation between SCM practices and competitive advantage (CA) or operational performance. In other words, SCM practices and competitive advantage (CA) have strong positive relationship with correlation coefficient of 0.846 (r=0.846) and significance value less than 0.001.

4.4. Regression Analysis

Regression analysis is conducted to know by how much the independent variable explains the dependent variable. The regression was conducted between supply chain management practices (independent variable) and supply chain response (SCR) (dependent variable) in the first regression. The second regression was made between supply chain management practices (independent variable) and competitive advantage (dependent variable). The third regression was made between supply chain response (SCR) (independent variable) and competitive advantage (dependent variable). The results of the regression analysis is presented as follows. In this linear regression model, the p-value ("sig" for significance") of the predictor's effect on the criterion variable, if less than .05 is generally considered "statistically significant."

The model specification is as follows:

Regression model: Y= a +b1x1+b2x2+b3x3+ where Y = Operational or Organization performance; a= the y intercept when x is zero; b1, b2, b3, are regression coefficients of the following variables respectively; x1- strategic supplier management; x2- customer relationship management; x3- level of information sharing.

4.4.1. Assumptions of Multi Collinearity Test

There is a very simple test to assess multicollinearity in your regression model. The variance inflation factor (VIF) identifies correlation between independent variables and the strength of that correlation. Statistical software calculates a VIF for each independent variable. Multicollinearity can affect any regression model with more than one predictor. It occurs when two or more predictor variables overlap so much in what they measure that their effects are indistinguishable. One popular detection method is based on the bivariate correlation between two predictor variables. Multicollinearity is the occurrence of high inter correlations among two or more independent variables in a multiple regression model. Multicollinearity refers to a situation in which more than two explanatory variables in a multiple regression model are highly linearly related. We have perfect multicollinearity if, for example as in the equation above, the correlation between two independent variables is equal to 1 or −1. Therefore, in the table below the variable inflation rate is 1. 419, 2.910, and 3.289 and this states that the variables are not collinear

and they will not be a problem on the multiple regression analysis since these values are less than 10 such that VIF<10. And the tolerance of each independent variables are 0.597, 0.666, and 0.835 and these are greater than 0.1.

Table 4.15 Multi Collinearity test of independent variable

Model	Unstandardized Coefficients	standardized Coefficients	**Collinearity Statistics**	
	B	Beta	**Tolerance**	**VIF**
(Constant)	.482			
Strategic supplier partnership (SSP)	.903	.507	.597	1.675
Customer relationship (CR)	.017	.015	.666	1.501
Information sharing (IS)	.084	.342	.835	1.198

Dependent Variable: Organizational Performances

The result in table 4.15 show that the collinearity between independent variables has no series problem Since the value of tolerance for all independent variable is greater than 0.1 and all VIF is less than ten (VIF<10)

4.4.2. Assumptions of Normality test

The two well-known **tests** of **normality**, namely, the Kolmogorov–Smirnov **test** and the Shapiro–Wilk **test** are most widely used methods to **test** the **normality** of the data. **Normality tests** can be conducted in the statistical software "SPSS" (analyze → descriptive statistics → explore → plots → **normality** plots with **tests**).

Table 4.16: The normality test of regression of the SCM, SCR with CA

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Standardized Residual for SCM	.431	101	.200*	.976	101	.785
Standardized Residual for SCR	.546	101	.200*	.831	101	.423
Standardized Residual for CA	.677	101	.200*	.712	101	.621

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance

The above table presents the results from two well-known tests of normality, namely the Kolmogorov-Smirnov Test and the Shapiro-Wilk Test. The Shapiro-Wilk Test is more appropriate for small sample sizes (< 50 samples), but can also handle sample sizes as large as 2000. For this reason, we will use the Shapiro-Wilk test as our numerical means of assessing normality. If the Sig. value of the Shapiro-Wilk Test is greater than 0.05, the data is normal. If it is below 0.05, the data significantly deviate from a normal distribution.

Therefore, in the normality test table depicted above the sig value for SCM, SCR, and CA are 0.785, .423 and .621 respectively that are greater than the p value of 0.05. And the data is normal for each case.

4.4.3. Assumptions of Residual test

We have now looked at how to assess the first assumption of multiple regression. To understand several of the other assumptions, you first need to understand what is meant by the term ‘residuals. To explain this look at the black line drawn on the graph and the point that are plotted on the black line on the following three graphs. This represents a linear model of our data. Residuals help to determine if a curve (shape) is appropriate for the data. A residual is the difference between what is plotted in your scatter plot at a specific point, and what the regression equation predicts "should be plotted" at this specific point.

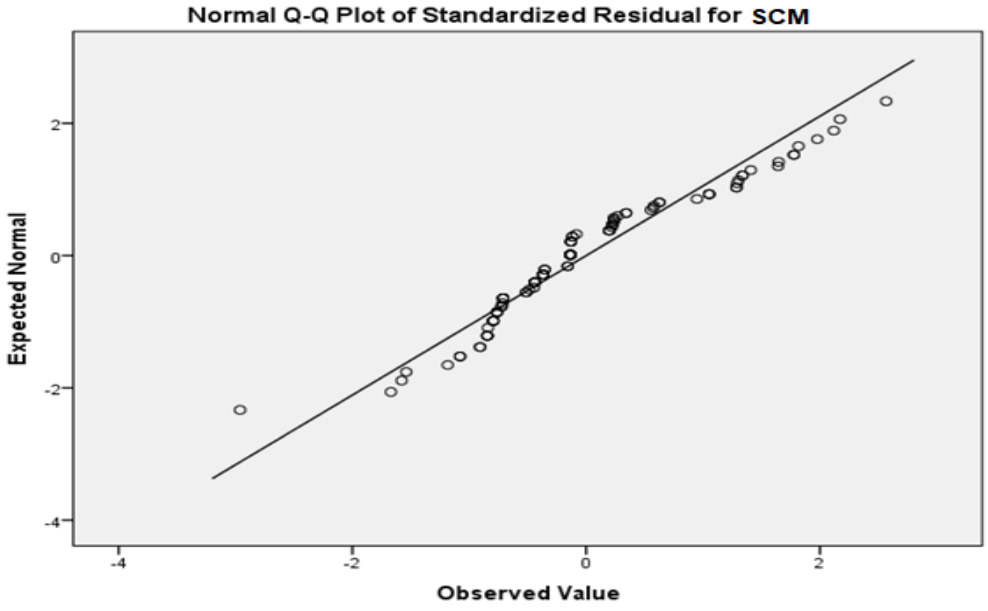

Figure 3 the normal Q-Q plot of standardize residuals for SCM

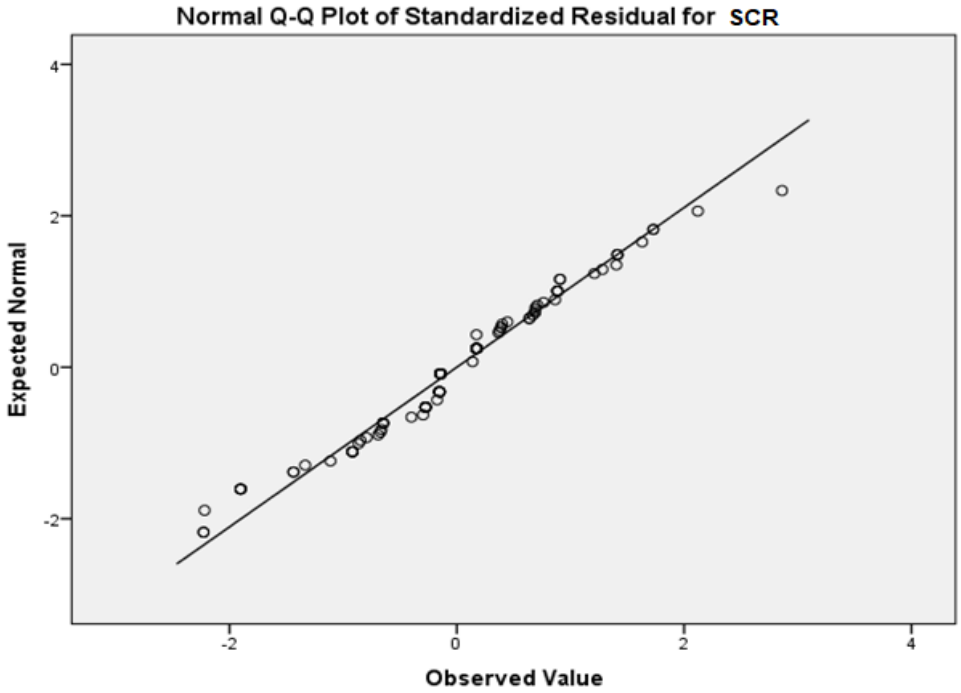

Figure 4 the normal Q-Q plot of standardize residuals for SCR

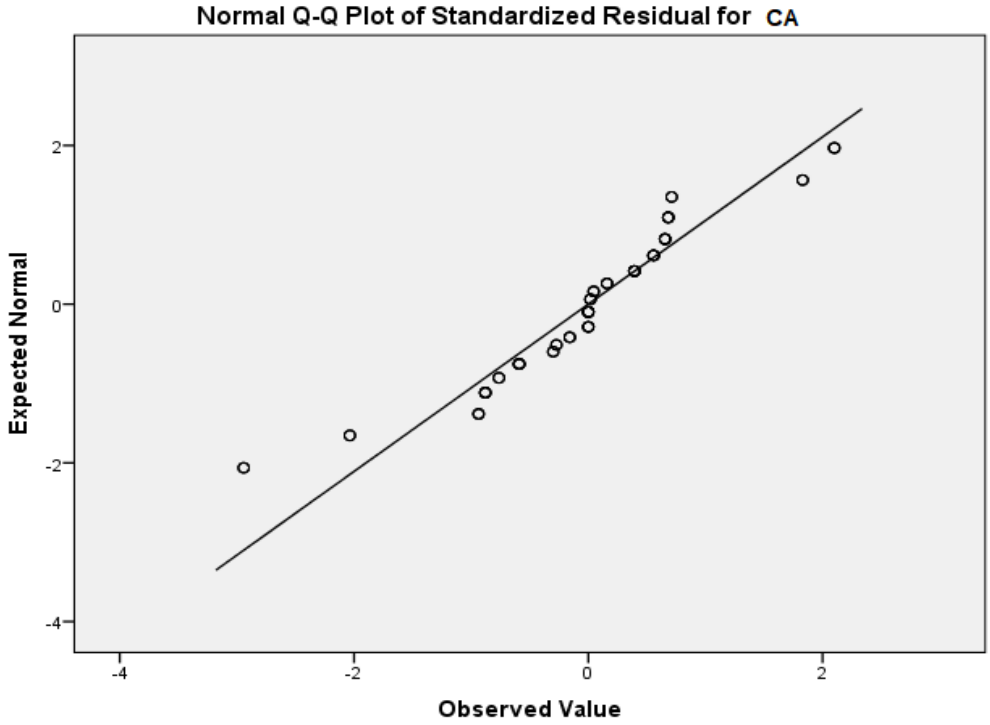

Figure 5 the normal Q-Q plot of standardize residuals for CA

It is a scatter plot of residuals on the y axis and fitted values on the x axis to detect non-linearity, unequal error variances, and outliers. Characteristics of a well-behaved residual vs fitted plot: The residuals spread randomly around the 0-line indicating that the relationship is linear.

A residual plot shows the difference between the observed response and the fitted response values. The ideal residual plot, called the null residual plot, shows a random scatter of points forming an approximately constant width band around the identity line. The residual plot shows a fairly random pattern - the first residual is positive, the next two are negative, the fourth is positive, and the last residual is negative. This random pattern indicates that a linear model provides a decent fit to the data. Below, the residual plots show three typical patterns. The first plot shows a random pattern, indicating a good fit for a linear model. The residual test of the independent and dependent variables shows that the there is a linear relationship between the independent and dependent variables.

4.4.4. Assumption of Homoscedasticity test

The next assumption to check is homoscedasticity. The scatterplot of the residuals will appear right below the normal scatter plot in your output. Ideally, you will get a plot that looks something like the plot below. The data looks like you shot it out of a shotgun it does not have an obvious pattern, there are points equally distributed above and below zero on the horizontal axis, and to the left and right of zero on the vertical axis.

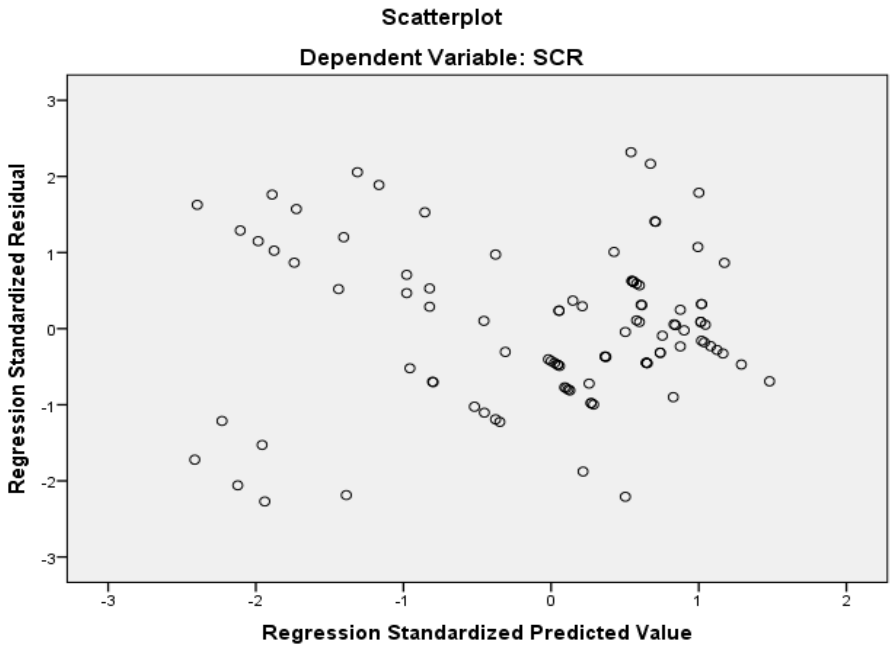

Figure 6 Homoscedasticity test for the independent variable SCR

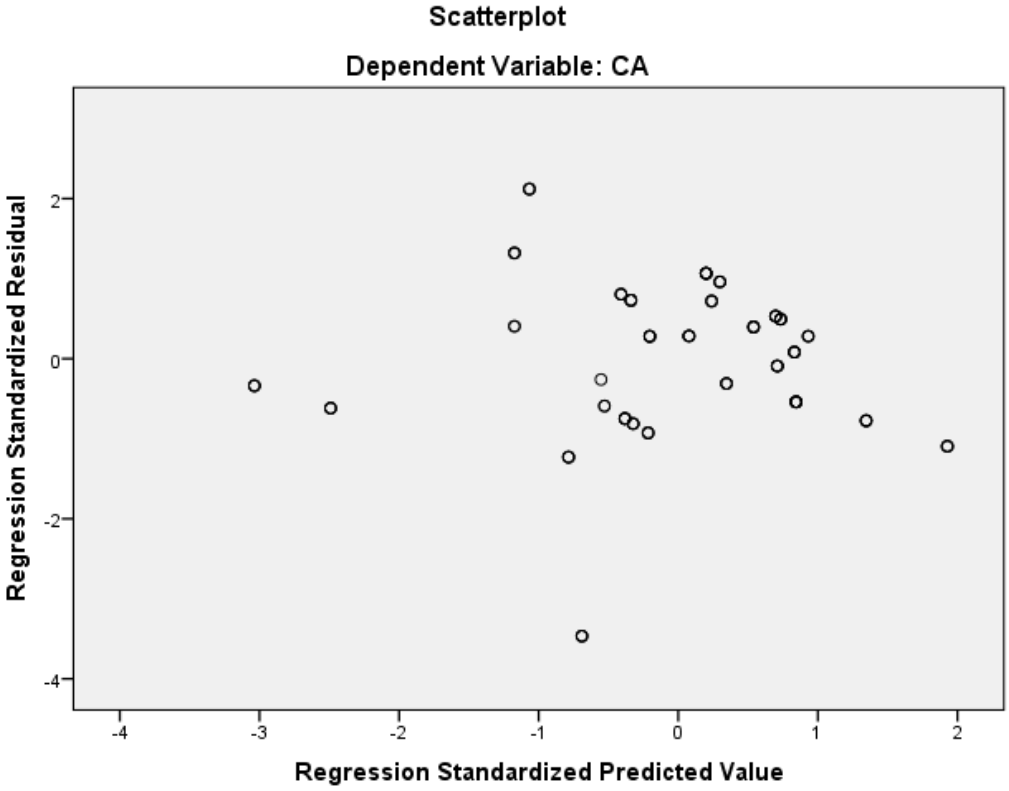

Figure 7 Homoscedasticity test for the independent variable CA

To test the homoscedasticity, you need to look at the final graph of the output. This tests the assumption of homoscedasticity, which is the assumption that the variation in the residuals (or amount of error in the model) is similar at each point of the model. This graph plots the standardized values our model would predict, against the standardized residuals obtained. As the predicted values increase (along the X-axis), the variation in the residuals should be roughly similar. If everything is ok, this should look like a random array of dots. If the graph looks like a funnel shape, then it is likely that this assumption has been violated. But in the above graph depicted in figure 4 and 5 the scatter plot shows that the distribution is uniform below 0 and above zero for vertical and horizontal axis or x and y axis therefore the assumption of homoscedasticity met.

4.4.2. Regression Analysis between SCM Practices and Supply chain responsiveness

Table 4.17 Multiple Regression Results of SCM practices and supply chainresponsiveness

Coefficients'							
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.482	.250		6.813	.000		
Strategic supplier partnership (SSP)	.903	.097	.507	4.243	.000	.304	3.289
Customer relationship (CR)	.017	.099	.015	.138	.891	.344	2.910
Information sharing (IS)	.084	.048	.342	4.365	.000	.705	1.419

Dependent variable: supply chain responsiveness

Based on the output of the SPSS version 23 regression to interpret the result on the relationship between the supply chain management (SCM) practice and the supply chain responsiveness (SCR), let's observe the beta value. The beta values above show the magnitude of relationship between variables, higher values being an indication of strong relationship. In this study, strategic supplier partnership had highest Beta coefficient of 0.507. This result implies that strategic supplier partnership had highest impact on supply chain responsiveness. Whereas, Information sharing (IS), is found to be the second most significant SCM dimension with Beta value of 0.342 implying that this dimension is significantly related and strongly influences the supply chain responsiveness (SCR). Then the influence followed by customer relationship, on the supply chain responsiveness (SCR) is 0.015, it has positive influence but relationship by the significance is not much.

Table 4.18 Regression Analysis between SCM Practices and supply chainresponsiveness

Model	R	R Square	Adjusted R Square	**F-value**	**Sig.**
1	.761[a]	.580	.567	44.617	.000[b]

a. Dependent Variable: SCR

b. Predictors: (Constant), IS, CR, SSP

As shown in the table 4.18 above, there was causal relationship between SCM practices and supply chain responsiveness. There might be many factors that can explain this variable, but our model, which includes SCM practices, can explain approximately 58.0% of it. This suggests that the remaining 42.0% of the variation in supply chain responsiveness cannot be explained by those dimensions of SCM practices.

4.4.3. Regression Analysis between SCM Practices and competitive advantage

Table 4.19 Regression Analysis between SCM Practices and competitive advantage

Coefficients[a]							
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.482	.202		2.385	.019		
Strategic supplier partnership (SSP)	.903	.078	.863	11.520	.000	.304	3.289
Customer relationship (CR)	.017	.080	.015	.207	.836	.344	2.910
Information sharing (IS)	.084	.039	.106	2.157	.033	.705	1.419

Dependent variable: competitive advantage

Based on the output of the SPSS version 23 regression to interpret the result on the relationship between the supply chain management (SCM) practice and the competitive advantage (CA), let's observe the beta value. The beta values above show the magnitude of relationship between variables, higher values being an indication of strong relationship. In this study, strategic supplier partnership had highest Beta coefficient of 0.863. This result implies that strategic supplier partnership had highest impact on competitive advantage. Whereas, Information sharing (IS), is found to be the second most significant SCM dimension with Beta value of 0.106 implying that this dimension is moderately significantly related and strongly influences the competitive advantage (CA). Then the influence followed by customer relationship, on the competitive advantage (CA), is 0.105, it has positive influence or relationship but it is moderately the significance.

Table 4.20 Regression Analysis between SCM Practices and competitive advantage

Model	R	R Square	Adjusted R Square	**F-value**	**Sig.**
1	.913[a]	.834	.829	162.926	.000[b]
a. Dependent Variable: CA					
b. Predictors: (Constant), IS, CR, SSP					

As shown in the table 4.20 above, there was causal relationship between SCM practices and competitive advantage. There might be many factors that can explain this variable, but our model, which includes SCM practices, can explain approximately 83.4% of it. This suggests that the remaining 16.6% of the variation in competitive advantage cannot be explained by those dimensions of SCM practices.

CHAPTER FIVE
SUMMARY OF RESULTS, CONCLUSSION AND RECOMMENDATION

This chapter presents the summary of the findings of this study followed by conclusions and recommendations. This study was designed to assess the Etete Construction supply chain management practice and to test empirically the relationship between the constructs of SCM practice and supply chain responsiveness, SCM practice and competitive advantage of the firm (organizational performance), supply chain responsiveness and competitive advantage of the firm (organizational performance) and also identify the factor affect the SCM practices of the firm in in terms of client side, contractor side and supplier side. In the study, supply chain management practice was analyzed interms of strategic supplier relationship, customer relationship, information sharing. The supply chain responsiveness in terms of operational system responsiveness, logistic process responsiveness, supplier network responsiveness. The competitive advantage of the firm (organizational performance) in terms of price/cost, quality and delivery dependable.

5.1. Summary of Results

This study is intended to assess the SCM practices of Etete construction in terms of three major practices, test if there is a relationship between SCM practices, supply chain responsiveness, and operational performance. Based on the results of the study the summaries of major findings are explained as follows.

This study supports major finding of related literature (Ashish Thatte, Subba Rao, Ragu-Nathan, 2013, Miguel, Ledur Brito, 2011) regarding the relationship between supply chain management practices, supplier responsiveness, and operational performance. The results prove that the implementation of supply chain management practices should improve supply chain responsiveness and leads to higher level of operational performance.

The study identifies, the level of relationship that exists between suppliers and ETETE Construction Company which is strategical supplier relationship practices, the group means was 3.52 and it indicated that the respondent agree the firm have a good strategical supplier relationship with respect to the overall measures taken into consideration. The

level of relationship that exists between customer and ETETE Construction Company which is Customer relationship practices, group mean value of 3.83 showed that the respondent agree the firm have a good customer relationship with respect to the overall measures taken into consideration. According to information sharing the group mean scoring the value of 3.85 showed that the respondent agree the firm have a high level of information sharing with both supply and client.

The study identifies Pearson correlation test was conducted between SCM practices (collective representative of three constructs of SCM practices) and Supply chain responsiveness (SCR). Hence, there was significantly strong correlation between SCM practices and Supply chain responsiveness (SCR). In other words, SCM practices and supply chain responsiveness have strong positive relationship with correlation coefficient of 0.748 (r=0.748) and significance value less than 0.001. Pearson correlation test conducted between SCM practices (collective representative of three constructs of SCM practices) and competitive advantage (CA). Hence, there was significantly strong correlation between SCM practices and competitive advantage (CA) or operational performance. In other words, SCM practices and competitive advantage (CA) have strong positive relationship with correlation coefficient of 0.846 (r=0.846) and significance value less than 0.01.

In other way, from the regression analysis SCM practices have also contributed 58.0% for the variability of Supply chain responsiveness. Similarly, the test result of SCM practices contributed 84.3% for the variability of competitive advantage of the firm (operational performances).

The final study is asses the factor affect the SCM practice in three major participant side this are, **First** Client side, from this result the low and average effect of the client side is too minimum and in percent of cases is 75.2% in comparisons with the high and very high responses that are 190.1% and 316.8% respectively in total case. This indicated that the client side highly affects the supply chain management practice of ETETE construction. **Second** Contractor side, up on observation of the frequencies 0.2%(3) samples responded very low(1), 3.0%(36) samples responded low(2), 14.1%(171) samples responded average(3), 42.4%(514) samples responded high(4) and 40.3%(488) samples responded

very high(5). This result shows that the number or frequency of respondents that give high level and very high level is larger than the frequencies of very low, low and moderate. From this observation it is possible to construe that the problem on contractor side highly affect the supply chain management practices of ETETE construction. **Third** supplier side, up on observation of the frequencies 3(0.7%) given on the low (2) level, 46(11.4%) given on the average (3) level, 231(57.2%) given on the high (4) level and 124(30.7%) given on very high (5) level. These show that the other factor affecting the supply chain management practices (SCMP) is the supplier side. Therefore, it is possible to infer that the supplier side highly affect the SCMP of ETETE construction.

5.2. Conclusion

The objective of the study was to assess the current SCM practices of Etete Construction, examine the relationship between supply chain management practices with supply chain responsiveness, supply chain management practices with competitive advantage of the firm (operational performance) and relationship between supply chain responsiveness and competitive advantage of the firm (operational performance) and also try to see the major factor affect the SCM practice of the firm in three major stakeholders perspective (client side, contractor side and supplier side).

- ❖ Based on the results of the study obtained and summary of findings the following conclusions are given.

First: from the assessment of SCM practice in Etete construction in terms of three major practices (Strategic supplier relationship, customer relationship, information sharing). Strategic supplier relationship practices the survey results revealed that the existing performance is satisfactory and from the interview response revealed that some performance was not satisfactory but most are in good level. The other major practices is customer relationship, the findings indicated that there was moderate performance level of customer relationship. The last important practice was information sharing, the result showed that there was good practice of information sharing but from the interview there is sometimes a gab in quality and on time information sharing.

Second the study takes a look the relationship between supply chain management practices and supply chain responsiveness and operational performance **for hypothesis 1**, this study found a significant positive relationship between SCM practices and supply chain responsiveness. Supply chain management practices have 58.1% significant positive impact on Supply chain responsiveness. **For hypothesis 2** the study test the relationship between supply chain management practices and competitive advantage of the firm (operational performance). The researcher found supply chain management practices have positive and significant relationship impact on competitive advantage of the firm (operational performance). Supply chain management practices have 84.3% variation on operational performance.

Finally the research has assessed that construction is ineffective and many problems can be observed. Analysis of these problems has shown that a major part of them are supply chain practice problems originating at the interfaces of different parties or functions, among which late and incorrect payments, design/engineering interface and difficulties in finding out client‘s desires, changes of client‘s requirements, long procedures to discuss changes are few of them. The findings show that the problems that are related to materials management are changes made to the design while construction is in progress as well as incomplete contract documents at commencement of project. Further challenges include inappropriate storage leading to damage or deterioration, Purchase products that do not comply with specification and Use of incorrect material, thus requiring replacements. Also the results show that the actions that are usually taken to avoid the problems with material deliveries are good coordination between store and construction personnel helps in avoiding over ordering. It is also suggested minimizing design changes and good construction management practice. Moreover, they suggest that having accurate and good specifications of materials can have favorable impact on material delivery.

- The results of this study seem to indicate that supply chain management practices have a positive and significant impact on supply chain responsiveness and operational performance, and also supply chain responsiveness have a positive and significant impact on operational performance Therefore, Etete Construction should take an active role in dealing all aspects of supply chain management practices to increase their profitable, minimized time loss, avoid delay in completing the project.

5.3. Recommendation

Based on the findings of the study and the discussions above, a summary of some general recommendations are offered to support the construction of future public building projects. In view of what should be done and by whom and why it needed, the following recommendations were forwarded in order to encourage the implementation of supply chain management practices and performance measurement in the case companies.

1. To improve strategic relationship with suppliers, the company should select potential supplier that can be willing and cooperative for long-term relationship and plan jointly, they need to measure performance and reward for best achievements, share quality information continuously for suppliers. In addition, quality should be given priority rather low cost approach for material purchasing from supplier. They should start motivate and give reward for satisfactory supplier to increase their relationship and build a trust. Regarding to customer relationship, the company should give more attention to create loyalty to the client through improvement collecting feedback from client, launch new construction design and service, long term relationship as well as improving strategic relationship with suppliers which help to get material on time and enable to complaints with customer's full requirements of the product and time requirements. Information sharing and its quality were another important point that increase effectiveness and efficiency of decision making process as well contribute for improvement of supplier and customer relationship among the supply chain members. As the research findings revealed that there were more gaps on adequacy, timeliness, reliability and completeness of information and build trust and problem sharing or joint risk taking behavior.
2. For the responsive supply chain, the firm must have to work for enhancement of top level management commitment to build responsive supply chain for the purpose of efficient operational performance. To build responsive supply chain, effective implementation of customer relationship must be needed. Customers of the case industries are looking to the competitors who are complete the project on time with the best quality as the contract agreement. The business environment is uncertain, as a

result the case construction companies need to build responsive supply chains to reduce cost and time delay to improve customer's satisfaction.

3. The current supply chain management practices of the case companies are average. Therefore; the case companies should implement supply chain management practices to improve responsiveness to customers need and support their operational performance. To advance a sustainable operational performance and supply chain responsiveness, supply chain management practices are a necessary variable. Generally, to increase supply chain responsiveness and competitive advantage of the firm (operational performance), the management and all stakeholders have to give due emphasis on SCM practices in modern way and develop sequences hierarchy work of who report to who, in this case it help to identify the missing information so it can easy to solve the problem.
4. Obstacles for SCM are found to be poor level of logistical competence, lack of guidance for creating strategic alliances, strong project focus as well as the attitudes and traditions in the construction industry. SCM is a great opportunity for the construction industry primarily to reduce cost and time, and thus improve profitability. SCM principles seem to have much strength to smoothen and integrate the construction processes. The SC in construction could be divided into two major groups as materials chain and the construction chain, which would help to separate the procurement and management operations. Both chains are linked through a SCM practices database. This would ensure the smooth flow of information within the different chains and results in increased collaboration within the supply chain partners.
5. The measures practiced to manage its supply chain better include improving the Just In time material delivery system at project sites, refining the relationship with the few suppliers which are currently involved with and the vertical integration of organization, planning strategically and holding safety stalk will also enhance the supply chain management better.

5.4. Limitations and Suggestions for Future Research

Multiple sources of information were combined in this study. The purpose and scope of this study were essentially exploratory. Based upon survey data and interviews, a number of propositions were developed and integrated into a theoretical framework that should be refined and validated in future research. The scope of the research was limited in the sense that the suppliers' side and client side of the supply chain was not taken into account. It is worthwhile to extend the case study and include the entire supply chain. Because of a lack of time and resources, this could not be realized in the current study. In a future research, the suppliers' and client side of the supply chain needs to be studied as well.

In addition, some interviewees could not elaborate on specific details since some aspects of this case study are considered a company secret. In addition, not everything was explained as well.

The present case study only involves one construction industry, specifically in Etete construction. Since the firm is the major player in this construction industry, one can assume that this company is representative for this industry. The sample of survey data is one sided, contractor side. They all work for the firm. It is necessary to involve and compare other large players in the construction industry in a future research as well. Such comparisons can identify strengths and weaknesses of each supply chain and the best common SCM practices.

The concept of SCM is complex and involves a network of company's effort for collaboration, joint planning and cooperative as well as strategic thinking and mind shift for mutual benefits within the supply chain members rather than focus on individually as traditional approach. Since SCM has rooted in manufacturing industry, there is lack of many literature and empirical evidence for construction industry in general and particularly for Ethiopian Construction Industry. As a result, most of the variables and measurements of SCM practice adopted from manufacturing literature have limitation to evaluate and measure the SCM practices of construction industry. In addition, as many literature supports, the fragmentation of the various actors such as, suppliers, customers, contractors, consultants and other actors are the challenge for the industries to bring

SCM practice successful. Moreover, there is limitation of the right IT application that can be adopted for Construction Industry in general and more importantly a major challenge for Ethiopian construction industry cases.

Few of these situations and other concern call for more studies on SCM practice in the Construction Industry in general and specifically focusing on Ethiopian Construction industry. Future research can expand the domain of SCM practice by considering additional dimensions such as supply chain integration and logistics integration to construction industry which have not been include in this study. In addition, though this study also tried to test the relationship between the three major dimensions of SCM practices with supply chain responsiveness and competitive advantage of the firm, other major dimensions that can affect performance has to be included in future study. Future research should also focus on the suitability of this industry and how supply chain management practices should be implemented

Future studies may test the hypothesized relationships across countries, for identification and comparison of country specific SCM issues. Finally, it would be interesting to explore other dimensions of supply chain responsiveness and operational performance, not considered in this research, such as assembly responsiveness and inbound logistics responsiveness among others.

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Appendices

St.Mary's University

Project ManagementDepartment

Master's thesis on Assessment of Supply Chain Management Practices and Effects on Supply Chain Responsiveness and Competitive Advantage of the Firm - A Case Study on Etete Construction, In Public Building projects

Dear respondents, the purpose of this questionnaire is to gather data to investigate the SC practice in Etete, to present the relationship between current supply chain management (SCM) practices of Etete with supply chain responsiveness (operation system responsiveness, logistics process responsiveness and supplier network responsiveness) and competitive advantage (cost, quality and delivery dependability) of the firm. It also present the effects of supply chain responsiveness on competitive advantage (operational performance) of the firm. This questionnaire also include factors that affect the SCM practices in Etete construction. The study is purely for academic purpose and thus not affects you in any case. I assure you that your respond will be kept confidential so, your genuine, frank and timely response is vital for successfulness of the study. Therefore, I kindly request you to respond to each items of the question very carefully.

General Instructions

- There is no need of writing your name
- Where answer options are available please tick (√) in the appropriate box.

Contact Address

Kidist Woreta

E-mail: kidistworeta7@gmail.com

Phone No: 0931831828

Thank you for scarifying your precious time in advance!

PART I: Demographic profile of respondents

1. **Sex:** Male ☐ Female ☐
2. **Age:**

Below 25 years ☐ 25-30 years ☐ 31-35 years ☐

36-40 years ☐ 41-45 years ☐ Above 45 years ☐

3. Educational Qualification:

Certificate ☐ Diploma ☐

First Degree ☐ Second Degree and above ☐

4. **Years of service at the organization:**

Less than 2 year ☐ 2–5 years ☐ 6–10 years ☐ Above 10 years ☐

5. **What is your title/position?** ☐

[1] Project Manager ☐ [4] Office Engineer ☐

[2] Resident Engineer ☐ [5] Site Engineer

[3] Architect /design engineer ☐ [6] logistics and supply chain -----

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Part II: Instruments for supply chain management practices, supply chain responsiveness, competitive advantage of the firm and factor affect SCM practicesin Etete construction

Section One: Supply Chain Management Practices

Below are list of Supply Chain Management Practices. From your experience, please express your opinion on dose the firm consider those criteria on SCM practices? With regard to SCM practices of your firm, use the following Rating Scales under the columns and please, tick (√) only one box from the given box after reading the variable.

1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree

Measures of Independent Variables		**Rating Scale**				
A	**Strategic supplier partnership:** the firm relationship with major suppliers and selection criterion	**Strongly Disagree**	**Disagree**	**Neutral(3)**	**Agree (4)**	**Strongly Agree (5)**
1	We consider quality as our number one criterion in selecting suppliers					
2	We consider price as our number one criterionin selecting suppliers					
3	We consider on time delivery as our number one criterion in selecting suppliers					
4	We have a long-term relationship with suppliers					
5	We regularly solve problems jointly with our suppliers					
6	We have Suppliers performance measurement systems					
7	We give motivation and rewards forsatisfactory suppliers					
B	**Customer Relationship:** the firm relationship with client. Mostly in construction the consultant is in the behalf of client so we consider our customer both client andconsultant	**Strongly Disagree**	**Disagree**	**Neutral(3)**	**Agree (4)**	**Strongly Agree (5)**
1	We quickly report out of stock material to theconsultant					
2	We quickly approve material to consultant					
3	We report to the client if there is a quality problem about the material that included in the contract document					
4	We quickly respond if client change the design					
5	We quickly respond if client change the material quality and quantity					
6	We frequently compliance with customer'sdemand delivery in- full and on time requirements					

7	We regularly monitor and evaluatecustomer/client satisfaction					
8	The firm has high level of cooperativeness with customers					
9	We frequently interact with customers to set reliability responsiveness, and other standards for us					

C	**Information Sharing**	**Strongly Disagree(1)**	**Disagree(2)**	**Neutral(3)**	**Agree (4)**	**Strongly Agree (5)**
1	The firm has the practice of material supply forecast Information sharing with Project sites					
2	The firm has the practice of material supply forecast Information sharing with suppliers					
3	The firm has the practice of material required related Information sharing with suppliers					
4	The firm has the practice of material requirement related Information sharing by project sites					
5	Adequacy and quality of information sharing throughout the supply chain partners					
6	The firm makes efforts on Inter-organizational information coordination and sharing					
7	The firm build sense of trust, problem sharing & solving mechanism and skills transfer with partners					
8	The firm make Timely Information exchange between its supply chain partners					

Section Two: Effect of supply chain management practice on supply chainresponsiveness

Below are list of Supply Chain Management Responsiveness. From your experience, please express your opinion by connecting the effects of SCM practices on the SCM responsiveness in terms of operational system responsiveness, logistics responsiveness andsupplier network responsiveness.

With regard to Supply chain responsiveness of your firm, use the following Rating Scales under thecolumns and please, tick (√) only one box from the given box after reading the variable.

1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree

Measures of dependent Variables		**Rating Scale**				
A	**operation system responsiveness**	**Strongly Disagree**	**Disagree(2)**	**Neutral(3)**	**Agree (4)**	**Strongly Agree (5)**
1	Low Information sharing bring late responds to the changes in product volume demandedby project site					
2	Difficult customer relationship cause late responds to the changes in product mix demanded by customers					
3	Incorrect information sharing in quantity and type of material affect the emergency siteorders.					
4	Lack of good customer relationship cause latereport out of stock material to the client and consultant					
5	Lack of good supplier partnership cause late in changes during fabrication processes that requested by both from site and client.					
6	Low customer relationship cause late respond for change in design , material quality and quantity that requested by client					

B	**logistic process responsiveness**	**Strongly Disagree**	**Disagree(2)**	**Neutral(3)**	**Agree (4)**	**Strongly Agree (5)**
1	Lack of information sharing with project site cause late reply to unexpected demand change					
2	Lack of coordination with supplier to adjusts warehouse capacity to address demand requested by project site					
3	Lack of good supplier partnership cause late arrangement of equipment to address demandchanges					
4	Lack of good customer relationship cause late accommodates for special or non-routine customer requests					
5	Incorrect information sharing cause ineffective delivers expedited shipments					
C	**supplier network responsiveness**	**Strongly Disagree**	**Disagree(2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
1	Lack of good suppliers partnership affect the accommodate change requested on product volume in a relatively short time					
2	Lack of good suppliers partnership affect accommodate change requested on product mixin a relatively short time					
3	Lack of coordination with suppliers affect consistently accommodate our requests					
4	Incorrect information sharing with suppliers partnership cause delay to on-time delivery of material					
5	Lack of good suppliers partnership affect the effectively expedite of our emergency orders					
6	Lack of good suppliers partnership disproved quick inbound logistics to us					

Section Three: Effects of supply chain practice on competitive advantage of the firm (operational performance)

Below are list of Competitive advantage of the firm (operational performance). From your experience, please express your opinion by connecting the effects of SCM practices on the Competitive advantage of the firm (operational performance) in terms of price/cost, quality and delivery dependability. With regard to operational performance of your firm, use the following Rating Scales under the columns and please, tick (√) only one box from the given box after reading the variable.

1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree

Measures of dependent Variables		**Rating Scale**				
A	**Price/Cost**	**Strongly Disagree**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
1	Incorrect price based supplier selection affect ourprices offer to the client during tendering process.					
2	Incorrect collaboration with supplier increase theproduction cost to run the operation.					
3	Incorrect deal with the supplier affect our prices during construction					
B. Quality: an organization is capable of offering product quality and performance that creates higher value for customers.		(1)	(2)	(3)	(4)	(5)
1	Difficult client relationship cause not to compete based on quality.					
2	Improper supplier selection cause low qualityproducts to the client.					
3	Improper supplier selection cause offering a low durable products to our client					
C. Delivery dependability: an organization is capable of providing on time the type and volume of product required by customer(s).		(1)	(2)	(3)	(4)	(5)
1	Incorrect information sharing cause not to deliver the kind of products needed to the site					
2	Lack of information sharing cause not to delivercustomer order on time					
3	Lack of good suppliers partnership cause difficult to provide dependable/faithful delivery					

4	ıck of good customer relationship are great affect in solving ɐr complaints					

Section Four: Effects of supply chain responsiveness on competitive advantage ofthe firm.

The effect of supply chain responsiveness in term of operation system responsiveness, logistic process responsiveness, supplier network responsiveness on competitive advantageof the firm.

With regard to operational performance of your firm, use the following Rating Scales underthe columns and please, tick (√) only one box from the given box after reading the variable.

1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree

Measures of dependent Variables		**Rating Scale**				
Supply chain responsiveness of Etete construction have effect on the firm completiveadvantage in terms of:		**Strongly Disagree(1)**	**Disagree(2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
1	Decreasing price and cost lost					
2	Increasing quality					
3	Enhancing delivery dependability					
4	Increasing market system					

Part III: The factor affecting the SCM practice of Etete Construction.

Below are list of the factor affect the affect SCM practices. From your experience, please express youropinion by on how much those factor affect SCM practices in Etete construction. With regard to operational performance of your firm, use the following Rating Scales under thecolumns and please, tick (√) only one box from the given box after reading the variable.

1= Very Low, 2= Low, 3= Average, 4= High, 5= Very High

Major factors		**Very Low (1)**	**Low (2)**	**Aver-age (3)**	**High (4)**	**Very High(5)**
Client side						
1	Late payment from client					
2	Design change					
3	Designer‘s unfamiliarity with alternative products					
4	Difficult for substitute product					
5	Incorrect document					
6	Delays in passing of information to the contractor on types and sizes of products to be used					
Contractor side						
7	Late and incorrect payment to suppliers					
8	Incorrect price during bidding process					
9	Extended time wait for architects/consultant approval					
10	Inaccurate data from project site					
11	Wrong and defective deliveries, Long storage period					
12	Incorrect packing and large shipment					
13	In accurate data & information needed for site					
14	Purchasing raw materials that are justsufficient					
15	Good coordination between store and construction personnel to avoid over ordering					
16	Employment of skilled laborers and training of construction personnel					
17	Accurate and good specifications ofmaterials to avoid wrong ordering					
18	Checking materials supplied quantities and volumes					
Supplier side						
19	Deliveries not in conformance with planning					

20	Unresolved quality problem					
21	Access to latest information about types of materials on the market					
22	Lack of attention paid to standard sizes available on the market					

Part IV: Open ended questions on Supply Chain Practice for different participate.

For ETETE Construction Customers /client/consultant/

How would you see your company relationship with ETETE Construction Company?

……

……

How do you see Etete company relationship management with their major suppliers in terms ofquality, cost and durability of the material?

……

……

Is there long term relationship, cooperativeness and joint planning effort with ETETE Company inorder to improve supply chain practices?

……

……

How do you see information sharing practice between your company and ETETE? (With trust, riskand gain sharing practice, timely, accurate, reliable & adequate information sharing).

……

……

How would you see the company's compliant management about material management and itslogistics management?

……

……

Does ETETE can introduce new design or system on supply chain management and equipment than competitor?

Part IV: Open ended questions on Supply Chain Practice for different participate.

<u>For ETETE Construction PLC Major Supplier:</u>

What are the types of materials your company supply to ETETE?

……

……

How do you see your company relationship with ETETE Construction?

……

……

Are there strategic /long-term relationship, cooperativeness, joint planning, and risk sharing practice with ETETE?

……

……

Do you think ETETE give priority for quality of materials rather than least cost in selecting suppliers?

……

……

Does material supply forecast & other information sharing with ETETE is complete, accurate, on time & adequate?

……

……

Is there any difficulty your company faces as supplier relationship with ETETE as compared with other Construction Company?

……

……

Part IV: Open ended questions on Supply Chain Practice for different participate.

For ETETE Procurement and Supply department;

How can you explain the overall supply chain management practices of the company?

……

……

How do you select the supplier – by quality or low price/cost?

……

……

Is there strategic / long term relationship with suppliers? How long you continue to buy from them? Is there joint planning, performance measurement system, rewarding best suppliers?

……

……

How can you manage relationship with customers? Monitor their satisfaction, deliver on time, with expected standards, and launch new design / art of building and joint planning?

……

……

Is there mechanism that the company measures the effect of SCM practice on supply chain responsiveness (operation system responsiveness, logistics process responsiveness and supplier network responsiveness) and competitive advantage of the firm (cost, quality and delivery dependability)?

……

……

Is there mechanism that the company measures the effect of supply chain responsiveness (operation system responsiveness, logistics process responsiveness and supplier network responsiveness) on competitive advantage (cost, quality and delivery dependability)?

……

……

Is there any challenge you want to say regarding the supply chain management practices of the company?

……

……

……

Thank you again very much!!