ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

PRACTICES AND CHALLENGES OF SUPPLY CHAIN MANAGEMENT ON ETHIOPIAN PRIVATE GRADE ONE ROAD CONSTRUCTION COMPANIES

BY

MOGES DIBABA

ADVISOR: ABDURAZAK MOHAMMED (PhD)

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APPROVED BY BOARD OF EXAMINERS

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Dean, Graduate Studies	Signature
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Advisor	Signature
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External Examiner	Signature
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Internal Examiner	Signature

DECLARATION

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of Dr. Abdurazac Mohammed. All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted to any other higher learning institution for the purpose of earning any degree.

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Name Signature

St. Mary's University, Addis Ababa June, 2015

ENDORSEMENT

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

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Name Signature

St. Mary's University, Addis Ababa June, 2015

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I would like to take this opportunity to forward my deepest gratitude to my advisor Dr.Abdurezak Mohammed who contributed a lot for my achievement.

My deepest thankfulness is also to Ato Tadese Abraha and Ato AleneTekelemariam, and to all who forwarded their hand to me

God Bless You all.

Table of Contents

List of Tables

List of Figure

ACRONOMYS

CSC:	Construction of supply chain
CSCMP	Council of supply chain management professional
CPFR	Collaborative Planning Forecasting, and Repleshment
EPGORCC	Ethiopia Private Grade One Road Contraction Companies
IS	Information System
IT	Information Technology
SC	Supply Chain
SCM	Supply Chain Management
SCR	Supplier and Customer Relationship

ABSTRACT

Supply chain management (SCM) has become a fundamental element in the construction industry to improve the efficiency and productivity in recent decades. The purpose of this paper is to study the practice of supply chain management from the five SCM practice and the challenges of SCM in Ethiopia Private Grade One Construction Companies. For Achieving the objective of this study, 33 Questionnaires' were distributed and 30 of them were Successfully Completed and analyzed using descriptive (mean and Standard Deviation) Statically analysis and random Sampling technique was used to select 11 Companies out of the existing 23 companies representing 47% the Participants were selected using purposive Sampling technique. Both Primary and Secondary Source of data were used for this Study. The method of data collection was Interview and questionnaire in the form of Closed and open ended question. The Questionnaire were rated using five points liker Scale. The major findings indicates that, most of SCM Practices are moderately Practiced with in the EPGORCC Supply chain, where as IT and training Practices are poorly applied. Willingness to share risk, unplanned orders financial Impact, Subsequent design change, inventory fluctuation and employee ineffectiveness are major the challenges of the Companies SC. The Study helps to create awareness to EPGORCC owners, and it will give Chance for others who are interested on SCM Practice and Challenges to make further studies.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The current economic environment in Ethiopia has been providing opportunities for the private sector to participate actively in investment activities. Among this investment areas construction sector is the one.

Road construction works always contain capital investment to carry out major new road construction, rehabilitation or upgrading works. The Ethiopian road sector is characterized by a massive ongoing and upcoming road construction program.

The road sector plans and commitments under the national road development program include a large number of high value projects. The implementation of this broad road construction program requires an increasing portion of local road contraction companies to be engaged with greater capacity (Eqisbceom, 2008).

The Ethiopia road sector development program requires and increasing portion of responsibility for its implementation was to be directed to the road construction companies. Thus to carry out this huge national and company level responsibility improved and high rise level of supply chain management to acquire company competitiveness.

On the other hand, because of globalization, steep competition, change in market demand and rapid adoption of out sourcing, today organization are operating in "a networked" business environment. As a result of interconnectedness of firms, this day multinational enterprises are being developed, and firms are competing in both domestically and at international market in order to defend international competitors, integration of firms in order to provide quality products at the required time and place, etc… Thus for the sake of achieving competitiveness and satisfying customers, the new

management philosophy called “Supply chain management” is developed (Eyong,2009).

Construction supply chain is all the construction process, from the demand by the client, conceptual design construction and maintenance, and organization, which are involved in the construction process, such as owner, general contractor, sub contractors, suppliers, consultants, etc. CSC is not a chain of construction business with business-to business relationship but a network of multiple organization and relationship, and the flow of funds between client, contractor and supplier.

As it was mentioned by (Neeley, *2006)* that Forrester was the first researcher who gave the concept that would eventually become Supply Chain Management. Forrester's theory of distribution management was introduced in 1950's. This theory was about an understanding of inter-organizational relationships and coordination.

Supply chain management has raised the interest in the past years as organizations started to realize that, the actions taken by one member of the chain actually have an influence on the profitability of other members in the chain. This scheme generated the act of competing as a part of supply chain against the other supply chains instead of competing as single firm against other individual firms (Silver. et al., 1998).

This is due to the fact that, nowadays the new source or business competition lies outside the walls of organizations, and it is determined by how effectively companies link their operations with their supply chain partners such as suppliers, manufacturers, distributors wholesalers, retailers and end customers (Silver. et al., 1998).

Therefore, Supply chain management offers a management philosophy to manage activities and integrate with down-streams, up-streams as well as

firms internal supply chain operations (Ross, 1998).

With the growth of inter-network competition, individual business' may no longer compete solely as independent company but must do as supply chains, Companies associated in the same network require efficient supply chain integration in order to optimize their collective performance, Moreover, numerous companies have started to appreciate that, as SCM plays a major role in building a sustainable competitive edge for their products in highly competitive markets (Jones, 1999).

Because of the collaboration between members of the chain, supply chain management gives significant opportunities to the firms involved in terms of cost reductions, revenue enhancement, flexibility, customer satisfaction, speed and economy of time (Forrester, 1958 cited in Neeley, 2006).

(Morten, 2003) concluded the general understanding of the business environment in most industries as, competition has been increasing and the condition under which business is running becomes more turbulent. By understandably this, many companies are now focusing on improving and developing their supply chain processes because it can play a significant role in customer service and their profitability.

Currently the Ethiopian business environment is becoming customer driven, competitive and technology based, Hence, it is unquestionable that companies should build an integrated and efficient system through which resources would flow in a across the supply chain. The current practices of Ethiopian construction industries regard to supply chain management is traditional in that, partners involved across the supply chain act independently in designing, developing and executing strategies with minimum effort made to align strategies with the partners doing business with them particularly suppliers, distributors,

Russell, (2006) as a coping up strategy suggests that the relationship with suppliers and other partners should be supported with an appropriate level of collaboration information technology, information system and Lean- agile principle.

Therefore the investigator has, thus been inspired to conduct a study on the practice and challenges of supply chain management in selected Construction Company and forward possible suggestion that would enable the company to be competitive.

1.2. Statement of the Problem

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 & 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 & Closely linking them with external operation of suppliers, customers, and other channel member(Kim, 2006).

For seeking the efficient and effective cooperation between organization 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, 1993).

Lazarevic et. al., (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, internal operation, information technology (SCM) and training of employees among the upstream, internal and down steams of the supply chain. This would be applicable to the extent of expected degree when there is trust and honest among the supply chain members.

On the other hand Lee et.al., (2000) suggested that trading partner companies, should get out of mere coordination and move towards collaborative SCM in an effort to reduce the information imbalances that result in the "bullwhip" effect, while increasing their responsiveness to market demand and customer service.

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 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.

It is possible to witness that supply chain management system development is a solution to help contractors can manage material resource acquisition, cost, distribution and utilization; and eventual requirement with these systems information contractors can easily calculate return on investment . where managers can easily track supply chain issue and simplify management of equipment and tools to Improve material resource supply and productivity, reduce loss.

If private domestic construction company to be effective and efficient in their construction performance implementing effective supply chain management system is imperative.

For this reason, conducting research on practice and challenges of supply chain management on domestic private construction company helps to identify the major reasons that adversely influence its success.

1.3 Research Questions

To address the problem the study was guided by the following research questions.

1. How the companies are working towards integrated internal operation for customer service ?
2. What do the current practices of SCM in the Construction Companies ?
3. What are the challenges of SCM in domestic private construction Companies ?
4. what is the integration/collaboration among main players of the SC ?

1.4. Objectives of the Study

1.4.1 General Objectives

The primary objective of this research is to examine the existing practices and challenges of supply chain management used by the construction companies and to give consideration that the significance of proper supply chain management system enable efficient utilization of materials on projects and lower project costs, finally to recommend the necessary process and activities needed to successfully manage supply chain to accomplish the overall objectives of the company at most effective level of understanding.

1.4.2 Specific Objectives

The specific objectives are:-

1. To study the current practice of supply chain management from the five SCM practice perspective;
2. To assess the companies orientation of internal operation towards customer service;

3. To describe the challenges of SCM for private domestic construction companies.
4. To asses the extent of collaboration/integration among the SC partners;

1.5. Significance of the study

The result of this study is expected to be useful and contribute in the following way.

- Contribute to the construction company management using the effective and efficient supply chain management system is important to maximize the capital turn over and to minimize losses
- To present the theories of supply chain management.
- Add knowledge to the construction company's management on how to manage supply chain management system.
- To Indicate further research for students and researchers .

1.6. Scope of the Study

Supply chain management (SCM) enables to see the members of the supply chain (SC) as an integrated whole and elicit synergy impact. In short an effective and efficient SCM has the importance of cost minimization, reducing lead time, operational flexibility, system integration, reducing utilization and ultimately customer satisfaction.

SCM encompasses vast area of managerial practice, However, it is difficult and unmanageable to conduct the study in all area that summarizes SCM in terms of time, finance, and research manageability. Therefore, the scope of this study was delimited to specific context that is practice and challenges of SCM in selected private sector grade one road construction companies only, not include the government grade one road construction companies.

According to the information from Ethiopia grade one contractors association, currently in Ethiopia there are 41 private grade one construction companies(Appendix D), among them 23 are engaged in road construction works, but the study covered only 5 companies which is (22%) of the total population and which is located in Addis Ababa.

The subject scope of this study is also limited to the companies point of reference towards collaboration, supplier and customer relationship, information sharing, information technology, internal operation of SCM, customer service and challenges of SCM.

The area of the study is also limited to the case companies i.e selected Ethiopia private grade one construction companies and the down stream of the supply chain.

1.7 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:- refer to those activities associated with the transformation and flow of goods and service, including their attendant information flows, from source of raw materials to end users (Handifield, and Nichols,1999)**.**

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).

Globalization:- is reflects a business orientation based on the belief that the world is becoming more homogenous and that distinction between national markets are not only fading but, for some products, will eventually disappear (Lambert, M and Cooper, 1999).

Integration:- is the process of combining or coordinating separate functions process, or producers and enabling them to interact in a seamless manner (Handifield, and Nichols,1999)**.**

1.8 Limitation of the study

This research has encountered certain limitation during the course of conducting the study. One of the difficulties encountered were respond acts reluctant to fill out and return the questioner on time. The other difficulties faced, lack of sufficient material in the study area and absence of research documents done on Ethiopia construction industry a supply chain management system, and the other difficulties due to time constraint it was not possible to collect data for reason which affect SCM in each company.

1.9. Organization of the research report

The research report was organized in five chapters.

Chapter one is the introductory part which contains background of the study, statement of the problem, basic research question, objectives (general & specific objective) of the study, significance of the study, delimitation and limitation of the study, and definition of terms. Chapter two focuses on review of related literature. The research design, sample and sampling techniques, types and sources of data, data gathering instruments, the procedures of data

collection and method of data analysis included in chapter three, while data analysis presented in chapter four. Finally, findings, conclusion and recommendations looked in chapter five.

CHAPTER TWO

LITERATURE REVIEW

As clearly stated by Gupta & Sahay (2007:6) many organizations and professionals misunderstood supply chain. Many people interpret this as another process of an organization, which deals with logistics and shear IT operation. A supply chain consists of various stages, which take part in conversion of raw material in to final products and its delivery to the end customer. It not only includes suppliers and manufactures but also the distributors, transporters, retailers and customers within each organization. It includes all the important functions i.e. order management, planning, shop-floor operations, inspections, packaging and dispatch, etc. Moreover, supply chain is the approach to regulate the flow of material, information and finances.

The term 'supply chain management' arose in the late 1980s and came into widespread use in the 1990s. Prior to that time, business used term such as ' logistics' and 'operation management'.

2.1 Supply Chain

A supply chain is a network that includes vendors of raw materials, plants that transform those materials into useful products, and distribution centers to get those products to customers. Known also as the value chain, it is the sequence, which involves producing and delivering of a product or service (Zailani & Rajagopal, 2005:380).

"A supply chain is the alignment of firms that bring products or services to market."(Lambert et al., 1998)

"A supply chain consists of all stages involved, directly or indirectly, in fulfilling a customer request. A supply chain not only includes the manufacturers and

suppliers, but also includes transporters, warehouses, retailers, and customers themselves" (Chopra and Meindl, 2001)."

A supply chain 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."(Ganeshan and Harrison, 1995).

customer is an integral part of the supply chain. The primary purpose for the existence of any supply chain is to satisfy customer needs, in the process generating profits for itself. Supply chain activities begin with a customer order and end when a satisfied customer has paid for his/her purchase. The term supply chain conjures up images of product or supply moving from supply to manufacturers to distributors to retailers to customers along a chain. Thus, most supply chains are actually networks.

2.2 Supply Chain Management

SCM is the integration of key business process from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholder, as quoted in the work of (Tracey et al.,2005:179)

Successful SCM requires an integration of all the components involved into a combination of business process within and across organization. This requires integration of the organization elements responsible for each activities and the external suppliers and customers who are part of the planning and executives process.

SCM as a management philosophy takes a system approach to viewing the Supply Chain as a single entity. This means that the partnership concept iA supply chain consists of all stages involved, directly or indirectly, in fulfilling a customer request. A supply chain not only includes the manufacturers and

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SCM as a management philosophy takes a system approach to viewing the Supply Chain as a single entity. This means that the partnership concept is extended into a multi-firm effort to manage the flow of goods from suppliers to the ultimate customer. Each firm in the Supply Chain directly or indirectly

affects the performance of the other Supply Chain members, as well as the overall performance of the Supply Chain.

The supply chain council definition of SCM is managing supply demand, sourcing raw materials and parts, manufacturing and assembly, warehousing and inventory tracing, order entry and order management, distribution across all channels, and delivery to the customer.

2.3 OBJECTIVES OF SUPPLY CHAIN MANAGEMENT

The objective of supply chain management is to maximize the overall value generated, minimize the cost, effective and timely distribution of products needed by ultimate customers.

Supply chain profitability in abstract is one of the objectives, which means profit sharing among partner organizations. Profitability due to low cost to all partners creates value to customers. Value is created by means of same or higher quality in lesser costs as compared to competitor's products.

Supply chain responsiveness is another most sought supply chain objective. Responding to wide range of customers demand, short lead times and wide ranges of products in appropriate cost creates value to customers, (Gupta & Sahay, 2007:13).

2.4 Supply Chain management in the Construction Industry.

Major steps are taken to improve the efficiency and productivity of construction industry for the last decades. Although performance of construction industry with regards to the budget, quality of service, quality of materials and time of delivery are as well-developed as the other industries, it is believed that there is still room for the improvements of supply chain management tools for the Construction Industry.

SCM plays a major role to improve the efficiency and productivity of companies. The actors of construction industry (contractors, supplier and customers) should interact and compromise to enable the essential adjustments (Dubois and Gadde,2000).

Since, contractors, suppliers and customers are very significant element of SCM, collaboration between those sector players is very essential. 'Total Management of supply chain enhance the competitive edge of all 'players' therein" (Berry et. al.,1994). Contractors have key role to establish and develop the supply chain management. Their role includes 'the activities and tasks leading to preparation of the production on site involving construction clients and design team' Dubois and Gadde (2000). Sustainable cash flow and data flow among both the upstream and downstream of chain are provided by contractors.

There are some features of the construction industry differing from the other industries which might prevent the proper application of SCM_in construction industry. Vrijhoef and Ridder (2007) pointed out that the difference of SCM in construction industry from the other industries occurs at the end-customer stage, since clients are involved in the chain both at the start and at the end for_construction project. Construction is a multi-organization process, which involves owner,~, contractor supplier, consultant etc. It is also a multi-stage process, which includes conceptual, design, construction, maintenance, replacement. From this point of view, 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.

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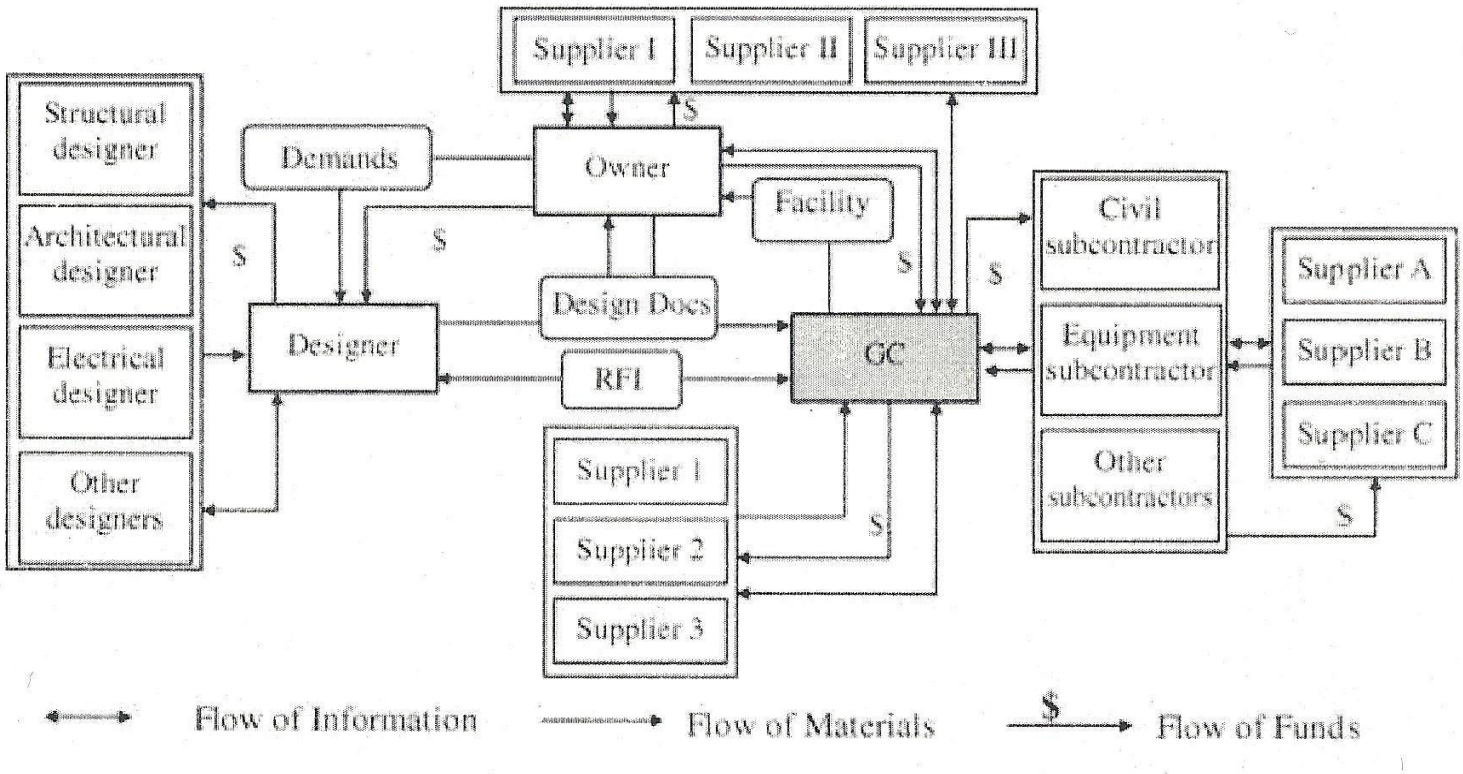

Figure 2.2 General Structure of Construction Supply Chain

Source :- Vrijhoef and Ridder (2007)

2.5 Drivers of Supply Chain Development and main initiatives

In today's global economy, companies face increasing pressure to reduce costs while maintaining production and quality levels to deliver results to the customers.
Handfield, (2002) summarized the basic drivers for SC development as: Ever-increasing customer demand in terms of product and service cost, quality, delivery, technology, and cycle time brought by global competition.

Companies all over the world are pursuing supply chain as the latest methodology to reduce costs, increase customer satisfaction, better utilize assets, and build new revenues. In order to achieve these goals, companies must successfully overcome a numbers of challenges/ problems (Makweba & Xu, 2009).
The consequence of this development is that companies are putting more and more efforts into developing new ways to increase competitiveness on the market in terms of more efficient and effective supply chain management.

2.6 The main members of supply chain

Chopra and Meindl (2007) described the supply chain as consisting of the parties who are involved in satisfying the customer demands. The members of supply chain are not limited to the manufacturers and suppliers. Warehouses retailers, transporters and customers are all players of supply chain. The sample of La Londe and Masters (1994) defined the supply chain more clearly as one firm producing a raw material and selling it to the second firm which then uses raw material and turns it to a component. The third firm buys this component from the second firm and assembles the component into a product sold to the fourth firm which might be a wholesale distributor. This firm distributes the product to the retail merchants who finally sell this product to the end users (customers). The set of firms which pass these materials forward can be referred to as a supply chain.

2.7 Collaboration in Supply Chain

The best supply-chain performers are deeply involved in relationships that call for tight links between partners. As companies migrate toward more extended supply chains, collaboration is becoming their most strategic activity.

Collaboration can have a variety of meanings but for the purpose of this study the researcher adopt the definition from Cohen et. al., (2004) that is: collaboration is the means by which companies within their supply chain work together toward mutual objectives through the sharing of ideas, information, knowledge, risk and rewards. Practically, coordination and collaboration of up-stream and down-stream of a supply chain is difficult because of uncertainty in demand and supply and the lack of communication between members of a supply chain which is amplified through successive linkages (Lee 2000).

In fact a very immediate and available opportunity when two or more companies involve in a chain is, the situation where partners would be able to recognize each other's competencies and combine them in order to satisfy the customer requirements. Some other features which may participant anticipate when entering in a partnership are joint planning, management and measurement; and sharing goals, objectives, benefits, resources, information, and risks with partners. Collaboration is a recognized term which could explain and entail all of the above features (Sunil, et, al. 2004).

Some companies have achieved integration through information sharing and inter organizational collaboration. In a study to measure the degree of integration among the companies it was found that information sharing and inter-organizational integration were the underlying factors for integration with suppliers and customers in areas like supply chain design, inventory management, and customer relationship management (Bagchi &Chu ha, 2005). But from time to time Firms have been struggling to balance their competitive

and cooperative relationships with other firms and stakeholders in the supply chain (Morgan et. al., 2007).

Ultimately supply chain management is about getting the right product, at the right time, in the right quantity to the right customer (Higgins, 2010).

2.7.1 Cooperative Behavior (Trust and commitment)

Trust is the belief, willingness, and extent to which the partners rely on with whom one has confidence and will act in ways that will bring positive outcomes for the firms and does not want to take unexpected action that may bring a negative out come (Ganesan & Shankar, 1994).

Commitment of trading partners in the supply chain is the willingness of each partner to exert effort on behalf of the relationship along the supply chain (Balsmeiere & 1996; Lee & Kim 1999). Therefore ,the two fundamental component for improving the relationship among supply chain are trust & commitment (Achim, W. & Ritter, T. (2003). Trust and commitment among the supply chain partners will improve the relationship with their future value.

2.7.2 Collaborative Planning, Forecasting and Replenishment (CPFR)

CPFR is aimed improving collaboration between buyer and supplier so that customers' service is improved while inventory management is made more efficient.

It is quite obvious that when each company have more information available regarding the customer demand the better the forecast may be. Therefore, in CPFR which was familiarized for the first time in 1995 by Wal-Mart, it was seen that collaboration is used to solve the errors in forecast (Ross 1998).

The cooperative behavior, such as trust & commitment will influence both supply chain performance indicators (Ruyter et al.,2001).

2.8 Supply Chain Management practices

SCM practices are defined as a set of activities undertaken in an organization to Promote effective management of its supply chain. Many manufacturers and distributors are waking up to the potential for the major cost reduction and service improvements offered by implementing best practices in their supply chain.

A number of literatures show many different perspectives of SCM practices (Tan et al., 2002; Chen and Paulraj 2004). These different writers perspectives suggested a multi-dimensionality of SCM that covers set of activities and processes from upstream, firm's internal operations to downstream of the supply chain.

Supply Chain Management is now recognized as a critical business process for companies manufacturing or distributing products. This is because customers' demand for most products are ever more demanding in response time, in choice and in seeking more competitive prices and thanks to globalization, customers can choose from an increased number of suppliers (Lazarovic et al., 2007).

There are five basic dimensions/perspectives of supply chain management practices. These are namely; supplier and customer relationship, information sharing, internal operation, information technology and training (Perry and Sohl 2000; Lazarovic et al., 2007).

2.8.1 Supplier and Customer Relationship (SCR)

Supplier and customer relationship is defined as a set of firms' activities in managing its relationships with customers and suppliers to improve customer satisfaction and synchronize supply chain activities with suppliers, leverage suppliers' capacity to deliver superior products to customers. This is due to the ultimate objective of SCM is to deliver products to the satisfaction of end customers (Tan, 2001).

The growth of mass customization & personalized service is leading to an era in which relationship management with customers is becoming crucial for corporate survival (Wines 1996).

The customer relationships include the complete range of practices that are employed for the purpose of managing customer complaints, building long-term relationships with customers & improving customer satisfaction (Tan et al. 1998; Claycomb et al. 1999).

Close customer relationship allows a company to be more responsive in fulfilling customers' demand and differentiate its product from competitors, sustain customer loyalty, & dramatically extend the value it provides to its customer through improving customer satisfaction by proactively seeking customers' needs and requirements. The ability to build a close relationship with customers will bring companies in to a long-lasting competitive edge (Bowersox et. al, 1999).

SCM suggests that firms need to integrate with their suppliers and customers to achieve both financial and non financial growth objectives (Tan, 2001). Stank et al, (2001) asserted that, the industry leaders increasingly build competencies to integrate with suppliers and customers and find that, these competencies lead them to supply chain excellence. Coordinating operational activities through joint planning with suppliers also results in inventory reduction, smoothing production, improve product quality, reducing supply uncertainty and lead time reduction (Lee, 2002).

Makweba & Xu, (2009) in their study, reviled that customers' need to be given its deserved weight. In today's competition, firms with a superior ability to provide services that customers perceive as valuable incur an important competitive advantage.

2.8.2 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 (Lee and Whang, 2000; Lee, 2002).

Many studies have reported that information sharing can bring many benefits to both suppliers and buyers, such as inventory reduction, and reduced manufacturing costs (Yu et al, 2001; and Raghunatahan, 2003).

The way companies share information whatever the confidential level or not; determines the success of the collaboration. The nature of information to be across the supply chain differs based on the degree of integration, institutional trust and availability of infrastructure that facilitate the practice (Lazarovic, et al., 2007).

Therefore, an informatics perspective is vital in the supply chain since information flow is an integral part of SCM and material flow is closely dependent on information flow.

2.8.2.1 Level of information sharing

Level of information sharing refers to the extent to which critical & proprietary information is communicated to one's supply chain partner. Many researchers have suggested that the key to make supply chain effective and efficient is making available undistorted & up-to-date marketing data at every node within the supply chain (Balsmeier et. al.1996; Child house and Towill, 2003)

The impact of information sharing on SCM depends on what information is shared, quality on shared information, and company's capability in using and translating the information in to a supply chain strategy and operational activities (Moberg et al, 2002). Basically, Information sharing can vary from strategic to tactical & from information about logistics activities to general market & customer information (Mentzer et al. 2004).

2.8.3 Information Technology (IT)

Nowadays, since IT is involved in every step of operation in each company, therefore it is not surprising that organizations' Supply Chain Management supported by adopting IT. Talluri, (2000) makes the comment that the advances in IT systems have given opportunities for organizations' to transform the way they manage their business.

In SCM, IT is highly regarded as a major enabler in achieving effective SCM. As a supply chain spans many organizations in developing products to customers both up-stream, downstream and many functional areas within a company, the implementation of IT allows the companies to increase communication and coordination of various value adding activities with their partners and between functions within their own operation (Simchi- levi et al, 2000).

In addition, to advance development of the internet technology offers significant opportunities for cost reduction, increasing flexibility, increasing response time, and improving customer services (Lee and Whang, 2001).

The benefits of IT in SCM do not come from the capabilities of IT itself; instead the significant benefits come from the combination of its application with corporate strategy and the nature of relationship between companies. IT will improve collaboration and coordination between supply chain members in the environment where trust and long–term commitment between partners exist (Chae, 2005).

Li et al, (2005) reviled that, the objectives of IT in SCM are; to provide the information availability and visibility to supply chain partners, to enable the collaboration with organizations in the supply chain and to allow the decision making based on the total supply chain information.

2.8.4 Training

Effective SCM requires managers to have an understanding of supply chain dynamic and ability to use information based tools. Lee and whang, (2000) argue that information visibility throughout a supply chain will bring significant impact if companies do not have a capability to utilize the information in effective ways. Hence companies need to consider the skills requirements and education when integrating their value-adding activities with their partners (Gattoma and Clark, 2003).

The major concept of SCM is collaboration and seamless integration between various value adding activities within individual companies and across different organizations along a supply chain. Beginning this concept in to practice requires significant changes in corporate culture as well as a new level of human performance. Successes full implementation of SCM concept largely depends on human aspects of organizations (Bowersox et al, 2000; Mentzer, et. al. 2004).

The review literature of different studies indicates that, there are various complicated and sophisticated operations and decision making those primarily demand knowledge based employees. To this end, organizations are supposed to enhance and maintain existing skills and knowledge of employees. Continuous development and skill building activities demand are sources of competent employees (Lazarovic, et al., 2007).

Therefore, effective training and knowledge based learning is essential in developing and maintaining these new SCM skills.

2.8.5 Internal Operation

In addition to the upstream and downstream integration, SCM also emphasize on the importance of both effectiveness and efficiency of firm's internal operations on its performance. This is due to a significant element of SCM practice is an internal operations and they are the basis for developing a competitive advantage before embarking into external integrations. Poor internal operations can lead to failure in coordinating with external partners (Handfield and Nichols, 1999).

Internal operation summarizes all activities related to service and production system, and internal, logistics flow (Handfield and Nichols, 1999). To judge the SCM practice as an effective and value adding the internal operation should be flexible in responding to changing market needs, which is expressed on the basis of agility principles. This means that, a production system must be able to perform rapid change over in both order patterns and mass customization (Lambert and Cooper 2000). Power and Sohal (2001) find that technology utilization, continuous improvement and computer based automation in manufacturing are some of characteristics of agile/flexible organization.

The main purpose of supply chain integration, of course, is to coordinate activities across the supply chain so that the enterprise can improve performance: reduce cost, increase service level, reduce the bullwhip effect, better use resources, and respond effectively to changes in the marketplace Vrihoef and Ridder (2007).

2.8.5.1 Internal Integration

Internal integration is the coordination between functional areas in the organization (i.e., purchasing, engineering, manufacturing, logistics, accounting, etc.). Internal strategic integration requires that all company members have access to an integrated information system, spanning multiple functions and locations. This is often accomplished through a company-wide

High internal integration can reach a level of "collaborative internal operation", with which the whole firm works like an integrated system that results in better performance and better interdepartmental effectiveness, such as cycle time reduction, better in-stock performance, increased product availability levels, and improvement in order-to delivery lead times (Handfield and Nichols, 1999).

2 8.5.2 External Integration

External integration also refers to the systems that link external suppliers and customers to the focal company. External integration allows all supply chain members to share critical information such as forecast demand, actual orders, and inventory levels across the supply chain. Systems used to integrate supply chain members include advanced planning systems, Internet linkages, network communications, and Electronic Data Interchange

Thus, the effectiveness of SCM can be examined by the ultimate effect it would have on customer satisfaction through responsiveness and lower price resulting from lean internal operations. Automated orders and automated productions are the key enablers to realize the quick response program (Perry and Sohal, 2000)

2.9 Challenges /Barriers of Supply Chain Management

The nature of construction industry evolves significant problems such as lack of communication, lack of knowledge sharing infrastructure, which are obstacles the improvement SCM in construction. Latham (1994) reported that the "fragmented and adversarial nature of the construction industry" have directly negative effects on communication between all parties on a construction project. Chinowsky et al. (2007) indicated that knowledge sharing infrastructure is one of the primary barriers preventing the successful implementation of organizations. If an infrastructure can not be established for sharing the information, exchanging knowledge will only be restricted among

individual.

Most SCM related-problems mainly occur from uncertainties and an inability to co-ordinate several activities and partners (Turban et al, 2000).

Fawcett, (2001) identified top ten barriers to supply chain management these are: Inadequate information sharing, Poor/conflicting measurements, Inconsistent operating goals, Organizational culture or structure, Resistance to change- lack of trust, Poor alliance management practices, Lack of supply chain vision (understanding), Lack of managerial commitment, Constrained resources, No employee dedication/ empowerment.

Currently, companies are striving for lower cost so that they will be competitive in the market while they have to maintain their service level. The key factor to offering the features that the customers want at the level of service they are willing to pay for is to minimize the lead time. One approach suggested to solve this problem is synchronized material movement where all parts of the supply chain have access to the information at the same time (Waters, 2003).

2.9.1 Uncertainty

SCM basically comprises of suppliers, manufacturers and customers. Manufacturers usually enter into a very complex relationship with suppliers in a supply chain that involves numerous sources of uncertainty. Generally Davis, (1993) identified three major sources of uncertainty: manufacturing, demand and supply uncertainty:

(1) Manufacturing uncertainty**:** Machine breakdowns that lead to the postponement of production, poor process design that causes a bottleneck in production or produces product of poor quality, are the manufacturing variables accounting for the late delivery and reduction in customer satisfaction.

(2) Demand uncertainty**:** Irregular orders from inconsistent customers may easily mislead manufacturers to make wrong forecasts, which cause excess inventory or insufficient supply.

(3) Supply uncertainty: Normally, suppliers fail to commit to promised dates, possibly due to poor material quality, machine breakdowns or deficiency in natural resources and so forth.

Wilding, (1998) states one key issue known to impact on the effectiveness of a supply chain is that of uncertainty. The major source of supply chain uncertainty is the demand forecast, which may be influenced by several factors such as competition, prices, technological development, customers' general confidence, and more.

Other uncertainties exist in delivery times which depend on many factors ranging from machine failures to road conditions and traffic jams that may interfere with shipments.

Levi et al., (2003) states some factors interfere to uncertainty, they emphasized the challenge of matching supply and demand, the impact of inventory and forecast, and finally factors except those embrace demand as a source of uncertainty; including delivery lead times, manufacturing yields, transportation times, component availability, and so on can also have significant supply chain impact.

2.9.2 Bullwhip Effect

Another barrier that different companies have been facing in their supply chain is bullwhip effect. The Bullwhip Effect is an observed phenomenon in forecast-driven distribution channels. The concept has its roots in Forrester's Industrial Dynamics (1961) and thus it is also known as the Forrester Effect. This phenomenon has been observed across most industries resulting in increased cost and poorer service.

Hau, et al., (2004), concluded as, one of the most common problem that hamper the smooth functioning of SCM is the so-called bullwhip effect which is resulted from inaccurate or distorted information flows**.** The bullwhip effect has been viewed as one of the forces that paralyze supply chains.

The major Consequences of bullwhip effects are**:**

- Inefficient production or excessive inventory.
- Low utilization of the distribution channel.
- Necessity to have capacity far exceeding average demand.
- High transportation costs.
- Poor customer service due to stock outs.

Bullwhip effect and order Fluctuations

The resulting order fluctuations have a variety of consequences for the supply chain. These fluctuations increase operational costs , inventory costs, replenishment lead times, transportation costs, and labor costs for shipping and receiving. (H.Moharana et.al, 2012).

As (H.Mohaarana, et,al.2012) described, there are four factors that cause the bull whip effect. These are:-

2.9.2.1 Demand Forcastupdating :- H.Moharana,et.all.(2012), When performing demand for casts, "Companies interpret historical order information and update them regularly. This order information from Customers, however, does not directly reflect actual demand". This information is used to determine "supply requirements as a function of historical demand information ,service level policies, and lead times in order to satisfy future demand and safety stock".

2.9.2.2 Order Batching :-H.Moharana, et.al.(2012) indicated that, "fixed order costs, such as order processing costs and transportation accosts, contribute to larger orders in order to reduce per unit order costs.

2.9.2.3 Price Fluctuation:"Temporary price discounts ,promotions, and payment term benefits offered by manufacturers to downstream supply chain members encourages forward buying behavior" H.Moharana, et.all. (2012). In order to Benefit From these price reductions, "Companies buy larger amounts than immediately needed. Depending on inventory holding costs, this might be beneficial for really large amounts. In any case, For upstream supply chain members, it is impossible to derive real customers demand because of this forward buying behavior ".

2.9.2.4 Rationing and shortage game: H.Moharana, et.all.(2012) described that, when "supply is limited due to a temporary surge in demand and orders are only partly filled due to shortage, customers might react by overstating their real demands in order to receive a large share of the limited supply ". On the other hand , "when demand returns to normal levels, orders are cancelled or , because of previous more –than- demanded deliveries, simply disappear". This is Especially a problem when customers only anticipate a shortage and place multiple orders with multiple suppliers.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

In this chapter the researcher discusses the research locale, research design, and method, population & sampling techniques, sample size, respondents of the study, research instrument, and the statistical treatment of data.

Research Locale is Addis Ababa-Ethiopia, because the head office of Ethiopian grade one contractors is located in Addis Ababa.

The target populations are managers and supply chain management related professionals such as employees in logistic, inventory control, procurement & warehouse section.

3.1 RESERCH DESIGN AND METHODOLOGY

The research design enables the researcher to answer the basic research question. According to saunders, Lewis and Thornhill (2009) showed that the choice of research design depend on the objective of the study, the availability data source, the cost of obtaining the data and the availability of time. The purpose of this research is making assessment on the practice and challenges of supply chain management to show the situation and to have a clear picture on phenomena by using quantitative and qualitative data. Therefore, the research has employed descriptive survey method, allow the collection of a large amount of data by using questionnaires in an economical way and it is comparatively easy to explain and understand(saunders et al, (2009).

. 3.2 POPULATION AND SAMPLING TECHNIQUES

3.2.1 SAMPLING TECHNIQUE

The sampling techniques used were mixed, simple random sampling & Purposive sampling technique. To EPGORCC the required capacity of supply chain system are almost the same to all companies (Appendix-D). Therefore; the researcher used simple random sampling techniques

to select the sample from the total EPGORCC and Purposive sampling technique to determine the number of respondent from the selected companies.

The researcher used Purposive sampling technique because, the selected sample or management and employee who are directly related with the topic under investigation & to get best meet to the purpose of the study.

3.2.2 POPULATION & SAMPLE SIZE

According to Ethiopian Grade one road contractors association record the total numbers of EPGORCC are 23 (Appendix -E).

The researcher conducted 5 companies (22%) sample from all 23 EPGORCC(Appendix - F). The total population was determined to be seven from each company, thus the total respondents are 35.The respondents are managers and supply chain management related professionals.

Interview was conducted with 9 management bodies of the companies.

3.3 TYPES OF DATA AND INSTRUMENTS OF DATA COLLECTION

The types of Research instrument were questionnaires & interview. Both primary & secondary source were used.

Data collection were based on questionnaires & interview. The questionnaires were used to collect relevant data on existing practices and challenges of supply chain management system variables. Using interview guide unstructured face to face with the interviewee was conducted.

3.3.1 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 procurement manager, supply chain manager, client, logistic and ware house manager and through questionnaires which is distributed to employees, who are directly related with the topic.

3.3.2 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.

3.4 **PROCEDURES OF DATA COLLECTION**

Structured questioner was designed to collect primary data from professionals who took part in supply chain management functions & company's managers.
Questionnaires were prepared in English language. The types of questions are open ended & closed items, five points liker's scale and interval for.

Questionnaire: Close ended questionnaire in a 5 point liker's scales was used to collect data from the sample respondents. The questionnaire has 5 rating scales ranging from **1-Very Low** to **5-Very High**. Data gathered through questionnaires is simple and clear to analyses and it allows for tabulation of responses and quantitatively analyzes factors.

Further More to this it is time efficient for both the respondents and researcher. The questionnaire was structured in such a way that it includes all relevant parts of and information to clearly acquaint the respondents.

Interview: In order to obtain sufficient information the researcher has used personal interview by management bodies of the Selected companies and client. Research issues like awareness, of **SCM practice & Challenge,** strategic view and logical Justifications of the case Company were addressed through interviews which are difficult to obtain though questionnaire in as much detailed as required.

3.5 **VALIDITY & RELIABILITY OF QUESTIONNAIRE**

After designing the questionnaires the researcher gave it to supply chain professionals and consultants to test the questionnaires are valid and questionable.

The supply chain management questionnaire per-tested by discussing with supply chain professionals and consultants. After the necessary modification made, the tools are administer to the respondents. Hence, the researcher believe that the instrument is valid.

3.6 METHODS OF DATA ANALYSIS

In general there are two types of data analysis techniques namely: qualitative and quantitative, Where by the choice of these methods greatly depends on the type of information the researcher has at hand . If most of information collected contains numerical, the analysis calls for quantitative tools and descriptive statistics can be used to characterize the data. on the other extreme, if most of the data collected are in words which mean data gathered using individuals interviews open-ended questions and focus group discussion, it is logical enough to apply qualitative data analysis tools Nunnery et al., (1994).

Therefore, as determined in the data collection tool for this Study, data were collected in both questionnaire and interview. Accordingly, the collected data were analyzed quantitatively and qualitatively. Particularly, statistical tools like: mean and standard deviation were employed.

3.7 ETHICAL CONSIDERATIONS

All the research participants included in the study were duly informed about the purpose of the study and their willingness and 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 participants. 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

DATA ANALYSIS AND RESULTS

This chapter summarized the results of analyzed data collected and interview conducted about current supply chain management system. The discussion particularly focuses on respondents profile, SCM practices, and supply chain integration, challenges of SCM and Customer services.

Out of thirty five (35) questionnaires distributed to respondent thirty (30) were returned. The returned responses were found valid and used for the analysis. This accounts for 86% of response rate. Thus, based on the responses obtained from the respondents data presentation and analysis were made as follows.

4.1 Analysis of the Respondents' Profile

The demographic profile of the sample respondents is presented and analyzed below. The purpose of assessing respondents' age, sex, is that, to determine whether the researcher considered heterogeneity of sample units. On the other hand assessing the work experience and education level of the respondents' is that, when the respondents are more experienced and educated they have better opportunity to understand the case and give better response than else.

4.1.1 Sex of Respondents

Gender frequency of the respondents shows that the numbers of male respondents were almost Forty times as female respondents. This is 93.3% of the respondents were male, while 6.7% were female respond. This reveals that in the companies most of supply chain activity are carried out by men. The difference between male and female participants may be created by the culture and social influence of the society.

4.1.2 Respondents work experience

As table 4.1 below clearly shows the frequency distribution of respondents work experience, the largest of the respondents 36.6% (11) have between 3-5 years of work experience. In the same case, of respondents within 6-10 years and above 10 years show similar experience and followed

by 7 years of experience, which is 23.4% there was no respondents less than one year experience. This implies that in total more than 60% of the respondents have more than 3 years of work experience with in the case company and it is sufficient to judge and give views. This is because when the respondents are more and more experienced within the organization they have better opportunity to know more and more about the organization.

4.1.3 Education level of respondents

Education is one of the factor that impact positively on improvement of the practice of the companies, and also better opportunity to understand the case and give reasonable response than else. As shown below in table 4.1 the highest education level attained by most of the respondents was first degree holders which represents, (19) 63.4% out of the valid respondents and followed by collage diploma holders which accounts (8) 26.6%. The least percentage was second degree and above education level, which is 3 (10.0%). Therefore, out of valid respondents about 90% are diploma and above diploma holders.

4.1.4 Age of Respondents

As shown table 4.1 below shows that, the researcher divided the age of the respondents in to six categories, starting from above 25 years of age to above 45.

In this study, the researcher can conclude that most of the respondents were above 41 ages. This group covers 53.3% of the respondents to the questionnaire. The next age group with valid percent of 16.6 is respondents gain aging between 36 and 40. On the other hand, respondents within age group of 31-35 covers 13.3 percentage, In addition, above 45 age groups represent 10.2 % of valid respondents. At last, the least number of respondents with in age group 25-30, which represent 6.6% there was no respondent below age of 25 years.

The study indicates that the companies found in the study area have diversified age group people, from this it believed that construction companies and its owners in the study area has bad future, most employee above 41 age, in the future it difficult to accept new technology and communication.

Table 4.1 Demographics of the Respondents

No	Item	Choices	Frequency	Percent	Cumulative Percent
1	Sex	Male	28	93.3	93.3
		Female	2	6.7	100.0
		Total	30	100.0	
2	Age	25-30 Years	2	6.6	6.6
		31-35 Years	4	13.3	19.6
		36-40 Years	5	16.6	36.5
		41-45 Years	16	53.3	89.8
		Above 45 Years	3	10.2	100.0
		Total	30	100.0	
3	Education	College diploma	8	26.6	26.6
		First degree	19	63.4	90.0
		Second degree and above	3	10.0	100.0
		Total	30	100.0	
4	Experience	1-2 Years	5	16.6	16.6
		3-5 Years	11	36.6	53.2
		6-10 Years	7	23.4	76.6
		Above 10 Years	7	23.4	100.0
		Total	30	100.0	

(Source: own survey, 2015)

4.2 Descriptive Statistical Analysis

As it were revealed in the methodology part, the designed method is descriptive statistical analysis to analyze the five components of the conceptual framework developed for this study. In addition to the quantitative analysis, the qualitative information obtained through interviews

from both managers and supervisors of companies is used to analyze the following issues. The analyses were on: Supply chain management practices, Challenges of SCM, Collaboration/integrated supply chain management, and project & client services.

The above listed items are the most critical parts of the conceptual framework and basic research variables of this paper. Therefore, the discussion of the above conceptual framework components will answer the basic research questions and meets the stated objectives of this study. For 'the analysis of all these variables, mean and standard deviation is used. Particularly mean value of the respondents has considered as an important indicator to the extent of the company's practices on each items. To conclude, the overall performance of the case company's practices on each variable, group mean was calculated and used.

The mean and group mean statistical values approaching to 2.00 and less indicates the poor performance, 3.00, average/moderate while 4.00 and 5.00 indicates higher and very high/excellent performance of the company on that particular item and variable respectively.

4.2.1 Supply Chain Management Practices

As it was briefly mentioned in the literature part of this study, the most common supply chain management practices are supplier and customer relationship, internal operation, information sharing, information technology and training (Perry and Sohal 2000; Lazarovic et al., 2007).

This study focused on the selected companies SCM practices from these five perspectives. For each practices different items were developed and measured based on their mean and group mean values.

4.2.1.1. Suppliers and Customers Relationship (SCR)

According to Sunil, (2004) the most commonly known characteristics of suppliers and customers relationships are: joint product planning, cooperativeness, frequent meeting, and others. To measure EPGORCC orientation concerning the SCR Six items were developed by the researcher.

Table 4.2 below indicates the extent of relationship that exists between suppliers, Customers and

the selected companies. Accordingly, the group means of suppliers and customers' relationship is 2.989 which is average/moderate performance with respect to the overall measures taken into consideration. Specifically, joint product planning with major supplier, and the level of compliance with customers(projects) delivery on time requirement shows the mean value of 2.266, and 2.866 respectively. These, mean values imply that the selected companies has poor relationship with its supplier on joint product planning, but moderate relationship with customer particularly, on the level of compliance .In line to this analysis, Tan et al., (1998) and Claycomb et al., (1999) states that customer relationships include the complete range of practices that are employed for the purpose of building long- term relationships with customers & improving customer satisfaction.

Table 4.2 Suppliers and Customers Relationship Practice of SCM

S/N	Items	Sum	Mean	Std. Deviation
1	The level of cooperativeness with suppliers	30	3.016	1.00801
2	Compliance with customers delivery in full requirement	30	3.103	1.04624
3	Joint product planning with suppliers	30	2.266	1.04419
4	Customers' delivery adherence requirement	30	3.20	.92050
5	The level of Compliance with customers delivery on time requirements	30	2.866	1.05545
6	The level of cooperativeness with customers	30	3.233	1.04419
	Group Mean		2.989	

(Source: own survey, 2015)

Whereas Compliance with customers' delivery in full requirement and customers' delivery adherence requirements represents mean values of 3.103 and 3.20. This implies the case companies is not meeting the full requirements of the customers as per their desire. On the other hand, customers are not fully satisfied in getting the amount of material they required. The level of cooperativeness with customers(projects) relatively represent the higher result which is 3.233. This implies that there is a gap between the customers and companies relationship. The reason

for this gap is the companies is not able to deliver the required amount of material to the customers' due to shortage of raw materials particularly cement, gas oil and reinforcement bar. The shortage of raw materials is because of the companies' weak relationship with its supplier on joint product planning ,as it presents in table 4.2 above.

The level of cooperativeness with suppliers scored mean value of 3.016. In order to experience successful relationship with customers and suppliers, there has to be a joint material planning. This is because, according to Lee, (2002) Coordinating operational activities through joint planning with suppliers and customers results in inventory reduction, smoothing production, improve product quality, reducing supply uncertainty and lead-time.

Therefore, even the mean value of joint product planning with major suppliers reveals poor performance of such practice (2.26). The group mean value result implies that SCM practice from the perspective of suppliers and customers' relationship of the case company is moderate, that is 2.989.

On the other hand, customers' delivery adherence requirement replies that the customers are more dependent on full quantity and timely delivery of their requirement. So that, this can adds pressure on the case companies to meet its customers' requirement. But the current performance of the companies to meet this is moderate. If the case companies is not in a position to improve this and other supplier and customer relationship practices, the case companies customers' have no option opportunity to go to its competitor companies, because constructions' companies customer depends on the companies provide service, but the case companies have a great possibility to loss its major clients that is (Ethiopia Road authority). Therefore, weak relationship of the case companies with its suppliers resulted in not fully satisfy its customers adherence requirement on time.

4.2.1.2. **Internal Operation**

Internal operation is the starting point to make the environment favorable for integration with the external partners. Handfield and Nichols (1999), states that Poor internal operations can lead to failure in coordinating with external partners.

As table 4.3 below illustrates that six items were used in order to see the extent of the internal

operation of the case company.

The mean value of respondents' reveals that Management Know-how regarding supply chain effectiveness is 3.13 . It is moderate, but the internal operations is the most critical factor to measure organizations' potential to go for supply chain partners .

According to Perry and Sohal, (2000) management know how about the orders and automated orders are the key enablers to realize the quick response program.

On the other hand, up-to-datedness of service giving system and flexibility of service giving system to handle order patterns shows 2.93, and 2.96 respectively.

Table 4.3 Internal Operation Practice of SCM

S/N	Items	Sum	Mean	Std. Deviation
1	Up-to-datedness of service giving	30	2.933	1.18231
2	The extent of flexibility of service giving system to handle order pattern	30	2.9677	.87498
3	The extent of continuous and instances service improvement	30	3.033	.90755
4	Management Know-how regarding supply chain effective	30	3.133	.87498
5	The level of Efficient utilization of resources	30	2.766	1.17501
6	The extent of internal logistics flow	30	3.100	1.17248
Group Mean			2.988	

(Source: own survey, 2015)

As stated by Lambert and Cooper (2000) a service giving system must keep pace with rapidly change in both order patterns and mass customization. In view of this theory, from the mean values presented above in table 4.3, the extent of flexibility of selected companies handling order pattern is moderate, and it clearly reveals that there are problems prohibiting flexibility to handle these changes. In fact, the customers' preferences and construction industry characters are changing very rapidly over time. This change enforces organizations to adopt flexibility to meet

the changing of the design of the project and order patterns.

Efficiency on resource utilization of internal operation has scored mean value of 2.76 which approximates to moderate performance. The intention of efficiency is to minimize overall cost of materials, wastage of materials, time and effort, which ultimately ensures profitability.

Furthermore, continuous and instantaneous service improvement and internal logistics flows have almost similar mean value that is 3.033 and 3.133. In order to make an internal operation effective and efficient, logistics flow plays an important role. Thus the current performance of the companies in operation and service improvement is moderate, 3.03. It implies that, EPGROCC has to take corrective actions to meet the customers' preferences. Finally, the overall group means value of EPGORCC SCM practice from the perspective of internal operation is 2.98. In general, each item's and group mean values of internal operation practice is more than 2.7, which conveys moderate/average internal operation practices are there in EPGROCC.

Based on the overall analysis of the case companies' internal operation practice the researcher concludes that it is moderate. However, this does not mean sufficient, because of the internal operations criticality for creating integration or relationship with external participants or supply chain partners. According to lazarevic et al., (2007) internal operation is the most critical factor to measure organization's potential to go for external integration. These writers state that companies should be internally efficient and effective before embarking on external integration.

Therefore, it implies that, the case companies have an assignment to improve its internal operation to create effective relation with external partners.

4.2.1.3. Information Sharing

The theoretical evidence confirms that supply chain management rides on the back of information in order to meet the required resources at the right time, and at the right place, seamless and instantaneous information flow should exist across the value chain (Russell, 2006).

With respect to the above theoretical justification, this study tried to investigate the practices of information sharing among the supply chain participants of the case companies. Accordingly,

seven items related to information sharing practice were used by the researcher.

Table 4.4 below indicates, the mean value of each items and group mean that can generalize the information sharing practice of the case companies with its up and down-stream supply chain partners.

Table 4.4 Information Sharing Practice of SCM

S/N	Items	Sum	Mean	Std. Deviation
1	The level of material supply forecast information sharing with project	30	2.566	1.02338
2	Material supply forecast information sharing with suppliers	30	2.033	1.02233
3	Material required related information sharing with suppliers	30	2.20	1.00322
4	Material requirement related information sharing with project	30	3.033	1.02443
5	Adequacy and quality of information sharing supply chain	30	2.766	.79785
6	Over all efforts of inter-organizational coordination and information sharing	30	2.366	.80723
7	Sense of trust and confidence along the supply chain	30	2.933	.98261
Group mean			2.742	

(Source: own survey, 2015)

Relatively, the high and the lowest mean values are scored by material requirement related information sharing with projects and material supply forecast information sharing with supplier that is 3.03 and 2.03 respectively. On the other hand, material required related information sharing with suppliers scored mean value of 2.20. This implies that the case companies has poor information sharing practice with its supplier than with its customers /projects/ materials supply. The overall effort of inter-organizational coordination and information sharing has a mean value of 2.36.

Whereas, other supply related information with both customers and suppliers, adequacy and quality of information sharing throughout the SC and sense of trust and confidence along the SC scored 2.56, 2.20, 2.76 and 2.933 mean values respectively.

In SCM, information sharing is another important practice that should have to be given due

attention in order to make the SC robust. Because, when there is distortion, inadequacy and lack of accuracy in information flows within the SC partners, it will negatively affect the SC participants. The mean value of the respondents on adequacy and quality of information sharing throughout the SC implies that, there is information sharing among the SC partners but it is not sufficient and it lacks accuracy.

From the above presented data, the researcher can conclude that the information sharing practice between companies and suppliers is poor. This is based on the mean value obtained with respect to material supply forecast information sharing which scored 2.03. In fact, customers like client and project site having moderate relationship. So that, having poor relationship with such suppliers is a cause for poor information sharing practices. According to Lee and Whang, (2000) poor information sharing between partners in SC will lead to many serious problems such as high inventory level, high demand uncertainty, inaccurate-forecasts, low resource utilization, and high material supply cost.

Furthermore to the above theory, many studies have reported that information sharing can bring many benefits to both suppliers and customers, such as inventory reduction, and reduced logistic /transportation/ costs (Yu et al, 2001; and Raghunatahan, 2003).

However, the information sharing practice of the case companies with its supplier particularly on material supply forecast and material required is poor the groups mean value of SCM practice from information sharing perspective shows 2.742, which is moderate.

The empirical study of Lazarovic et al., (2007) states that efficiency in meeting customers' requirement is significantly differentiated by the level and quality of information sharing among SC partners.

Therefore, based on the analysis, empirical study and the current (21^{th}) century real practice and importance of information sharing and its impacts on any kind of organization, even if the group mean value shows moderate mean value, with respect to these stated issues the result is not sufficient to create effectiveness and efficiency in SCM activities.

4.2.1.4. Information Technology

Advance in information technology have given opportunities for organizations to transform the way they manage their business Talluri (2000).

As table 4.5 reveals that, four items were used to measure IT application of the case companies. Out of four items developed to see the extent of IT application in selected construction companies SC, surprisingly all of the items scored the mean value approximate to 2.

The adequacy of IT throughout the supply chain and the level of IT-based automated ordering from major customers represent mean value of 253 and 2.40. On the other hand, the mean value of Up-to-datedness of IT throughout the supply chain, IT-based automated ordering from major customers and IT-based automated ordering to major suppliers revealed that2.66, 2.40 and 2.30 mean value respectively.

Generally, the groups mean value of SCM practice from IT perspective is 2.45, which is interpreted as there is poor IT application practice across the companies supply chain.

Table 4.5 Information Technology Practices of SCM

S/N	Items	Sum	Mean	Std. Deviation
1	The level of IT-based automated ordering from major customers/projects/	30	2.40	.89202
2	The level of IT- based automated ordering to major suppliers	30	2.301	.87252
3	Up-to-datedness of IT throughout the supply chain	30	2.766	.80456
4	The adequacy of IT systems throughout the supply chain	30	2.733	.65746
Group Mean			2.45	

(Source: own survey, 2015)

Eng (2005) illustrates as, good experience in information technology have a positive effect on the firm's ability to enhance customer satisfaction and supply chain responsiveness.

In addition to the data collected through questionnaire, interview was held with the supply

manager and inventory manager of the case companies. According to the interview there are poor information technology facilities within the companies. But, some companies implementing intra network connection facilities to connect supply Inventory and purchasing sections. However, it does not give real time and comprehensive reports, due to absence of supportive IT instruments or information system.

According to Levi et al.,(2003) the objectives of IT in SCM are; to provide the information availability and visibility to supply chain partners, to enable the collaboration with organizations in the supply chain and to allow the decision making based on the total supply chain information.

Currently, some construction companies are using integrated information systems to manage their business activities. To share information there should be an up-to dated IT and integrated information system which is capable of connecting all functional units of the company and its external participants.

Based on the data collected both in questionnaire and interview and the analysis made on the IT practices, the existing IT System of EPGORCC supply chain can not support effective SCM implementation. Therefore, based on the mean value of each items, group mean and interviews, the SCM practice of IT in the selected companies is poor and conveys that a lot has to be done to bring about change in the IT system.

4.2.1.5. Training practice As presented in the literature review, the last (fifth) SCM practice is training. The ultimate objective of SCM is customer service as it was depicted in the conceptual framework developed for this study. To provide good customer service, organizations are supposed to enhance and maintain existing skills and knowledge of employees.

Table 4.6 Training Practice of SCM

S/N	Items	Sum	Mean	Std. Deviation
1	The level of Adequacy of training and development for management	30	2.466	l.10433
2	Employees training in supply chain concepts &	30	2.366	.91228

	management principle			
3	The overall adequacy of employees training	30	2.333	.99785
4	Provision of diversified skill training to employees	30	2.333	.77321
5	Giving training to downstream SC members /Intermediaries/	30	2.1666	.83215
Group mean			2.3528	

(Source: own survey, 2015)

According to Bowersox et al, (2000) and Mentzer, et. al. (2004) the successful supply chain management implementation concept largely depends on human aspects of the organizations. With respect to this theory effective training and knowledge, based learning for both managers and employees of organizations is essential in developing and maintaining SCM skills.

Table 4.6 above shows five items developed to investigate the training practice of EPGORCC. Even if the training practice is considered as one of SCM practices, with exception of the first item i.e., adequacy of training and development for management which scored mean value of 2.46, the remaining mean value of other items is less than 2.4 including the group mean. The group mean scored 2.352, which is the least mean value, even compared with other SCM practices group mean values.

Employees training in supply chain concepts & management, the overall adequacy of employees training, Provision of diversified skill training to employees, and giving training to downstream SC members scored mean value of, 2.366, 2.333, 2.233 and 2.166 respectively.

This clearly implies that, there is a great problem with the human resource management area of the selected companies. It is a fact that whatever the extent of information technology, information sharing and other SCM practices is applied; without skilled and committed human resource it is nothing. These all practices of SCM require the human resources to make SCM effective. In addition to the responses obtained through questionnaire, there is an interview conducted with human resource manager and human resource officer. According to their response, still now there is no well organized training program within the companies to the

employees and managers. Even when some invitations come from government and other training institutions simply some managers or employees have been sent to the training without consideration of the relevancy of the trainee to the companies real problem.

There is no established criterion to evaluate and prepare employees and leaders for the training that fits or concerns them. Furthermore, per month at least four to six employees are leaving the companies. If the case companies would not take actions in order to solve such poor practice and related problems it creates great negative consequences on its SC. The vivid impact of poor training program/practice is reflected on internal operation of the companies, which is a spring board for external integration.

As it was asserted by Gattoma & Clark (2003) managing supply chain actually involves the interaction between human behavior, IT**,** and infrastructures. In addition, training can enhance the ability of work force and the organization. But the current training practice of the case companies does not support to achieve the above mentioned benefits.

Therefore, based on the above analysis the researcher find out inconsistency between the theory and the real practices that is going on in the case companies. And there is consistency between qualitative and quantitative information collected from the respondents.

So that, the SCM practice from the training perspective of the selected companies at hand is poor. If it continues in such a way the company will be at risk in the future to achieve its objectives and to satisfy its customers.

4.2.2 Challenges of Supply Chain Management

The other part of the conceptual framework developed for this study is challenges of SCM that consists of uncertainties, bullwhip effect.

As illustrated in table 4.10, out of seven items used to determine the extent of major challenges in supply chain management: willingness to share risks and benefits shows the lowest mean value, which is 2.40. This implies that the participants in the SC of selected construction Companies are not willing to share risks and benefits associated with their supply chain.

When there is poor willingness to share risks and benefits with the SC partners that conveys weak relationship and integration among the SC partners. The implication is that the supply chain practice is traditional. It means, partners/members with in the chain do their own decision and take the responsibility for any risk in a disintegrated manner.

The remaining items scored moderate mean values. Accordingly, inventory fluctuation due to bullwhip effect, and institutional trust to share confidential data represented mean value of 3.166 and 3.133 respectively. The result of institutional trust to share confidential data shows moderate institutional trust in sharing confidential information and as it is good for those of SC partners.

Whereas the mean value of inventory fluctuation due to bullwhip effect conveys that there is distorted and inaccurate information flow within the SC of the case companies. This implies that there is a relationship between bullwhip-effect, information sharing and IT practices of SCM. Therefore poor information sharing practice is resulted from poor IT which ultimately resulted in distorted information flows.

Table 4.7 Major challenges / Barriers of SCM

S/N	Items	Sum	Mean	Std. Deviation
1	Supplier inability to carry out the promise (supply uncertainty)	30	2.76	1.06761
2	Institutional trust to share confidential data	30	3.133	.88354
3	The level of impact on finance	30	3.570	.88232
4	The level of ineffectiveness of employee	30	3.53	
5	Inventory fluctuation due to Inaccurate information sharing (bullwhip effect)	30	3.166	1.06620
6	Irregular orders from inconsistent customers/projects/	30	3.20	.99028
7	Willingness to share risk and benefit	30	2.40	
Group mean			3.112	

As it was analyzed above the quantitative analysis of information sharing and IT practices of the case companies revealed moderate and poor group mean values, respectively.

On the other hand, level of impact on finance, ineffectiveness, Irregular order from customers is the greatest challenge for the case companies, followed by inventory fluctuation, due to in accurate information and trust to share confidential data, which represents 3.570, 3.53 and 3.20 mean values respectively. The groups mean value for challenges of supply chain management of the case companies are moderate which is, 3.112 The reason for the level of impact on finance, ineffectiveness of employees, irregular order from customers weighted more than other challenges is that, it was affected by both internal and external factors. Some of the internal factors are unnecessary bulk purchase, down of trucks, shortage of spare part items, ineffectiveness of employees, and external factors are change the design of a project, and suppliers' inability to provide the required inputs according their promises. So that, unplanned orders of EPGORCC is victimized with these factors.

For further, consolidating quantitative analysis and qualitative information were collected through interview from procurement, and supply managers and major customers/clients. These management bodies also confirmed that impact on finance ,ineffectiveness of employee, irregular orders and inventory fluctuation are their major problems. According to the supply manager's response, there are greater possibilities of stoppage of supply materials due to financial implication. Particularly, for spare parts and construction materials, there is shortage of supply. Sometimes, there is also environmental change influence, which enforces to stoppage of operation.

For triangulating the analysis, procurement and supply manager was interviewed for supply uncertainty. According to his response, there is a shortage of supply for the above-mentioned items, and the reason is that domestically there are few sources of supplies for such products (i.e bitumen, reinforcement bar, cement and machinery spare parts). Furthermore, importing these inputs from abroad it takes long time.

Therefore, based on all of the above quantitative and qualitative analysis the case companies SC is exposed for different challenges. Out of these challenges receiving materials before they are

required, causing more inventory cost and chance of deterioration in quantity, supply uncertainties, incorrect material take off from drawing and design document, subsequent design changes, vendor evaluation criteria and financial implications are major problems that the case companies has been facing. Next to these problems, inventory fluctuation due to bullwhip effect is also another challenging factor that prohibits effective supply chain management. So that, these all challenges are mostly effected from the existence of poor relationships between SC partners, weak information sharing, poor IT and weak internal operation practices of SCM.

4.2.2.1 comparison of major challenges

Although all issue related to support institution, supplier inability to carry out the promise, institutional trust, willingness to share risk, inventory fluctuation, unplanned orders, employee ineffectiveness, subsequent design change, financial impact, environmental change influence, and issue related to vendor evaluation criteria have its own effect on the success or failure of SCM. This does not necessary mean that all issue have equal influence on SCM operation. thus the table 4.8 below rank the level of influence of the major issue discussed before.

Table 4.8 comparison of major challenges

	General Factor	Sum	Mean	SD	Rank
1	Challenge related to supplier inability	30	2.76	1.182	**6**
2	Challenge related to institutional trust	30	3.133	0.874	**5**
3	Challenge related to willingness to share risk	30	2.40	1.136	**10**
4	Challenge Related to inventory fluctuation	30	3.166	1.095	**4**
5	Challenge Related to unplanned orders	30	3.26	0.907	**3**
6	Challenge related to employee ineffectiveness	30	3.53	0.982	**2**
7	Challenge related to subsequent design change	30	2.65	1.022	**7**

8	Challenge Related to financial impact	30	3.60	1.063	**1**
9	Challenge related to stoppage of operation due to environmental change	30	2.64	1.077	**8**
10	Challenge related to vender evaluation criteria	30	2.53	0.843	**9**
	Group mean		2.726		

(Source: own survey, 2015)

As it can be observed in the table above ,the issue related to finance impact ,employee ineffectiveness, unplanned orders and inventory fluctuation have greatest influence on SCM operation followed by institutional trust, supplier uncertain ,subsequent design change ,environmental influence, vender evaluation criteria and willingness to share risk. This means problems related to finance, supply employee capacity, irregular orders and inventory fluctuation are ranked the most challenges that affect SCM operation.

4.2.3 Collaboration in Supply Chain

As companies migrate toward more extended supply chains, collaboration is becoming their most strategic activity. Collaboration may be with customers, suppliers and even within organization's functional units. Some of the features which many participants anticipate when entering in to collaboration are: joint-planning, management and measurement, sharing goals, objectives, resources, information, risks and benefits with partners (Sunil, 2004).

When the level of collaboration is becoming more and more strong it leads to integrated and efficient SCM. Based on this, the researcher has tried to see the extent of integration of the case companies with suppliers, customers /clients/ and cross functional units within the company.

4.2.3.1 Integration With suppliers

In this part, the researcher tried to see the level of integration between EPGORCC and its suppliers.

Integration is the process of combining or coordinating separate functions, processes, or producers and enabling them to interact in a seamless and continuous manner (Kenneth and Brian 2006).

Table 4.9 Company Integration with Suppliers

SIN	Items	Sum	Mean	Std. Deviation
1	The level of strategic partnership with suppliers	30	2.966	.89443
2	The establishment of quick ordering system	30	2.933	.90874
3	Stable procurement through network	30	2.40	1.02233
Group mean			2.766	

(Source: own survey, 2015)

As illustrated in table 4.9, there are three items used to determine the extent of integration of the case companies with its suppliers. Accordingly, relatively to other items the high mean value was scored on the level of strategic partnership with suppliers which are 2.966, followed by the establishment of quick ordering system, 2.933. The mean value of stable procurement through networking indicates 2.40.

Furthermore the group mean shows that 2.76 mean value. The group mean value approximately reveals as, moderate integration between EPGORCC and its suppliers. In addition to this, an interview was conducted with procurement and supply manager of the case companies to consolidate the information obtained through questionnaire. According to the interview response, EPGOCC have common supplier both in domestic and foreign cases. This is due to the procurement method of the case companies a direct purchase method. And any supplier who fulfils the specification and requirements of the companies wins to provide the material and the company buys the materials from those winner organizations. But, according to the interview there is no stable procurement through networking.

Due to the inconsistency between the response of the procurement and supply manager and the respondents of questionnaires, the researcher interviewed both local and foreign purchasers to

clearly understand the level of integration with suppliers. They also assure the same point as the procurement and supply manager. They replied that the company has no strategic/planned relationship with its suppliers. But, sometimes the company made contracts with the winner suppliers for six to twelve months, especially on gas oil and cement supply.

Therefore, the researcher tried to identify the area for the respondents' difference through triangulated analysis. Even if the group mean value of company integration with suppliers reveals as moderate it is not convincing. Because it is inconsistent with qualitative information of the responses found through interviews from procurement and supply department. The respondents of the questionnaire assumed the six to twelve month contractual relationship as a strategic alliance which does not actually exist. Therefore, based on information obtained from both sources (qualitative and quantitative) the level of integration between the suppliers and the case companies is not sufficient.

4.2.3.2 Integration with Customers

SCM suggests that, firms need to integrate with their suppliers and customers to achieve both financial and none financial growth objectives (Tan, 2001).

Table 4.10 Company Integration with projects and client

SIN	Items	Sum	Mean	Std. Deviation
1	Follow-up projects for feedback	30	3.201	.91933
2	Monitoring and measuring customer service level	30	3.563	.88232
3	The level of material supply information sharing with major customer	30	3.20	.84370
4	Frequency of contacts with major customers/client/	30	3.666	.92516
Group mean			3.46	

(Source: own survey, 2015)

As table 4.10 above depicts, four items were used to evaluate the case companies integration with its customers or downstream of the Sc. Accordingly, the first item: follow-up customers for

feed back and the level of supply information sharing with major customers scored mean value of 3.201 each which is moderate level of integration. Monitoring and measuring customers service level and frequency of contacts/meeting with major customers' indicates mean value of, 3.563 and 3.666 respectively.

When the level of collaboration between SC partners is becoming strong and strong, it leads them to integration, which in turn makes the SC more effective. So as to make integration with customers' follow-up customer for getting feedback, monitoring and measuring the service level, good supply information sharing, and frequent meeting with customers are some of the attributes to be considered.

The mean value of Follow-up customers for feedback and the level of supply information sharing with major customers are 3.201 mean values each which conveys that it is moderate.

Therefore, based on the above data the mean value of both Monitoring and measuring customers' service level and frequency of contacts/meetings with major customers indicates moderate result which is 3.563 and 3.666 respectively. This implies that the case companies is in an average position to their customer for measuring the extent of customers' service level ,but the integration wants improvement to fully satisfy the customers. On the other extreme, for doing so, meetings should have to be made with major customers to discuss on what is going on in their supply chain. But, these attributes scored moderate mean values which is 3.66. Whereas, the group mean result shows 3.46 which implies that the case company's integration with its customers is on average.

In addition to the mean value obtained through questionnaire, an interview was conducted with project manager, project supply head and supply manager . According to their response, replied that as they do a moderate integration with the case companies.

Based on the analysis of the EPGORCC integration with its customers is moderate. This shows that on the average satisfaction of its customers and in a long-run there may be a chance losing their clients . Therefore, the result is not sufficient to create effectiveness and efficiency in SCM activities.

4.2.3.3 Cross functional integration with in a company

Eng (2005) reported that a cross-functional orientation in SCM has positive effects on customer satisfaction and supply chain responsiveness in terms of improved efficiency among different functions in the supply chain. Integration plays a decisive role for successful SCM (Kenneth and Brian 2006). To realize an effective internal operation functional integration plays a great role.

Table 4.11 Cross Functional Integration with in the Company

S/N	Items	Sum	Mean	Std. Deviation
1	Data integration among internal functions through network	30	3.066	.92283
2	Information system integration among internal functional unit	30	2.502	.92632
3	Team work and intra-organizational coordination	30	3.210	1.11779
4	Extent of integration between main office and project supply	30	3.403	1.06256
5	Periodic intra departmental meetings	30	2.1333	1.32633
Group mean			2.702	

(Source: own survey, 2015)

Table 4.11-above represents the extent of internal integration of EPGORCC functional units. Accordingly, almost all items except information system integration among internal functional unit and periodic intra department meetings the rest items scored a mean value greater than 3.0 namely: data integration among internal functions through network and team work and intra-organizational coordination mean value of 3.06, 3.210 and 3.403 respectively.

Relatively, the extents integration between supply department and project supply have scored better mean value than others which is 3.403. Periodic intra departmental meetings is the least mean value which is 2.13. This is the reflection of poor SCM practice.

The case companies have poor periodic intra departmental meeting and information system

integration. Therefore, with such environment cross functional integration could be poor. On the other hand, data integration among the functional units of the case companies is also highly related with IT application so that, even if its mean value approaches to moderate, it is not as such sufficient. This implies that poor IT application practice also affects other factors like the extent of integration. On the other hand, the overall group mean of internal integration is, 2.902 which reflects the internal integration of the case company is moderate.

4.2.4 Customer Service Analysis

The ultimate goal of an integrated, efficient and effective SC system is superior customer service: short lead-time, quick response to requirements, accurate delivery, product accessibility, risk sharing, complains handling etc (ChristopherI998; Kenneth 2006; Russell 2006; and Eyong 2009).

Table 4.12 project /customer/ Service Descriptive Statistics

S/N	Items	Sum	Mean	Std. Deviation
1	The accuracy of order processing for project	30	3.266	.88961
2	Required material accessibility	30	2.933	1.06357
3	Effectiveness and flexibility in meeting project/customer/ requirement	30	3.130	.83215
4	Reduction of lead time/speed of ordering handing	30	2.433	1.07663
5	Low stock out frequencies	30	3.466	1.07763
6	Timely invoice completion	30	2.933	.8437 0
7	Effectiveness in clients' complaints management	30	2.333	.87129
Group mean			2.625	

Table 4.12 above depicts that seven essential customers service attributes were used to investigate the extent of the case companies orientation towards customers service Performance. In view of this, except reduction of lead time/speed of ordering handling and effectiveness in client complaints management scored a mean value of greater than 2.5. Low stock out frequency,

the accuracy of order processing for customer and effectiveness and flexibility in meeting customers' requirement represents 3.466, 3.266 and 3.130 respectively.

On the other hand, required material accessibility and timely invoice completion have the same mean value that is 2.93, but effectiveness in customers' complaints management and reduction of lead time are represents poor performance that is 2.33, and 2.43 mean values respectively.

Lazarevic et al., (2007) empirically found that, SCM practices significantly affect companies performance particularly lead time, inventory turnover, cost reduction and avoidance of product reject/return, product accessibility, and meeting customers' requirement.

Accordingly, the groups mean value of customer service reveals that the case companies orientation towards customers service is moderate. And as it was presented in the conceptual framework developed for this study, customers service is the last component. This implies that, customer service is resulted from practices of supply chain management, level and nature of SC challenges, collaboration, and integration of the company with its suppliers, customers and internal functional units. All of these variables except training and IT practices of SCM shows a moderate performance.

This is in line with the theory of successful development of SCM performance has to focus on customers' needs and wants. Consequently the performance of the supply chain can affect customer satisfaction (Chandra and Kumar, 2000; Svensson, 2003).

The researcher held an interview with procurement and supply managers, and project managers of the selected companies to triangulate, and state the extent of services given to the customers' and which finally results in customer satisfaction and loyalty.

As per the interview held with procurement and supply managers of the selected companies reveals that in lead time reduction, there are problems resulted from both external internal factors. As their response the external factor is related with client and suppliers i.e., in the case of client, payment not paid in the specify period of time and in the case of supplier, some inputs are bought from abroad and it takes up to three months to reach to the company which may increase lead time. Whereas from the internal factors there is inefficiency. Sometimes due to shortage of

stock item, shortage of cash, break down of truck; the logistic section do not transport the required amount of materials to the customers. But, to minimize the delay of resulted from shortage of input materials as much as possible the case companies has materials stock with in warehouse which pushed inventory cost up.

For the issues related with effectiveness and flexibility in meeting customers' requirement and required material accessibility, as supply manager's response shows the companies create agreement for critical materials with Derba cement factory and Guna tradig about material supply from the factory warehouse to project site by their transport. In order to make required material accessible to the customers the case companies bought additional lowbed, highbed and truck to transport the required material to the project site.

In the case of meeting customers' requirement, at the time of shortage in input materials the companies gives priority to some major project site. For instance on the shortage of gas oil, the companies transfer the item from the main depot to project site /customers/. And the level of flexibility is an average.

In the case of effectiveness in managing customers' complaints, at the very beginning the customers are part of companies. Most of the time the reason of complaints is the required material not delivered on time. If any complaints come from customers the companies could manage it as its rationality.

With respect to compliant management, major customers replied as, the case company is not responding their complaints immediately, to solve this complain at least it took two weeks.

Therefore, based on the above analysis of both quantitative and qualitative with different management bodies, and customers conveys that the company's orientation towards customers service is moderate. This is not sufficient because effective and efficient customer service on construction companies is critical for the successful completion of any construction project. Availability of materials is essential for the timely completion of activities and for the productivity of the labor force. If materials are not available when they are needed, a variety of problem might arise.

CHAPTER FIVE

Summary, Conclusion and Recommendation

5.1 Summary of Finding

Current supply chain practice in the construction industry are performed on fragmented basic with unstructured communication and no clearly responsibilities between the parties involved. The fragmentation lead to low productivity, cost and time overruns, conflicts and disputes.

There are different literature regarding the concept of supply chain management. As indicated in the literature part, SCM have different benefits like: to increase productivity, and competitive advantage, reduce inventory, cycle time and to increase customer satisfaction, market share and profit of firms. However, as depicted on the statement of the problem part, companies are not achieving a corresponding improvement in their business performance due to failure to addresses the whole spectrum of SCM. Having these facts, this research tried to achieve identify the current practice and based on this to explain the challenges of SCM in Ethiopian private Grade One Construction Companies.

Based on these facts, the analysis and interpretation of data findings was presented as follows;

The degree of relationship across the supply chain of EPGORCC is leveled to be transactional or adversarial, which is characterized by less joint product planning with suppliers, but a better relationship with customers' and independent decision making across the SC. The descriptive analysis and interview with management bodies has verified the prevalence of these characters of traditional relationship.

With regard to internal operation, the descriptive data and interview analysis conveys that, there is good continuous and instantaneous service improvement moderate flexible service giving system for handling order patterns and internal logistic flow. Relatively the cases companies an average in efficient resource utilization, and up-to datedness of production.

Information sharing practice of SCM in the case companies is generally moderate. But there is poor information sharing on material supply forecast information with suppliers and overall effort of inter organization information sharing mean value of 2.033 and 2.36 respectively. Again the material required related sharing information across the supplier are weak. But material supply and required related information sharing with customer is moderate.
Concerning information technology, the quantitative and qualitative analysis indicated that, poor and absence of IT & IS tools with in the case company which scored 2.45 groups mean.

Supply chain management practice from training perspective of EPGORCC is the poorest in respect to other SCM practices which revealed group mean value of 2.352. Each items and the overall training practice performance shows very poor than expected. This adversely affects the effectiveness of SCM.

Among the major challenges of SCM, SCM shortage of finance unplanned orders and ineffectiveness of employee the major headache of the case company with mean values of 3.60, 3.53 and 3.26 respectively. Inventory fluctuation due to in accurate information (bullwhip) effect is also another challenges of the case companies SC. There is also poor willingness to share risks and benefits among the SC partners.

Regarding to integration among the SC partners the group mean of EPGORCC integration with its supplier's shows 2.76 which approximate to moderate level. But the qualitative analysis reveals poor integration. The quantitative analysis

of customers' integration conveys group mean value of 3.46 and it is really moderate even if it approaches to high the customers have no strong integration with the EPGORCC than supplier.

Concerning to the internal integration, data integration through network and information system integration among internal functional units are moderate and would be support external integration. But, periodic intra departmental meetings is poor, the overall internal integration is moderate represented by mean valve of 2.70.

With respect to orientation towards integrated superior customer service, both qualitative and quantitative analysis revealed that, the company's effectiveness and efficiency in meeting customers' requirement is average and effectiveness in handling customers' compliant is moderate, but customers were dissatisfied with the company's compliant management. At the time of shortage of materials the case company gives priority to major customer (client) and this dissatisfies other customer (site or project). In general the case companies orientation towards customers' service is moderate.

From the discussion, analysis and interpretation of challenges, the higher the mean value the higher the Challenge. Thus companies with higher mean value have to improve the practice. Accordingly, those having a mean value of High and Average need to improve the practice.

5.2 Conclusions

The supply chain is a network of organization that are involved, through upstream and down stream linkages, in the different process and activities that produce value of the form of products and service in the hands of the ultimate customer.

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

- The eventual conclusion of this study is that generally, the case companies orientation towards SCM is traditional that lacks substantial indicators of an integrated, efficient and effective SCM. In addition, the quantitative analysis of the company's customer service group mean is moderate that is 2.62. Therefore, this can't ensure customer satisfaction with respect to customer service. Based on qualitative and quantitative analysis the investigator comes up with conclusion that the case company's orientation towards customer service is poor and SCM practices have direct impact on customers' service.

- The primary reason mentioned for poor level of customer service is the internal operations that have direct effect on the companies ability (potential) to embark on external integration. In other words, its effect is clearly reflected on customers not getting what they need when they need it, long lead time, and poor complaints management, poor integration with suppliers, not having effective flexible production system that could respond to the changing customer's preference.

- From SCM practices the case companies has a great problem on training and IT practices. These two practices play a decisive role for creating effective and efficient SCM. Poor IT facilities lead to poor information sharing and poor information sharing practices makes a supply chain management ineffective. On the other hand, supply chain management need effective internal operation for creating integration with external partners. For making internal operation effective, the human resource is a critical factor and in order to have skilled, committed, and capable employees and mangers, to utilize resources effectively and efficiently training plays a significant role. But the case company's training practice to make both employees and mangers competent is the poorest out of the five SCM practices. Therefore, the case company's poorness in training

and IT leads to poor/ week integration both in internal and external partners.

The SCM main concept is creating a relationship with other partners through the SC to provide products and services in order to satisfy the customers. The relationship of the EPGORCC with its customers and suppliers is not strong, in sharing material required forecast, cooperativeness, delivery on time requirement, is moderate. Therefore, these relationship shows as the relationship between EPGORCC's SC participants are traditional, that is limited to needs current transaction.

The survey result indicates that, degree of willingness to share needed information, level of establishing relationships based on shared risks and rewards, level of trust among supply chain members, degree of adequacy of information system, level of clear guidelines for managing supply chain alliances, level of employee loyalty/motivation/empowerment ,the extent of willingness to Share risks and rewards, level of flexibility of organizational system process, degree of employee resistance to change, level of training for new mindsets and skills, and the level of product quality and design are challenges for construction industry under study.

The researcher concludes that the great challenges that prohibits effective SCM of EPGORCC's like, financial, supply and demand uncertainties and fluctuation of inventories due to distorted information (bullwhip effect) are because of poor relationships between SC partners.

Thus companies with higher mean value have to improve the practice. Accordingly, those having a mean value of High and Average need to improve the practice.

5.3 Recommendation

On the basis of the findings and conclusions reached, the following recommendation were forwarded in order to improve the Supply Chain Management of the case company.

- It is noticeably explained that internal integration is vital in increasing the potential of the company to get external integration. EPGOCC is suggested to integrate the internal operational units, so as to bring about flexible, responsive and efficient production. This can be done first, by networking the functional units of the organization with appropriate. IT and integrated information system. Secondly, breaking functional silos to encourage coordination and interdependent work design accompanied with agile work force and a network of multiple organization and relationship to improve flexibility and responsiveness to client and customers requirements.
- The human resource is the essential factor that performs all activities to make Supply Chain Management effective and efficient. At the current situation marketing competition, customer preferences, and every thing is changing rapidly. Therefore, this change enforces companies to change their strategies, and operations. Out of these changes having skilled, agile, and lean man power is the one. So that, EPGOCC is highly suggested that to prepare training program for its employees and managers in order to enable them to be competent, committed, responsive, finally which improves internal operation and customers service.
- The current information technology practice of the case companies is poor and affects effective communication and integration of data with in the companies. The case Companies should improve and invest on IT facilities to enhance information sharing both internally and externally. This can be done through hiring IT specialists or out sourcing.

- More importantly, the case companies is suggested to improve its relationship with suppliers from simply buy-sale relationship to a modern supply chain relationship through establishing strategic or long term relationship, contract, and continuous information sharing in order to minimize supply uncertainty which resulted in demand and supply unmatched and dissatisfaction of customers of the case companies. Because, this could help the case companies to obtain the inputs at the right time and quantity from these suppliers and provide the required quantity by the customers when they need it. So that, this will minimizes the dissatisfaction of customers due to shortage of materials.
- Another important issue that is suggested to the case companies' supply department is improving the relationship with customers through a continuous information sharing, follow-up them and get feedback, monitoring customers' perceptions towards service of the company, improving its compliant management through conducting market research for better responsiveness.

Generally, All stake holders have to work jointly, and the companies making bench mark with other countries regarding the SCM practices.

5.4 Limitation of the study

This research has encountered certain limitation during the course of conducting the study. One of the difficulties encountered were respond ants reluctant to fill out and return the questioner on time. The other difficulties faced, lack of sufficient material in the study area and absence of research documents done on Ethiopia construction industry a supply chain management system, and the other difficulties due to time constraint it was not possible to collect data for reason which affect SCM in each company. This limitation was, however, resolved in dealing with and developing friendly relationship wi

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APPENDICES

APPENDIX 1

ST MARYS' UNIVERSITY

School of graduate Studies

MBA Program

Dear Respondents:-

This questionnaire is designed for preparing a thesis on the title of **practice and Challenges of supply chain management in construction companies**. The outcome of the study will be used in order to suggest possible solutions for problems identified while conducting the study. I kindly request you to spend your precious time to fill the questionnaire as frank and reasonable as possible. I inform you that, the information you provide will be confidential and consumed for academic purpose only. Therefore, you are not expected to write your name.

If you have any question and comments, don't hesitate to contact me with the address.

Email:- mogesdibaba@gmail.com

Thank you for your cooperation!

General Background of respondents.

(Tick only one box)

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. **Year of service in the company**.

Less than 1 year ☐ 1-2 years ☐ 3-5 years ☐

6-10 years ☐ more than 10 years ☐

4. **Educational Qualification**:

10+2 ☐ 12+3 ☐ BSc/BA ☐

MSc/MA ☐ PhD ☐

Other (please specify) ----------

5. **Related service year in supply chain management**.

Less than 1 year ☐ between 2-5 year ☐ above 5 year ☐

6. **Your current position**_____

APPENDIX 2

Profile for Supply Chain Management Practices

Using the following Rating Scales under the columns, "tick" **(X)** only one box from the given box after reading the variable on the left hand."

A.	**Suppliers and contactor relationship**	**Very low (1)**	**Low (2)**	**Average (3)**	**High (4)**	**Very High (5)**
1	The level of cooperativeness with suppliers					
2	Compliance with contactor's delivery in- full requirements					
3	Joint product planning with suppliers					
4	Customer's delivery adherence requirement					
5	Compliance contactor's delivery on time requirements					
6	The level of cooperativeness with customers					

B.	**Internal Operation Practices**	1	2	3	4	5
1	Up- to- datedness of giving service's					
2	The extent of continuous and instantaneous service improvement					
3	The level of flexibility of service giving system to handle order patterns					
4	Management know-how regarding supply chain effectiveness					
5	The level of Efficiently utilization of resources					
6	The extent of Internal logistics flow					

C	**Information Sharing Practices**	1	2	3	4	5
1	Material supply forecast Information sharing with projects					
2	Material supply forecast Information sharing with suppliers					
3	Material required related Information sharing with suppliers					
4	Material requirement related Information sharing by projects					
5	Adequacy and quality of information sharing throughout the supply chain					
6	Overall efforts of Inter-organizational information coordination and sharing					
7	Sense of trust and confidence along the supply chain					

D.	**Information technology**	1	2	3	4	5
1	The level of IT-based automated ordering from major project & client					
2	The level of IT-based automated ordering to major suppliers					
3	up-to-datedness of IT technologies throughout the supply chain					
4	The adequacy of IT systems throughout the supply chain					

E	**Training Practices**	1	2	3	4	5
1	The Level of Adequacy of training and development for management					

2	Employees training in supply chain concepts & management principles					
3	The overall adequacy of employee's training					
4	Provision of diversified skill training to employees					
5	Giving training to downstream SC members /intermediaries					

F	**Challenges/ Barriers for effective SCM implementation**	1	2	3	4	5
1	Supply uncertainty (supplier inability to carry out the promise)					
2	Institutional trust to share confidential data.					
3	The level of Willingness to share risks and benefits.					
4	The extent of Inventory fluctuation due to inaccurate information sharing (bullwhip effect)					
5	Irregular orders from inconsistent customers (project)					

G	**Supply chain Collaboration**					
G1	**Company's integration with suppliers**	1	2	3	4	5
1	The level of strategic partnership with suppliers					
2	The establishment of quick ordering system					
3	Stable procurement through network					
G2	**Company's Integration with Customers(projects)**	1	2	3	4	5
1	Follow-up customers for feedback					
2	Monitoring and measuring customer service level					
3	The level of supply information sharing with major customers					

4	Frequency of contacts with major customers(clients)					
G3	**Cross functional integration within a company**	1	2	3	4	5
1	Data integration among internal functions through network					
2	Information system integration among internal functional units					
3	Teamwork and intra-organizational coordination					
4	Extent of interaction between main office supply and project warehouse					
5	Periodic interdepartmental meetings					
H	**Customer/ project/ service descriptive statistics**	1	2	3	4	5
1	The accuracy of order processing for customers					
2	Required material accessibility					
3	Effectiveness and flexibility in meeting customers' requirement					
4	Reduction of lead time/ speed of order handling					
5	Low Stock out frequencies					
6	Timely invoice completion					
7	Effectiveness in customers' complaints management					

Please indicate the degree to which you agree with the following challenges that have a direct influence on the performance of your company supply chain management.

I	**General factor**	Very low	Low	average	High	Very high
		1	2	3	4	5
1	Challenge related to supplier inability					
2	Challenge related to institutional trust					

3	Challenge related to willingness to share risk					
4	Challenge Related to inventory fluctuation					
5	Challenge Related to unplanned orders					
6	Challenge related to employee ineffectiveness					
7	Challenge related to subsequent design change					
8	Challenge Related to financial impact					
9	Challenge related to stoppage of operation due to environmental change					
10	Challenge related to vender evaluation criteria					

APPENDIX 3

Interview Question

Supply Manager

1. How do you manage your supply chain? (close partnership with suppliers, out sourcing, subcontracting, few supplier, many supplier, holding safety stock, or use of external consultants)
2. What are the main internal & External challenges your department are facing in managing the Supply chain.
3. What about the level of Cooperativeness with Supplier and Customer.
4. What do you think the major factor contributing to the existing challenges?
5. How do you see the extent of information technology practice between your company and your partners ?

7. How do You express the effectiveness and flexibility in meeting Customers Requirement ?

8. How Do You express the relationship between your company and your supplier ?

9. How do you evaluate the extent of information sharing Practice between your company and your Suppliers?

11. What about the extent of integration between Your Company and Your Customers ?

12. Do think that it is important to establish strategic or long term relationship with suppliers?

For Procurement Manger

1 How do you see the customer service in different perspective?

2. How do you evaluate the extent of information sharing practice between your company and your suppliers?

3. What about the extent of integration between your company and your customers and supplier ?

4 Is there uncertainty of suppliers, sense of trust?

5. How do you evaluate the level of information technology between your company and your supplier and customer ?

For Human resource Manager

1. Does your company have training program & criterion in order to make employees & managers competent?
2. How do you see provision of multi skill training for your employees?
3. How does your company manage employee's complaints?
4. Does your company have flexible/agile man power?
5. How do you see the employees' commitment and initiation for work and learning?
6. How do you see the internal operation practices of your company?

For Customers /Client / project

1. How would you see your relationship with contractor?
2. Does contractor provide the material need at the promised date?
3. How do you see information sharing practice between you/your company with contractor Company? What about the level of integration with you/your company and the contractor Company?
4. How would you see the required material accessibility of the contractor?
5. What about the willingness to share risks and benefits with contractor ?

APPENDIX—4

MEMBERS OF ETHIOPIAN GRADE ONE CONTRACTORS ASSOCIATION

SOURCE: - ETHIOPIAN GRADE ONE CONTRACTORS ASSOCIATION

No	Member Company Name	Grade	Owner of the Company	Address		
				Kefele Ketema	Kebele	Office Tel.
1	Yencomad Construction PVT.LTD.CO.	GC-1	Ato Yemeru Nega	Kirkose	20/21	0115-51-40-87
2	Sur Construction	GC-1	Ato Tadese Yemane	Kirkose	03	0114-66-86-50/59 0114-66-83-44
3	Alemayhu Ketema Construction	GC-1	Ato Alemayhu Ketema	Yeka	04	0116-51-20-42 0116-47-78-06
4	Yergaaleme Construction	GC-1	Ato Zelaleme W/Amanuyele	Hawasa	Tabor	0462-20-16-02
5	Varniro Construction	GC-1	Mir Adelefo Varniro	Kirkose	21	0115-51-45-11
6	Federal Construction Engineering	GC-1				0114-34-18-79 0114-34-27-52
7	Sun Shine Construction PVT.LTD.CO.	GC-1	Ato Samuel Tafese	Kirkose	03	0115-51-32-89
8	Pyramid Construction	GC-1	Ato Dejene Eremeno	Arada	01/02	0115-52-49-17
9	Akir Construction	GC-1	Ato Awetahegne Kirose	Nefase Selke Lafeto	56	0114-42-04-01
10	Aleme Tefera General	GC-1	Ato Alem Tefera	Kirkose	08/09	0114-66-15-37
11	Tibebe Construction	GC-1	Ato Tesefaye Yeferu	Bole	14	0116-51-05-32 011651-05-34
12	Genete Construction PVT.LTD.CO.	GC-1	Ato Mulugeta Zeleke	Bole	12/13	0116-47-82-26
13	DMC Construction PVT.LTD.CO.	GC-1	Ato Daniel Mamo	Yeka	04	0114-19-81-83/198477/78
14	Afero Tseyon Construction PVT.LTD.CO.	GC-1	Ato Sisay Desta G/Yesuse	Bole	13/14	0118-50-37-71
15	Yo-teke Construction	GC-1	Ato Yohanese Tekelaye	Kirkose	10	0113-72-71-12 0113-20-08-26
16	Asere Construction PVT.LTD.CO.	GC-1	Ato Yemane T/Selase	Bole	03/05	0116-62-03-57
17	Sate cone Construction	GC-1	Ato Samuel Tekelay	Lafeto	05	0113-72-78-22 0113-72-54-09
18	Tekeleberehan Ambaye Construction	BC-1	Ato Tekeleberehan Ambaye	Kerekose	04	0114/42-61-44 0114/42-30-42
19	Berehe Hagose General Construction	GC-1	W/ro Fantaneshe W/Mherete	Bole	08	0116-61-04-17 0116-62-81-80
No	**Member Company Name**	**Grade**	**Owner of the Company**	**Address**		
				Kefele Ketema	**Kebele**	**Office Tel.**
20	Gad Construction	BC-1	Ato Gezahegne Adeghe	Nefase Selke Lafeto	11	0114/42-22-55
21	Ethio Canadian Business Group Construction	GC-1	Ato Yosefe Aserate	Akaki/Kaliti	10	0114-39-34-39 0114-41-42-43

22	Gerese Engineering PVT.LTD.CO.	BC-1	Ato Gebremikaiel Markose	Bole	12	0116/29-41-90
23	Eny Construction	RC-1	Ato Endale Yerga	Kolefe	04	0113-48-21-44 0113-48-20-62
24	Nasew Construction PVT.LTD.CO.	BC-1	Ato Shete Lulesegede	Lafeto	10	0114/42-54-90
25	Gemshu Beyene Construction	RC-1	Ato Gemshu Beyene	Bole	04	0116-47-76-40
26	Santamaria Construction PVT.LTD.CO.	BC-1	Ato Abele S/Mariam	Bole	03	0116/63-77-63
27	Rama construction	GC-1	Ato Ferewe Tedela	Gulele	15	0116-46-32-90
28	NKH Construction PVT.LTD.CO.	BC-1	Ato Ngeru Keberet	Arada	15	0114/67-30-02/06/04
29	Tera Construction	RC-1	Ato Yonige Bosasiayan	Nefase Selke Lafeto	10	0114-42-59-00
30	Emenete Endeshawe Building Construction	BC-1	Ato Emenete Endeshawe	Kolefe	05	0116/61-68-59
31	Pan Africa Construction Engineering	BC-1	Ato Mekedeme Abera	Lafeto	59	0114/65-48-60 0114/66-52-87
32	Taye Asefaw Construction	BC-1	W/ro Fantansh Mesefen	Yeka	22	0116/63-60-76 63-60-77/78
33	Redsee Construction	BC-1	Ato Asemelash Menaye	Kirkose	45	0114/16-01-55
34	Berket Endeshawe Construction	BC-1	Ato Berket Endeshawe	Bole	08/09	0114/65-43-74
35	Homa Construction	BC-1	Ato Adugna Ejegu	Bole	06	0116/62-72-00
36	Asemelash & Children's Construction PVT.LTD.CO.	BC-1	Ato Tadele Asemelash	Nefas Silke	03	0113/71-27-93 0113/71-65-96
37	Raycon Construction & Machinery Rental	BC-1	Aresema Abebe Kasay	Ledeta	08	0115/54-96-58
38	Kerafts Construction PVT.LTD.CO.	BC-1	Ato Yemanhe Tesfay W/Abzgi	Bole	14/15	0116/47-80-97/98
39	Melkone Construction	BC-1	Ato Melekam Kumelachew	Bole	04/06	0118/96-12-54
40	Ele General Business PVT.LTD.CO.	BC-1	Ato Daniel Wendwesen Benti	Bole	-	0116/63-78-50/51
41	Zamera Construction PVT.LTD.CO.	BC-1	Ato Sabagads Abay	Bole	20	0116/18-17-58

APPENDIX - 5

LIST OF ETHIOPIA GRADE ONE ROAD CONSTRACTION COMPANIES

SOURCE : ETHIOPIAN GRADE ONE CONTRACTORS ASSOCIATION

No	Member Company Name	Grade	Owner of the Company	Address		
				Kefele Ketema	Kebele	Office Tel.
1	Yencomad Construction PVT.LTD.CO.	GC-1	Ato Yemeru Nega	Kirkose	20/21	0115-51-40-87
2	Tibebe contraction PVT.LTD.CO.	Gc-1	Ato Tesfaye Yeferu	Bile	14	0116-51-05-32
3	Varniro Construction	GC-1	Mir Adelefo Varniro	Kirkose	21	0115-51-45-11
4	Tera Construction	GC-1	Ato Yonige Bosasiayan	Nefase Selke Lafeto	10	0114-42-59-00
5	Akir Construction	GC-1	Ato Awetahegne Kirose	Nefase Selke Lafeto	56	0114-42-04-01
6	Alemayhu Ketema Construction	GC-1	Ato Alemayhu Ketema	Yeka	04	0116-51-20-42 0116-47-78-06
7	DMC Construction PVT.LTD.CO.	GC-1	Ato Daniel Mamo	Yeka	04	0114-19-81-83/198477/78
8	Yoteke Construction	GC-1	Ato Yohanese Tekelaye	Kirkose	10	0113-72-71-12 0113-20-08-26
9	Sate cone Construction	GC-1	Ato Samuel Tekelay	Lafeto	05	0113-72-78-22 0113-72-54-09
10	Genete Construction PVT.LTD.CO.	GC-1	Ato Mulugeta Zeleke	Bole	12/13	0116-47-82-26
11	Eny Construction	GC-1	Ato Endale Yerga	Kolefe	04	0113-48-21-44 0113-48-20-62
12	Ethio Canadian Bussiness Group Construction	Gc-1	Ato yosefe Aserate	Akaki/kaliti	10	0114-39-34-39
13	Gemshu Beyene Construction	GC-1	Ato Gemshu Beyene	Bole	04	0116-47-76-40
14	Rama construction	GC-1	Ato Ferewe Tedela	Gulele	15	0116-46-32-90
15	Sur Construction	GC-1	Ato Tadese Yemane	Kirkose	03	0114-66-86-50/59 0114-66-83-44
16	Sun Shine Construction PVT.LTD.CO.	GC-1	Ato Samuel Tafese	Kirkose	03	0115-51-32-89
17	Yergaaleme Construction	GC-1	Ato Zelaleme W/Amanuyele	Hawasa	Tabor	0462-20-16-02
18	Federal Construction Engineering	GC-1				0114-34-18-79 0114-34-27-52
19	Pyramid Construction	GC-1	Ato Dejene Eremeno	Arada	01/02	0115-52-49-17
20	Aleme Tefera General	GC-1	Ato Alem Tefera	Kirkose	08/09	0114-66-15-37
21	Berehe Hagose General Construction	GC-1	W/ro Fantaneshe W/Mherete	Bole	08	0116-61-04-17 0116-62-81-80
22	Afero Tseyon Construction PVT.LTD.CO.	GC-1	Ato Sisay Desta G/Yesuse	Bole	13/14	0118-50-37-71
23	Asere Construction PVT.LTD.CO.	GC-1	Ato Yemane T/Selase	Bole	03/05	0116-62-03-57
