ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

LOGISTICS AND SUPPLY CHAIN MANAGEMENT PROGRAM

ASSESSEMENT ON THE CHALLENGES OF SUPPLY CHAIN MANAGEMENT PERFORMANCE OF CEMENT FACTORIES IN ETHIOPIA

BY

MANAYE WEGAYEHU

THE THESIS SUBMITTED TO SCHOOL OF COMMERCE OF ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

ADVISOR
TARIKU JEBENA (PHD)

JUNE, 2019
ADDIS ABABA, ETHIOPIA

Addis Ababa University

School of Commerce

Graduate program

Assessment on the challenges of supply chain management performance of cement factories in Ethiopia

By: ManayeWegayehu

APPROVED BY BOARD OF EXAMINERS:

Tariku Jebena (PhD)	**_____**	**_____**
(Advisor)	**Signature**	**Date**
Mengist H/mariam (PhD)	**_____**	**_____**
(External examiner)	**Signature**	**Date**
Mathiwos Ensurem (PhD)	**_____**	**_____**
(Internal examiner)	**Signature**	**Date**

DECLARATION

"I declared that the **ASSESSENET ON THE CHALLENGES OF SUPPLY CHAIN MANAGEMENT PERFORMANCE OF CEMENT FACTORIES IN ETHIOPIA** is my original work that all the sources I have used or quoted have been indicated and acknowledgement as complete reference and that it has been submitted for degree purpose previously.

Name: Manaye Wegayehu Signature _____April, 2019

I Tariku Jebena (PhD), confirm that this research project has been submitted for examination with my approval as the University advisor.

Tariku Jebena **_____** **_____**

(Advisor) **Signature** **Date**

ACKNOWLEDGEMENTS

Above all, I wish to thank my Lord and savior **GOD** for blessing me and bringing me this far. Next I want to thank my wife Aleph Babu, and my son Abenezer Manaye, for all of their kindness and support.

I would like also to express my heartfelt gratitude to my advisor, Dr. Tariku Jebena for his guidance, advice and support throughout the entire project.

I also would like to thank Dr. Birhanu Denu for his valuable comments and guidance.

I would like to thank Mr. Abebe Endawoke for his assistance in the coding and guidance of analysis of the statistics where without his assistance I probably would not be on the right track easily and finish in time. I would like to thank Mr. Tekola Hailu for his unlimited and heartfelt support and advice from the beginning till the end of the project.

Finally, I am extremely grateful to all participants of the management teams of Mugher, Messobo, Habesha, Dangote, and Derban-Midroc cement factories, who coordinated and facilitated the distribution and collection of questionnaires at their respective organization from the respondents.

TABLE OF CONTENT

LIST OF FIGURES AND TABLES

LIST OF TABLES:PAGE

LIST OF FIGURES **PAGE**

ABBREVIATION/ACRONYMS

ESC	Effective supply chain
CLSC	Customized leagile supply chain
FDRE	Federal Democratic Republic of Ethiopia
LSC	Lean supply chain
LESC	Leagile supply chain
OPC	Ordinary Portland cement
RFID	Radio frequency ID
RSC	Responsive supply chain
EDI	Electronic Data Interchange
SCM	Supply chain management
CSCMP	Council of Supply Chain Management Professionals
ERP	Enterprise Resource Planning
KPI	Key performance indicator
CRM	Customer Relationship Management
SRM	Supplier Relationship Management
GSCF	Global Supply Chain Forum
GCR	Global Cement Review
EERCA	Ethiopian Road Construction Authority
UNDP	United Nations Development Program
MoFED	Ministry of Finance and Economy Development
GSCF	Global Supply Chain Forum
CSA	Central Statistics Agency
ICT	Information Communication Technology

ABSTRACT

Supply chain management would strive to scan the environment, plan along with forward and backward stakeholders, design proper strategies to lower costs, shorten delivery time, low inventory level and improve reliability, where all intended to improve the SCM performance of supply chain team members. The purpose of this study is to assess the challenges of supply chain management performance of cement factories in Ethiopia. Primary data (questionnaires) were used for this study. Purposive sampling technique was used to distribute and collect the questionnaire. Descriptive statistics, Correlation and multiple regression analysis were implemented for presentation and interpretation of the findings. The total of 57 cement factor's professionals participated in this study. Four dimensions of supply chain management performance (suppliers' partnership, customer relationship, environmental issues and information communication technology were identified. The results of the study showed that supply chain management challenges have significant relationship with the SCM performance of cement factories and the current SCM performance of cement factories in Ethiopia is poor. The organizations should give emphasis to supply chain management challenges to maintain and improve the performance of supply chain management in cement factories.

Key Words: Supply chain management, supplier partnership, customer relationship, environment, information communication technology, SCM performance.

CHAPTER ONE
INTRODUCTION

1.1. Background of the study

In the current competitive scenario supply chain management assumes a significant importance and calls for serious attention as companies are challenged with finding ways to meet ever-rising customer expectations at a manageable cost. To do so, businesses must search out which parts of their supply-chain process are not competitive, understand which customer needs are not being met, establish improvement goals, and rapidly implement necessary improvements.

In today's business environment with globalization, specialization, innovation and outsourcing, it is crucial for entities to corporate and work in networks. So, the concept of supply chain is inevitable. Supply chain is described in the literature as a flow of goods, information or financial. We can refer to a supply chain as a flow, where an actor decides which strategy is to be used, and we may therefore talk about the management of flows in terms of the flow of goods, information and finances. It means supply chain refers to the complex network of relationships that organizations maintain with trading partners in order to procure manufacture and deliver products to services.

The term "supply chain management" appeared in the early eighties (Oliver & Webber 1982). The concept of supply chain in management, was of great importance long before in the early 20th century, especially by the creation of the assembly line. As the first era it was termed as of creation era. The second era was integration of supply chain management, where studies were highlighted with the development of Electronic Data Interchange (EDI) systems in the 1960s and developed through the 1990s by the introduction of Enterprise Resource Planning (ERP). The third era which was identified as of globalization era characterized by the globalization of supply chain management in organizations with the goal of increasing competitive advantage, creating more value-added, and reducing costs through global sourcing (Kiran, April, 2014, pp.3-10).

Lastly the era was supply chain management (SCM 2. 0) which was characterized by the use of the World Wide Web to increase creativity, information sharing, and collaboration among users. Basically, supply chain management deals with how a supply chain operate in their environment and requires meaningful collaboration and mature relationships in order to provide the necessary basis for cooperation and joint development.

Supply chain has operational objectives that could be classified in three groups: asset utilization, customer response and efficiency. We believe that the cement industry is concentrated on asset utilization with some level of efficiency and low customer response. The main reason for this location is that cement companies are focused in minimizing cost based on the economies of scale generated by their investment in large manufacturing plants. This is a given condition for all large cement companies in the industry (Isabel, 2011). The same is also in case of Ethiopia.

Cement companies must transform their supply chains to be responsive in emerging markets. Especially in Ethiopia there are emerging markets for the cement factories are expected to play significant role in terms of supplying variety of cement products for the booming construction and infrastructure development. In addition in today's dynamic and very variable; companies need to consider their supply chain management as of strategic objective in a way of improving their SCM performance increased.

These days identifying challenges of supply chain management is considered as the tool for improving overall supplies chain performances in global competitive environment (Kiran, April, 2014). So, this study is aimed to assess the challenges of supply chain management performance in cement factories of Ethiopia.

1.2. Statement of the problem

Unquestionably, the intense competition in the global business environment will continue. Walfried, et.al, (April, 2009, pp.2-5) pointed out, ***the real competition will not be among companies but among supply chains***. Especially, SCM is one of the major issues in the process industry because it deals with large and complex supply chain networks in contrast to discrete industry. As part of the process industry, cement is a key portion in the world economy. Meanwhile, so far supply chain management (SCM) has traditionally played an operational role

within companies missing opportunities for enhancing its concept and application as a mechanism to deal with the competitiveness challenges (Isabel, 2011).

Nowadays, the focus of supply chain management has shifted from production efficiency to customer driven and partnership synchronization approaches. To implement this strategic shift requires high-level collaboration among supply chain partners. Especially, this makes cement industries to move farther to efficiency and/or customer response objectives in a way of gaining competitive advantage in the market. And literatures revealed demand/supply fluctuation at the market level that pose a serious challenge to the asset configuration of supply chain, capacity synchronization, and lead-time management as of strategic challenge from market dimension aspect.

The very essence of supply chain management is satisfaction of the customers. The commitment and integration of the processes starting from the source of the materials up to the delivery of goods and services to the customers and done in such a way that it adds more value, strategically integrated and coordinated towards meeting to the best level of the satisfaction of the final consumers. Properly managed supply chain would result in lowering costs, short delivery time, low inventory level and improve reliability which are all would improve the SCM performance of the organization.

Accordingly, firms need beforehand to identify the major supply chain management challenges that may exist in the industry. Different researchers and practitioners have identified major supply chain management issues as supply chain integration and strategic partnering, poor coordination of efforts, incompatible information system, long cycle times, communication problems, customer service issues, excessive waste and environmental degradation, relatively high inventory and lower than optimal profits. For this particular case the research has chosen the general challenges that are crossing other multiple specific problems and multiple supply chain processes. These issues are strategic supplier's partnership, effective customer relationship, effective information communication technology, and managing the environmental issues.

Cement factory in Ethiopia is an emerging industry where only few pioneers are regulating the market. The complacent conditions have led them to be driven by transactional suppliers

relationships, not that much customer focused. Energy sources and environmental issues were not to the level required and information communications, infrastructure and linkages were not that much developed.

The study used enough literature on the current supply chain practice in Ethiopian Cement Industry. However, from the country's experience in the area of procurement, logistics and distribution management, the research generally describes the current practice of the supplier customer relationship based on transactional basis instead of strategic alliances. The most accustomed and taken as transparent way of procurement is bid to purchase. Though, this may enable to secure least price bid, it may not guarantee sustained lower cost, inventory, short delivery time, share appropriate feedback and improved reliability.

Therefore, identifying challenges of supply chain management performance is inevitable especially in process industry which are producing homogeneous product by focusing on efficient, market responsive and agile supply chains. So, it is strongly felt that it is so fair and relevant to assess on challenges of supply chain management performance and to gain insight into their impact on the future growth in Ethiopia Cement Industry.

1.3. Research Questions

1. What is the current level of supply chain management performance of cement factories in Ethiopia?
2. Do strategic suppliers' partnership challenges having relationship with SCM performance of cement factories in Ethiopia?
3. Do effective customer's relationship challenges having relationship with SCM performance of cement factories in Ethiopia?
4. Do effective environmental issues' challenges have relationship with SCM performance of cement factories in Ethiopia?
5. Do information communication technology Challenges have relationship with SCM performance of cement factories in Ethiopia?

1.4. Objective of the study

1.4.1. General objective

The general objective of the study is to assess the challenges of supply chain management performance in cement factories of Ethiopia and forwarding appropriate solutions.

1.4.2. Specific objectives

The research has the following specific objectives:

1. To identify the current level of SCM performance of Cement Factories in Ethiopia
2. To identify the challenges of SCM performance of cement factories in Ethiopia
3. To identify the causes of challenges in SCM performance of cement factories in Ethiopia
4. To identify the impacts of challenges on SCM performance of cement factories in Ethiopia
5. To identify the challenges of information communication technology in SCM performance of cement factories in Ethiopia
6. To bridge the study gap and propose ways forward.

1.5. Significance of study

This study adds a well understanding of the supply chain management concept by focusing the development of the practice in developing country and the future challenges that may soon come in the oligopoly structured of the Ethiopian cement market.

For the cement factories: this study is important to bridge the study gap and to propose ways forwards by assessing challenges of supply chain management performance. In addition it enables the factories to know their status in respect of SCM.

Moreover, it would enable them for they could understand challenges related to their customers and suppliers as well as to comprehend supply chain management in comprehensive way. The study could serve as a spring board for future related studies to be undertaken in the specified sector.

Furthermore, the study would help the student researchers to be aware and knowledgeable of supply chain management challenges in respect of process industry. It means the study would help them to be a better analyst and it can be a help as future reference for more studies in the future. For the staffs in supply chain management section: this study would enable them to place their effort on the gap identified.

1.6. Scope and Limitation of the study

Challenges of SCM in cement industry are broad concepts, which consist of numerous interactions, but the scope of this study is restricted to particular topical and spatial areas. Topical approach of the study is limited to see into future challenges of cement industries in respect of their supply chain management performance. The spatial aspect of the study is limited to cement factories found in Ethiopia. The survey may have involved a specific group of staffs in logistics, operation, technical, marketing, ICT, and supply chain management sections and high level managers of DerbaMidroc, Mugher, Messebo, Habesha and Dangote cement factories by considering their contribution to cement production market share which is 70%, and which are the largest and most modern cement plants in incorporating dry-process rotary kilns with pre-calciners that boost a manufacturing plants' performance levels but use less energy (Alubel, 2017).

1.7. Organization of the study

This research is organized into five chapters. The first chapter deals the background of the study, statement of the problem, objective of the study, research questions, significance of the study, and scope and limitation of the study. Chapter two embarks mainly on theoretical review, empirical review, and conceptual framework related to this research. Chapter three encompasses research design and methodology. The fourth chapter deals: Data presentation, analysis, and discussion. The fifth chapter is about conclusion and recommendation.

CHAPTER TWO
REVIEW OF RELATED LITERATURE

This chapter embarks on reviewing theoretical literature on such topics as concept of supply chain management, the back ground of cement industry, the current status of Ethiopian Cement Industry, supply chain management in cement industry, challenges of supply chain management, and empirical evidence on challenges of SCM till the study leads towards the framework of analysis. Empirical evidences and conceptual framework of the study would also discuss.

2.1. The Concept of Supply Chain Management

2.1.1. Fundamentals of Supply chain management

Supply chain management is defined by different practitioners and researchers depending on the background where they come from. Generally the following definitions can be as a working definition of supply chain management.

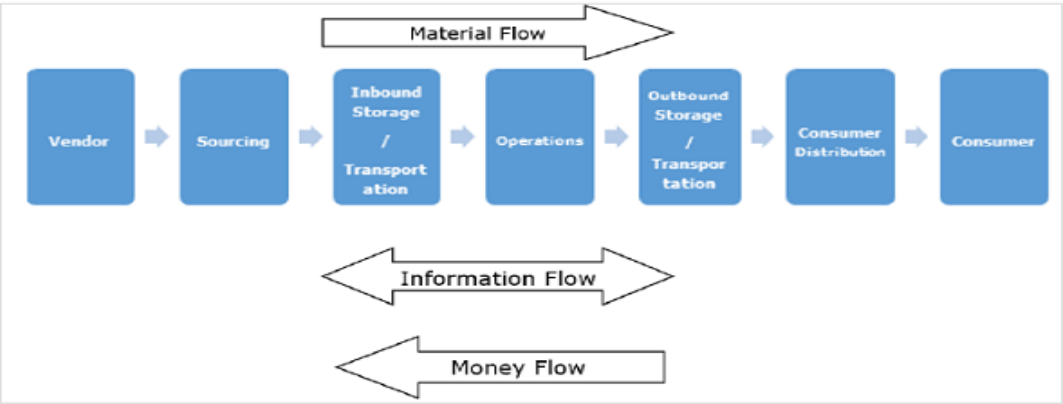
Blanchard (2010) defines supply chain as the sequence of events that cover a product's entire lifecycle, from conception to consumption. Supply chain is defined as a group of inter-connected participating companies that add value to a stream of transformed inputs from their source of origin to the end products and services that are demanded by the designated end-consumers (Dawei, 2011, pp.8-11). It means a supply chain is basically a group of independent organizations connected together through the products and services that they separately and/or jointly add value on in order to deliver them to the end customer.

Based on this first a supply chain is formed and can only be formed if there are more than one participating companies. Second, the participating companies with in a supply chain normally do not belong to the same business ownership, and hence there is a legal independence in between. Third, those companies are interconnected on the common commitment to add value to the stream of material flow that run through the supply chain.

Lambert and Cooper (2000) use the definition of Supply Chain Management (SCM) as forwarded by the Global Supply Chain Forum (GSCF) as: "supply chain is the integration of key

business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders."

Figure: 2.1. Type of supply chain



Source: adopted from http//www.Pinterest.com

The terms supplier and customer have been in use since the start of commerce. However, the concept of supply chain began to appear in the late 1950 after Jaly Forrester and his colleagues from Massachusetts, Institute of Technology, began to study the relationship between the suppliers and customers and where they identify what causes what later known as bullwhip effect. From functional approach of managing units, the process oriented term of supply chain management was also discussed by Keith Oliver in the year 1982. Following this the value chain processes were identified by Michael Porter in the year 1985 (Banchard, 2010).

In today's global, dynamic economy, it is beneficial for companies to operate a supply chain that is both *agile* and *lean.* Using lean and agile in combination is known as having a hybrid supply chain strategy. A lean supply chain focuses on adding value for customers, while identifying and eliminating waste-anything that does not add value. Being agile and responsive, on the other hand, implies that your supply chain can handle unpredictability and a constant stream of new, innovative products with speed and flexibility.

Supply chain management (SCM) has three principal components: (1) creating *the supply chain network structure* (2) developing the *supply chain business process* (3) *Managing the supply chain activities.* The supply chain network structure consists of the member firms and the links between these firms. Business processes are the activities that produce a specific output of value to the customer and the management function integrates the business processes across the supply chain.

Performance and competitiveness are key factors in supply chain management. This means the integration of the supply chain activities to achieve a sustainable competitive advantage (Handfield and Nichols, 1999). It can be defined as "the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole" (Krisztina and Károly, 2012, pp.8-12)

2.1.2 Supply chain management performance issues

To make the supply chain operations more effective and for better customer satisfaction, organizations need to evaluate their process and measure the supply chain performance so that improvement in the process can be made on a continuous basis. Supply chain is a dynamic function of organization that changes with time, there are several factors that influence its performance. Each organization has its unique supply chain structure so the critical factors that influence its performance also vary from organization to organization.

Top-performing supply chains have three distinct qualities. First, they are *agile* enough to react readily to sudden changes in demand. Second, they *adapt* over time as market structures and environmental conditions change. And third, they *align* the interest of all members of the supply chain network in order to optimize performance.

Performance as an indispensable tool measurement provides the necessary assistance for performance improvement in pursuit of supply chain excellence". The main difference between supply chain performance and other performance measures lies in the extended concept of supply chain where it includes suppliers and distributors etc. There are a number of performance

measures that are available. The different performance measure systems have different views for integrating supply chain performance measures. These performance measure systems answer basic question like what is to be measured, what measures to be integrated and what is the frequency of integration etc.

Supply chain performance measures can be classified broadly into two categories: qualitative measures (such as customer satisfaction and product quality) and quantitative measures (such as order-to-deliver, lead time, supply response time, flexibility, resource utilization, delivery performance etc).

2.1.3 Supply chain management, strategic supplier partnership issues

Supplier relationship management (SRM) is a systematic approach to assess suppliers' contribution to business. It helps to determine which suppliers are providing the best influence on your success and ensures they are performing well. Supply chain management uses SRM in procurement, operations, and project management. SRM helps to foster positive relationship with your suppliers and helps guide the activities you should engage in with each supplier.

The main goal of suppliers' relationship is to improve business between you and your suppliers. By creating a streamlined approach, you improve efficiency for both business and your suppliers. Though the approach to SRM can vary from one organization to the next, the main focus is on developing a mutually beneficial relationship with all of your suppliers, especially those that are considered as ***strategic partnerships*** for your brand.

A strategic supplier partnership is defined as a long-term relationship between the organization and its supplier (Li et al., (2006). Companies such as Infineon Technologies, BM, Cisco and Hewlett Packard have worked closely with their suppliers and moved from early "arm's length" relationships to "durable arm's length" relations and strategic partnerships. The strategic partnership could involve joint product development, and sharing of product demand forecasts. Adopting early supplier development operational activities, such as product development projects, can offer more cost-effective design choices, and select best available components and technologies, resulting in smoother production, improved product quality and reduction in lead time (Tan et al., 2002). Through strategic supplier partnerships, organizations can work closely

with suppliers who can share responsibility for the success of the products (Li et al., 2005). Such strategic supplier partnership should enable successful supply chain management.

2.1.4 Supply chain management, customer relationship issues

Customer Relationship Management (CRM) refers to the methodologies and tools that aim encompasses all of a business' interactions with current, past and future customers with the goal of "improving" customers' relationships with that business. In other words, the goal of CRM is to gather enough information about a customer and use it well enough to increase that customer's positive interactions with the company, thereby increasing that company's sales.

CRM systems are collaborative; the gathering of data through all phases of the customer relationship (marketing, sales, and service)provides a complete picture, allowing business owners/managers to make informed decisions. Customer relationship management includes:

- Processes: that helps identify and target their best customers, generate quality sales leads and plan and implement marketing campaigns with clear goals and objectives.
- Processes: that help form individualized relationships with customers (to improve customer satisfaction) and provide the highest level of customer service to the most profitable customers.
- Processes: that provide employees with the information they need to know their customers' wants and needs and build relationships between the company and its customers.

Customer relationship management (CRM) is an important component of SCM (Ta et al., 1999) and involves building and maintaining long-term relationships with customers (Li et al., 2005). Stalk and Hout (1990) stated that maintaining a good customer relationship will enable organizations to be more responsive to customers' needs, thus creating greater customer loyalty, repeat purchase and willingness to pay minimum prices for higher quality products. Customer loyalty and customer satisfaction are the main goals of supply chain management.

2.1.5 Supply chain management, information communication issues

The success of a company's supply chain management depends upon the accuracy and speed of the information provided by each business partner (Chong et al., 2009). Li t al. (2006) defined information sharing in the supply chain as the extent to which vital and proprietary information is communicated to the company's supply chain partner. Wal-Mart is an example of successful information sharing practices whereby it shares online summaries of point-of-sales data to its close suppliers such as Johnson and Johnson and Lever Brothers (Lee et al., 2000). A successful sharing of useful information between the supply chains partners can result a reduction of inventory and manufacturing cost. Better understanding of customer needs and faster response to market changes. Driven by e-commerce's capabilities to empower client, most companies have moved from the traditional "PUSH" business model, where manufacturers, suppliers, distributors, and marketers have most of the power to customer driven "PULL" model.

2.1.6 Supply chain Management, environmental issues

For years the producers' responsibilities were finished when the product was on the shelves in the shop or when the guarantee period was over. Supply chain management was perceived as the planning and control of the flow of goods from the sourcing base to the final consumers, accompanied with the necessary information and money for the independent entities along that chain.

Traditional supply chain management focuses on low cost, high quality, reduced lead time and high service level. The introduction of the Extended Producer Responsibility in a number of countries and industries has changed the rules of the market behaviors. Nowadays manufacturers need to take into consideration the post-consumption phase of their products, the so called end-of-life phase: the environmental burdens incurred during different stages of the product transfer from manufacturer to final user and then to the disposal site. The interest in environmentally friendly supply chain management has risen considerably in recent years. This can be seen by the number of initiatives taken by companies.

Brand owners are very often perceived to be responsible for environmental problems in the entire supply chain from the sourcing base to end-of-life recovery issues. It is expected that the

manufacturers should reduce sources of waste and pollution throughout their supply chains, across multiple entities, upper stream (suppliers) and downstream (distributors and consumers). An environmentally friendly supply connects with partners who should make managerial decisions with regard to environmental consequences. It enhances competitiveness and creates better customer service, resilience and increased profitability. Companies are forced to adopt ecologically responsive practices to meet legislative requirements but they can also benefit from "green" behavior. According to Strivastava (2007), green supply chain management can reduce the ecological impact of industrial activity without sacrificing quality, cost, reliability, performance or energy utilization efficiency, meeting environmental regulations to not only minimize ecological damage but also to ensure overall economic profit.

Ignoring these issues has wide range of costly consequences. Some of these consequences are easily detected but others are hidden and difficult to track down. Government fines and civil penalties are clearly seen in terms of costs incurred to the company. Costs like legal and investigation costs, costs of taking corrective actions and administrative costs incurred for future compliances are covered in the general costs of an organization. Customer deflections and loss of reputations have devastating consequences and are difficult to quantify them as well (Thompson et al. 2008). According to McCrea (2010), these day's companies are discovering that greener and most sustainable supply chain is not only good for the environment, but also for business firms.

2.2. Background of Cement Industry

Invention of Cement Ever since civilizations first started to build; the world has sought a man made bonding material that would bind stones into a solid, formed mass. The Egyptians discovered lime and gypsum mortar as a binding agent for building such structures as the Pyramids. The Greeks made further improvements and finally the Romans developed cement that produced structures of remarkable durability (Cement Association of Canada 2006).

In 1845, Issac Ohnson made the first modern Portland cement by firing a mixture of chalk and clay at much higher temperatures, similar to those used today. At these temperatures (1400^{o}c-1500^{o}c), clinkering occurs and minerals form which are very reactive and more strong cements.

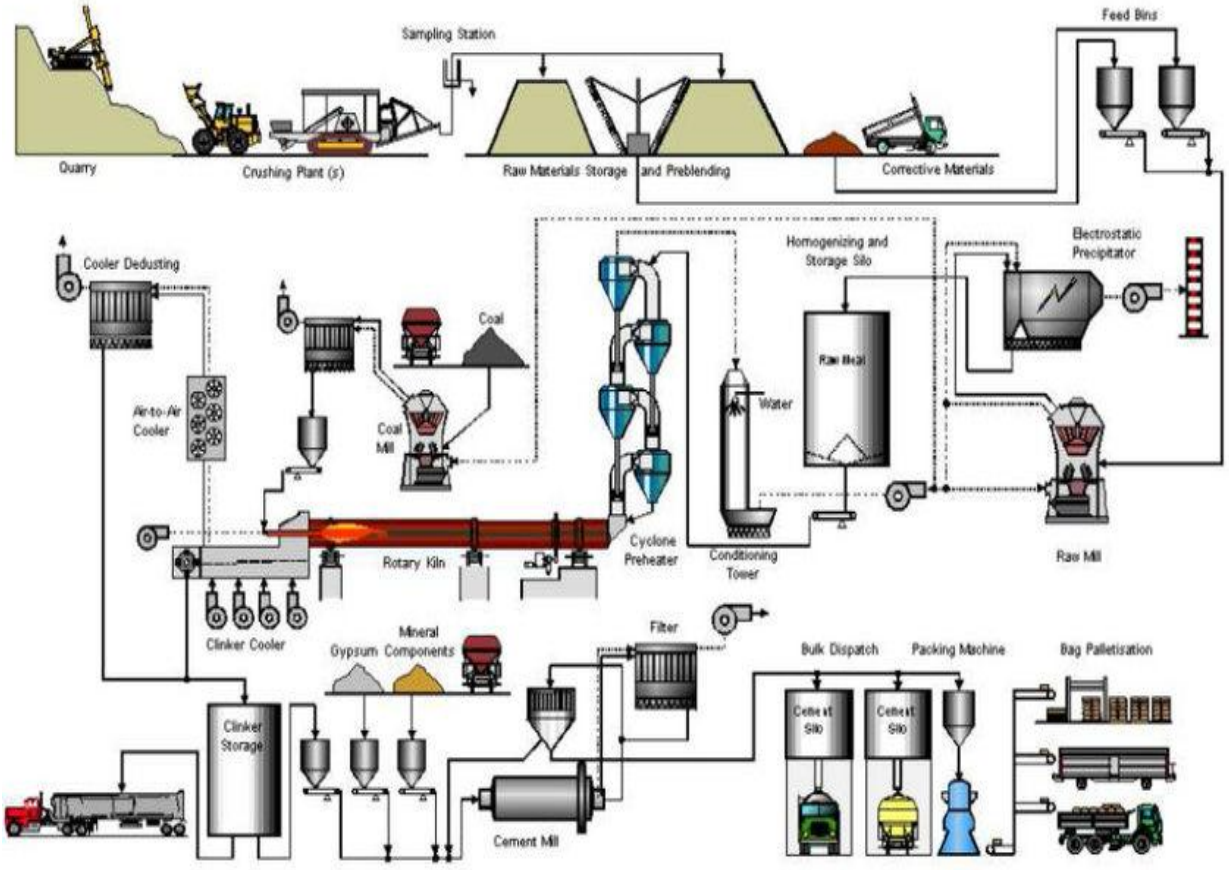
While Johnson used the same materials to make Portland cement as we use now, three important developments in the manufacturing process lead to modern Portland cement:

- Development of rotary kilns
- Addition of gypsum to control setting
- Use of ball mills to grind clinker and raw materials

From the turn of the 20th century, rotary kilns gradually replaced the original vertical shaft kilns, used originally for making lime. Rotary kilns heat the clinker mainly by heat transfer and this is more efficient at higher temperatures, enabling higher burning temperatures to be achieved.

Cement is the major component of concrete. Concrete is an artificial rock-like made from a proportioned mix of hydraulic cement, water, fine and coarse aggregates, air, and sometimes additives. Concrete can also be made from a ready mix- formula in a concrete plant. Concrete is one of the most important and widely spread building materials in the world.

Fig.2.2. Production of Cement by the dry process



Source: http://www.engineeringintro.com/uncatagorized/Cement -manufacturing-process/

Cement is a mixture of limestone, sand, clay and iron. The most common type of hydraulic cement is the Portland cement. The term hydraulic cement is used because cement hardens when mix with water. According to the Portland Cement Association (2008), "Portland cement is a closely controlled chemical combination of calcium, silicon, aluminum, iron and small amounts of other ingredients to which gypsum is added in the final grinding process."

According to CEMBEUREAU, (2008), the cement industry is capital and energy intensive, but not labor intensive. According to Lafarge (2007), the cost of a new cement plant is between 50 to 160 Euros per ton of annual capacity, depending on the country. According to Ghemawat (2002), the minimum scale that is efficient for a cement plant is approximately one million tons of annual capacity. Combining this information, the average investment for an efficient plant is

approximately 105 million Euros. Labor usage in the cement industry is relatively low because it is a continuous process with high level of automation.

A description of the upstream component of the cement supply chain, including sourcing of raw materials, manufacturing and delivery from the plant. Cement plants are normally located near the quarries which are the source of their main raw materials. The main reason for their location is that 1.6 tons of main raw materials are required to produce 1 ton of cement. According to the information gathered there are no constraints on the availability of main raw materials needed for cement.

There are two steps in cement production. The first step is the production of clinker from raw materials. The second step is the production of cement from clinker. The first step requires raw materials to be transported to the plant and then to be crushed and homogenized to enter a big rotating pipe called a kiln. The kiln is heated to very high temperatures, and then it is inclined, allowing the raw materials to roll to the other end, where they are quickly cooled. The result is a solid grain called "clinker." The second step is the transformation of clinker into cement in grinding mill process. Additional elements like gypsum and perhaps other minerals might be aggregated to obtain a fine powder called cement. Finally, cement is moved to storage until a customer place an order.

Cement as a final product is sold in bulk or bags. Cement bulk is the normal way to distribute cement in developed economies. Bulk sales represent almost 90% of the US cement market. Concrete producers are biggest customers. According to CEMEX, bagged cement represents 80% of sales in emerging markets. Bag sales are strongly related to Do-It-Yourself (DIY) home construction.

2.3 The Current Status of Ethiopian Cement Industry

Ethiopia is well set up geographically for cement production and currently has more than 16 cement plants (Ministry of Industry, 2015). In terms of size and installed production capacity: four are large and integrated firm with more than 2.2Mta designed production capacity, four are mid-sized cement with combined installed cement production capacity of 2.3 Mta; while the rest

are small cement plant with vertical shaft kiln technology including clinker grinding facilities (Global Cement Review, 2013).

Cement is an essential component of infrastructure development and most important input of construction industry, particularly in the government's infrastructure and housing programs, which are necessary for the country's socio-economic growth and development. Currently, the average cement production capacity utilization rate in the country is about 50%. This level of capacity utilization even compared to global average of 60 to 70% or recommended acceptable optimum production capacity utilization rate that range between 80 to 85% is substantially low (FDRE Ministry of Mining (2015, pp.1-5).

Even though cement consumption in Ethiopia is significantly growing, evidences show that the country's production capacity has grown far more than the demand leading the industry to under capacity production. As a result, some cement companies have started to struggle for survival due to substantially low capacity utilization compare due to global standards. Compared to 11.2 Mta actual installed capacities (2014), consumption is only 5.47% Mta. This leaves the industry at only 49% utilization.

Ethiopia, in terms of cement production and consumption has overtaken the leading position from Kenya. However, for instance compared to Egypt, Ethiopia substantially lags behind in terms of production, rate of consumption, capacity utilization and the proportion of energy cost as compared to total production cost. Egypt has 23 cement plants with total production capacity of 55.2 Mta; per capital consumption of 554kg as well as nearly 51.1 Mt cement domestically in the year 2012 alone. Besides, the cement capacity utilization in Egypt ranges from 77% in 2004 to 92% in2008. Even though strong demand driver exist in Ethiopia, per capital cement consumption is till 62kg compared to 165kg of Sub-Saharan African's average.

Moreover, the energy cost for Ethiopian cement firms accounts nearly 50 to 60% of the total production cost structure as contrast to 30 to 40% of Global standards. Poor infrastructure status mingled with high trade and logistic cost, make import of energy inputs and distribution of cement very expensive, which further escalate the production and distribution cost. Consequently, price in Ethiopia is still perceived to be relatively higher as compared to global

price. Comparison of Ethiopian cement production, consumption, and export with global, China and Egypt since 2010 is indicated in the table: 2.2.below.

Table: 2.1 Comparison of production, consumption and export (in Million Ton)

year	Global			China			Egypt			Ethiopia		
	Consumption	production	export	consumption	production	Export	consumption	production	export	consumption	Production	export
2010	3312	3365	162.3	1850	1880	16.1	49.5	48	0.61	2.11	1.62	0
2011	3585	3839	161.2	2050	2080	10.6	48.7	45.4	0.91	3.01	2.72	0
2012	3736	3831	167.4	2160	2220	11.5	51.1	55.2	4.02	3.77	3.77	NA[3]
2013(E[4])	3954	4061	171.5	2290	2350	12	54.2	58	3.41	4.73	4.73	NA
2014(F[5])	4140	4263	176.7	2360	2430	12	58	62	3.29	5.48	5.47	NA

Source: GCR, 2013 AND ERCA, 2014

([2]Based on actual data from CIIDI, [3]Actual data not available, [4]Estimated, [5]Forecasted)

2.3.1 Marketing and logistics performance of Ethiopian cement industries

Cement price in Ethiopia is still perceived to be higher compared to global price level. Several factors have contributed to relatively higher cement price in Ethiopia: high production cost mainly due to relatively higher energy cost; high inbound and outbound logistics; high initial investment cost; and most importantly lower level of production capacity utilization among others.

In general, it is difficult to get reliable marketing performance related data on Ethiopian cement firms. Yet, summary of available sources suggest that the major cement markets are geographically concentrated around Addis Ababa. Besides, the government is the major buyer of cement for construction of mega projects. In this regard, small cement firms are less likely candidate to supply cement for the government projects due to quality and limited capacity to supply in large quantity. As a result, four to five of large cement firms in Ethiopia are currently

dominating Ethiopian cement market. Due to their higher production cost and limited capacity utilization, the current profit margin of cement firms in Ethiopia is claimed about 7-10% according to industry experts. So, some owners suggest that, they are producing at breakeven let alone to make profit. If the current condition continues, most cement firms will eventually be forced to close their firms or respective owners of the firms may shift their attention to other investment and also become unable to further invest in HR, R&D, and technology among others for the opportunity cost to invest in cement will remain abnormally higher.

According to CEMBUREAU estimates cement transportation by road turns uneconomical beyond 300km; otherwise the price of transportation may even go higher that has manufacturing cost itself. In Ethiopia trucks are still the predominant and almost the sole option to transport cement and its related imported inputs.

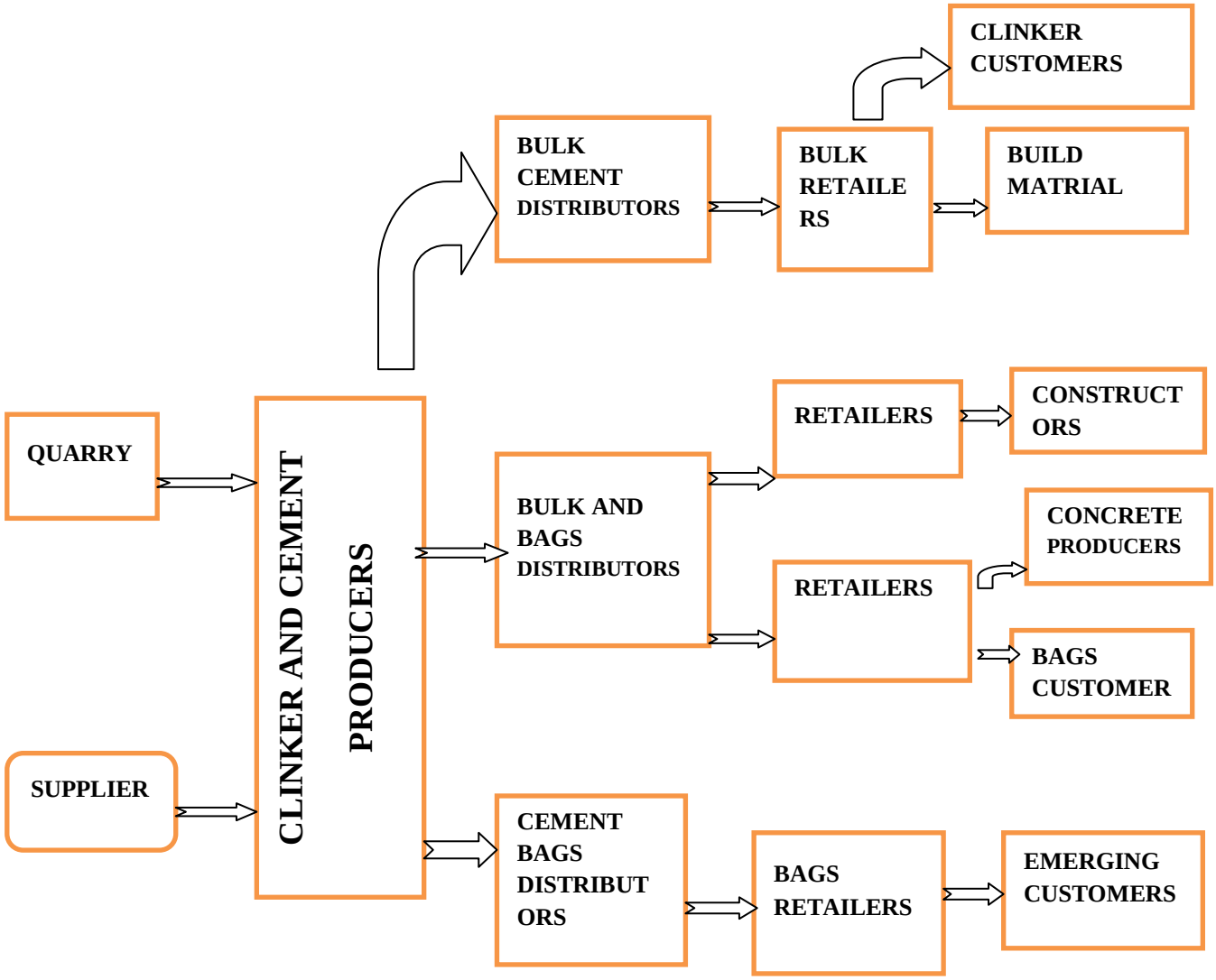
2.5. Supply chain Management in Cement Industry

2.5.1 Overview of Cement Industry supply chain management

According to SongSong Liu, (2011) SCM is one of the major issues in the process industry, which deals with large and complex supply chain networks as a process industry cement production plant consists of the following three processes: raw material process, clinker burning process, and finish grinding process. So, the distribution is an important area where with the help of supply chain management the best distribution channel can be framed. In cement industry SCM has its own role for improving its processes, especially energy, which would also enhance competitiveness of supply chain.

Cement as a final product is sold in bulk or bags. Cement bulk is the normal way to distribute cement in developed economies. Bulk sales represent almost 90% of the US cement market. Concrete producers are the biggest customers. According to CEMEX, bagged cement represents 80% of sales in emerging markets. Bags sales are strongly related to Do-It-Yourself home construction.

Figure 2.3: Cement supply chain network



Source: own survey (June 2019)

A description of the upper stream component of cement supply chain, including sourcing of raw materials, manufacturing and delivery from the plant. The downstream component of cement supply chain varies from country to country. Concrete (and therefore cement) demand is created in the short term by residential, no-residential and public sector construction. Cement sales are normally related to economic growth, macroeconomic factors and weather conditions. These issues have local and regional cycles.

According to Grossmann (2004) (as cited in Songsong Liu, 2011) supply chain management is one of the major issues in the process industry, which deals with large and complex supply chain networks. As process industry cement production plant consists of the following: raw material process, clinker burning process and finished grinding process. So, the distribution is an important area where with the help of supply chain management the best distribution channel can be framed. In cement industry supply chain management has its own role for improving its processes, especially energy, which would also enhance competitiveness of supply chain.

Cement supply chain from an economic perspective, the oligopoly or monopoly that characterized cement industry might explain the lack of importance of SCM. Compared to a free market, oligopolies and monopolies have low pressure from customers and limited number of competitors. The focus of companies in oligopolies or monopolies is concentrated on pricing and competition monitoring. Traditionally, supply chain management is not a priority of these companies.

Traditionally, cement supply chain is driven by asset utilization. Assets are represented by production plants, infrastructure and transportation equipment. Asset utilization is a given for the largest companies in the cement industry. This is why they are moving to efficiency and /or customer response objectives to differentiate and to gain competitive advantage in the market. This change in strategy requires cement companies to build supply chain management capabilities that traditionally asset utilization companies do not have,in order to succeed in new competitive environment. The low price-to-weight ratio, which is a characteristic of cement, limits the geographical coverage of a production center. This solution reduces supply chain management to an operational role because it is solely responsible for moving the product by truck in a ratio of 300 kilometers. The use of maritime, rail and river transportation expanded the coverage of a production center allowing supply chain management to increase its scope facilitating the access to new markets and reducing costs significantly. Additionally, supply chain management costs are normally hidden in the company financial statements. Detailed cost analysis is required to uncover the potential of savings of supply chain management.

Practices such as collaboration and information sharing with upper stream and downstream supply chain partners are a significant opportunity to gain alignment for cement companies.

Other elements such as use of equitable contracts and the elimination of forward buying practices might generate value and increase the agility of these chains. One additional opportunity is supply chain collaboration with local or regional competitors in the purchasing of common components, equipment and services. Collaboration with competitors requires a significant change in the min-set of the cement companies.

2.6. Challenges of supply chain management

The challenges facing SCM as theory and practice stem from their interplay and misalignment. The research reported here reveals the substantial gaps between theory and practice. One central challenge is to the very idea of "managing" the supply chain. Who could and should have this responsibility? Arguably one ideal would be a separate function independent of the existing array of functions which are partially but not fully involved. Such a developed function might act as the arbitrator of supply and demand.

Many researchers have mentioned a classification of supply chain integration challenges. SC integration challenges can be classified through the challenge of system relationships; the SCM system has two kinds of relationships, which are the relation between sub-systems, and the relationship between SCM system and the business strategies. This classification emphasizes the technical challenges that came from the relation between SCM system and internal business strategy, unfortunately this classification bypass the challenges that the companies may face from external environment (Kiran, April, 2014).

Information sharing in a supply chain faces several hurdles. The first and foremost challenge is that of aligning incentives of different partners. It would be naive of a partner to think that information sharing and cooperation will automatically increase his or her profit. In fact, each partner is wary of the possibility of other partners abusing information and reaping all the benefits from information sharing.

Shah (2005) classified the supply chain problems in the process industry into three categories: supply chain network design, supply chain simulation and policy analysis and supply chain planning, and reviewed the state of the art of research in these areas. Regarding to the second element of the theories i.e. type of supply chain: efficient, quick, market responsive, lean and

hybrid is the theory as the framework for providing valuable guidance to prioritize performance measures for evaluating cement factories. It is an appropriate theory for this sector because cement factories are well known for producing homogeneous type of the product by focusing on efficient, market responsive and agile supply chains. In respect of supply chain management: theory, practice and future challenges.

John, et al. (2006) in their paper critically assesses current developments in the theory and practice of supply management and through such an assessment they could identify future challenges. Here the scholars have given due consideration to the challenges in SCM. So, in order to assess evidence and categorize the analysis, the frame work for this study was designed on collecting the responses given by the professionals in SCM sections of the cement factories in respect of the degree of agreement (Do not agree, Agree to small extent, Agree to moderate extent, Agree to a considerable extent and Agree to a great extent) to the statements of related to challenges.

2.7 Empirical evidence on challenges of SCM

Owing to SCM's interdisciplinary origin, there have been various definitions of SCM (Li, et al., 2006). The supply chain Management concept was derived from the areas of purchasing and supply management, and transportation and logistics management (Li et al., 2006; Tan et al., 1998). From purchasing and supply perspective, SCM is synonymous with the integration of the supply base that evolved from the traditional purchasing and materials function. Others who defined SCM from the purchasing perspective include Wisner and Ta (2000) and they stated that SCM is a basic strategic business process, rather than a specialized supporting function. From the perspective of transportation and logistics management however, SCM is synonymous with integrated logistics systems, and focuses on inventory reduction both within and across organizations in the supply chain (Fisher, 1997; Lamb, 1995).

Based on such integrated SCM concept, SCM is defined by Shimechi-Levi et al. (2000) and Park and Krishnan (2001) as a set of approaches utilized to efficiently integrated suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the

right quantities, to the right location, and at the right time, in order to minimize system-wide costs while satisfying service level requirements.

Grossmann (2005) gave an overview and highlighted some major challenges of SCM in the process industry. Specifically, John, et.al (2012) evinced in their journal a number of challenges inhibiting supply chain management depending on the context and the way in which the challenge is utilized in reference to green manufacturing for Indian cement industry. In case of Pakistan as the challenge of lean supply chain management Khurram, et.al (2017) pointed out that even though lots of cement manufacturers have now developed their own energy development plants, which have resulted in elimination of production disruptions as well as reduction in overall energy bill and likewise, level of technology has also improved which would also support in implementation of lean supply chain; suppliers' consolidation is not taking place in cement industry of Pakistan. An underlying reason for this is that suppliers who not very learned and they do not understand benefits of such consolidation.

In addition, it was observed that in last few years, demand for cement was not certain. There were a number of reasons for this. This includes undocumented economy as well as limited ability of the businesses to forecast future demand. Moreover, unstable political and legal condition in Pakistan had resulted in varying demand patterns and had made planning difficult for businesses. This resulted in rise in stock levels, which resulted in loss in competitiveness of supply chain.

Moreover Belay Mengistu (November, 2011) forecast future challenges by analyzing challenges in exploring correlation between the dependent variable – competitive position of cement factories and independent variables Extent of Strategic Suppliers Partnership, Effective Customer Relationship, Managing Environmental Issues and Effective Information Communications in Ethiopian Cement Industry. In respect of supply chain performance Cuthbertson, R. and Piotravicz, W.(2002) on their study identified future challenges of supply chain management by analyzing challenges in exploring correlation between the dependent variables - supply chain performance and independent variables Extent of Strategic Suppliers Partnership, Effective Customer Relationship, Managing Environmental Issues, and Effective Information Communications.

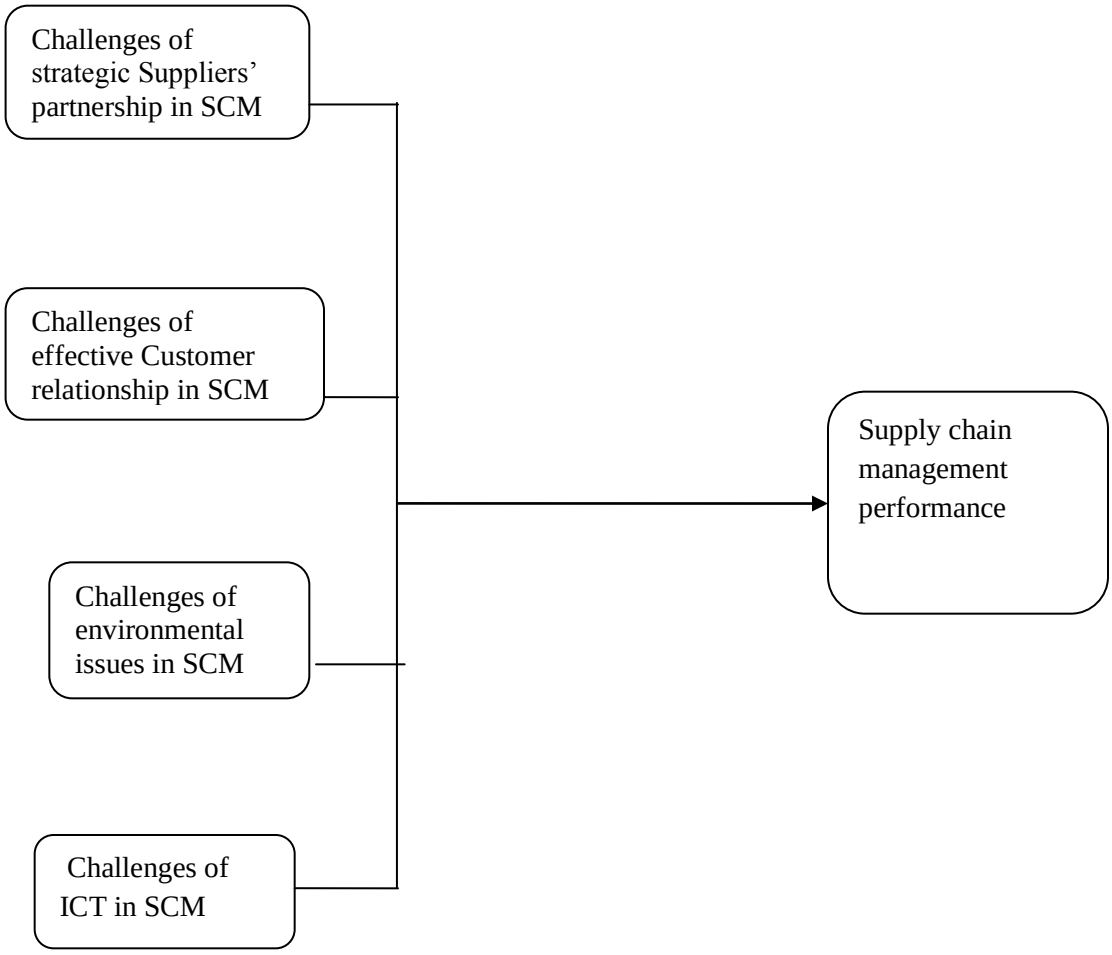
2.8 Conceptual framework of the study

Issues/challenges in SCM, as listed by Fawcetet al.2007, are poor coordination of effort, incompatible information system, long cycle time, communication problems, customer service issues, excessive waste and environmental degradation, relatively high inventory for the level of customer service achieved and lower than optimal profits.

For this particular research, the researcher would identify the general problems that have an impact on the future performance of cement firms in Ethiopia. These are partnership with the suppliers, information communication, managing environmental issues and customer relationship issues. As described above, these challenges cross other multiple specific problems and cross multiple supply chain processes. For example, information communication crosses various processes related to demand management, transportation, inventory control, procurement, energy and environmental issues and so on.

The study was formulated based on four major dimensions of supply chain management challenges namely supply chain partnership, customer relationship, environmental aspects, and information technology. Independent variables of this research are supply chain partnership, customer relationship, environmental aspects, and information technology. Organizational SCM performance is dependent variable of the study.

Figure 2.4 Conceptual framework



Source: adopted from Okoth, 2011

CHAPTER THREE
RESEARCH METHODOLOGY

Brief description of the study area, research design and approaches, population and sample, data collection method, reliability and validity test are presented in this chapter. Further description and illustration is given on how each data collection tool is applied

3.1 Brief description of the study area

The study embraces DerbaMidroc, Mugher, Messebo, Habesha and Dangote cement factories whose contribution to cement production market share is 70% and which are the largest and most modern cement plants in incorporating dry-process rotary kilns with pre-calciners that boost a manufacturing plants' performance levels but use less energy (Alubel, 2017). Dangote Cement Industries Ethiopia is taking the lion's share after the Nigerian-based company commissioned a 2.5 million-tone plant in 2015. The plant which is located 90km from Ethiopia's capital Addis Ababa is the largest and most modern cement plant in Ethiopia, producing 32.5 and 42.5-grade cements, according to the company's latest annual report.

3.2 Research approach (research design)

This research employs descriptive survey research approach method in order to identify the current and the future challenges of supply chain management performance by analyzing challenges in exploring correlation between the dependent variable-supply chain management performance and independent variables: challenges of strategic supplier's partnership, effective customer relationship, managing environmental issues, and effective information communications. The study is also explanatory research, with purposes of finding challenges and screening them. It is often referred to as grounded theory approach or interpretive research as it used to answer questions like what, why and how. And this research poses questions to willing participants, summarized and analyzed them and finally conclusion is made for the population from the drawn samples.

3.3 Population, Sample and Sample size of the study

The target population is the subject which a researcher wants to generalize the results of the study. The target population of this study will include mainly professional staffs in logistic and supply chain management and some related sections' managers of DerbaMidroc, Mugher, Messebo, Habesha and Dangote cement factories. In align with the objective- assessing challenges of supply chain management performance, the aforementioned factories are considered because of their contribution to cement production market share which is 70% and which are the largest and most modern cement plants in incorporating dry-process rotary kilns with pre-calciners that boost a manufacturing plants' performance levels but use less energy (Alubel, 2017). And currently there are 77 professionals in logistics, operation, ITC, technical, marketing, supply chain management section managers and general managers of these cement factories (Alubel, 2017). This same number is considered as the sample size

3.4 Sampling Technique

The careful design of the sample size and the right selection of sampling techniques are important to ensure the representativeness of the sample that can be dependable to generalize the information obtained from the sample to the whole population of the study (Kothari 2004). As the sampling technique this study will employ non-probability sampling, but purposive sampling.

Purposive sampling (also known as judgment, selective or subjective sampling) is a sampling technique in which researcher relies on his or her own judgment when choosing members of population to participate in the study. Purposive sampling is a non-probability sampling method and it occurs when elements selected for the sample are chosen by the judgment of the researcher. Researchers often believe that they can obtain a representative sample by using a sound judgment, which will result in saving time and money (Black, K. 2010).

3.5 Method of Data Collection

The research data addresses three issues; the topic of the interest, the respondents and the responses of respondents in relation to the topic of interest (Diamantopoulos and Schelegelmich,

2000). Data could be in different methods. In survey research the most applicable methods are face-to-face interview, telephone interview or written questionnaire (Leedy and Ormarod, 2010).

In this practical case the researcher will apply a written questionnaire and as the case may require face-to-face briefings. Method is a specific data collection process in accordance with the assumption of the selected methodology. Primary data are those which are collected a fresh and for the first time and thus happen to be original in character (Kothari, 2004). Thus this study apply mainly the following information gathering tool, i.e. survey /questionnaires

3.5.1 Survey/ Questionnaire

Questionnaires are used as the main instrument of data collection from the primary sources. The questionnaire consisted of closed ended questions which were prepared and distributed to selected 77 respondents. Close ended questionnaires were designed in the form of showing the extent of strategic suppliers' partnership, effective customer relationship, managing environmental issues & supply chain management competitive performance level of the factories

3.6 Data Analysis Technique

The data collected has to give meaning to what it is intended for. As discussed by Diamantopoulos & Schlegelmilch (2000), data analysis begins with doing some data description and followed estimation and or hypothesis testing.

The primary data will be collected with great attention to minimize the loss of important information. The quantitative data will be checked during data collection and data entry. The data will be coded and entered into the computer by using SPSS 20. Cronbach's Alpha is used to measure internal consistency that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability. The finding of the study would be analyzed by the frequency distribution, Pearson correlation, and linear regression to analyze the relationship between the dependent and independent variables.

3.7 Instrument Reliability and Validity

For assuring reliability and validity a pilot study will be conducted. Accordingly, the questionnaire is distributed to 15% of the total sample size. After the pretest, the researcher identified the gaps of the questionnaire and made necessary modifications by rearranging the questions in a more systematic way and revising some unclear words to make easily understandable to participants. Moreover, this study will ensure the reliability of the instrument by Cronbach'sAlpha. Crombach's Alpha value with Linker scale is widely used to verify the reliability of the consistency.

3.8 Ethical Consideration

To collect data the ethical permission will be taken from Addis Ababa University by official letter. The respondents will be asked respectfully to receive the required information based on their willingness. Responses of respondents will be unnamed. The researcher will disclose the privacy of respondents and will keep secretly the information collected from respondents. Confidentiality is considered in all levels of the study during information gathering.

CHAPTER FOUR
DATA PRESENTATION AND ANALYSIS

This chapter presents the findings of the study based on the data collected through questionnaire which includes the demographic profile of the respondents, descriptive analysis, correlation and regression of challenges of SCM and SCM performance. By using SPSS20 software application findings would be presented and interpreted and the identified research question in chapter one will be answered in this chapter.

4.1 Data Processing

After data are collected, they need to be cleaned by editing for the possible avoidance of errors in the data matrix questionnaire both during and immediately after the collection of data (Diamantopoulos and Schlegelmilch, 2000). Accordingly, the researcher cleans the data to avoid any inconsistencies, ambiguous answers and missing information. Following the data edition and correction, data were coded so that it was understood and analyzed by a computer software program called SPSS 20. Data analysis was made into four forms: descriptive statistics, reliability test, regression and correlation.

4.2 Response Rate

The list of cement factories as obtained from Ministry of Industry 2015 (strategic plan from 2015-2025) is the basis for the sample framework. Out of 16 cement factories that are currently operating in Ethiopia, five were purposely selected for this particular case. The selected respondents were general managers, technical managers, supply managers, operation managers, marketing managers, logistics managers, and IT managers.

A total of 77 questionnaires were disseminated in person to factories whose head offices are residing in Addis Ababa and continues telephoning and repeating visit activities were carried out to remind the respondents to return me the questionnaire. But, some respondents contacted complained that they are so busy, and some of the respondents were considering the response as a disclosure of company's internal information to competitors.

The researcher has done his best level of effort to convince them by enhancing their level of understandings and informing them the mutual benefits that would be gained as a result of this study. With all these challenges and level of efforts 57 (74.03%) questionnaires were collected from 77 questionnaires distributed and the remaining 20 (25.97) questionnaires were not collected due to lost from the respondent's and refusal of the respondents to complete questionnaire.

According to Willimack et al. (2002) report response rates for questionnaire surveys of business ranging from 50 to 65 per cent are significant for further analysis (Saunders, et al. 2009). Therefore, in this case response rate of **74.03%** is significant for further analysis.

4.3 Validity and Reliability

Validity is the credibility or believability of the research. There are theoretical concepts related to the research and the questionnaire used for this study is adopted from earlier researches (Belay Mengistu 2011). Additionally the validity is verified by the advisor of this research who looks the appropriateness of the questions and scale of measurement. Discussion with friends was another way of checking the appropriateness of the questions

Table 4.1 Reliability test for the variables

Variables	Cronbach's Alpha	N of Items
Supplier partnership	0.746	7
Customer relation ship	0.762	7
Environmental issues	0.779	5
Information technology	0.809	5
Organization SCM performance	0..711	5

Source: survey result (2019)

Cronbach's alpha is a coefficient of reliability used to measure the internal consistency of the test or scale. The result is between 0 and 1 in which result approaches to 1 is more internal consistency of the items. The result of the coefficient alpha for this study's instrument of supplier partnership (0.746), customer relationship (0.762), environmental issues (0.779), information technology (0.809), and supply chain performance (0.711) indicates the scale is acceptable for further analysis that measures the same variables.

4.4 Demographic Analysis of the Respondents

This section discusses about the general characteristics of the respondents such as gender, age, education level, work position and respondents work experience.

Table 4.2 Respondent's demographic profiles

sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	44	77.2	77.2	77.2
	female	13	22.8	22.8	100.0
	Total	57	100.0	100.0	

From the table above out of 57 respondents 44 (77.2 %) respondents were males and females were 13 (22.8%). This indicates that majority of respondents were males.

age of respondent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	below 30 years	5	8.8	8.8	8.8
	31-40	23	40.4	40.4	49.1
	41-50	26	45.6	45.6	94.7
	above 50	3	5.3	5.3	100.0
	Total	57	100.0	100.0	

Regarding to age group 5 (8.8 %) of the respondents was below 30 years old. 23 (40.4 %) of them from 31-40 years, 26 (45.6%) from 41-50 years, and 3 (5.3 %) of the respondents were above 50 years old. This indicates that majority of the respondents 52 (92%) were from age of 31-50 years and above which was good advantage to have them for analysis because these ages are more responsible and rational behavior and they are working group according to Ethiopian context.

respondent's work position

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	General managers	3	5.3	5.3	5.3
	Technical managers	2	3.5	3.5	8.8
	supply managers	20	35.1	35.1	43.9
	operation managers	5	8.8	8.8	52.6
	marketing managers	10	17.5	17.5	70.2
	Logistics' managers	7	12.3	12.3	82.5
	IT managers	10	17.5	17.5	100.0
	Total	57	100.0	100.0	

The majority of the respondents about 20 are supply managers, about 10 are marketing managers and 10 of them are IT managers. This indicates about 40 (71%) respondents are directly related to the supply chain management and their answers are believed to be reliable.

work experience of respondent

Experience		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 3	5	8.8	8.8	8.8
	3-5 years	6	10.5	10.5	19.3
	6-10 years	17	29.8	29.8	49.1
	above 10	29	50.9	50.9	100.0
	Total	57	100.0	100.0	

When we see the experience of the respondents:3 (8.8%) have less than three years of experience, 6 (10.5%) of respondents have from 3-5 years experience, 17(29.8%) respondents have from 6-10 years experiences, and 29 (50.9%) respondents have more than 10 years of experience in which they are familiar with the cement industry.

educational level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	up to diploma	8	14.0	14.0	14.0
	BA degree	35	61.4	61.4	75.4
	Masters degree	14	24.6	24.6	100.0
	Total	57	100.0	100.0	

Source: survey result (2019)

Regarding the level of education the highest level of respondents were first degree holders (35 or 61.4%) followed Master degree holders (14 or 24.6%). The rest (8 or 14%) of the respondents have diploma level and lower. From the result shown above, almost all of the respondents were

literate which implies that they can easily understand and give rational response to the researcher.

4.5 Descriptive Analysis of the Variables

4.5.1Respondents' Perception towards the Extent of challenges of Supply Chain Management Practices

The perception of respondents on each of the supply chain management practices described in view of strategic suppliers partnership, effective customer relationship, managing environmental issues, information communication technology (ICT), and company's performance.

I) Extent of strategic Supplier's Partnership challenges (Independent variable)

The respondents were asked about their practice of challenges of strategic supplier partnership as described into seven variables. These variables assess: well-established trust problem sharing mechanism skill transfer among partners, cooperation among supply chain members, and security among channel partners, supply volatility situation, legal enforcement, and incentive strategy.

Table: 4.3Extent of strategic supplier partnerships challenges

Variables	Strongly disagree %	Disagree %	Neutral %	Agree %	Strongly agree %	Mean
The is no well-established trust, problem sharing solving mechanism and skills transfer among partners	5.3	10.5	31.6	29.8	22.8	3.54
cooperation isn't existed among supply chain members	5.3	14	28.1	29.8	22.8	3.51
There is poor security among channel partners	3.5	14	31.6	33.3	17.5	3.47
There no alternative choice of raw material suppliers	5.3	19.3	12.8	38.6	14	3.37
There is volatile supply situation	8.8	15.8	28.1	31.6	15.8	3.30
There is no legal enforcement action taking disciplinary measures on those commuting fraud related activities	7	10.5	22.8	40.4	19.3	3.54
There is no incentive strategies or performance appraisal for SCM personnel	1.8	21.1	15.8	43.9	17.5	3.54
Supply chain partnership						**3.47**

Source: survey result (2019)

As indicated in the table 4.3 above, the mean value for the variables are ranges from 3.30 to 3.54. More than half of the respondents 52.6%(29.8% agree and 22.8% strongly agree) said that there are no well-established trust, problem sharing solving mechanism and skills transfer among partners. 15.8 % of the respondents disclosed that there are good established trusts, problem sharing solving mechanism and skills transfer among partners, while 31.6% of them were neutral.

About 47.4% of the respondents disclosed that there are volatile supply situation. According to the table cooperation aren't existed among supply chain members. Supply chain management requires a close collaboration and integration of activities among different team members. Under this instance, the alignment of goals and cooperative planning among team members is essential.

Unless a proper security measures are in place, sharing of information may lead to the loss of its main strategic competition tool. The respondents confirmed that there is poor security among channel partners. About 52.6% of the respondents said that there aren't alternative choices of raw material suppliers. There isn't legal enforcement in taking disciplinary measures on those committing fraud related activities and also due consideration is given to motivate and reward them which in the end are essential to the attainment of the objective of the organization as well as the whole supply chain members. Over all the mean value 3.47 indicates that more than half (69.4%) of the respondents agreed that there is poor supply chain partnership in their organization.

II) Extent of effective Customer relationship challenges (Independent variable)

The respondents were asked about the effective customer services and relationship issues as described into seven variables. These variables assess: feedback from customers, integration with customers, predictable and stable demand, fulfillment of customer's orders, organizational culture, technical assistance and training, and customer satisfaction.

Table 4.4 Extent of effective customer relationship challenges

Variables	Strongly disagree %	Disagree %	Neutral %	Agree %	Strongly agree %	Mean
There is no feedback from customers and modify products services to meet the requirement of customers	3.5	3.5	21.1	49.1	22.8	3.84
It is difficult to integrate with customers	1.8	3.5	26.3	56.1	12.3	3.74
There are unpredictable and unstable demand	3.5	8.8	17.5	47.4	22.8	3.77
There is inefficient filling customer orders as accurately and promptly as required	1.8	10.5	22.8	42.1	22.8	3.74
There is poor organizational culture of understanding customers	-	14	26.3	38.6	21.1	3.67
There is poor technical assistance and training offered to various users of the product	1.8	8.8	22.8	45.6	21.1	3.75
There is customer dissatisfaction in service delivery	3.5	8.8	15.8	47.4	24.6	3.81
Customer relationship						**3.76**

Source: survey result (2019)

According to Table 4.4, 71.9% (49.1+22.8) of the respondents responded that there is no feedback from customers and modify products and services to meet the requirement. 7% of the respondents said that there is feedback from customer and modify products and service to meet the requirement and the rest 21.1% are neutral. This indicates more than half of the respondents disclosed that feedback from customer and modify products and service are poor.

The mean value ranges from 3.67 to 3.81. The mean value of customer satisfaction 3.76 implies more than half (75.4%) of the respondents agreed for the poor organizational effective customer relationship.

III) Extent of Managing Environmental Issue challenges(Independent variable)

The respondents were asked about their practice of environmental aspects in five variables. The variables are environmental policy and programs, heat recovery mechanism, substituting non renewable energy sources, protection of mining sites, and the pressures to reduce the environmental impacts.

Table 4.5Extent of managing environmental issues (independent variable)

Variables	Strongly disagree %	Disagree %	Neutral %	Agree %	Strongly agree %	Mean
The organization hasn't environmental policy and programs	3.5	7	21.1	54.4	14	3.68
The organization hasn't a well-established heat recovery mechanism	1.8	5.3	31.6	45.6	15.8	3.68
Hasn't sufficient substituting the non-renewable energy sources (coal, oil, natural gas) with alternative energy sources (solar, wind, wastes etc)	5.3	7	31.6	43.9	12.3	3.51
There is no sufficient protection of mining sites from deforestation and land degradation activity	1.8	7	28.1	50.9	12.3	3.65
There is no sufficient pressure to reduce environmental impact	3.5	3.5	22.8	43.9	26.3	3.86
Environmental issues						**3.67**

Source: survey result (2019)

As indicated in table 4.5 the mean values of the variables ranges from 3.51 to 3.86. More than half of the respondent (67.4%) disclosed that the organizations haven't environmental policy and programs. But, environmental issues become major concerns, the industry is forced to work and invest on energy efficient technologies, diversifying energy sources and clinker substitution. Environmental friendly firms are encouraged. The mean value for environmental issues challenge is **3.67** which implies about 73.4% respondents disclosed that there is poor implementation of managing environmental issues in the organizations.

IV) Extent of Effective Information Communications Technology challenges (Independent variable)

The respondents were asked about information communication as described into five variables. These variables assess; the people's willingness and share of information, use online connections (EDI, Internets, etc) across supply chain members, information regarding monitoring of (orders, materials, schedules, inventories, ERP), information technology infrastructure, and closely works with SC members to align and solve basic information communication challenges.

Table 4.6Extent of Information communication technology's challenges

Variables	Strongly disagree %	Disagree %	Neutral %	Agree %	Strongly agree %	Mean
People are not willing to use and share information within and across the supply chain	3.5	8.8	21.1	57.9	8.8	3.60
There is no online connection (EDI, internets, etc)as required, which are widely used within as well as across supply chain members	8.8	5.3	19.3	50.9	15.8	3.60
Insufficient information system regarding monitoring of orders, materials, schedules, inventories (ERP)	5.3	3.5	31.6	42.1	17.5	3.70
There I spoor information technology infrastructure	1.8	12.3	21.1	49.1	15.8	3.63
There are poor closely working attitudes with SC members to align and solve basic information communication challenges	3.5	8.8	19.3	50.9	17.5	3.70
Information technology						**3.63**

As indicated in Table 4.6 the mean value for the variables ranges from 3.60 to 3.70. Regarding to the SC members cooperation to align and solve basic information communication challenges 68.8 % (50.9%+17.5%) disclosed that cooperation among supply chain members to solve ICT challenges is poor. The mean value **3.63** indicates more than half (72.6%) of the respondents agreed there are poor information communication technology practices in the organizations.

V) Extent of organization's SCM Performance challenges of Ethiopian Cement Factories (dependent variable):

The variables asked to the respondents related to the organization performance are :attaining to offer low cost/price product by full capacity operation; innovation and delivers new products and services to the market; offer quality products, value and services; have many product variations,

wide selections, extended services and attributes; and developed energy conserving systems as well as environmental friendly products.

Table 4.7 Extent of organization's SCM performance's challenges

Variables	Strongly disagree %	Disagree %	Neutral %	Agree %	Strongly agree %	Mean
Not attaining to offer low cost/price product by full capacity operation	3.5	7	22.8	43.9	22.8	3.75
Not under constant innovation and delivers new products and services to the market	1.8	7	24.6	49.1	17.5	3.74
Offers low quality products, value and services	3.5	12.3	35.1	40.4	8.8	3.39
Hasn't many product variations, wide selections, extended services and attributes	5.3	5.3	19.3	45.6	24.6	3.79
No developed energy conserving systems as well as environmental friendly products	1.8	3.5	22.8	43.9	28.1	3.93
Organization performance challenges						**3.72**

Source: survey result (2019)

As indicated in table: 4.7, the mean value ranges from 3.39 to 3.93. Almost half of the respondents (49.2%) stated that the organization does not offer quality products value and services. 40.4% of the respondents neither agree nor disagree and 15.8 of the respondents said the organization offer quality products, value and services. The overall mean value of the

organizations performance challenge is 3.72.When we change it in to percentage it is 74%. This indicates that on average 74% of the respondents said that there is poor organizational SCM performance.

4.6 Correlation between Dependent and Independent Variables

Correlation analysis is conducted to analyze the strength correlation between dependent and independent variables. Pearson correlation coefficient enables to investigate the relationship between dependent and independent variables. This coefficient can take on any value between 1 and -1. A value of 1 represents a perfect positive correlation where as a value of-1 represents a perfect negative correlation (Saunders, et al. 2009). Furthermore according to Kifle (2012) cited in Rubin (1994) Correlation coefficient value between:

- 0- 0.19 slightly/negligibly correlated
- 0.20- 0.39 weakly correlated
- 0.40-0.69 moderately correlated
- 0.70- 0.89 highly correlated
- 0.9- 1.00 very high correlation

Table 4.8 correlation between dependent and independent variables

Correlations

		partnership	customer	environment	ICT	performance	SCM
partnership	Pearson Correlation	1	.662**	.728**	.477**	.814**	.814**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	57	57	57	57	57	57
Customer	Pearson Correlation	.662**	1	.801**	.736**	.913**	.914**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	57	57	57	57	57	57
environment	Pearson Correlation	.728**	.801**	1	.645**	.908**	.888**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	57	57	57	57	57	57
ICT	Pearson Correlation	.477**	.736**	.645**	1	.841**	.821**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	57	57	57	57	57	57
performance	Pearson Correlation	.814**	.913**	.908**	.841**	1	.988**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	57	57	57	57	57	57
SCM performance	Pearson Correlation	**.814****	**.914****	**.888****	**.821****	**.988****	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	57	57	57	57	57	57

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

Source: survey result (2019)

According to the Table: 4.8 above, the correlation of supplier partnership shows strong correlation with organization performance ($r = 0.814$, $p<0.01$). Customer relationship ($r = 0.914$, $p<0.01$) shows strong correlation with organization performance. Environment ($r=0.888$, $p<0.01$) and ICT ($r=0.821$, $p<0.01$) also have strong correlation with organization performance. In general supply chain management performance had strongly and positive correlation with organizational performance with r value of 0.988 and $p<0.01$.

4.7Regression Analysis

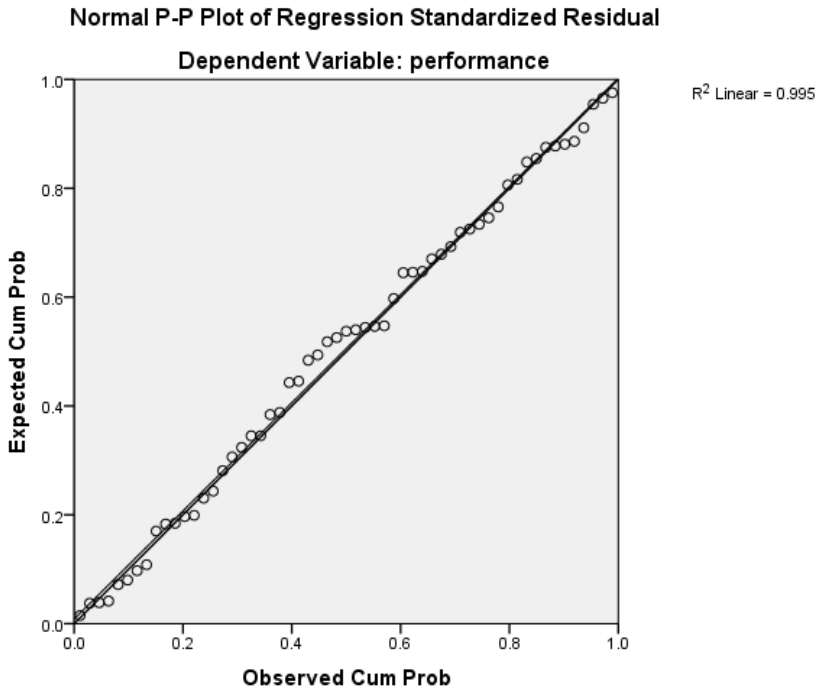
4.7.1Assumption of Regression

Linear regression is analysis that assesses whether one or more predictor variables explain the dependent variable. The most common assumptions are linearity, autocorrelation, and multicolinearity.

i) Linearity

Linear regression needs the relationship between the independent and dependent variables to be linear. As shown in figure 4.1 below NPP plot the relationship between dependent and independent variables is straight line which fulfils the assumption of linearity.

Figure 4.1 linearity assumption tests



Source: survey result (2019)

ii) Auto correlation

According to Gujarati & Sangeetha, (2007) autocorrelation is the correlation between members of series of observations. The linear regression model for autocorrelation can be tested with the Durbin-Watson d statistic .The value of d can be value between 0 and 4, if d found to be 2 in an application, one may assume that there is no first order autocorrelation. From the Table 4.9 below the value of d is2.016, which is close to 2 which indicate there is no auto correlation and the auto correlation assumption is fulfilled.

iii) Multicollinearity

Linear regression assumes that there is no multi co-linearity in the data. Multicolinearity occurs when independent variables are highly correlated with each other. Multi co-linearity assumptions can be tested with Variance Inflation Factor (VIF). If the value of VIF is greater than 10 there is interdependence between independent variables (Gujarati &Sangeetha, 2007). According to table 4.11 below the VIF value for supplier partnership is 2.226, customer relationship 3.793, environmental issues 3.554, and information communication technology 2.243, in which the values of all independent variables are less than 10. So multi co-linearity assumption is fulfilled.

4.7.2 Determinants of challenges of supply chain management on the performance of cement factories in Ethiopia

Multiple regressions were used for this research to analyses the challenges of supply chain management on Ethiopian cement factories.

Table 4.9 Model Summary of regression analysis

Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.989[a]	.978	.976	.09181	2.016

a. Predictors: (Constant), ICT, partnership, environment, customer
b. Dependent Variable: SCM performance

Source: survey result (2019)

Table 4.9 presents the model summary of the performance of cement factories as a function of challenges of supply chain management dimensions. The adjusted R square for the regression model is **0.976.** This indicates that 97.6% of the variation in cement factories performance is explained by supply chain management performance dimensions and other 2.4% can be attributed to other factors which were not included in this study.

Table 4.10ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	16.486	4	4.122	19.877	.000[b]
	Residual	10.782	52	.207		
	Total	27.269	56			

a. Dependent Variable: SCM performance
b. Predictors: (Constant), ICT, partnership, environment, customer

Source: survey result (2019)

As shown in the table 4.10 above ANOVA model, significant value is 0.000 which is significance 1% level of significance.

Table: 4.11 Regression Coefficients for challenges of supply chain management dimensions on cement factory's performance.

Coefficients[a]

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**	**Collinearity Statistics**	
		B	**Std. Error**	**Beta**			**Tolerance**	**VIF**
1	(Constant)	.042	.081		.517	.607		
	partnership	.265	.028	.299	9.624	.000	.449	2.226
	customer	.313	.040	.314	7.751	.000	.264	3.793
	environment	.194	.034	.224	5.704	.000	.281	3.554
	ICT	.220	.023	.303	9.718	.000	.446	2.243

a. Dependent Variable: SCM

Source: survey result (2019)

The established regression function is:

$Y = a + b_1x_1 + b2x2 + b_3x_3 \ldots b_nx_n$

SCM Performance = 0.042(constant) + (0.265 x p/ship) + (0.313 x C. r/ship) + (0.194 x envir)+ (0.220 x ICT)

From the above regression coefficient results, we can analyze the following points:

1. Supplier partnership

As shown in Table 4.11 beta (B) values for supplier partnership is 0.265 and p value is ($p<0.01$). This implies that on average a 1% improvement in supplier partnership will increase factories' performance by 26.5% and $p<0.05$ implies that supplier partnership is significant at 5% level of significance. Thus we can conclude that the challenge of supplier partnership has significant relationship with cement factories' SCM performance.

2. Customer relationship

As presented in Table 4.11 the beta (B) coefficient of customer relationship 0.313 indicates that on average 1% increase in customer relationship will increase factories performance by 31.3%. This implies there is significant relationship between customer relationship and factories performance. The p value is ($p<0.01$) indicates that customer relationship is significant at 1% level of significant. Therefore the challenge of customer relationship has significant relationship with cement factory's SCM performance.

3. Environmental issues

The result of regression regarding environmental issue has significant relationship with performance of cement factories. Beta value of environment 0.194 indicates on average a percent increase in environmental issues will increase factories performance by 19.4% as shown in table 4.11. The significance level is ($p<0.01$) which is less than 0.05 and is statistically significant.

So, the challenges of environmental practices have significant relationship with cement factories' SCM performance

4. Information communication technology (ICT)

From the Table 4.11, the beta (B) value for information communication technology is 0.222 which indicates on average 1% increase in ICT will increase organization performance by 22%. The beta value ($P<0.01$) which is less than 0.05 implies that, ICT is statistically significant. Therefore, ICT has significant relationship with performance of cement factories. So, the challenges of information communication have significant relationship with cement factory's SCM performance.

4.8 Discussion

Cement is a homogeneous product where cost differentiation is the main strategic issue to secure competitive advantage in the market. Cost minimization could be attained in maximizing the economies of scales in process of production and conserving the type and level of energy consumption which accounts the major cost component in industry. Most of the factories in Ethiopia are using fossil fuel in the process of their calcinations where it is both costly and none environmentally friendly.

As it is mentioned in the previous chapters, the lucrative profits currently gained in the industry, visible demand and supply gaps in the coming years and government's relentless effort to attract local and global firms, the oligopoly nature of completion never last longer. Today is the era of globalization where other multinational cement industries (Pakistan, Indian, etc) show high interests to join into Ethiopian cement markets by providing high quality products with lower prices. Therefore, the researcher has identified mainly the general supply chain management challenges and analyzed their relationship with the performance of Cement Factories in Ethiopia.

4.8.1 The relation of Suppliers Partnership challenges and SCM Performance in Ethiopian Cement Factories

Strategic supplier's partnership was assessed in terms of strong key suppliers strategic partnership, supply base optimization, alignment and involvement of key suppliers in goal setting

and planning, sharing of information among the critical suppliers, motivation and rewarding suppliers as well as sharing and solving mechanism and skills transfer among partners.

The involvement of suppliers in the goal setting and planning phase as well as motivation and rewarding of suppliers got the highest poor scores. Other variables are also not as such good enough. As indicated by Fawcett et al. (2007), working with selected few strategic suppliers would enhance collaborations among partners that have an impact on responsiveness, quality and costs. These factors have an impact on the performance of cement factories in Ethiopia.

As shown in the correlation test (Table 4.8) the level of correlation between strategic supplier's partnership challenges and supply chain management performance is found to be .814 with a significant level of 0.05, which suggests that their relationship is highly significant.

4.8.2 The relation of Customer Relationship challenges and SCM Performance in Ethiopian Cement Factories

Business exists for make profit. Profit can only attained through a sustainable customer satisfaction. This process requires a customer focused and uninterrupted relationship. The relationships with the customers shall be managed in such a way that the efforts are systematically integrated with the organization as well as with the supply chain members. This management process is a process of identifying key customers, communication development and implementation of different programs to secure the best level of customer's satisfaction.

As it can be seen under Table 4.4 the majority (75.4%) of the respondents answered that the variables mentioned under customer relationship are poor.

A company should establish facts about its customers, and offers need based and defined services. Though cement is considered a homogenous product, there could be various values and service attributable to customers. Dependable information and various assistances are the after sales part which would attract, satisfy and retain customers for firms to last in a sustainability and performance.

As shown in table 4.8 the level of correlation between strategic customer relationships challenges and supply chain management performance is found to be .914 with a significant level of 0.05, which suggests that their relationship is very highly significant.

4.8.3 The relationship of environmental Issue challenges and SCM Performance in Ethiopian Cement Factories

Firms work in an environment receiving different inputs and delivering output in return. Moreover, they are expected to abide by the laws and norms of the society. In supply chain management, the concept of green supply chain is getting a new momentum. Green supply chain management, as defined previously in literature review, is an inclusion of environmental issues in the process of sourcing, design, production, distribution as well as end of life time disposal.

In this particular case, the existence of environmental policy, energy savings and usage of renewable energy sources, environmental pollutions and degradation protection, usage of recyclable packages as well as inclinations towards sourcing from green suppliers were examined.

Among these variables, as it contended by the majority (73.4%) of the respondents, the existence of heat recovery mechanism, utilization of renewable energy sources and usage of recyclable materials are found to be poor condition. Weak handling of the environmental issues, have a great implication on cost, reputation and on the overall SCM performance of the organization.

As indicated in the Table 4.8, the level of correlation between challenges of environmental issues and supply chain management performance is found to be **.888** with a significant level of 0.05, which suggests that their relationship is highly significant.

4.8.4. The relationship of information Communication technology challenges and SCM Performance in Ethiopian Cement Factories

As discussed in the literature review, IT improves supply chain agility, reduce cycle time, and enable higher level of efficiency and timely deliver goods and services to the customer. It requires uniform and compatible information technology investments and applications among the

supply chain members. The connectivity alone does not bring what is required. There shall be a well established trust and willingness among the users of the technology. Online infrastructures also be well designed and implemented so that chain members can transfer and share information among themselves.

As shown in Table 4.6, the respondents were asked about the interconnected information, online monitoring, customers tracking, information technology infrastructure and willingness to share information. The majority (72.6%) of the respondents disclosed that there is poor level.

As indicated in the Table 4.8, the level of correlation between relationship of challenges of information communication and supply chain management performance is found to be **.821** with a significant level of 0.05. This suggests that their relationship is highly significant.

4.8.5. The relationship between organizational performance challenges and SCM performance in Ethiopian cement factories

Performance and competitiveness are key factors in supply chain management. This means the integration of the supply chain activities to achieve a sustainable competitive advantage. It can be defined as "the systematic, strategic condition of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purpose of improving the long-term performance of the individual companies and the supply chain as a whole".

The variables asked to the respondents related to the organization performance challenges were: attaining to offer low cost/price product by full capacity operation; innovation and delivers new products and services; have many product variations, wide selections, extended services and attributes; and developed energy conserving systems as well as environmental friendly products.

As it can be seen under Table 4.7, the results showed that the majority (74%) of the respondents answered the variables mentioned under organizational performance, results show that there are poor SCM performance.

As shown in Table 4.11 the level of correlation between the relationships of organizational performance challenges and SCM performance is found to be **.988** with significant level of 0.05 which suggests that their relationship is very highly significant.

CHAPTER FIVE
CONCLUSION AND RECOMMENDATION

5.1 Conclusions

The objective of the study is assessing of the challenges of supply chain management performances of cement factories of Ethiopia. The study uses four dimensions of challenges in organizational performance as independent variables and organizational SCM performance as dependent variable.

The majority of the respondents responded as there are poor supply chain performances of cement factories in Ethiopia with mean value of 3.72 (74%).

The perception of respondents regarding dimensions of challenges of supply chain management performance, majority of the respondents for all variables declare that there is poor supply chain management practice.

From the analysis of the survey, the challenges of supply chain management have significant impact with cement factory's performance. As the regression result showed for individual dimensions of challenges of supply chain management, supplier partnership, customer relationship, environmental issues, and information communication technology issues have highly significant relationship with the factory's SCM performance.

As it is shown in the descriptive statics, to the four general challenges of supply management and each classified variables, one can say that the performance of supply chain management in Ethiopian Cement Factories are almost poor and at their low level. The impacts of these variables on the performance of Ethiopian cement factories are highly significant.

Properly managed Sc would result in lower costs, short delivery time low inventory level and improve reliability which are all would improve the supply chain management performance of the organizations.

The energy cost for Ethiopian cement factories accounts 50 to 60% of the total production cost as contrast 30 to 40% of global standards. Consequently, cement price in Ethiopia is sill perceived

to be relatively higher as compared to global prices, because the use of costly imported energy sources, high logistics cost, poor infrastructure status, the factory's concentration at the center ..etc are some challenges of the cement industries.

5.2 Recommendations

The finding shows the challenges of supply chain management have highly significant relationship with cement factory's performance. Therefore, improving supply chain management practice can leads to good performance of cement factories.

To proactive and avert the challenge of these variables on the performance of Ethiopian Cement firms, the study recommends the followings:

- Cement Factories in Ethiopia need change from their usual transactional supplier's relationship to strategic supplier partnership. There should also be a suppliers performance measurement schemes with which they are going to be motivated and rewarded. Together, they should develop a joint team that facilitate trust among partners, solve potential harms that may be created within or across the border.
- An organization never exists if there are no customers. So, the cement factories need to understand that they are there not only sell cement but to serve their customers. Therefore, the factories need to identify the need of the customers, collect feedbacks on any complaints and avail different products and services attributes to their customers.
- Cement organizations should consider environmental issues as a competitive necessity, instead of not only regulatory obligation. So, Cement factories in Ethiopia should form a strong executive committee that generate ideas, transform and follow up different environmental programs.
- Information communication technology should be instituted to foster information communication within and among all supply chain members. Technologies also have to be compatible enough along the networked lines.
- To reduce production costs cement factories should use alternative energy sources (wind, thermal energy, solar, etc) rather than using imported fossil oil and coal energy sources.

REFERENCES

AlubelKassaw (2017).Assessment of Partial and Multi Factor Productivity on MesseboCement Factory (Ethiopia).*Journal of Resources Development and Management1* (36), 12-15. Retrieved from: https://www.iiste.com

Anthony Okoth, (2011).Supply Chain Management Practices and performance of Cement Industry in Kenya.

AronChibba. (2007). Measuring supply chain performance measures - prioritizing performance measures

Belay Mengistu. (November, 2011). Challenges of supply chain management and their relationship with the competitive position of cement industries in Ethiopia, pp.15-25

Black K. (2010). Business statistics: Contemporary Decision Making. 6th edition, John Wiley & Sons

Blanchard, D. (2010). Supply chain Management Best Practice, 2nd edition, John Willey & Sons, Inc. New Jercy

Chandra, C. and Grabis, J. (2007). Supply chain Configuration –Concepts, Solutions and Application, Spinger, New York

Chase, R.B. et al. (2004). Operation management for competitive advantage (10th edition). Boston: McGraw Hill

Christopher S. Tang (1992). Robust strategies for mitigating supply chain disruptions .*International Journal of Logistics: Research and Applications, 9:1, 33-45*

Cooper, D.M. et al. (2000). Supply Chain Management: More than a new name for logistics. *International Journal of Logistics Management, 8,pp 1-13*

Council of Supply Chain Management Professionals, (CSCMP), (2012). "Supply chain management definition". Available at http://CSCMP.org/about-us/suuply-chain-management-definition

CSCMP, India. (2013). Creating competitive advantage through the supply chain: insights on India, pp.12-13

Cuthbertson, R. and Piotrwicz,W. (2008). Performance measurement systems in supply chains: A framework for contextual Analysis

Dawei Lu. (2011). Fundamentals of supply chain management, pp.8-11.Retrieved from: http://bookboon.com

Diamantopoulos &Schelegelmich, (2000).Taking the Fear out of Data Analysis, South Western-Cengage learning, Singapore.

Ethiopian Investment Commission, 2015

Fawcett, S. et al. (2007). Supply chain management from vision to implementation, Pearson Education, Inc. New Jercy

FDRE Ministry of Industry, (2015). Ethiopian Cement Industry Development Strategy 2015-2025

Fisher M.L. (1997). What is the Right Supply Chain for your product,*Harvard Business Review, 75,pp.105-116.*

Ghemawat, P. (2002).Competition and business strategy in historical perspective. Bus. Hit. Rev.76

GholamrezaJamali, et.al. (2017). analyzing large supply chain management competitive strategies in Iranian cement industries, pp.3-8

Global Cement Review, (2013)

Grossman, (2005).The major challenges of Supply Chain Management in the process industry.

Gujarati, N. and Sangeetha, (2007), *Basic Econometrics 4th edition*, New Delhi, Tata McGraw-Hill publishing company limited

Handfield&Nichols, (1999).Introduction of supply chain management. New Jercy, Prentice- Hals Inc

Heizer,J. and Render, B. (2007).Operation management version Pearson Education.Inc. New Jersy.

Isabel Agudelo. (2011). Supply Chain Management in the Cement Industry, pp.2-3

John Storey. et. al. (2012). Supply chain management: theory, practice and future challenges. Retrieved from: www.emeraldinsight.com/0144-3577.htm

Ketchen and Hult, (2007). Bridging organization theory supply chain management: Journal of operation management 25(2007) 573-580: The case of best value supply chains.

Khurram Aziz Fani. et.al. (August 2017).An evaluation of challenges faced by cement industry of Pakistan in implementation of lean supply chain.*European academic research*, *V*(5), 3-10

KifleTamene (2012) *the impact of service quality on customer satisfaction: the case of Ethiopian airline domestic in-flight services*, Addis Ababa, Ababa University.

KiranBala. (April, 2014). Supply Chain Management: Some Issues and Challenges - A Review. *International Journal of Current Engineering and Technology*, *4*(2), 3-10.Retrieved from: http://inpressco.com/category/ijcet

Koh, et al. (2007).The impact of supply chain integration on operational capability in Malaysian manufacturers

Kothari, C.R (1985). Research methodology Age international publication. New Delhi

Krisztina Szeged et al. (2012). Challenges of Responsible Supply Chain Management. *Journal of Economic Literature*, *8*(2), 8-12

Lafarge Press Kit, (2007).www.lafarge.com. Assessed on February, 2019.

Lambert, et al. (2000). Issues in supply chain management: Industrial Marketing Management 29, 65-83. *Electric science Inc. New York*

Lee, C.W., et al. (2000).Relationship between supply chain performance and degree of linkage among supplier, internal integration and customer supply chain management. *International Journal, Vol. 12, Issues*

Leedy, P.D. and Ormarod, J.E. (2010). Practical Research Planning and Design, 9th edition: Pearson Education, Inc. New Jercy

Li, S. et al. (2005). The impact of supply chain management practices on competitive advantage and organizational performance. Omega, 34, 107-124

McCREA, B., (2010). Why "Green" Equals Good Business, SCM. Review, vol. 14, issue

Mentzer, (2004). Developing and measuring supply chain concepts. Journal of Business logistics; 25(1): 63-99

Mugher Cement Enterprise, 2010. Strategic plan: 2010/11-2014/15

Okoth A. (2011).Supply Chain Management Practices and Performance of Cement Industry in Kenya.

Oliver and Webber, (1982). Supply chain management: Relationships and Networks: British Journal of Management; Vol.7, special issue

Park, D. and Krishman, A. (2001). Supplier selection practices among small Firms in the United States. Testing Three Models

Saunders, M., Lewis, P. and Thornhill, A., *research methods for business students,* 2009, 5th edition,Harlow, Pearson Education Limited.

Selim T. &Selem A.(2010). Global Cement Industry: Competitive and Institutional Dimensions. MPRA

Shah, (2005). Classification of Supply Chain Problems in the Process Industry

Shimechi-Levi, et al. ((2000). Designing and managing the supply chain: Concept and strategy

Shrivastava, et al. (August, 2007). Indian Cement Industry: Status and challenge on Adaptation for Green Manufacturing. International Journal of Engineering Research and Technology (IJERT),3(8), 3-8

Songsong Liu. (2011). Supply chain management for the process industry, pp.20-25

Stalk and Hout, (1990). The concept of Time-Based Competition in the context of Management theory

Tan, K.C. et al. (1998). Supply chain management: Supplier performance and firm performance. International Journal of purchasing and materials management, 34(3): 2-9.

Tan, K.C. et al. (1999) Supply chain management: A strategic perspective. International Journal of operations and productions management, 22: 614-631

Thompson et al. (2008). Crafting and executing strategy: The quest for competitive Advantage-concepts and cases 16th edition, McGRAW Hill Irwin, New York.

Walfried Lassar1.et.al. (April, 2002). Competitive Challenges for Supply Chain Management in Emerging Markets: The Case of Mexico,pp.2-5

WBCSD, (2002). The Cement Sustainability Initiative: "Our Agenda for action", World Business Council for Sustainable Development, Geneva, Swizerland.

Wisner and Ta (2000). The influencing factors of commitment and business integration on supply chain management.

ANNEX

ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

LOGISTIC AND SUPPLY CHAIN MANAGEMENT PROGRAM

Research Topic: - Assessment on the challenges of supply chain management in cement factories of Ethiopia

Dear Respondents

Great thanks for sharing your generous time and being honest to provide your genuine and important responses. This questionnaire would serve as a primary data required for my survey research which I am conducting in partial fulfillment of the requirements of senior essay for completing my MA in Logistic and Supply Chain Management program in Addis Ababa University.

Therefore, this thesis is to be evaluated in terms of its contribution to my understanding of challenges of SCM and in terms of its contribution in filling the knowledge gap that exists in the area. You do not need to be subscribed by your name. Any way for questions that demands your opinion, please try to honestly describe as per the questions on the space provided. Lastly, I want to assure you that this research is only for academic purpose authorized by Addis Ababa University. No other person will have access to data collected. In any sort of report, I might publish, I will not include any information that will make it possible to identify any respondent.

If you have any question, you can contact the researcher by the following address E – Mail: **……..**Telephone (Mobile) No: **……**

Thank you again!!!

ANNEX- A: RESEARCH QUESTIONNAIRES

Section I: General Information

Direction: Please select the appropriate response category by **encircling** the number against each question

1) Sex

1. Male 2. Female □

2) Age

1. Below 30 years 2. 31-40 years

3. 41-50 years 4. Above 50 years

3) Education level

1. Up to diploma 2.BA/BSC degree

3. Master's degree; 4. Above master's degree

4) How many years of services do you have?

1. Less than 3 years 2. 3-5years

3. 6-10 years 4. Above 10 years

5) Work position

1) General Manager 2) Technical manager 3) Supply manager

4) Operation manager 5) Marketing manager 6) logistics manager

7) ICT manager

Section II: supply chain practice dimensions

Direction: Please indicate your degree of agreement/disagreement with the following statements related to your perception about supply chain practice by encircling the appropriate number. (1=Strongly disagree ; 2=Disagree ; 3=Neutral ; 4=Agree ; and 5=Strongly agree .

A) Strategic supplier partnership issues						
S/N	Measurements	Degree of agreement				
		1	2	3	4	5
1	There are not well-established trust, problem sharing solving mechanism and skills transfer among partners					
2	Cooperation isn't existed among supply chain members					
3	There is poor security among channel partners					
4	There is noalternative choice of raw material suppliers					
5	There is Volatile supply situation					
6	There isn't legal enforcement in taking disciplinary measures on those committing fraud related activities					
7	There is no incentive strategies or performance appraisal for SCM personnel					
B) Effective customer relationship issues						
1	There is no feedback from customers and modify products and services to meet the requirement of customers					
2	It is difficult to integrate with customers					
3	There are unpredictable and unstable demand					

4	There is inefficient filling customer orders as accurately and promptly as required					
5	There is poor organizational culture of understanding customers					
6	There is poor technical assistance and training are offered to various users of the product					
7	There is customer dissatisfaction in service delivery					
	C) Managing environmental issues					
1	The organization hasn't environmental policy and programs					
2	The organization hasn't well-established heat recovery mechanism					
3	Hasn't sufficient substituting the nonrenewable energy sources (coal, oil, natural gas) with alternative energy sources (solar, wind, wastes etc)					
4	There is no sufficient protection of mining sites from deforestation and land degradation activity					
5	There is no sufficient pressure to reduce environmental impact					

Effective information communication issues						
1	People aren't willing to use and share information within and across the supply chain					
2	There is poor online connections (EDI, internets, etc) as required ,which are widely used within as well as across supply chain members					
3	Insufficient information regarding monitoring of orders, materials, schedules, inventories (ERP)					
4	There is poor information technology infrastructure					
5	There are poor closely working attitudes with SC members to align and solve basic information communication challenges					

Section Three: SCM competitive performance

Direction: Please indicate your degree of agreement with the following statements related to the level of company performance by encircling with the appropriate number. (1=strongly dissatisfied; 2=Disagree; 3=Neutral; 4=Satisfied; and 5=Strongly Satisfied.)

	E) Company performance	Degree of agreement				
		1	2	3	4	5
1	Not attaining to offer low cost/price product by full capacity operation					
2	Not under constant innovation and delivers new products and services to the market					
3	offer low quality products, value and services					
4	Hasn't many product variations, wide selections, extended services and attributes					
5	No developed energy conserving systems as well as environmental friendly products					

ANNEX–B: RELIABILITY STATISTICS

Extent of strategic supplier partnership

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.746	.748	7

Extent of effective customer relationship

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.762	.765	7

Extent of managing environmental issues

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.779	.784	5

Extent of information communication technology

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.809	.809	5

Extent of organizational SCM performance

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.711	.708	5