Addis Ababa University

College of Business and Economics

School of Commerce

Department of Logistics and Supply Chain Management

Graduate Studies

Factors Affecting Supply Chain Performance in Construction Sector: the Case of RAMA Construction PLC.

By

Mulugeta Amare

January 2017

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Advisor

Mathewos Ensermu (Ph.D.)

A thesis submitted in partial fulfillment of the requirements for the Master of Arts in Logistics and Supply Chain Management

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DECLARATION

I hereby declare that the thesis entitled "Factors Affecting Supply Chain Performance in Construction: the Case of RAMA Construction PLC" is original and has not been submitted for other degrees or the like in this University College or any other institutes. It does not contain any material, partly or wholly, published or written by others, except those references quoted in the text.

Mulugeta Amare _____

Student Name **Student Signature and date**

CERTIFICATION

This to certify that Mulugeta Amare has carried out his thesis work on the topic entitled "Factors Affecting Supply Chain Performance in Construction: The Case of RAMA Construction PLC" under my guidance and supervision. Accordingly, I hereby assure that his work is appropriate and standard enough to be submitted for the award of Master of Arts degree in Logistics and Supply Chain Management.

Dr. Mathewos Ensermu _____ _____

Name Advisor Signature Date

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Mulugeta Amare

This is to certify that the thesis prepared by Mulugeta Amare, titled: "Factors Affecting Supply Chain Performance in Construction: the Case of RAMA Construction PLC" and submitted in partial fulfillment of the requirements for The **Master of Arts Degree in Logistics and Supply Chain Management** complies with the regulations of the Addis Ababa University College of Commerce and meets the accepted Standards with respect to originality and quality.

Signed by the Examining Committee:

External Examiner	Signature	Date
Internal Examiner	Signature	Date
Dean of Graduate Program Coordinator	Signature	Date

Acknowledgement

First of all, I would like to thank the Almighty God, who gave me the commitment and tolerance to pass various obstacles and come up to the accomplishment of this thesis.

I am deeply indebted to my advisor, Mathewos Ensermu (Ph.D.), from Addis Ababa University, College of Commerce, department of Logistics and Supply Chain Management for his understanding, answering my frequent questions without any hesitation, for his countless suggestions, assistance, kindness and invaluable advice.

To my wife Eden Tekeste, My lovely kids Nathan, Mathias, Abigail, and Amen, thank you for the encouragement and understanding during my study.

A special recognition goes to my friend Tekezeshewa Teshome, for his support with SPSS, his valuable advice, and encouraging remarks to the successful completion of this thesis.

I would like to thank the websites and authors who availed the resources cited in this research especially Taylor and Francis group for granting me one month free access.

Last but not least, I would like to express my appreciation to RAMA Construction PLC in general and the respondents, especially all the respondents, Supply chain department and Project coordination department for the focus group discussion.

To all of you, kindly accept my appreciation for your great support.

Abbreviations

AEO- *African Economic Outlook*

CSFs- *Critical Success Factors*

EEA- *Ethiopian Economic Association*

E.C. *-* *Ethiopian Calendar*

FGD- *Focused Group Discussion*

GDP- *Gross Domestic Product*

GTP- *Growth and Transformation Plan*

GTP II- *Second Growth and Transformation Plan*

HRM- *Human Resources Management*

MoC- *Ministry of Construction*

MoUDC - *Ministry of Urban Development and Construction*

P.A. - *Per Annum*

PLC - *Project Life Cycle*

PM- *Project Management*

PMBoK- *Project Management Body of Knowledge*

RFID - *Radio Frequency Identification*

SCM - *Supply Chain Management*

SPSS - *Statistical Package for Social science*

UN- *United Nations*

UNDP - *United Nations Development Program*

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Abstract

This research aims at assessing factors that affect supply chain performance in the construction sector, the case of RAMA Construction PLC, in Ethiopia. Based on literature reviews, the study identified four factors that affect the supply chain performance. These include information sharing, supplier buyer relationship, human resource, and customer orientation on one hand and an outcome, supply chain performance (Efficiency and Effectiveness) on the other hand. The hypothesis of the study was the supply chain factors (independent variables) affect the supply chain performance (dependent variable) of RAMA Construction PLC. The research design is made based on descriptive and explanatory research approaches. Both primary and secondary data were used throughout this research. For primary data, both structured and semi structured type questionnaires were prepared. Interviews and focused group discussions were made to collect more qualitative information. The study used non-probability sampling techniques to select individuals who were interviewed and those who took part in focus group discussions. 74 questionnaires were distributed to the respondents and 64 were filled and returned. It shows a response rate of 88.9%. On top of this, assumption tests and hypothesis test were made. The results of this study indicate that the information sharing, customer orientation, supplier buyer relationship, and human resource affect the supply chain performance to a significant extent, which is consistent with similar researches. These factors explain 60.1% *of supply chain performance, while the rest 39.9% is explained by other factors which are not subject to this study. It therefore recommends that the use of information technology be enhanced so as to deliver success in the performance of it supply chain, customer orientation should also be focused in and it has to enhance its relationship with key suppliers and subcontractors, and competence of employees should be promoted to improve the supply chain performance of RAMA Construction Plc. Research limitation and future research areas are also discussed.*

Key words: Buyer supplier relationship, Customer orientation, Information sharing, Human resource, Supply chain performance

Chapter One: Introduction

1.1. Background of the Study

According to AEO (2016), Ethiopia has experienced double-digit economic growth, averaging 10.8% since 2005, which has mainly been underpinned by public-sector-led development. Real gross domestic product (GDP) is estimated to have grown by 10.2% in fiscal year 2014/15. The agriculture, services and industry sectors accounted for 38.8%, 46.6% and 15.2% of real GDP, respectively. Public investments are expected to continue driving growth in the short and medium term with huge investments in infrastructure and the development of industrial parks, prioritized to ease bottlenecks to structural transformation, which will still have to take shape with industry playing a significant role in the economy (AEO, 2016).

The construction industry is considered as vital due to its contribution to the development of a country. Construction plays a central role in driving economic growth and socio-economic development due to both its growth-initiating and growth-dependent nature. One way it contributes to the GDP and creates considerable employment opportunity to citizens of a nation. The sector contributes 7% -10% of GDP in developed Countries (Lowe, 2003) in (Agung, 2009). According to Lowe (2003), the construction industry has a considerable contribution to GDP and employment creation in developing countries as well; it contributes 3-6% to GDP.

In Ethiopia, according to a report by EEA (2006-07) it contributes an average of 5.2% to GDP in the period 2002/03-2006/06, 1.4% employment in the country in 2005, and the contribution to government revenue grew from Birr 15.2 million in 1997/98 to Birr 78.3 Million in 2004/05 but lowed to Birr 32 Million in 2005/06. These figures do not include the direct and indirect revenues from the sector due to the limitation of data as reported by EEA. Another way through the development of infrastructure, the sector plays an important role in the development of other sectors like manufacturing and agriculture. It is believed that through the access roads farmers (at house hold level) can have access to major markets whereby they can earn a better income for their produce as well as for exporters (EEA, 2006-07). In

addition, the manufacturing industry will be benefited from the development of industry parks, roads, rails, buildings so that they can easily export their outputs to the foreign market. This is through the multiplier effect; (Agung, 2009) asserts that the multiplier effect demonstrates the impact of a change in investment on the levels of income and employment in an economy. The main concept of the multiplier is based on the recognition that the various sectors that make up the economy are interdependent.

The Ethiopian government has given due emphasis to the sector, due to this a separate Ministry is known as Ministry of Construction (MoC) is established since 2015. The government expects the sector to grow at 20% annually (MoUDC, 2016).

1.2. Background of RAMA Construction Company

RAMA Construction Private Limited Company was established in 1995 in Addis Ababa, Ethiopia. The Company is registered under Ethiopian law. The Company is certified in Integrated System of Quality and Environmental Management System (ISO 9001:2008 and 14001:2004).

Ever since its establishment the company has successfully accomplished different construction works estimated at hundreds of millions of Birr for the Federal Government, Regional Governments and the Private sectors in Ethiopia. Currently, the Company is undertaking a number of construction activities in different parts of the country. As Category - One General Contractor, the Company is engaged in building, industry projects road construction works and Real Estate. To mention few, Ketema Negus-Tsegede Junction Road Project, Bole, and Gullele Sub city Building Projects, NILE Insurance HQ Building, Arbaminch Main Campus Project, Arbaminch Laboratory Building Project, Jimma University Referral Hospital, Heineken Brewery Green Field Project etc. The company has generated an employment to more than 5000 employees, excluding daily laborers throughout the country (RAMA Construction, N.D.).

1.3. Statement of the Problem

The construction sector is expected to play an important role in the development of infrastructure in every part of the world. This is not different in developing countries in general and in Ethiopia in particular. However, it is public information to hear about time and cost overruns in construction projects. For instance, a study by Abubeker (2015) shows that 100% of the road construction projects he studied had both time and cost overrun. The rate of time overrun ranges from a 25% to 264.38% of the contract period and cost overrun ranges from a minimum of 4.11% to the maximum of 135.06% of the contract amount. Another study by Siraw (2014) also shows that almost 80% of the projects were completed beyond their planned completion period, out of the asphalt road construction projects, which was completed from 2000-2005 E.C., and in effect, almost 95% of those road projects have consumed more than the planned cost.

To supplement the above point, the study would raise the case of the Dire Dawa industrial park construction, a turnkey project where the government looked for a foreign firm to undertake its construction. According to Fortune newspaper (Volume 16, No 813 dated November 29, 2015), the Bole-Lemi I industrial park, where about 23 local contractors involved in the construction failed to deliver a fully completed facility, even after five years as compared to Hawassa Industrial park, first turnkey industrial park project, completed on time by a foreign contractor (Tesfaye, 2015). One of the factors that caused delay to the construction of the projects is a supply of materials, where it is believed that many stakeholders are involved. Therefore, it is very important to know what factors affect the performance of supply chain in the construction sector.

Supply chain management can play major roles in construction. However, actual practice in construction addresses issues of the supply chain and follows principles that make supply chain performance worse (Vrijhoef and Koskela, 1999).

Having the above points in mind, it is observed some problems in the supply chain Management of RAMA Construction Plc. The company used to have progress report meetings and one of the main problems discussed is supply of materials i.e. Supply Chain Management related issues.

Moreover, the gap identified during the literature review by the study is that limited researches have been done to evaluate factors that affect the supply chain performance in the construction sector. Therefore, the researcher is motivated to undertake this research and fill the gap.

1.4. Research Questions

Based on the literature reviewed, the following questions were developed that need to be researched in the context of Ethiopia with a special focus on RAMA Construction PLC building and road projects.

The major research question is "What are the major factors that affect supply chain performance of construction projects in the case of RAMA Construction PLC?"

The following are specific research questions;

- What is the effect of adoption of information technology (information sharing) on the supply chain performance in construction?
- How does supplier buyer relationship affect the supply chain performance in construction?
- What is the effect of Customer Orientation or focus on supply chain performance?
- How does Human resource affect the supply chain performance at RAMA Construction PLC?

1.5. Research Objectives

Based on the questions above, the research has the following general and specific objectives:

1.5.1. General Objectives

The general objective of this research is to assess the factors that affect supply chain performance in construction so that to improve the effectiveness and efficiency of supply chain activities in the construction industry, specifically at RAMA Construction PLC.

1.5.2. Specific Objectives

The researcher has the following specific objectives:

1. To investigate how the adoption of Information sharing can affect the performance of Supply Chain at RAMA Construction PLC;
2. To asses if Supplier buyer relationship affects the performance of Supply chain in RAMA construction PLC;
3. To evaluate how Customer Orientation can affect the performance of supply chain in RAMA Construction PLC;
4. To investigate how Human resource can affect the performance of Supply chain in RAMA construction PLC;

1.6. Hypotheses of the Study

The research used the following working hypothesis to be tested in the analysis:

H1o: The supply chain factors in general don't affect the supply chain performance of RAMA Construction PLC;

H1a: The supply chain factors in general affect the supply chain performance of RAMA Construction PLC;

H2o: Information Sharing don't affects the Supply Chain performance of RAMA Construction PLC;

H2a: Information Sharing affects the Supply Chain performance of RAMA Construction PLC;

H3o: Supplier buyer Relationship has not effect on the Supply Chain performance of RAMA Construction PLC;

H3a: Supplier buyer Relationship has effect on the Supply Chain performance of RAMA Construction PLC;

H4o: Customer Orientation doesn't affect the supply chain performance of RAMA Construction PLC;

H4a: Customer Orientation affects the supply chain performance of RAMA Construction PLC;

$H5_o$: Human Resource doesn't affect the Supply Chain performance of RAMA Construction PLC;

H5a: Human Resource affects the Supply Chain performance of RAMA Construction PLC;

1.7. Significance of the Research

This research is significant for the following:

- The results of this study are expected to help construction companies to recognize major factors that affect efficiency and effectiveness of supply chain management performance and enhance their supply chain efficiency as well as develop a good relationship among their partners. Besides, a decision given based on the study is important to improve overall supply chain management performance and also have an advantage on the profitability of the firm.
- The output of the research may help other construction companies to study the real extent of the factors that affect the supply chain performance in construction, the case of RAMA construction PLC in their respective organizations.
- It may help the management of RAMA to take corrective actions on the gaps identified during the research.
- It may help as a reference for future researchers and could serve as a springboard for future research in the area.
- Moreover, this study may be important to identify and answer questions related to the relationship between supply chain factors and supply chain performance. The decisions given based on the study may also be important to improve overall supply chain performance.

1.8. Scope of the Study/Delimitation of the Study

The scope of the study is delimited to the supply Chain management activities of RAMA Construction PLC, especially on the factors that affect the performance of supply chain in the construction projects both in Addis Ababa and outside of Addis. The research is focused on road, industrial and building projects area. Furthermore, competency of one organization is varying from others hence the challenge factor for one organization may not be the same to the other; therefore, to avoid such kind of complexity this research is conducted in the case of RAMA Construction only.

1.9. Limitations of the Study

The study recognizes that the research has the following limitations, which are subjects for further research. First, the research was conducted in one organization and from the contractors and suppliers perspectives only. However, in the construction there are many actors; including but not limited to; the client, the contractor, suppliers, and the consultant. This can be reckoned as a limitation as it could be complete if the perspectives of the client, consultant, and other stakeholders would also be incorporated. Secondly, some aspects of the methodological approach used in this research could limit the generalization of the findings. This research revealed the inherent limitations of the methodological choices adopted, taking into account a non-probability sample of selected projects. However, the sample size was selected for and represented effect, reliability, and power.

1.10. Operational Definitions

Construction industry -is a sector of the economy that transforms various resources into constructed physical economic and social infrastructure necessary for socio-economic development. It embraces the process by which the said physical infrastructure are planned, designed, procured, constructed or produced, altered, repaired, maintained, and demolished.

Constructed infrastructures- include: Buildings; Transportation systems and facilities (airports, harbors, highways, subways, bridges, railroads, transit systems, pipelines and transmission and power lines); Structures for fluid containment, control and distribution

(water treatment and distribution, sewage collection and treatment distribution systems, sedimentation lagoons, dams, and irrigation and canal systems); and Underground structures, such as tunnels and mines.

Cost overrun -is defined as the cost difference between the actual completion cost and the estimated completion cost.

Customer Orientation-A service offered by companies that focus on the internal and external needs of a business's customers. Consumer orientation establishes and monitors standards of customer satisfaction and strives to meet the clientele's needs and expectations related to the product or service sold by the business. It is a business strategy in the lean business model that requires management and employees to focus on the changing wants and needs of its customers. In other words, it's a company-wide philosophy that the customer's wants and needs are the first priority of all management and employees.

Developing countries -can be defined for this research as a low and middle income country in which most people have a lower standard of living with access to fewer goods and service than do most people in high income countries.

Information Sharing - in the supply chain is defined as the scope, frequency, and intensity to which the critical and proprietary information is communicated to participating entities

Project life cycle-is all the collective phases the project progresses through in concert.

Buyer Supplier Relationship -is the business relation between the customers and the suppliers in terms of product quality, services, complaint handling, deliveries etc. Customers and Suppliers are the vital cogs in business. Both have the same goal- to satisfy end consumers. Hence, having a healthy Customer- Supplier relationship is imperative for any business.

Supply chain collaboration- is defined as a long term relationship where participants cooperate, share information, and work together to plan and even modify their business practices to improve joint performance.

Supply chain performance -refers to the extended supply chain's activities in meeting end-customer requirements, including product availability, on-time delivery, and all the necessary inventory and capacity in the supply chain to deliver that performance in a responsive manner.

Time overrun- is defined as the time difference between the actual completion time and the estimated completion time, agreed by and between the client and the contractor during the signing of the contract.

1.11. Organization of the Thesis

This study is organized in to five chapters. The first chapter deals with the introduction part of the paper encompassing background of the study and the company under evaluation, statement of the problem, objectives of the study and other relevant issues. The second chapter focuses on relevant literature review. In this chapter, a review the relevant literature in relation to the topic under discussion was made. The third chapter deals with research Methodology; that is, the research design, approaches used throughout the data collection and analysis processes are discussed. The fourth chapter presents the overall findings of the study which prevails about the factors affecting the performance of supply chain management in construction projects with an emphasis on RAMA construction PLC. Finally, chapter five incorporates a summary of major findings, conclusion and recommendation part of the study.

Chapter Two: Literature Review

In this chapter, the study has reviewed relevant literature which is in tandem with the title in the study area. The chapter thus includes concepts and ideas, practices of SCM, and organizational and SCM performance. The conceptual framework of the research and empirical evidence are also included.

2.1. Concepts and Ideas of Supply Chain Management

Supply chain management (SCM) evolved from a traditional focus on purchasing and logistics practiced, to a broader, more integrated emphasis on value creation. According to Ashayeri et al., leading companies increasingly view supply chain excellence as more than just a source of cost reduction – rather, as a source of competitive advantage, with the potential to drive performance improvement in customer service, profit generation, asset utilization, and cost reduction. Effective collaboration within each entity (cross-functional) and between chain entities (cross-enterprise) is essential to achieve these goals, individually and collectively (Ashayeri, Gattorna, and Kampstra, 2008).

Basnet et al. (2003), define Supply chain management (SCM) as:

> *"... a new concept involving the integration of all the value-creating elements in the supply, manufacturing, and distribution: from raw material extraction to end user consumption. This indicates that the actors in these economic activities need to work together to achieve efficiency and effectiveness*."

According to Youn, Hong, and Nahm (2008), survival and growth of firms within a supply chain may depend on how effectively they distribute timely and relevant information (quality) throughout the supply chain by improving the characteristics of their chain partnership.

2.2. Supply Chain Management Practice and Organizational Performance

Supply Chain management is an important field that enhances the performance of a firm. In today's world, competition is becoming between supply chains, not companies, i.e. the supply chain of many companies against another supply chain of companies. For this to happen, collaboration among supply chain partners is very important to meet the increasing requirements of stake holders and thereby improving efficiency along the supply chain (Blome *et al.*, 2014) in (Massaroni, Cozzolino, and Wankowicz, 2015).

Studies have found out that supply chain performance has a positive impact on innovation of an organization. According to Sachin and Vincent (2010) over time a firm's supply chain performance and supply chain stability positively influence the volume of its innovations.

From the case study analysis made by Hasan (2013), it is found that the companies studied are involved with suppliers to increase efficiency and working effectively with customers to design sustainable products and services. Most of the companies are involved in measuring supplier performance, developing alternative methods of supply, develop supplier solution and build a long-term relationship with suppliers.

2.2.1 Organizational Performance

Organizational performance refers to how well an organization achieves its market-oriented goals as well as its financial goals.

Companies have become aware of the sustainability of their businesses and supply chains: being more environmentally, societally and economically responsible may also give them the potential to gain better firm performance and improve the competitive advantage. A research by Massaroni et al. (2015) suggests that to obtain these results, companies have to go towards the implementation of supply chain performance measures that embrace collaboration among the members or partners in a systemic approach.

Stefan Tangen (2004) in Kurien and Qureshi (2011) suggested that performance is defined as the efficiency and effectiveness of action, which leads to the following definitions:

"…. (i). Performance measurement is defined as the process of quantifying the efficiency and effectiveness of action; (ii). A performance measure is defined as a metric used to quantify the efficiency and/or effectiveness of an action; and (iii). Performance Management System is defined as the set of metrics used to quantify the efficiency and effectiveness of an action."

According to a research by Mutuerandu (2014), SCM practices which include information sharing, Customer Orientations, strategic partnerships, and training improves the organization's performance in terms of its operational and business parameters.

2.2.2 Supply Chain Performance

Performance measurement has been defined as "a systematic process of effectively and efficiently quantifying a concept or an action" (Neely et al., 1997) in (Sundram et al. 2011). Efficiency means the usage of minimum inputs while effectiveness is related to meeting customer's unique needs and demand variability (Fawcett and Clinton, 1996) in (Abdallah, Obeidat, and Aqqad, 2014).

2.2.2.1 Supply Chain Management Measurement

According to Li et al. (2006); Lyons et al. (2004) in Sundram et al. (2011), in supply chain management (SCM), performance measurement enables collaborative integration among the supply chain partners. In addition, there are short-term objectives of SCM (enhance productivity and reduce inventory and lead time) and long-term objectives (increase market share and Integration). According to them, Supply Chain Metrics may include measurements for procurement, production, transportation, inventory, warehousing, material handling, packaging, and customer service. There are many of metrics that can be used to score Supply Chain Management performance, but Spacey J., considered the 12 measurements which are: Perfect Order Measurement, Cash to Cash Cycle Time, Customer Order Cycle Time, Fill Rate, Supply Chain Cycle Time, Inventory Days of Supply, Freight bill accuracy, Freight cost per unit, Inventory Turnover, Days Sales Outstanding, Average Payment Period for Production Materials, and On Time Shipping Rate (Spacey, J., 2016, June 27).

2.2.2.2 Factors that Affect Supply Chain Performance

Measuring supply chain performance is very important as it enables us to take corrective action. Supply Chain Performance is about efficiency and responsiveness. There are many factors that affect the supply chain performance. According to (AbTalib & AbdulHamid, 2014) from a review of Critical Success Factors (CSFs) related articles, they proposed a collaborative partnership, information technology, top management support and human resource as the major CSFs.

Nyamasege and Biraori (2015) also studied if Supplier relationship Management, Inventory management, Information technology, Distribution management, and Training management affect the supply chain effectiveness. The study findings indicate that supplier relationship management greatly determines the effectiveness of supply chain management practices.

Table 2.1 Summary of related literatures

No	Supply chain Factors	Reference	Remark
1	Information Sharing	Marinagia et al. (2015); Nyamasege and Biraori (2015); Hudnurkar et al. (2014); AbTalib and AbdulHamid (2014); Yang and Zhang (2013); Zahra et al. (2013) ; (Visich et al., 2009); Youn, Hong, and Nahm (2008); Sundram et al. (2011)	All stated that the usefulness of information sharing and its effect on supply chain performance. They asserted the positive relationship among the two variables.
2	Supplier-Buyer relationship	Nyamasege and Biraori (2015); AbTalib & AbdulHamid (2014); (Cheung, 2006a) in Cheung, (2011); (Cheung and Rawlinson, 2007)	The studies assert that there is a positive relationship between supplier-buyer relationship and supply chain performance

No	Supply chain Factors	Reference	Remark
		in (Cheung, 2011); Sundram et al. (2011); Othman and Rahman (2010); Ryu, So, and Koo (2009); Yang (2007); (Landeros and Monczka, 1989) in Yang, (2007); Mukhtar et al. (2002); (Chow et al. 1995) in Mukhtar et al., (2002);	
3	Human resource	Albahussain et al. (2016); Ertemsir and Bal (2012) in AbdulRazak, Othman, and Sundram, (2015); Marwah et al. (2014); Mutuerandu (2014); Hasan and Abdul Alim (2010); Vereecke et al. (2010); Chan and Greenwood (2006);	These studies found out that there is a positive relationship between human resource and supply chain performance
4	Customer orientation	Stanley Kam Sing and Canon (2012) in Ku et al. (2015). Mutuerandu (2014); Sundram et al. (2011); Jeong and Hong (2007),	These studies concluded that there is a positive relationship between customer orientation and supply chain performance

Source: Own summary (2017)

2.2.2.3 Supply Chain Performance Effectiveness

Effectiveness is defined by Mentzer (1991) as the extent to which goals are accomplished. Supply chain performance effectiveness is very important.

The findings of Chow et al. (2008) in Muysinaliyev and Aktamov (2014), show that Supply chain competencies have positive effects on organizational performance in both the US and Taiwan. Supply chain competencies are developed around quality and service, operations and distribution, and design effectiveness.

Many successful construction organizations have embraced just-in-time philosophies and use Critical Path Methods concepts to enhance the effectiveness of the construction supply mission (Benton and McHenry, 2010).

2.2.2.4 Supply Chain Performance Efficiency

Efficiency according to Beamon (1999) is the measure of how well the measurement of how well the resources expended are utilized. Supply chain efficiency is how well the resources in the Supply chain are utilized.

According to Pettersson, (2008);

> *"In a Supply chain with external actors is it important to think about that efficiency improvements have to consider the whole Supply chain. There is no good solution when the own company makes a profit at the expense of another part, for example, a supplier. This is short-term profit and will for sure result in an increase in price in the long term. An individual, when optimizing its own success has to consider both how it best utilizes its internal resources and how it best benefits of collaborative efforts in the Supply chain. There are two important parts for efficiency and that is Supply Chain Cost and performance measurements."*

Efficiency is usually reflected by using cost and inventory turnover measures (Gunasekaran et al., 2004; Lee et al., 2007) in (Abdallah et al., 2014).

2.3. Construction Supply Chain Management

2.3.1. The Construction Process

The construction industry is defined generally as an economic activity directed to the creation, renovation, repair or extension of fixed assets in the form of buildings, land improvements of an engineering nature, and other engineering construction such as roads, bridges, dams etc. according to UN (1996) in (EEA, 2006-07).

Construction Projects as any other projects have different phases. The famous Project management body of Knowledge (PMBOK) Guide identifies and categorizes project phases into five major categories: Initiating, Planning, Executing, Monitoring and Controlling, and Closing (Heldman, 2009). The phases may differ from project to project based on complexity of the project. These process groups or phases are inter-related and are known as the Project Life cycle. Other books on Project management (PM) may define these phases into more or lesser phases. For instance Larson and Gray (2011) defined Project Life Cycle stages into four as; Defining, Planning, Executing and Closing. On the other hand Lock, (2007) states that many project management publications limit their account of the project life cycle or life history to Phases 6 through 13. According to Lock (2007) the reason for this is that these are the phases that most directly involve the control of the project manager, who might not actually come on to the scene until Phase 6 or 7.

Construction also exhibits similar phases that could be described in different stages depending on the complexity of the project. Olsson (2000) asserts a simple housing project may be designated using the following process map. (Please refer Figure 2.1 below)

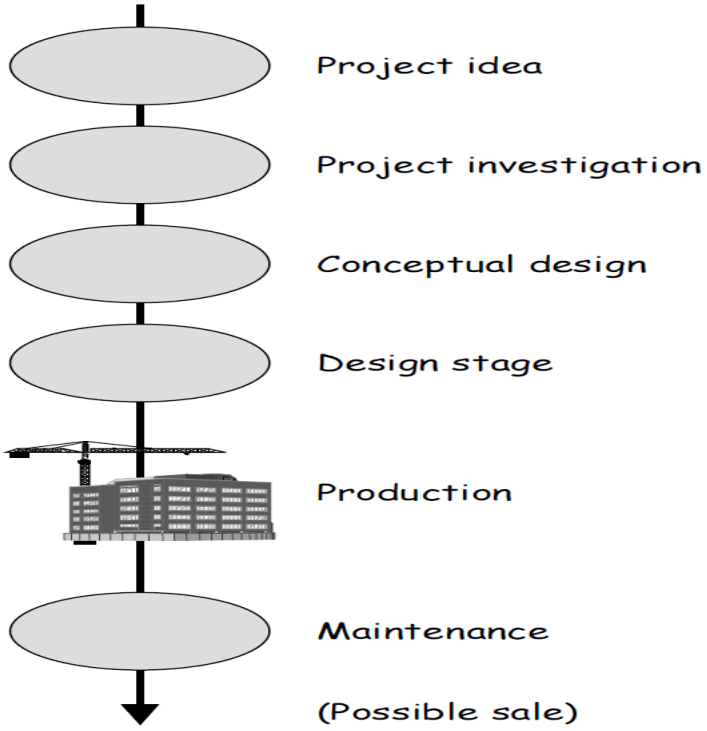


Figure 2.1: The Construction Process (Olsson, 2000)

2.3.2. Construction supply chain

Xue *et al*. (2007) in Dike and Kapogiannis *(2014)* describes construction supply chain management as the integration of key construction business processes, which focuses on how firms make the most of their suppliers' processes, technologies, and capabilities with the ultimate goal of improving construction performance and adding client value at less cost.

The construction industry is characterized by fragmentation, adversarial relationship, project uniqueness, separation of design and production, competitive tendering in the UK according to a book by (Pryke, 2009).

According to Taylor and Bjornsson (1999) supply chain networks that collaborate and share information using the proposed Internet pooled procurement model would perceive benefits in terms of efficiency in material manufacturing and distribution, decreased material costs to contractors and owners, and reduced transaction costs. They reasoned out that due to tighter integration of information and decision-making, construction supply chains would be capable of holding fewer inventories and realizing a more accurate demand signal.

Supply chain integration is very important for construction performance; though there are problems in supply chain integration in Construction Industry. Related research by Briscoe and Dainty (2005) revealed that a large number of supply chain partners and the significant level of fragmentation limit the levels of integration that are achievable in UK construction. The interplay of environmental and procurement related factors renders the realization of truly integrated supply chains very problematic and difficult to achieve.

There are many factors that should be considered in the selection of suppliers in construction. Material quality, delivery dependability, and price are the most critical criteria for supplier selection in the construction industry (Benton(Jr.) and McHenry, 2010).

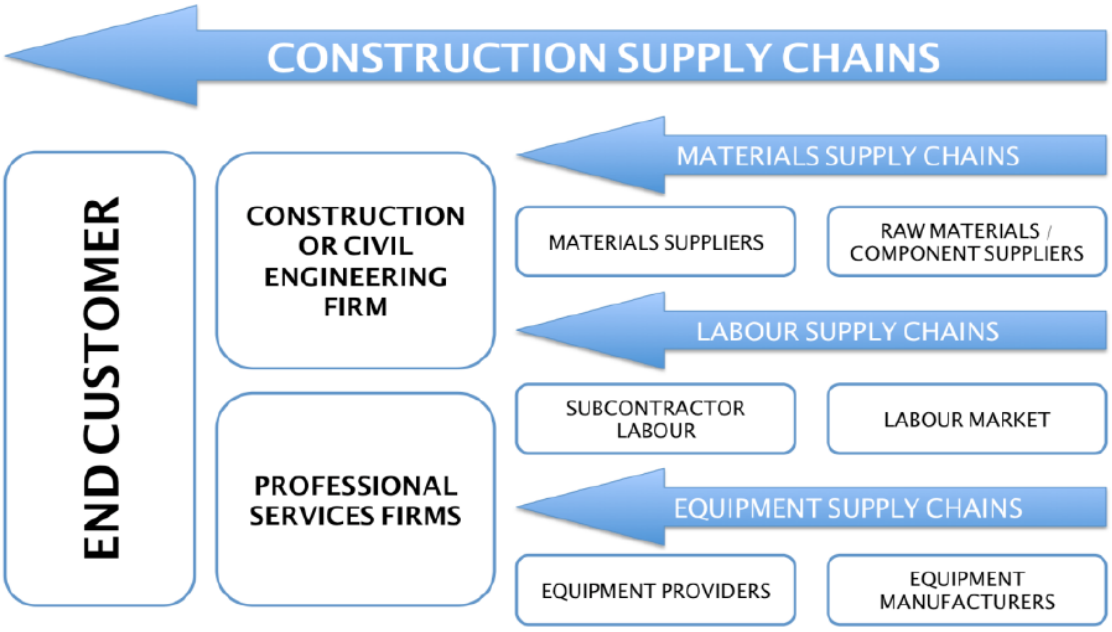


Figure 2.2: The Myriad of Construction supply Chains (Cox et. al. 2006) in Lovrencic, Grilec, and Mikulic (2016)

The construction supply chain is one of the complex supply chains where many stake holders involve. The above figure 2.2 depicts a myriad of construction supply chains where material supply chains, labor supply chains, and equipment supply chains are linked to construction or engineering firms and professional services firms. The ultimate end customer is the source of the construction requirement that is also called the client.

According to Cox et al. (2006) in Lovrencic, Grilec, and Mikulic (2016),

> *"The stage end customer includes all customers of construction projects. These clients typically source their construction requirements from highly competitive construction supply markets so the construction project provides the required functionality to support their business. Furthermore, construction or civil engineering firm includes all civil engineering and construction firms that deliver projects to the end customer. These firms play the 'integrating' role for all the constituent construction supply chains and typically operate within a highly competitive market place. Professional services firms include all professional services firms that provide engineering, design, planning etc..."*

2.4. Construction Supply Chain Management in Developing Countries

As defined by BeteGeorgise et al. (2013) developing countries are those low and middle income countries in which most people have a lower standard of living with access to fewer goods and service than do most people in high income countries.

Supply chain management in developing countries is a less researched area as compared to developed countries. However, some research findings reveal that the local end component of the global supply chain in Tanzania faces many problems compared to developed countries. According to Tesha and Msimangira (2014)., key problems facing Tanzania are: the use of out-dated technology in the domestic market, lack of trust, documentation problems, procurement of counterfeit products (e.g., spare parts), and lack of integrated computerized systems to link with the overseas suppliers in the global supply chain, and so on.

A research in Kenya revealed that there is a positive correlation between procurement and supply chain practices in construction companies in Nairobi and improved its organizational performance to large extent. Kiromo (2015) asserts that some of the ways in which procurement and supply chain improved organizational performance include; improved quality of products, improved ability to meet demand, improved organizational performance,

leads to reduced costs improved ability to meet demand and helps in customer satisfaction and confidence.

2.5. Construction Supply Chain Management in Ethiopia

The construction industry in Ethiopia is one of the major sectors where public and private sectors are investing a huge amount of fund. Its contribution to the economy is growing from time to time. According to MoUDC, the percentage share of the construction sector to GDP at constant basic price has increased from 4.3% in 1993 E.C. to 5.8% by 2002 E.C. Expansion of economic infrastructure (railways, roads, telecom, power, irrigation) being critical towards achieving the country's Growth and Transformation Plan (GTP) (MoUDC, 2012).

Construction in Africa is becoming an attractive sector. Researches indicate that out of five Construction companies in developed countries with a turnover up to USD 5 billion and above two companies are interested in Africa as compared to one in five for Enterprises with a turnover higher than USD 5 billion (KPMG, 2014).

The Ethiopian construction industry has been the biggest beneficiary of the government's Growth and Transformation Plan (GTP) 2010-15. According to Access Capital's calculations, based on a subset of projects with high contractor use, the GTP will provide revenue opportunities to contractors to the order of USD 20 billion per annum and prospective profits of USD 2 billion p.a. (ibid).

Supply Chain management is very important for any business and the same holds true for construction, where more than 60% of the input is a material resource.

A research by shows that there is a low degree of integration among supply chain partners in manufacturing industries in Ethiopia. According to BeteGeorgise et al. (2013);

> *"…. degree of integration is low when it comes to Ethiopian firms but it is some promising initiatives are undergoing. The existing practices have shown that firms have managed the information flows in a number of ways, mainly telephone, mobile, letters, telex, and faxes over the years. More recently, firms have started using the internet to create connections with imported material suppliers for their*

foreign purchases, even though telephone and fax are also still dominant ways of communication."

2.6. Construction supply chain of RAMA construction

RAMA Construction Plc. has relationships with its supply chain members both down ward and upward. Downward, it has relationship with the client, and the consultant, and upward it has relationship with its raw-material, equipment and machinery suppliers, and sub-contractors. This relationship is depicted in the figure below.

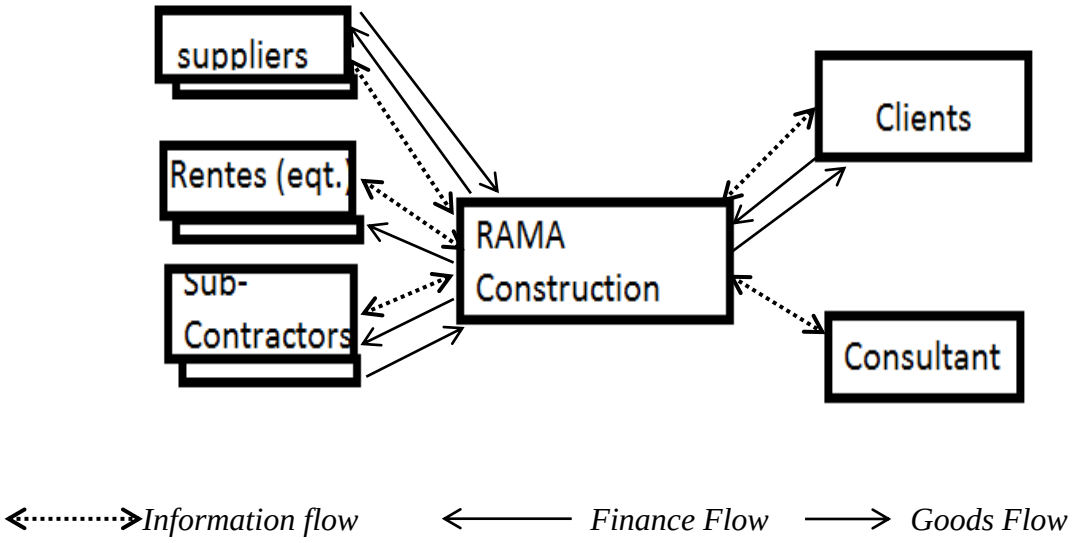
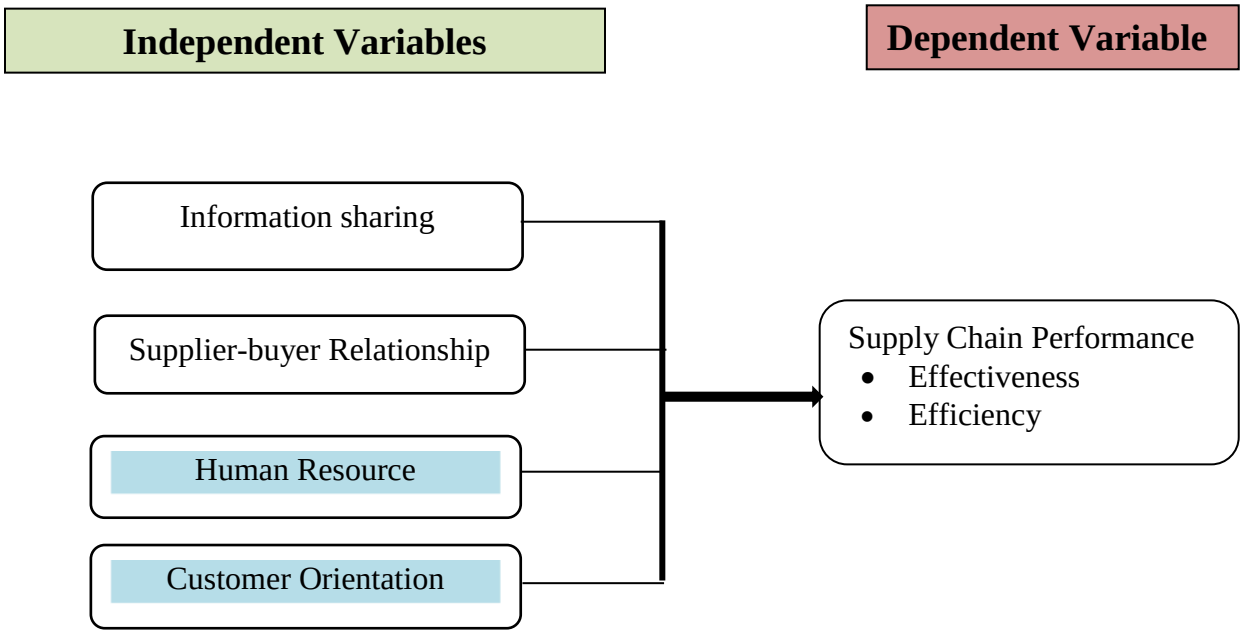


Figure 2. 3 *Supply Chain of RAMA Construction*

As can be depicted from the above figure, the supply chain of RAMA construction there is information flow in both direction, goods flow downwards, and a finance flow upwards. This relationship has to be managed well for the supply chain of RAMA construction to perform well.

2.7. Model Specification (Conceptual Framework)

The study attempts to establish factors that influence or affect supply Chain Performance in Construction, the case of RAMA Construction PLC. The aspects of Adoption of IT (Information Sharing), Human Resource, Relationship, and Customer care/focus are the independent variables while supply chain performance is the dependent variable.



Source: Adapted from (Kiage, 2013) *and own compilation*

Figure 2.4: Conceptual Framework

In the above conceptual model, the human resources and customer orientation are included by the study and the information sharing and supplier buyer relationship was adapted from the model by Kiage (2013).

Chapter Three: Research Methodology

3.1. The Research Approach

The research is made based on descriptive and explanatory research approach or design. According to Kothari (2004), descriptive research includes different kinds of surveys and fact-finding enquiries. The major purpose of descriptive research is a description of the state of affairs as it exists at present. The design is used to describe the characteristics of the independent variables (Information Sharing, Human resources, Relationship, and Customer care/focus). This helps to obtain information concerning the current status of the phenomenon to describe what the current situation is with respect to the variable of the study, the supply chain performance. The same author asserts that in descriptive design the problem is structured and well understood and gives a report on things as they actually are.

Adams et al. (2007) state that explanatory research describes the phenomena as well as explains why the behavior is the way it is. This research has applied the explanatory type of research since it attempts to describe the relationship between independent (factors affecting supply chain performance) and dependent variables (supply chain performance).

3.2. Data Type and Sources of Data

Saunders, Lewis, and Thornhill (2007) define two types of data, namely primary and secondary data. According to them, a study might use either both or one of the types of data depending on the research type and data collected by the researcher. For the purpose of this research primary data were collected through standardized structured and semi-structure questionnaire and an interview and focused group discussion. Primary data are originated by a researcher for the specific purpose of addressing the problem at hand (Malhotra and Birks, 2006). Primary data of this research are both quantitative and qualitative types. The study used quantitative data because of the need to make correlation analysis and tests of significance for the effect of supply chain factors on supply chain performance using numerical data statistical analysis.

Moreover, primary qualitative data were collected using the semi-structured interview and focused group discussion. The interview included open-ended questions. The content of the interview questions was grounded in the type of information and the results of the quantitative parts.

The primary data collection method was used in the study that includes the use of a questionnaire, (that is used to collect crucial information from selected employees of RAMA construction PLC and its major suppliers), interviews and focused group discussions. Secondary data is collected from company's profile, specific research document, articles, and reports.

3.3. Data Collection Method

The data collection instrument, structured and semi-structure questionnaire, based on five likert scale was designed using the variables identified as important for meeting the survey objectives. Closed-ended questionnaire and open-ended interview questions were distributed to respondents, including a contingency to compensate for invalid and uncollected questionnaires. The questionnaires were administered using a drop and pick later method in Projects in Addis Ababa. For projects in upcountry, the questionnaire was sent through email and collected similarly. Moreover, an interview was conducted from selected suppliers of goods and services, i.e. for major suppliers of items like Rebar, Cement, etc., and for major subcontractors like firefighting equipment, electro mechanical works, and Electrical works.

3.4. Sampling Technique and Size

3.4.1. Study Population

The study target source of population of this research is staffed working on active projects in and out of Addis Ababa under RAMA Construction PLC as well as major RAMA suppliers. RAMA's suppliers are selected based on the level of relationship as well as a large amount of money transaction.

The study has focused only on staffs who have a direct and indirect relationship with supply chain performance; therefore, the research population is operational managers, project

managers, supervisors and staffs who are work in supply chain management, finance and engineering section as well as RAMA's supplier's managers.

Table 3.1: Questionnaire Target Population and Sample size of the Study

Target Functions	Number of Employees	Sample Size
Finance Department	10	10/87*71 = 8
Engineering Department	15	15/87*71 =12
Projects Team	34*	34/87*71 =28
Supply Chain Management Department	15	15
Other Employees and RAMA's Suppliers	13	13/87*71 =11
TOTAL	**87**	**74**

Source: RAMA Construction, own calculation

*Relevant staff only

3.4.2. Sampling Technique

The purpose of sampling is to gain an understanding of some features or attributes of the whole population based on the characteristics of the sample. A sampling frame is the list of all the items where a representative sample is drawn for the purpose of research. Sampling is the process or technique of selecting a suitable sample for the purpose of determining parameters or characteristics of the whole population (Adams et al., 2007).

The study first identified the major sections that have direct and indirect relationship with supply chain performance as well as the major suppliers of construction materials. The study also collected both location and email address of projects under RAMA and major supplier managers. And then define target population using judgmental sampling technique. Purposive sampling technique is used to select the respondents working with the contractor and Suppliers. According to Walliman (2005), Saunders et al. (2007), purposive sampling is a useful sampling method which allows a researcher to get information from a sample of the population that one thinks knows most about the subject matter. Therefore, the study has

applied the later approach as it is convenient and also the targeted respondents are the ones who have knowledge of the area under research.

All the respondents are selected based on prior information about RAMA structure and also the study believes that respondents have sufficient knowledge on how the performance of the supply chain function could influence the supply chain process. To make the research meet its objectives, the study used purposive and convenience sampling methods.

3.4.3. Sample Size

Determining sample size is very complex as it depends on other factors such as margins for errors, the degree of certainty and statistical technique (Corbetta, 2003). A general rule, one can say that the sample must be of an optimum size i.e., it should neither be excessively large nor too small (Kothari, 2004).

Saunders, Lewis, and Thornhill (2012) stated that the likely response rate shall be reasonable if 50% or moderately high. Sampling technique may succeed or not by determining the sample proportion based on the experience from previous survey research response rate (Zikmund and Babin, 2010). Having this, the study projected to successfully collect or return the questionnaires at a rate of 60% because the respondents are not in the specific area and somehow not easy to collect questionnaires, so the remaining 40% might defect or non-response. The confidence level of this research is 95%. The study used the below sample size determination confidence formula Kothari (2004) to determine the sample size of the population.

Sample size calculation formula for defined population:

$$n = \frac{z^2 \cdot p \cdot q \cdot N}{e^2 \,(N-1) + z^2 \cdot p \cdot q}$$

Where:

- N = Size of Population
- Z = z score level of confidence (95% confidence level = 1.96);
- P = Sample successfully collected (0.6)
- q = Failure of sample (0.40)

- e = marginal error (5%)

$$n = \frac{(1.96)^2 * 0.6 * 0.4 * 87}{(0.05)^2 (87 - 1) + (1.96)^2 * 0.6 * 0.4}$$

n = 70.54 = 71 respondents

3.4.4. Research Respondent

3.4.4.1. Questionnaire Respondent

Once sample size identified, the research next classified the respondents. The research first allocated respondents for each group using quota/ratio method. To select questionnaire respondents from each group, the study used probability sampling approach, specifically simple random sampling technique in order to select employee included in this research study. Also, the study used a judgmental sampling technique to include all Supply Chain Management Department staff that is why calculated sample size is increased from 71 to 74. In addition, 8 interviews were held to compensate for the non-response and triangulate the output of the quantitative data. Hence, questionnaires are randomly distributed to the employees as per the quota on table 3.1 above.

3.4.4.2. Interview Respondent

In order to select interview respondents, the study used non-probability sampling, which is judgmental sampling (Saunders et.al, 2007) to select managers who are working on Finance Department, Engineering Department, selected Projects and Supply Chain Management Department since they are less in number and have good work experience in the area. Moreover, Focused group discussions were also held with selected respondents based on non-probability sampling, mainly using judgmental sampling. According to Saunders et al. (2012), judgmental sampling enables us to use our judgement to select cases that will best to answer our research question(s) and to meet our objectives. “This form of sample is often used when working with very small samples such as in case study research and when we wish to select cases that are particularly informative…”

3.5. Ethical Considerations

For the purpose of the study, permission was requested through formal letter from the company, RAMA Construction PLC., to collect data. Data collectors gave the necessary information to respondents from the prepared information on the first part of the questionnaire. All information given and identities of individuals are kept confidential and only used for academic research only.

3.6. Validity and Reliability

The study first tried to address related and extensive literature to have complete data on the research topics. This comprehensive approach helps to ensure face and content validity of the survey instrument. Extensive literature was reviewed to develop questions for the survey. A pilot test was also conducted on survey instrument (questionnaire) to check the questionnaire is complete, free from any biased and confusion word to selected few respondents. The instrument and research method also revised and commented by to professional advisor and expertise before going to data collection.

This study used the most popular test of inter-item consistency reliability that is the Cronbach‘s coefficient alpha, to identify the validity of items used in the survey. Calculating Cronbach’s alpha ($\propto$) has become a common practice when a multiple-item measurement of a concept or construct are employed because it is easier to use in comparison to another estimate (Willson, 2003).

Cronbach's alpha measure falls between the range of 0 and 1, Sekaran (2000) the Cronbach's alpha value is less than 0.6 is considered to be poor; if it is above 0.7 it is acceptable, and those over 0.8 are good.

The Cronbach’s alpha value of each dimension of independent variables (factor affecting supply chain performance) and dependent variable (Supply chain performance) is listed in below table 3.3 indicate all Cronbanch’s alpha value is greater than 0.7, which means all items are reliable and data has internal consistency and able to accepted for further analysis.

Table 3.2: Cronbach's Alpha Summary

S. No	Dimension	Cronbach's Alpha Value	Items Cronbach's Alpha	Result
1.	Information Sharing	5	0.751	Accepted
2.	Supplier Relationship	5	0.725	Accepted
3.	Human Resource	5	0.781	Accepted
4.	Customer Orientation	6	0.701	Accepted
5.	**Collective reliability**	**27**	**0.740**	**Accepted**

The Cronbach's alpha coefficient is an indicator of internal consistency of the scale. A high value of the Cronbach's alpha coefficient suggests that the items that make up the scale "hang together" and measure the same underlying construct. A value of Cronbach's alpha above 0.70 can be used as a reasonable test of scale reliability (Gaur A. and Gaur S., 2009).

3.7. Data Analysis Method

Sekaram (2003) in Kiage (2013) emphasizes the three objectives in data analysis; getting a feel for the data, testing the goodness of the data, and answering the research question. He notes that establishing the goodness of data provides credibility to all subsequent analysis and findings because it measures the reliability and the validity of the measures used in the study.

In line with this, after gathering the data from questionnaire schedules, the researcher checked completeness adequately for reliability and clarification. The data were analyzed using quantitative techniques, whereby the findings are presented in the form of frequency distribution tables and different types of charts. Qualitative techniques are incorporated in the study to facilitate description and explanation of the study findings. By doing so, the researcher has tried to create a good understanding of the study findings. The data collected were entered into a computer, coded and analyzed using Statistical Package for Social Sciences (SPSS) Version 23.

In addition, the study checked the relationship between the dependent and independent variables through correlation coefficients. The directions of the strength of this relationship are measured, and various outputs of regression analysis are summarized, interpreted and discussion and concluding remarks and recommendations are forwarded.

Chapter Four: Data Analysis, Presentation, and Interpretation

The main objective of this study was to assess factors that affect the supply chain performance in relation to RAMA construction PLC. In this regard, this chapter presents the results and findings of the study as collected from the sample population. The data have been presented by tabulation and some figures. The chapter covers respondents' general information based on demographic information, and findings based on how the research questions/objectives affect supply chain performance practices employed in RAMA construction PLC and the results are presented and interpreted.

4.1. Demographics

In this section, the researcher analyzed and discussed Demographic information of the respondents which are relevant to the study is summarized on the table here below and the frequencies and percentages are calculated and described. Many of these variables are only to provide background information about the respondents and have no impact on the factors of the study. The age of the respondents, their position, educational level and relevant work experience are discussed. The summary of these variables is depicted in table 4.1.

Out of the 64 respondents, the age frequencies show that 40.7% are in the age group of 26-35 years, 37.5% aged 36 to 45 years, 18.8% are in the age group of 46-55 years and the rest 3.1% are below 25 years old. Majority of the respondents (78.2%) fall in the age groups 26-45 years old.

Concerning position of respondents, out of the distributed questionnaires, 32.8% were responded by line managers, 34.1% by supervisors, 22.1% others and 6.3% by directors. These groups of respondents have direct relationship with the management of supply chains in construction projects. Hence, we can say all of the functions are represented.

The level of education of the respondents show that 34.4 % were Diploma and advanced diploma holders, while 42.2%, who were the majority, were first degree holders, and 23.4% were second degree and above holders. This shows that the respondents were well educated and could understand and respond to the questionnaire. Moreover, they were qualified for their current positions.

Table 4.1: Demographic background of Respondents

Variables		Frequency	Percent	Obsr.
Age Range	Below 25	2	3.1	64
	26-35	26	40.7	
	36-45	24	37.5	
	46-55	12	18.8	
Position	Director	4	6.3	64
	Manager	15	23.4	
	Project Manager	6	9.4	
	Project/Site engineer	21	32.8	
	Office Engineer	2	3.1	
	RAMA Suppliers and Other staffs	16	25	
Educational level	Diploma	3	4.7	64
	Advanced diploma	19	29.7	
	First degree	27	42.2	
	Second Degree and above	15	23.4	
Relevant Work Experience	Less than Five	5	7.8	64
	5-9	14	21.9	
	10-14	18	28.1	
	15-20	16	25	
	20 and above	11	17.2	

As it is shown in table 4.1 above, from the total valid respondents, 7.8% (5 respondents) of them have 5 and below five years of experience, 21.9% (14 respondents) of the respondents have five to fourteen years work experience, 18 respondents (28.1%) have fifteen to twenty years' work experience and the rest 16 of them which are 25% of them have twenty one to twenty five years' work experience and the remaining 11 respondents which are 17.2% have more than twenty six years work experience.

In general, around 70% of respondents have more than fifteen years' experience and from this figure we understand that the information obtained from them is reliable or dependable since they have good know-how and experience about the concept of supply chain and its relationship with company performance.

4.2. Summary of qualitative responses

The researcher has developed interview questions for the interview and focus group discussion and posed these questions to the selected individuals and groups who have extensive knowledge in the area based on the methodology suggested in this study, the purposive sampling or judgmental sampling. The qualitative responses are summarized in the paragraphs below.

About Information Sharing

Many of the respondents said that the company shares some order and operational information. As to the quality of the information, they believe there is a need to share the quality of information, especially in the construction sector. However, there is little integration within the company (internal) and with the supply chain members (external). There exist instances of wrong operational and order information. The use of information communication technology is limited to some areas of the supply chain and in stand-alone computers. Many instances of wrong items delivered to the site and much stock out conditions exhibited. With regard to sharing strategic information with supply chain members, there is no such practice.

Regarding Customer Orientation

In general, the company is an ISO 9000:2008 and 14000:2008 certified and there is some level of customer service policy. They strive to construct high quality, on budget and time buildings. However, in practice the respondents said, there is no customer feedback collection mechanism, budget and time overrun is exhibited largely. There is no full-fledged customer relationship management and the efforts are fragmented. There are instances to minimize cost for the customer by providing optional cost saving drawings and construction processes. However, the majority say this area requires much more attention and a lot of work has to be done according to its internal policy and to beat the competition in the sector.

On Human resource

The respondents said that there is some qualified staff but many of the supply chain department staff, especially those in the projects either doesn’t have formal education and

training on SCM or lack experience. Those who have good hand writing and who are considered to be ethically decent are sometimes assigned in the stores, or warehouses and procurement respectively. They lack the skill, knowledge and training required to handle this important assignment. There is seldom on job training and skill upgrades and high turnover of employees is exhibited. This is due to the nature of the construction sector in general and the view of the management providing training or paying for the education of the employees is as expense. However, from the discussion with the selected respondents, the expense of education and training could have been recovered by the improved performance or productivity of employees to a large extent.

Concerning Supplier buyer relationship

According to the respondents, the company tries to maintain good relationship with its suppliers and clients. However, the contracts it enters into with these supply chain members are transactional based. This does not help it to gain advantage in-terms of cost minimization, and building confidence of the supply chain members. There is no such difference between the contracts they enter with supply chain members. It has no different types of agreements that exhibit a kind of long-term relationship. Almost all contracts are short-term or single transaction agreements. The researcher has also asserted this by reviewing more than 40 sample contract agreements. The reason for this is because of less understanding of the differences between different types of agreements.

On overall performance of supply chain

All the respondents said supply chain management can affect the performance of the organization and they believe importance should be given to the department. However, they believe that little focus is given to the department and its manpower.

The reasons they gave include, lack of enough financial resources, attention of top management, no culture of doing such thing in other construction companies, lack of knowledge, lack of initiative by concerned department, traditional thinking of considering supply chain department as cost center.

4.3. Statistical Analysis

4.3.1. Correlation Relation

The correlation of the variable is measured by Pearson correlation coefficient. The result of the Pearson correlation is presented in the following table and interpreted by the guide line suggested by Field (2006); he mentioned that the Pearson correlation coefficient shows the relationship and direction between the predictor and outcome variable. Accordingly, if the relationship is measured in the range of 0.1 to 0.29 it is a weak relationship, 0.30 to 0.49 is moderate, above 0.50 shows strong relationship; while the positive and negative sign tell us the direction of their relationship.

Table 4.2: Pearson Correlation Information

		Information Sharing	Human Resource	Customer Orientation	Supplier Relation	Supply Chain Performance
Information Sharing	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	64				
Human Resource	Pearson Correlation	.600**	1			
	Sig. (2-tailed)	.000				
	N	64	64			
Customer Orientation	Pearson Correlation	.503**	.398**	1		
	Sig. (2-tailed)	.000	.001			
	N	64	64	64		
Supplier-buyer Relation	Pearson Correlation	.432**	.365**	.113	1	
	Sig. (2-tailed)	.000	.003	.374		
	N	64	64	64	64	
Supply Chain Performance	Pearson Correlation	.722**	.591**	.477**	.477**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	64	64	64	64	64

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

*. Correlation is significant at the 0.05 level (2-tailed).

The above correlation table shows that the correlation relationship between predictor variables (i.e. Information Sharing, Supplier-Buyer Relationship, Human resource and Customer

Orientation) and dependent variables (Supply Chain Performance - Efficiency and Effectiveness).

Accordingly, supply chain performance has a strong and positive correlation with all supply chain factors at Pearson correlation (r) value of 0.722, 0.591, 0.477 and 0.477 respectively as information sharing, human resource, customer orientation, and supplier relationship with the significant value of $P<0.01$.

4.3.2. Assumption Test

4.3.2.1. Multicollinearity Assumption

Multicollinearity exists when there is a strong correlation between two or more predictors in a regression model (Saunders et.al, 2007). There should be no perfect linear relationship between two or more of the predictors. So the predictor variables should not correlate too highly (Ho, 2006). If there is perfect collinearity between predictors, it becomes impossible to obtain unique estimates of the regression coefficients because there are an infinite number of combinations of coefficients that would work equally well. Perfect collinearity is rare in real-life data, but less than perfect collinearity is virtually unavoidable (Field, 2006).

If there is a high degree of correlation between independent variables, we have a problem of what is commonly described as the 'problem of multicollinearity' (Kothari, 2004; Field, 2006). This research data multi-collinearity assumption is checked by the Person Correlation Coefficient and Collinearity Statistics.

4.3.2.2. Assumption Test using Pearson Correlation Coefficient

The first assumption is checking the value of Pearson correlation coefficient among predictor's variables. If Pearson correlation coefficient (r) value among predictors is below <0.9, there is no substantial correlation between predictor variables so there is no multi-collinearity problem (Field, 2006). As shown in table 4.5 above, all the Pearson correlation coefficient values (r) between predictors are below 0.90. Therefore, it has satisfied multi-collinearity assumption and doesn't have collinearity problem so that it is able to obtain unique estimates of the regression coefficient.

4.3.2.3. Assumption Test using Collinearity Statistics

The other way of checking the multicollinearity assumption is that by looking SPSS analysis output correlation table of collinearity statistics value of Tolerance and Variance Inflation Factor /VIF (Field, 2006). The Tolerance column value below 0.02 and VIF value above 10 pose a multicollinearity problem. Having this, the Tolerance and VIF value is shown in the regression standardized coefficients tables below (table 4.6) and the analysis indicates that there is the minimum tolerance value of 0.365 which is above 0.02 and the maximum VIF value is 2.740, which is below 10. Therefore, the predictors don't highly correlate with each other; hence, there is no multicollinearity problem.

4.3.2.4. Auto-correlation Assumption /Durbin–Watson test/

It is the assumption of independent error tenable or reasonable test. Durbin-Watson used to test for serial correlation between errors. The test statistic can vary between 0 and 4, with a value of 2 meaning the residuals are uncorrelated (Field, 2006). A value greater than 2 indicates a negative correlation between adjacent residuals, whereas a value below 2 indicates a positive correlation. Similarly, Ott and Longnecker (2001) defines when there is no serial correlation, the expected value of the Durbin–Watson test statistic d is approximately 2.0; positive serial correlation makes $d < 2.0$ and negative serial correlation makes $d > 2.0$. Although, values of d less than approximately 1.5 (or greater than approximately 2.5) lead one to suspect positive (or negative) serial correlation. If serial correlation is suspected, then the proposed multiple regression models are inappropriate and some alternative must be sought.

Referring this and the model summary table 4.3; the Durbin-Watson value of this research is 1.587. Therefore, the auto-correlation assumption has almost certainly met, since it falls between 1.5 and 2.5. Furthermore, the correlation relation between the variables also is positive correlation since Durbin-Watson value is below 2.0 (Ott and Longnecker, 2001).

4.3.3. Interpretation of Model Summary

Model summary table 4.3 describes the overall model whether the model is successful in predicting dependent variables. It gives a value of R square, which measures how much of the variability in the outcome is accounted for the predictors. Under this section, the researcher

explains coefficient of determination, model generalization, model change statistics and auto-correlation assumption of each dependent variables and predictor variables.

4.3.3.1. Regression Analysis

Regression standardized coefficients can take on any value between 0 and 1, and it measures the proportion of the variation in a dependent variable that can be explained statistically by the independent variable(s) (Saunders et al., 2012). R square tells us how much of the variance in dependent variable is accounted for by the regression model from our sample, the adjusted value tells us how much variance in dependent variable would be accounted for if the model had been derived from the population from which the sample was taken (Field, 2006). Regression coefficients (R) and R Square of the research are discussed below:

Table 4.3: Model Summary Table

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			Durbin-Watson
					R Square Change	F Change	Sig. F Change	
1	.775[a]	.601	.574	.27983	.601	22.237	.000	1.587

a. Predictors: (Constant), Supplier Relationship, Customer Orientation, Human Resource, Information Sharing

b. Dependent Variable: Supply Chain Performance

In the table 4.3, the multiple correlation coefficient R of 0.775 indicates that the correlation among the independent and dependent variables is a strong positive relationship; as a result working on those selected factors have positive impact on performance of supply chain of the construction company. The coefficient of determination, R square is interpreted as 60.1% of the variation in the dependent variable supply chain performance is explained by the independent variables (i.e. Information sharing, human resource, supplier relationship, and customer orientation) and the remaining percent (39.9%) is explained by other dimensions.

4.3.3.2. Model Generalization

Generalization is a critical additional step and if we find that our model is not generalizable, and then we must restrict any conclusions based on the model to the sample used (Field, 2006).

The adjusted R square gives some idea of how well the model generalizes and ideally it would like its value to be the same or close to, the value of R square. In addition, the adjusted value tells us how much variance in a dependent variable would be accounted for if the model had been derived from the population from which the sample was taken.

The model generalization value is calculated by the difference between R square and adjusted R square (Field, 2006). As a result model generalization summary of supply chain performance is calculated as the difference between adjusted R square and R square. Referring table 4.3 above, value of adjusted R square and R square is 0.574 and 0.601, respectively. Hence the difference between R square and adjusted R square gives the shrinkage value 0.601 - 0.574 = 0.027, about 2.7%. This shrinkage means that if the model was derived from the population rather than a sample, it would account for approximately 2.7% less variance in the outcome. Therefore, we can conclude that if this model is applied on the total population, only 2.7% of variance occurs on the result.

4.3.3.3. Multiple Regression Analysis

Regression analysis is a statistical method to deal with the formulation of mathematical model depicting relationship amongst variables which can be used for the purpose of prediction of the value of dependent variable, given the value of the independent variable(s) (Kothari, 2004). Multiple regression analysis is an analysis of association in which the effects of two or more independent variables on a single, interval-scaled dependent variable are investigated simultaneously (William and Barry, 2010).

There are three major types of multiple regression techniques namely standard multiple regression, hierarchical regression, and statistical (stepwise) regression (Ho, 2006). This study is conducted using standard multiple regression method that all the study's independent variables are entered into the regression equation at once. According to William and Barry

(2010), no cutoff values for the model R square value to accept or reject the regression model; therefore, the regression analysis results are interpreted and regression models are developed to all dependent variables.

In this study, multiple regression analysis is conducted to test the effect of independent variables or supply chain factors (i.e. Information Sharing, Human Resource, Supplier Relationship, and Customer care) on the dependent variables or supply chain performance. The reason for using this multiple regression analysis was to examine the direct effect of factors that affect supply chain performance in construction.

4.3.3.4. Analysis of Variance /ANOVA/ Test

ANOVA tests indicate that whether the model is significantly better at predicting the outcome than using the mean as a 'best guess' (Field, 2006). ANOVA model is more likely to be significant, indicating that at least one group mean is different from another group mean. ANOVA is the appropriate statistical technique to examine the effect of a less-than interval independent variable on an at-least interval dependent variable. If the F test result is not significant, the model should be dismissed and there is no need to proceed to further steps (William and Barry, 2010).

On the other hand, regarding ANOVA test Saunders et al., (2012) discussed that a very low significance value (usually less than 0.05) means that your coefficient is unlikely to have occurred by chance alone. A value greater than 0.05 means you can conclude that your coefficient of multiple determinations could have occurred by chance alone. Therefore, the ANOVA table and test result are presented and discussed below.

Table 4.4: ANOVA[a] table

Model		Sum of Squares	Df	Mean Square	F	Sig.(p)
1	Regression	7.280	5	1.456	19.617	.000[b]
	Residual	4.305	58	.074		
	Total	**11.585**	**63**			

a. Dependent Variable: Supply Chain Performance

b. Predictors: (Constant), Supplier Relationship, Customer Orientation, Human Resource, Information Sharing

The ANOVA test result of supply chain performance is indicated on above table 4.4, it is noticed that F value 19.617 is significant at P<0.001 levels. Therefore, from the result, it can be concluded that with 60.1% of the variance (R square) in supply chain performance is significant and the model appropriately measure the dependent variables. Furthermore, the significant value P is very low or less than 0.01 means that the coefficient value is unlikely to have occurred by chance alone.

4.3.3.5. Multiple Regression Model

Multiple regression models often are used to develop some proposed theoretical model (William and Barry, 2010). Multiple regression analysis is used to know by how much the independent variable(s) i.e. supply chain factors explain or influences the supply chain performance in RAMA Construction performance.

Standardized regression coefficient (Beta) is the estimated coefficient indicating the strength of the relationship between an independent variable and dependent variable expressed on a standardized scale where higher absolute values indicate stronger relationships (range is from -1 to 1) (William and Barry, 2010).

Table 4.5: Regression Standardized Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-.976	.635		-1.536	.130		
	Information Sharing	.516	.141	.413	3.808	.000	.499	2.004
	Human Resource	.203	.129	.191	1.812	.045	.610	1.640
	Customer Orientation	.250	.156	.239	1.600	.031	.714	1.400
	Supplier Relationship	.228	.108	.216	2.120	.038	.776	1.288

a. Dependent Variable: Supply Chain Performance

Based on the multiple linear regression analysis, table 4.8 above Beta weight reveals that the impacts of each relationship of Information Sharing, Human Resource, Supplier Relationship, and Customer Orientation on supply chain performance are 0.413, 0.191, 0.216, and 0.239 respectively. This informs the predicted change or any improvement in the dependent variable for every unit increase in the predictor, while other variables being held constant.

By examining the standardized regression coefficient (ß) for each of the predictor variables, the result found that information sharing ß = 0.413, $p < 0.05$), human resource (ß = 0.191, $p < 0.05$), customer orientation (ß = 0.239, $p < 0.05$) and supplier relationship (ß = 0.216, $p < 0.05$) show significant positive relationship with supply chain performance.

According to Ho (2006), multiple regression equation:

$$Y = C + B_1X_1 + B_2X_2 + \ldots\ldots + B_nX_n$$

Where: Y = dependent variable

C = constant

B = Unstandardized regression coefficient

X = Value of the predicted coefficient

The researcher has discovered the degree that affect Supplier Chain Performance by those identified supply chain factors. The researcher developed below regression model:

$$Y(SCP) = C + (B1)\,IS + (B2)HR + (B3)SR + (B4)CO$$

Where: SCP = Supply Chain Performance

C = Constant

IS = Information Sharing

SR = Supplier Relationship

HR = Human Resource

CO = Customer Orientation

$$Y\,(SCP) = -0.976 + 0.413(IS) + 0.191(HR) + 0.216(SR) + 0.239(CO)$$

4.4. Hypothesis Test

According to Weiers (2008), if the p value is less than the specific level of significance (α), reject the null hypothesis; otherwise, do not reject the null hypothesis.

The hypothesis result of supply chain factors which are shown above in table 4.4 ANOVA Table and 4.5 regression standardized coefficients, for all alternative hypothesis p value is less than 0.05, and this means to reject the null hypothesis. Therefore, the regression analysis agreed to accept alternative hypothesis, as a result, all alternative hypotheses are accepted. Hence, supply chain factors have a positive correlation with supply chain performance namely information sharing, human resource, supplier relationship, and customer orientation.

Table 4.6: Hypothesis test result

Hypothesis No.	Hypothesis	P value	Relationship Direction	Result
H1a	The supply chain factors, in general, affect the supply chain performance of RAMA Construction PLC;	0.000	Positive	Reject $H1_0$
H2a	Information Sharing affects the Supply Chain performance of RAMA Construction PLC;	0.05	Positive	Reject $H2_0$
H3a	Supplier Relationship has effect on the Supply Chain performance of RAMA Construction PLC;	0.05	Positive	Reject $H3_0$
H4a	Customer Orientation affects the supply chain performance of RAMA Construction PLC;	0.05	Positive	Reject $H4_0$
H5a	Human Resource affects the Supply Chain performance of RAMA Construction PLC.;	0.05	Positive	Reject $H5_0$

1. H1a- The supply chain factors, in general, affect the supply chain performance of RAMA Construction PLC;

The p value is 0.000 and the relationship is positive, therefore, we accept the hypothesis H1a; the supply chain factors, in general, affect the supply chain performance of RAMA Construction PLC. The null hypothesis $H1_0$, therefore, will be rejected.

2. H2a-Information sharing affects the Supply Chain performance of RAMA Construction PLC;

The p value is 0.000 and the relationship with is positive, therefore, we accept the hypothesis H2a- Information Sharing affects the Supply chain management performance of RAMA Construction PLC. The null hypothesis $H2_0$, Information Sharing has no effect on the supply chain management performance of RAMA Construction PLC, therefore, will be rejected.

3. H3a- Supplier Relationship has an effect on the Supply Chain performance of RAMA Construction PLC;

The p value is 0.050 and the relationship with is positive, therefore, we accept the hypothesis $H3_a$- Supplier Relationship has an effect on the supply chain management performance of RAMA Construction PLC. The null hypothesis $H3_0$, Supplier Relationship has no effect on the supply chain management performance of RAMA Construction PLC, will be rejected.

4. $H4_a$ Customer Orientation affects the supply chain performance of RAMA Construction PLC;

The p value is 0.000 and the relationship with is positive, therefore, we accept the hypothesis H4a-Customer orientation has an effect on the supply chain management performance of RAMA Construction PLC. The null hypothesis $H4_0$, Customer Orientation has no effect on the supply chain management performance of RAMA Construction PLC, therefore, will be rejected.

5. H5a Human Resource affects the Supply Chain performance of RAMA Construction PLC.;

The p value is 0.000 and the relationship with is positive, therefore, we accept the hypothesis H5a- Human Resource has an effect on the supply chain management performance of RAMA Construction PLC. The null hypothesis $H5_0$, Human Resource has no effect on the supply chain management performance of RAMA Construction PLC, therefore, will be rejected.

To summarize, the entire null hypotheses are automatically rejected and all alternative hypotheses are accepted. This shows the company has to work in these factors so that it can increase the performance of the supply chain.

The following chapter discusses the summary of major findings, conclusions, recommendations and suggestions for further research.

Chapter Five: Summary, Conclusion, and Recommendation

This thesis discusses the factors that affect the construction supply chain performance in the case of RAMA Construction PLC, an Ethiopian Grade I General contractor. Hence, it tries to assess the influence of the independent variables on the dependent variable.

In this chapter, the summary of the major findings are provided, and conclusions are drawn in light of the objectives of the study. The researcher then presents recommendations for both the research and for improvement by the organization under study. Finally, it highlights suggestion for further study by other researchers in the future.

5.1. Summary of Major Findings

The research aims at the Assessment of factors that affect supply chain management performance on construction Supply chain performance with reference to RAMA Construction PLC. Accordingly to meet this objective, the researcher has developed a questionnaire from the relevant literature to collect and analyze the opinions of the study sample. The following findings are obtained;

- Regarding the relationship between the supply chain factors (independent variables) and supply chain performance (dependent variable) the correlation relation shows that they have a strong and positive correlation with all supply chain factors at Pearson correlation (r) value of 0.722, 0.591, 0.477 and 0.477 respectively as Information Sharing, Human resource, Customer Orientation, and Supplier Relationship with significant value of $P<0.01$. The results are consistent with similar research findings by other researchers (Othman and Rahman, 2010; Albahussain et al., 2016; Vereecke et al., 2010).
- Another finding of the statistical analysis regarding information sharing reveals that the standard coefficient beta value is ß =0.413, at $p<0.05$. This factor relative to the other independent variables listed in this research takes the lion share on the prediction of the supply chain performance. As a result, if the company does a unit of improvement in its information sharing, it will help to improve its supply chain performance by 41.3%.This finding is consistent with earlier studies that pronounced better supply chain performance as a result of information sharing in SCM (Mutuerandu, 2014;Visich et al., 2009).

- The other factor tested in the statistical analysis was Human resource. The statistical result of this factor shows that it significantly explains the supply chain performance at beta value of ß =0.191, with significance of p<0.05.Whenever the company made a unit of improvement in its human resource, it will obtain a 19.1% improvement on its supply chain performance. This finding is in line with previous studies that asserted better supply chain performance as a result of human resource in SCM initiatives (Albahussain et al., 2016; Vereecke et al., 2010).
- The standard coefficient value ß =0.239 of Customer orientation significantly explains supply chain performance at p<0.05. This implies that a unitary change in the customer orientation will help the company to obtain an improvement of 23.9% in its supply chain performance. This finding is consistent with other previous studies that proclaimed better supply chain performance as a result of customer orientation in SCM initiatives (Mutuerandu, 2014).
- The statistical analysis on Supplier relationship shows it significantly explains the supply chain performance at beta value of ß =0.216, with significance of p<0.05. Whenever the company made a unit of improvement in its supplier relationship, the company will obtain a 21.6% improvement on its supply chain performance (Mukhtar et al., 2002).
- With regarding to supply chain performance, all the four factors; information sharing, customer orientation, supplier relation, and human resource, explain at ß = 0.413, 0.239, 0.216, and 0.191 and at P<0.05, respectively in descending order. The multiple regression analysis result indicates that 60.1% of variance in the supply chain performance can be predicted from the supply chain factors. While the remaining 39.9% is explained by other supply chain factors which are not included in this research.

5.2. Conclusion

Construction is very important sector which hires many citizens, generates more revenue, and contributes a lot to development of a country through its direct and indirect effects. However, the sector has many problems due to the nature and the complexity of the sector itself due to the involvement of various stakeholders with different interests. The supply chain management is one of the major functions which manage key resources with large type, quantity and amount in the sector which handles these interests. Therefore, an extensive study

of supply chain factors and practice will be of a paramount importance, for the company overall performance in general and supply chain performance in particular.

This study has provided empirical justification for a framework that identifies four constructs of Supply chain Performance and describes the relationship among these constructs and supply chain performance within the context of construction in RAMA Construction PLC. It concludes that there is a relationship between the supply chain factors (independent variables) and supply chain performance (dependent variable); the correlation relation shows that they have a strong and positive correlation with all supply chain factors.

The independent variables studied significantly and positively affect the supply chain performance of RAMA construction plc. If the company invests in improving these factors, it can increase overall supply chain performance by 60.1%.

In general, the study concludes that supply chain factors which are information sharing, human resource, supplier buyer relationship, and customer orientation positively and significantly affect the supply chain performance of RAMA Construction PLC. Based on this the study will provide professional recommendation in the next section.

5.3. Recommendations

Based on the findings of this study, the following points are suggested by the study in order to improve the supply chain performance of RAMA construction PLC;

The company, RAMA Construction PLC, has to focus on the four supply chain factors in order to improve its supply chain performance in particular and organizational performance in general. Based on the result, priorities should be given to information sharing, customer orientation, supplier-buyer relationship, and human resource in descending order.

The company has to invest in information communication technology that enables it to share information with its suppliers, clients and subcontractors in order to capitalize on the quality of information and response time there by increase customer satisfaction.

Customer orientation is one of the areas where the company can capitalize to benefit from its competitive advantage. Hence it should employ full-fledged customer relationship management practices.

The supplier buyer relationship is more of transactional than a kind of long-term one. This will enable it to make a joint planning, increase collaboration and have joint decision making with its key supply chain members, both downstream and upstream in order to increase its supply chain performance. Therefore, the management should look for ways to work in long-term relationships where it can benefit more and improve its supply chain performance.

The organization has to carefully recruit and employ supply chain management professionals. It also has to invest in training and development of its human resource to improve and benefit from the supply chain performance.

5.4. Suggestion for Further Study

This research is conducted only on RAMA Construction PLC and well as it supplier; now therefore, the researcher recommends that other researchers include other construction companies and additional construction material supplier to widen the scope of study.

This study limits itself to four factors, which explain about 60.1% of the factors affecting the supply chain performance of RAMA construction plc. That means 39.9% is explained by other factors which are not included or studied by this research. Therefore, the researcher suggests including other factors in future studies by other researchers.

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Appendices

Appendix I

Addis Ababa University

College of Business and Economics

School of Commerce

Department Logistics and Supply Chain Management

Graduate Studies

Questionnaire for Employees and Suppliers of RAMA Construction PLC

This questionnaire is prepared to conduct a study in the partial fulfillment of a Master's Degree in Logistics and Supply Chain Management (MA) program entitled with "Factors Affecting Supply Chain Performance: The case of RAMA Construction PLC." Hence, you are kindly requested to give the necessary information for the research questions.

There is no need to write your name and address and the information that you provide will be kept ***confidential***. The accuracy, honesty, and fairness of your response will have a great impact on the outcome of the research.

Aim of the questionnaire: This questionnaire is developed to assess the views of Employees and Some Suppliers to asses some of the factors affecting the supply chain performance of RAMA Construction PLC.

If you have any question, please don't hesitate to ask: Mulugeta Amare, Cell: 0911241734/ 0912956208, mulued2003@gmail.com

Thanks in advance for your cooperation

General guidelines:

Please read each question carefully and make a tick or a circle under each value and you can write your opinion on the remark section.

1. Sex: ☐ Male ☐ Female
2. Age: ☐ Under 25 ☐ 26-35 ☐ 36-45 ☐ 46-55 ☐ above 55
3. Respondent's position:

☐ Director ☐ Manager ☐ Project

☐ Manager ☐ Project/Site Engineer ☐ Office Engineer

Other Please specify, if other _____

4. Educational Status: ☐ Certificate ☐ Diploma ☐ Advanced Diploma
   ☐ First Degree ☐ 2nd Degree and above
5. Relevant work experience:
   ☐ Below 5yrs ☐ 5-10yrs ☐ 11-15yrs ☐ 16-20yrs ☐ > 20yrs

SECTION B: Factors that affect the supply chain performance

1. To what degree your companies share information with suppliers and clients? Please rate the following;

1	***2***	***3***	***4***	***5***
Strongly Disagree	***Disagree***	***Neutral***	***Agree***	***Strongly Agree***

Please put (√) sign for each of the following statements as appropriate

No.	**Attributes**	**1**	**2**	**3**	**4**	**5**	**Remark**
1	Order information should be shared with the suppliers and subcontractors						
2	Operational Information has to be shared with stake holders						
3	Sharing Strategic Information enables supply chain partners to trust each other and increases supply chain performance						
4	Sharing information, in general, enhances the performance of supply chain						
5	Sharing quality information is very important for the performance of supply chain						

2. To what magnitude you think human resource will have an impact on the performance of supply chain in construction, especially in your company?

1	*2*	*3*	*4*	*5*
Strongly Disagree	***Disagree***	***Neutral***	***Agree***	***Strongly Agree***

Please put (√) sign for each of the following statements as appropriate

No.	Attributes	1	2	3	4	5	Remark
1	Experience in the area of Supply chain management (SCM) affects the performance of supply chain in Construction						
2	Education of employees in the SCM affects the performance of supply chain in construction						
3	Motivation of supply chain professionals in your company affects supply chain performance						
4	Attitude of supply chain staff can affect the performance of supply chain						
5	The employees capability and motivation can affect the overall performance of your company						

3. To what extent do you agree supplier-buyer relationship affects the performance of your organization?

No	Attributes	1	2	3	4	5	Remark
1	Your company signs long term contracts with suppliers and subcontractors						
2	Your organization maintains strong and enduring ties with key suppliers						

3	Supply Contract has to be crafted in a way to increase collaboration among partners						
4	Your company manages inter-organizational relationships to create closer linkages and greater cooperation						
5	Your company believes that Joint Planning and decision making is very important during partnership						

3. To what extent is your company customer focused (Oriented towards Customers) and this affects the supply chain performance of your company?

1	***2***	***3***	***4***	***5***
Strongly Disagree	***Disagree***	***Neutral***	***Agree***	***Strongly Agree***

Please put (√) sign for each of the following statements as appropriate

No.	**Attributes**	**1**	**2**	**3**	**4**	**5**	**Remark**
1	Your organization focuses on customers and recognizes their desire						
2	Your company places first priority on meeting customers' needs with superior products or services						
3	Your company collaborates with other supply chain partners to fulfill the needs of your customers						
4	Your company has clear customer service policy and is incongruence with other supply chain members						
5	Your organization supply chain is organized for satisfying and exceeding multiple customer requirements						

4. How do you evaluate the contribution of the following factors of supply chain effectiveness and efficiency measures in respect to your company supply chain management?

No.	Attributes	1	2	3	4	5	Remark
1	Your organization works for Cost reduction for its benefit and its customers						
2	Your company works to minimize lead/delivery time reduction						
3	Your company quality the needs of your customers enhancement collaborates with other supply chain partners to fulfill						
4	Your organization works for revenue enhancement through supply chain management						

----------Thanks a lot for your valuable time----------

Appendix II

Questionnaire for selected RAMA Construction PLC Management and Focused group discussion

1. What level of strategic partnership practices your company employ like Bonding between suppliers and your company, Trust and cooperation, increase collaboration among partners, Joint Planning, and Joint Decision making?

2. Do you share Order information, Operational Information, and Strategic Information with suppliers and customers? How do you share the information and how do you describe the quality information shared between your company and actors?

3. What level and type of Customer Orientation do you have? Do you have customer service policy? What are your view to minimize cost, decrease delivery time of the project, and your response time to customer requests?

4. What is your view on supply chain management human resource /manpower/ of the company? Do they have the required skill, training, knowledge or competence in general?

5. Do you think supply chain management can improve the performance of RAMA Construction PLC in general?

6. What are the main reasons for not practicing these supply chain factors in your organization?

Appendix III

Permission Request Letter

Dear the Managing Director,

RE: REQUEST FOR PERMISSION FOR DATA COLLECTION

I am a postgraduate student of Addis Ababa University School of Commerce pursuing a master degree in Logistics and Supply Chain Management. I wish to conduct a research titled **Assessment of Factors Affecting Supply Chain Performance in Construction: the Case of RAMA Construction PLC**. A questionnaire has been developed to assist gathering relevant information for this study. I wish to seek your permission to be allowed access to your members of staff who will be selected randomly and issued with a questionnaire.

Your grant of permission to conduct the study in your company will be highly appreciated. I wish to guarantee you that all information gathered will be for academic purpose only and will be treated with utmost confidentiality and high ethical standards will be observed.

Yours Sincerely,

Mulugeta Amare

Researcher

ID No. GSR/2871/07