DETERMINANTS OF SUPPLY CHAIN MANAGEMENT PERFORMANCE:

THE CASE OF METEHARA SUGAR FACTORY

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By: TESFAYE DERBIE LEGESSE

ADVISOR: TEKLEGIORGIS ASSEFA (Asst. Prof.)

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ETHIOPIA

Addis Ababa University
School of Commerce
Graduate Studies
Approved by Board of Examiners

Teklegiorgis Assefa (PhD)

_____	_____	_____
Advisor Name	**Signature**	**Date**

Mengistu Bogale (PhD)

_____	_____	_____
Internal examiner Name	**Signature**	**Date**

Baynesagn Asfaw (PhD)

_____	_____	_____
External Examiner Name	**Signature**	**Date**

_____	_____	_____
Chairman of Graduate Committee	**Signature**	**Date**

Declaration

I, Tesfaye Derbie, announce this research paper entitled **DETERMINANTS OF SUPPLY CHAIN MANAGEMENT PERFORMANCE "THE CASE OF METEHARA SUGAR FACTORY EMPLOYEES PERSPECTIVES"** is my own and I dare to say original research work that has not been produced by others in any other universities for any other requirements in any form. To this end, I acknowledged all sources of information that I used to produce the study appropriately and I would say perfectly.

Student Researcher	**Signature**	**Date**
Tesfaye Derbie	_____	_____

Letter of Certification

This to certify that Tesfaye Derbie has carried out his thesis work on the topic entitled **DETERMINANTS OF SUPPLY CHAIN MANAGEMENT PERFORMANCE "THE CASE OF METEHARA SUGAR FACTORY EMPLOYEES PERSPECTIVES"** under my guidance and supervision. Accordingly, I here assure that his work is appropriate and standard enough to be submitted for the award of Master of Arts in Logistics and Supply Chain Management.

Research Advisor	**Signature**	**Date**
TEKLEGIORGIS ASSEFA (Asst. Prof.)	_____	_____

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ACRONYMS/ABBREVATIONS

EF: Environmental Factors

ESC: External Supply Chain

HM: Human Metrics

IS: Information Sharing

LPI: Logistics Performance Indicator

SBR: Supplier-Buyer Relations

SC: Supply Chain

SCM: Supply Chain Management

SCMP: Supply Chain Management Performance

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ABSTRACT

Supply Chain Performance measures clearly show not only how well an institution meets the needs of its customers but also how it handles its customers in terms of quality and efficiency to add customer value for goods and services. This has triggered the need for performance measures, or metrics, for global supply chain performance improvements. Nevertheless, no study has been conducted to identify or assess the determinants of supply chain management performance in sugar factories. This study mainly tries to examine the determinants of supply chain management performance in Metehara Sugar Factory. The study problem was answered through a combination of qualitative and quantitative approach in order to reduce the limitation and an explanatory design was employed in the current study to assess the determinants of supply chain management performance. The researcher used primary and secondary data for further analysis. The study found a positive correlation among the five (supplier buyer relation, human metrics, external supply chain, environmental factor and information sharing) supply chain managements performance determinants. Furthermore, the value of regression analysis shows that supplier buyer relation, human metrics, external supply chain, environmental factor and information sharing have a statistical significant effect on supply chain management performance. All the independent variables in the study influenced supply chain performance and with the highest influence being the supplier buyer relationship and human metrics and the least being external supply chain and environment. In order to improve the supply chain management performance, the factory needs to create a long-term strategic approach.

Keywords: Supply Chain Management Performance, supplier Buyer Relations, External Supply Chain, Environmental Factors, Human Metrics and Information Sharing

CHAPTER ONE
INTRODUCTION

This chapter addresses the introductory part of the research. It basically includes background of the study, statement of the problem, purpose and significance of the study and definition of basic terms.

1.1 Background of the Study

In the new era, understanding of supply chain performance is vital to achieve supply chain performance improvements. Supply Chain Performance measures clearly show not only how well an institution meets the needs of its customers but also how it handles its customers in terms of quality and efficiency to add customer value for goods and services (Deloitte 2007, p. 111). Nowadays measures, actions and decisions that happen within a factory are no longer the sole determinants of performance instead everyone that has connection or some form of association with the organization has a huge and meaningful overall results of the Supply Chain (SC) as every factor is connected to every other factors in one way or the other. The competition having shifted from individual organizations to supply chains because Supply Chain Management (SCM) is an essential element that must be implemented effectively when organizations form global alliances (Halldorsson et al. 2008, p. 126).

Supply Chain that involves all levels of the manufacturers and suppliers; transporters, warehouses, retailers as well as the end users full-fill a customer's desire and request is ultimately linked with customer's satisfaction and meet their needs in turn produces profits for the company itself. Currently African in general and Ethiopia in particular, manufacturing industries, like anywhere in the world where competition is very high, are facing similar challenges: consequently, both multinational and other import substitute companies whose profit is highly determined by the quality and standard of the supply chain are required to enhance the quality of their products, reduce cost, provide better services and supply a wider variety of products, all fulfilled at once in a given scenario that (Dangayach and Deshmukh 2003, p. 279) are included in the new competition parameters. Gunasekaran et al. (2004, p. 265) stated that, many companies are not able to increase their prospective of supply chains due to failure in the implementation of performance measures and metrics targeted to integrate the chain in a more efficient manner which may result in the enhancement of effectiveness and efficiency of the companies.

Despite that fact that many factors are cognizant of the benefits of supply chain management in the routine daily operations, there are yet many more that do not comprehend fully how important and useful supply chain management is for to integrated the chains and thereby measure the performance given the metrics.

In fact, without a precise measurement of the performance it is highly unlikely to expect improvement. Hence, there needs to be an approach of measurement to have an open dispatch of the levels of strategy, operation and tactics to get the actual scope of the operation (Bhagwat and Sharma 2007, p. 56). What makes supply chain management more important is that the supply efficiency chain needs to and can be improved; however, the nature of its measurement is more qualitative than quantitative and is rated in a unit of ratio. Therefore, while there is no doubt supply chain is still measurable through qualitatively the support it gives to improvement of supply chain can be enhanced through measuring supply chain performance (Chen and Paulraj 2004, p. 45) what can be measured can also be improved up on the measuring gives insights into the division that needs upgrading for more efficient performance.

Although the sharp contrast that the manufacturing sector proliferating in an astonishing rapidity in countries, such as India and China and seems decline in the giant advanced economies it remains pivotal to assure steady growth in the manufacturing sector which is only possible through creating a conducive atmosphere for global competitiveness both in quality and quantity from the initial establishment of a plant to the integrated supply chain until a product reaches to the consumer (Deloitte 2007, p. 234). When considering mass production and competitiveness index in the global stage the Asia, China, India and Korea are the top three (CIMA 2010)while India standing at 46^{th} on Logistics Performance Indicator (LPI). This illustrates the fact that supply chain performance measurement method is a necessary among other things to ensure the balance between manufacturing and comprehensive supply of products. This study examine the determinants of supply chain performance in Metehara sugar factory.

1.2 Statement of the Problem

There are three large-scale sugar establishments in the Ethiopia; two of them in the Awash Basin (Wonji/shewa and Metehara) and one (Finchaa) in the Blue Nile Basin. The present level of Ethiopia's production from the three-sugar estates is about 261,041 tons of sugar. The Metehara

Sugar Factory, which was brought on stream in 1969 by HVA (Handlers-Vereenging Amsterdam) at Metehara, developed 9919 hectares and has a capacity to process 115,000 tons of sugar annually.

Ethiopia started the implementation of a five-year Growth and Transformation Plan (GTP) in 2010/2011 with the aim of becoming a middle-income country with a climate-resilient green economy by the year 2025. For the duration of the GTP, the sugar sub-sector (production and processing of sugarcane) has been given top priority together with a few other sub-sectors such as the textile industry, and the meat and leather processing industry. Compared to the recent development in the sugar sub-sector, development has been very slow both in terms of the area under production and the number of factories from the establishment of the first commercial sugarcane production in 1953 until 2006 (Wendimu et al. 2015, p. 201). However, rapid development within the sugar industry has taken place in the previous decade: the construction of the largest sugar factory in the country (Tendaho Sugar Factory) started in 2006 with the first phase being completed in 2014; two existing sugar factories (Metehara and Fincha Sugar Factories) were considerably renovated and extended from 2009 to 2013; the oldest Ethiopian sugar factory (Wonji-Shoa Sugar Factory) was replaced by a new and much larger sugar factory in late 2014; and the construction of 11 new sugar factories started in 2011. Ethiopia has one of the highest sugarcane yields (land productivity) in the world. While Ethiopia exports a small part (about 7% in 2013) of its sugar production to the European Union (EU) to take advantage of the duty-free and quota-free access for sugar exports from developing countries, it imported more than half of its domestic sugar consumption in 2013. However, the Ethiopian sugar sub-sector aims to become self-sufficient and to start exporting sugar (in addition to the preferential exports to the EU) by 2015.

Now a day, factories are changing as companies discover new ways of working together to achieve the ultimate supply chain goal, the ability to fill customer orders faster and more efficiently than the competition. This has triggered the need for performance measures, or metrics, for global supply chain performance improvements. According to Beamon (1999) performance measures must show not only how one is providing for your customers (service metrics) but also how an organization is handling its business (speed, asset, inventory and financial metrics).

Measurement of supply chain performance is necessary to be carried out in order to solve some problems that may arise out of the supply chain before the widespread impacts are realized. Supply

chain performance measurement would organize supply-chain coordination to cope with consumer demands (Chopra and Meindl 2001), evaluate holistically supply chain performance, and create more efficient supply chain integration (Balfaqih et al. 2016). Agro-industrial supply chain management has a different model from conventional manufacture, that perishable raw materials and product, business activity depends on seasonal condition, raw material varied size and quality, voluminous and hard handling (Marimin eta al. 2010). By these constraints, the complexity of agriculture and agro-industrial supply chain has not been studied and reviewed widely (Higgins 2007).

Sugarcane agro-industry supply chain as a business process to produce sugar from cane -a product of agriculture- has many constraints and differences with other supply chain model. The complexity of sugarcane supply chain model can be seen as agricultural product characters, involve multi-actor and multi-sector to make a business decision, and uncertainty supply chain business process input and output factors (Chiadamrongm and Kawtummachai 2008). Supply chain performance measurement is needed to ensure the supply chain objectives achievement and to know the company's capabilities to overcome the supply chain problem. . There is little or no study was conducted in the area of determinants of supply chain management performance in the case of Metehara Sugar Factory.

Some studies states that, supply chain management plays pivotal role in the effectiveness and efficacy of sugar factories. According to Wendimu et al. (2015) related the issue of supply chain management performance of sugar factories both from the perspectives of demand side and supply side. These include supplier-buyer relations, external supply chain, environmental factors, human factors and information sharing used in the overall sugar industry. Nevertheless, no study has been conducted to identify or assess the determinants of supply chain management performance in sugar factories.

Unfortunately, despite decades of research using a variety of methods, the debate over the determinants of supply chain management performances remain unsettled, largely due to theoretical and methodological controversies. Besides, most researches done in the area of supply chain management performance of manufacturing products were undertaken in qualitative means in which this study tries to make it both quantitative and qualitative supply chain management

performance of agro-industry (Balfaqih et al. 2016). This study mainly tried to examine the determinants of supply chain management performance in Metehara sugar factory.

1.3 Research Questions

The study has been initiated to seek answers for the following basic questions:

1. What are the determinant factors of Supply Chain management Performance in Metehara sugar factory?
2. What is the association between supplier-buyer relationship, external supply chain, human metrics, information sharing, environmental factor and supply chain management performance?

1.4. Objectives of the Study

1.4.1. General Objective

The general objective of this study was to assess the major determinant factors of Supply Chain Management Performance of Matahara Sugar Factory.

1.4.2 Specific Objectives

The study was guided by the following sub- objectives:

- Investigate the determinant factors of Supply Chain management Performance in Metehara Sugary Factory.
- To identify the correlation between supplier-buyer relationship, external supply chain, human metrics, information sharing, environmental factor and supply chain management performance

1.5 Significance of the Study

The study focused on the Supply chain management performance in Metehara sugar factory. This will be the background on the realization that, supply chain management performance is very important to the sector even with the little attention is given by different researchers in the discipline. The issue of applying supply chain management performance in the sector is a fairly

new phenomenon in Ethiopia; hence there is need for extensive research to unravel the various underlying dynamics of the research topic so as to be applied to increase their performance.

The rationale of the study will support to generate new knowledge and comprehensive approaches to be used by factories to help them manage their Supply Chain management performance. The findings of this study will be valuable to diverse segments of the people. Different factories will benefit from the findings of this study as they will have the knowledge of the SCMP practices that enhance the performance of the factories. Government and non-government factories will be benefited from the findings of this study by getting to understand the effect and contributions of SCMP practices and procedures that promote efficient service.

This research will develop a model for SCMP which integrates existing theory, and explains the critical factors influencing SCMP and their impact on performance in the sugar sector. The model will provide a framework in which the relationships between SCMP constructs and performance dimensions.

1.6 Scope of the Study

The study was delimited to assess the determinate of supply chain management performance from the perspectives of supplier buyer relations, external supply chain, environmental factors, human factors and information sharing factors.

Geographically, the study was conducted in Metehara, East Shoa Zone, Oromia Region of Ethiopia, particularly in Metehara Sugar Factors.

1.6 Organization of the Paper

This study is organized in such a way that chapter one presents introduction, chapter two presents the theoretical and empirical related literature to the study, while chapter three provides research methodology. Chapter four deals about research findings and interpretation and the last chapter focused on conclusions and recommendations.

1.7 LIMITATION OF THE STUDY:

The study was conducted on Metehara sugar factory and the factory had different stakeholders including suppliers and out growers. But, the study assessed the determinants factors from the

perspective of factory employees only and it lacks other channel partner's perspectives and this can be a limitation of the study. This study was be carried out at Metehara sugar factory, so generalizing the results of this study on other sugar factories are questionable. In addition, the study was carried out on Ethiopian setting; also generalizing Ethiopian sugar sector results to other countries may be questionable.

1.8 Operational definition of key terms

Supply Chain Management Performance (SCMP): The overall efficiency and effectiveness of a supply chain (Beamon 1998, p. 35).

Supplier-Buyer Relations (SBR): The long-term relationship between the organization and its suppliers. It is designed to leverage the strategic and operational capabilities of individual participating organizations to help them achieve significant ongoing benefits (Li et al. 2006, p. 107).

External Supply Chain (ESC): The established and nurtured supply chain network. The existing supply chains have been strengthened through increased collaboration. Integration with external partners here is very much needed. Strategic partners throughout the global supply chain collaborate to identify joint business objectives and action plans (Bititci et al. 2006).

Environmental Factors (EF): The source of events and changing trends and regulations which create opportunities and threats for an individual organization (Lenz 1980).

Human Metrics (HM): Behavioral and support issues while establishing and implementing the key Supply Chain Management and metrics (Tony and Kelvin 2007, p. 6).

Information Sharing (IS): The extent to which critical and proprietary information is communicated to one's supply chain partner (Li et al. 2006, p.107).

CHAPTER TWO

LITERATURE REVIEW

This chapter reviews works on supply chain and supply chain management at global, regional and national level in general and Ethiopia in particular. Works on the factors affecting the performance supply chain management were also reviewed.

Aiming to contribute to the design and implementation of conceptual framework with critical variables included measuring supply chain performance in the context of Metehara Sugar Factory, three major components are included first, a brief definition and explanation of what supply chain and supply chain management were discussed. Second, factors that influence supply chain performance measurement and determinants that define the outcome was put forward. At last, the total effects of all the determinants of supply chain performance were explained and analyzed accordingly.

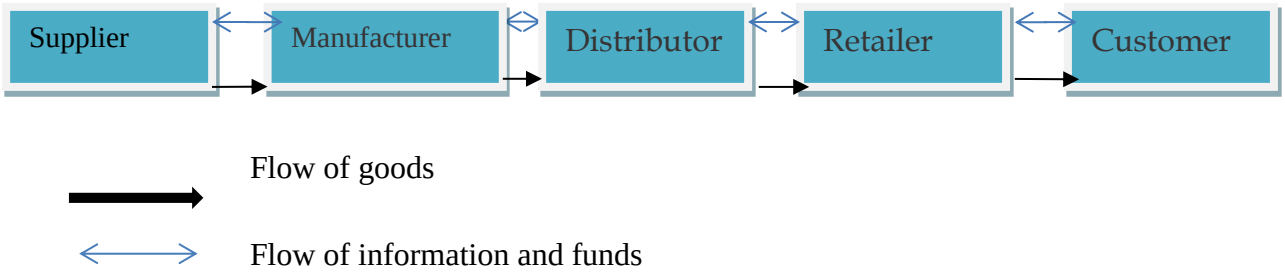
This is of help to understand the state of supply chain management and its determinants of the performance. This chapter comprises of four sections. These are definitions of supply chain and supply chain management, supply chain management performance, empirical studies and the conceptual framework.

2.1 Theoretical review of Related Literature

2.1 .1 Supply Chain and Supply Chain Management

The term supply chain (SC) is a system of an organization that is networked to implement multiple processes and activities that is targeted to bring about a value which include finished products and services that are intended to directly reach the end users (Christopher 1998, p. 35).In other words, a supply chain is a network that stretches between the manufacturer and the end customer and also serves to connect the two extreme ends so as to deliver either a product or a service that carry a definitive value to the end user (ibid 1998). Alternatively, supply chain is defined as ‘‘the network of facilities and activities that performs the functions of product development, procurement of material from suppliers, the movement of materials between facilities, the manufacturing of products, the distribution of finished goods to customers, and after-market support for sustainment.’’

Figure 2.1: The Basic Supply Chain.



Source: (Chopra and Meindl 2001, p. 35).

Supply Chain Management (SCM) is a scheme that is widely implemented in various business worlds and is catching the attention of academics being the subject of study and research for the benefits are worthy. Supply Chain Management has the function of connecting business entities with companies, such as manufacturer and distributor through managing the dynamics in the chain located at various stages (Ballou et al. 2000). Numerous researchers have been conducted until today to assess the system. Also, articles that attempted to define the supply chain management and predict the level of influence through empirical research methodology have been published (Cooper et al. 1997; Lambert & Cooper 2000; Larson & Rogers 1998, p. 67).

Supply Chain Management is a network constructed in such a way that it enables to connect the upstream and downstream paths of supply chain aiming to produce a product or a service of a certain definite value and through the process reach the target users. The chain involves the design and control of products of not costlier (Li et al. 2006, p. 107).The supply chain minimizes inefficiency through inspection of the network and takes process oriented approach in the management system in order to provide input to make decisions to improve performance (Bowersox and Class 1996, p. 94).

2.1.2 Determinants of Supply Chain Management Performance

In this research, supply chain management performance is presented in one comprehensive study where by the authors put forward a conceptual model correlating the relationships of supplier-

buyer relations, information sharing, external supply chain, environmental factors and human metrics.

2.1.2.1 Supplier Buyer Relations (SBR)

The improved buyer-seller relationship is based on mutual reinforcement for a common goal. In this regard long term relations are a signal that the facility is a lasting one (Wisner 2003). In supply chain management the supplier-buyer healthy and positive engagement is pivotal. This is possible when the relation is founded on trust, mutual support, positive outcome and working towards a common goal (Chandra and Kumar 2000, p. 113). Therefore, the success of any given company is determined by its strength and communication with in both the individual teams as well as the relationship with supply chain partners (Spekman et al. 1998, p. 60) because by its very nature the system requires collaboration between cross-functional teams.

2.1.2.2 External Supply Chain (ESC)

The nature of global supply chain is that of collaboration at various levels. This factor is common to ever world Class Company in the world from textile factories to car making and pharmaceutical supply producers is based on the organizational establishment and the support it gains from the supply chain network. Strategic partnership is, therefore, is the key motive behind the integral objective activities that strengthens and nurtures the supply chain.

Networks of supply are growing to more complex level than ever before. The challenge and opportunity of companies is whether or not to establish complex networks together with others so as to reap the benefits of multilateral collaborations. As a result of the emergence of networks that operates not only at inter-organizational level but also at trans-organizational level (Bititci et al. 2006, p. 27) there by create a lasting and more dependable chains of supply. This is a leap from the traditional method of chain supply to a complex and comprehensive approach (Gunasekaran et al. 2005, p. 266).This increase in efficiency both in terms of performance and timely delivery can have a number of positive results: reducing entire supply chain costs, facility costs, and labour and transportation costs. This in turn will reduce the price of products and services and enhance volume of sales (Simchi-Levi et al. 2000, p. 69).

2.1.2.3 Environmental Factors (EF)

Environmental factors are among the factors that determine the performance of a company. Therefore, the responsibility to do environmental protection works, along with the growing technology and global trade calls for environmental responsibility that requires changes in the way and system companies as well as individual's employ in their business (Lenz 1980). The private sector plays a pivotal role in addressing social responsibilities. In this regard Confederation of Indian Industry (CII) had reported that in Corporate Social Responsibility (CSR) most of nation's organizations have implemented the program, a huge step to promote environmental safety and responsibility that is growing recently. Unlike the times elapsed that introduced many technological and economic changes. The increasing number of population coupled with the needs to ensure safety and security will trigger social changes. The coming decades, therefore, may see adjustments in the way companies deal with the social compulsive demands.

2.1.2.4 Human Metrics (HM)

Human metrics is an indicator of the key factors that affect the implementation of performance measures and metrics other factors behavioral, cultural and political issues. They are key factors that require wholesome approach to manage their effect. An effective supply chain management demands organizational capability and management in addition to the shared values of trust, commitment and collaboration (Mello and Stank 2005, p. 550). Moreover, the human factor is most critical (Tony and Kelvin 2007, p. 4) in affecting the supply chain and is also a critical factor in achieving strategic and operational objectives (Hoek et al. 2002).

Managerial components are essential and the findings show that the four pillars of management must be implemented. In order for supply chain to achieve the required result, these managerial supports are top management support, broad-based functional support, channels support and infrastructural or governance support. Details are available on the works of (Robinson and Malhotra 2005, p. 320 and Wouters 2009, p. 69).

Implementing supply chain management initiatives require proper cultural elements, such as shared values and artifacts as well as assumptions (Mello and Stank 2005, p.552). Besides, organizational commitment and good governance are essential to achieve success in supply chain

performance while lack of these components can result in failure in implementing supply chain initiatives (Fawcett et al. 2006, p. 27).

Generally, human and organizational issues need to be measured and evaluated and in doing so performance measuring can deal with in a wholesome manner to get the desired outcome.

2.1.2.5 Information Sharing (IS)

The supply chain rotates flow of information among business partners. Information sharing is therefore described as getting access to private data among business partners for the common goal of monitoring and adjusting the process of products and orders through the constant flow and exchange process at various stages in the supply chain (Simatupang and Sridharan 2002, p. 490). This process is mainly comprised of elements, such as consistent data acquisition, storage, processing, presentation, retrieval, and broadcasting of supply and demand equilibrium and forecast the output, inventory status and location, order status and cost related data, performance status and presentation.

Information is the essential inputs that determine the process of data and improves supply chain clarity that is used as a springboard to arrive at t sound decision which in turn contributes to the improvement of the system. Hence, information needs to be relevant, timely, reliable and accurate when and if one of these is missing, the outcome can be wrong and therefore the decisions is wrong (Simatupang and Sridharan 2005, p. 493; Thatte 2007, p. 69). Shared information is the basis of right decision and helps business partners to take the right step in making the right decision. The actions following the decision of can be geared towards adjusting the process to the benefit of both producers and end customers (Davenport et al. 2001, p. 31; Tathee 2007, p. 96).

One of the fundamentals of supply chain effectiveness is to have a clear understating of the basic concepts of supply chain and the transparency and willingness to give and receive information between partners that is essential for both in order to be competitive in the business (Lummus and Vokurka 1999; cited in Thatte 2007, p. 84).

2.1.3 Relationship between determinants and Supply Chain Performance

2.1.3.1. Relationship between Buyer-Supplier Relationship and Supply Chain Performance

Buyer supplier relationships (BSR) are connections or agreements involving firms deciding to work together and share information between them and establish a form of trust that will see them have a better advantage in the market over their competitors. These relationships are part of supply chain management strategies of a firm. Supply chain management covers business processes done starting from the supplier to the end user departments. The relationships therefore serve as a means of enabling better service, product provision and information availability between firms and to the end users (Global Supply Chain Forum 2008). This was evident with the Romanian Small and Medium Sized Enterprises which realized that having a onetime supplier attracted more losses especially due to receipt of poor quality goods. The enterprises then sought to have mutually beneficial relationships with its suppliers as a way of minimizing problems during procurement (Plaias & Muresan, 2007).

2.1.3.2. Relationship between information sharing and Supply Chain Performance

Information sharing in a supply chain context refers to the extent to which crucial and/or proprietary information is available to members of the supply chain. Shared information can be tactical i.e. purchasing, operations scheduling, logistics or strategic i.e. long-term corporate objectives, marketing and customer information. Prior research on the importance of formal and informal information sharing between trading partners has shown that effective information sharing enhances visibility and reduces uncertainty. It allows firms to access data across their supply chains, allowing them to collaborate in activities such as sales, production, and logistics. The extent to which information is shared can create opportunities for firms to work collaboratively to remove supply chain inefficiencies, and thus has a significant direct impact on the relationship between buyer and the supplier (Hsu et al. 2008). This sharing strengthens the bond among the supply chain members, enables every member to be fully aware of any business undertaking and then ensures that any new knowledge is acted upon on time (Zhou & Benton 2007 and Patnayakuni et al. 2006). However, studies do not show conclusively the relationship between information sharing and positive changes within the supply chain partners. Besides this many studies have explored how information technology can be used to enable better information sharing by firms, others (Hsu et al. 2008) have even looked at what information sharing entails and what can make it work between firms. Little has focused on how information sharing can impact on the performance of a firm's supply chain. It is in this aspect of lack of comprehensive information on

this area that the study sought to unearth the actual role of information sharing on supply chain performance with reference to Kenya Power & GDC Companies.

2.3.3. Relationship between environmental factors and Supply Chain Performance

In recent years, environmental issues have severely affected human being daily life and practicing green practices has been seen as one of the approach to mitigate these problems. Green supply chain management (GSCM) is the contemporary approach in this era that should be started to be embraced by every industry as the performance of firm will improve drastically after the implementation of this practice (Friso & Kai 2014). In Minhaj et al. (2016) study, the environmental performance, economic performance, social performance and operational performance are proved to be improved due to the implementation of green practices. Several studies have been carried out to prove the performance improvement after adopting GSCM (Taticchi et al. 2013).

As mentioned by Chavez et al. (2015), to attract potential consumers and customers that concern about the importance of green practices and environmental friendly products and services, many corporations across the globe has started to adopt these environmental friendly practices to have a competitive edge in their markets. Being greener than their competitors might bring the meaning of having more customers to gain higher profit and the development of their corporations can be reached sooner than other similar companies in the same market. Furthermore, by implementing GSCM, corporations not only manage to attract more potential customer's sources but fulfilling the government regulations that requiring each corporation to achieve a standard of environmental protection approaches to ensure the environmental issues are not compromised by the authority while rapid development is ongoing. Organizations which cooperation with the authority might tend to obtain more opportunities in business aspect and survival chances when facing challenge (Vijayvargy et al. 2017).

2.3.4. Relationship between external supply chain and Supply Chain Performance

The external supply chain refers to the network of activities outside of a company such as transportation, and the environmental factors, which can have a direct or indirect effect on operations e.g. supplier failure, changes in laws and natural disasters. Supply chain management seeks to reduce risks associated with procurement process and enhance

competitive performance of the organization by closely integrating internal functions within the firm and effectively linking them with the external operations of suppliers, channel members and final customers. Different research indicated that external supply chain and Supply Chain Performance are directly related and significantly correlated with each other (Friso & Kai 2014).

2.3.5. Relationship between Human metrics and Supply Chain Performance

It is an established fact that many companies have not succeeded in maximizing their supply chain's potential because they have often failed to develop the performance measures and metrics needed to fully integrate their supply chain to maximize effectiveness and efficiency(Gunasekaran 2004, p. 265).The contribution of human behavior in performance measurement is mostly neglected. SCM managers are a critical factor in achieving strategic and operational objectives and changes in the supply chain (van Hoek 1998, p.187). It is found that firms lacking in appropriate cultural elements such as shared assumptions, values and artifacts tend to fail when implementing SCM initiatives (Mello 2005, p. 542). On top of that, the organizational commitment and governance for supply chain success are being studied (Fawcett 2007, p. 22).The findings indicated that four types of managerial support are needed to achieve the highest levels of supply chain success: top management support, broadbased functional support, channels support and infrastructural/governance support. Few more research works (Robinson 2005, p. 315) and Wouters 2009, p. 64–78) clearly support the need for a performance measurement system taking the holistic picture, including the human side and organizational issues. Research has identified a variety of collaboration enablers including the following: aligned objectives, a shared customer-oriented vision, technological connectivity, relationship trust, supplier development, and process redesign and integration (Burke 2005). The centrality of human resources is usually accounted for by the fact that nowadays organizations are facing such challenges as a need to increase productivity, expand into global markets, develop new technologies, respond to changes in the highly volatile marketplace, increase revenue and decrease costs, develop skilled and flexible workforce, and introduce changes (Burke 2005), which, of course, emphasizes the significance of human resources and capabilities. The present study involves behavioral determinants of SCM viz. continuity, communication, power and trust and related variables are chosen from the existing body of literature.

2.2. Empirical Review

Studies in Africa have focused on supply chain performance, Gichuhi (2003, p. 62) found that integration highly influence supply chain performance among commercial banks in Kenya. In another study, Livohi (2012, p. 89) concludes that the downstream supply chain performance measurement led to supply chain performance in oil marketing companies in Kenya. A study by Gwako (2008, p. 29) found that supply chain management was key in achieving performance of Kenya Airways. These studies were too broad and thus did not address the problem of this study which is to establish the determinants of supply chain performance in Metehara Sugar Factory in Ethiopia. There is little or no study was conducted in the area of determinants of supply chain performance in the case of Metehara Sugar Factory.

In addition, some studies conducted in Ethiopia in general and sugar factories in particular, states that the supply chain management plays pivotal role in the effectiveness and efficacy of sugar factories. According to (Wendimu et. al. 2015, p. 213) associated the issue of supply chain management performance of sugar factories both from the perspectives of demand side and supply side. These includes supplier-buyer relations, external supply chain, environmental factors, human factors, information sharing and supply chain models used in the overall sugar industry.

Unfortunately, despite decades of research using a variety of methods, the debate over whether the performances of supply chain management remain unsettled, largely due to theoretical and methodological controversies. Besides, most researches done in the area of supply chain management performance were undertaken in qualitative means in which this study tries to make it both quantitative and qualitative. Hence, this study thus aims to test these controversies. This study mainly tries to examine the determinants of supply chain performance in Metehara Sugar Factory.

The supply-chain for sugarcane agro-industry ranged from ensuring sugarcane raw materials availability, processing plant and packaging then storage in warehouses. Results of the value-added analysis showed that processing plant had a greater profit percentage rather than plantations and potentially took advantage of the value-added ratio, moreover it is needed to improve. Sugarcane agro=industrial supply-chain performance demonstrated in very low and poor performances or was in critical condition. Such a condition required strategies for an improvement

in supply-chain performance for the purpose of preserving the company and enhancing productivity (Muhammed et al. 2017).

Performance improvement of the supply chain would be executed by implementing alternative strategies and accompanied with a good control as well as paying attention to implications that might be generated. Results of expert opinions illustrated that strategy execution of encouraging research and development and performance was the most suggested to be implemented. Qualities, yields and performance are key factors for enhancing supply chain performance and enhancing consumer trust. Research and development for quality and yield basically had been accommodated by the research and development section (Muhammed et al. 2017). Improvement measures necessarily are that the research and development do not merely focus on plantations but on processing by incorporating with research centers and partnerships. For further application, we have to applied research Centre and control management for all chain, not only focus on plantation but also for minimizing quality and yield degradation in processing then distribution to consumer. Furthermore, the companies have to pay attention to internal strategic integration, which would improve company's financial performance (Qi et al. 2016) as impact of strategies implementation.

A research study by Michael (2018) stated that Top management support and logistics integration is very important in SCM performance. Therefore top management should recognize and give full support to SCM functions within their organizations. Logistics is a key component of supplies chain management. Players to given SCM should integrate their logistics activities.

Previous research found that collaborative relationship between customer and supplier has positive significant influence to SCM performance improvement (Fearne and Hughes 1999; Humphreys et al. 2001; Ounnar and Giambiasi 2007). The supplier satisfaction and contribution lead to customer satisfaction and SCM performance (Alfred Wong 2002). The research also found that trust has strong prediction to a long-term relationship with customer and supplier (Sahay 2003; Van Weele 2005; Tumala et al 2006; Chandra and Kumar 2000). Therefore, a good, trust-based and long-term relationship with customer and supplier will lead to high performance of supply chain.

A research studies conducted by Prahalad (1998) stated that the following eight significant discontinuities that are emerging simultaneously and they must be managed simultaneously have been identified : These are: global customers and increasingly global competition , unstoppable trend toward deregulation and privatization , new level of volatility, convergence of multiple

technologies, indeterminate industry boundaries , evolving new standards , shrinking distance between the producer and end-user and increasing eco-sensitivity.

(Fawcett et al. (2006) indicated that four types of managerial support are needed to achieve the highest levels of supply chain success: top management support, broad-based functional support, channels support and infrastructural/governance support. Few more research works (Robinson and Malhotra 2005; Wouters 2009) clearly support the need for a performance measurement system taking the holistic picture, including the human side and organizational issues. Frequent meetings and transparent communication system such as web based information systems will be helpful to overcome barriers that arise due to behavioral and political factors (Gunasekaran & Kobu 2007). Thus, there is significant positive relationship expected between human metrics and SCM performance.

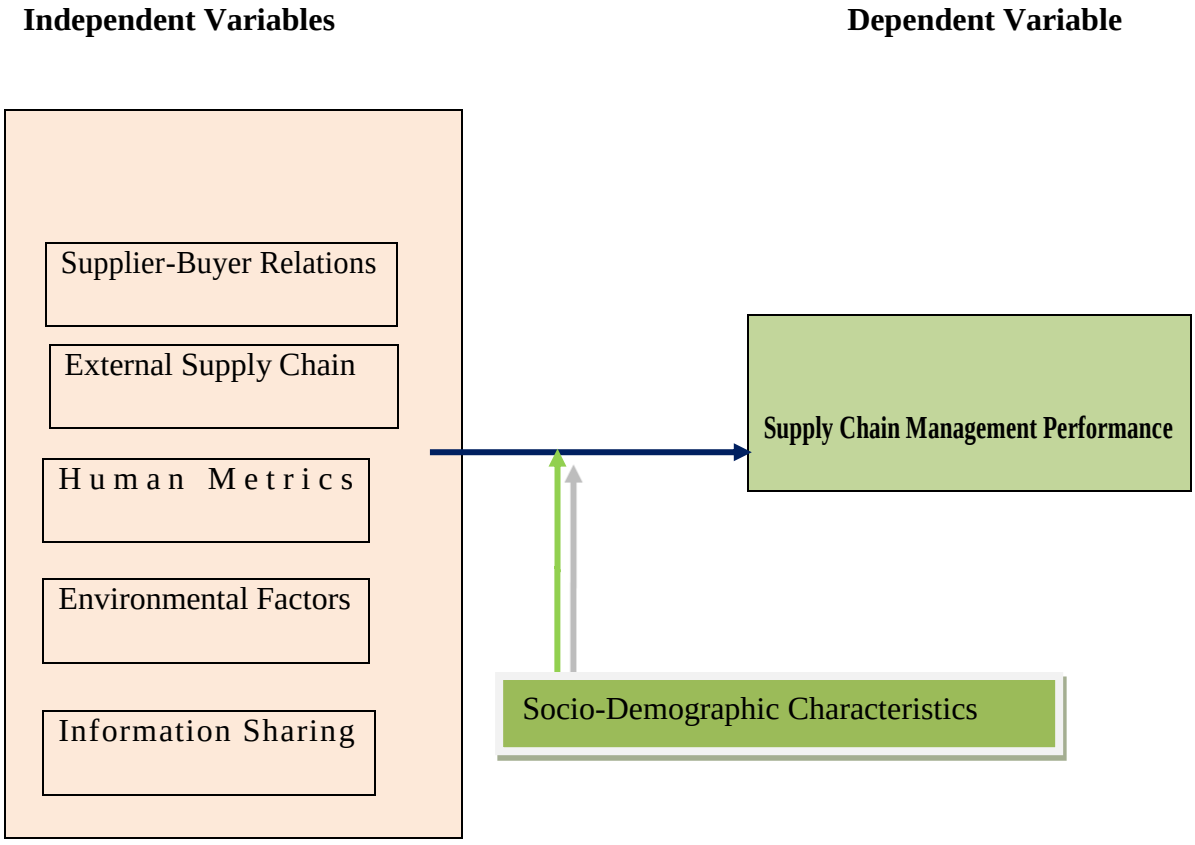
Researchers suggested that an appropriate performance measurement system is a critical requirement for the effective management of a supply chain (Liang et al. 2006). There are studies about the performance measurement systems and metrics of supply chains by critically reviewing the contemporary literature and suggesting possible avenues for future research (Shepherd and Gunter, 2006). SCM needs to be assessed for its performance in order to evolve an efficient and effective supply chain (Gunasekaran et al. 2001). Another finding suggests that customer satisfaction is increasingly being recognized as an appropriate measure for determining how well a particular organization is accomplishing its mission and while customer satisfaction surveys provide valuable information and may be used to improve the entire operation (Swinehart and Smith 2005). But, there are a number of important problems have not been yet addressed (Shepherd and Gunter 2006).

2.3 Conceptual Framework

Conceptual frameworks are used to explain the research problems. Supply chain performance is highly influenced by supplier-buyer relations, external supply chain, environmental factors, human metrics and information sharing and industries need to understand these to reach peak performances so as to take timely measures either to take advantage of them or to combat the challenges. The factors that affect the enterprise's performance can be also be classified as internal and external factors. To relate the conceptual framework with the research objectives, supply chain management performance is the dependent variable whereas supplier-buyer relations, external

supply chain, environmental factors, human metrics and information sharing are all the independent variables (Marwah et al. 2012). This relationship is shown in figure 2.

Figure 2.2 Conceptual Framework of Determinants of Supply Chain Management Performance



Source: Marwah et al. 2012

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter presents the research methodology that was applied in conducting the study. This involved the research design, target population, sampling design and sample size, data collection procedures and instrument, determination of reliability and validity as well as data analysis technique.

3.1 Description of Study Area

Metehara Sugar factory is found in Oromiya Regional State at 200 Killo Meters distance from Addis Ababa. Same as WonjiShoa Sugar Factory its construction was carried out by H.V.A. Company of the Netherlands.

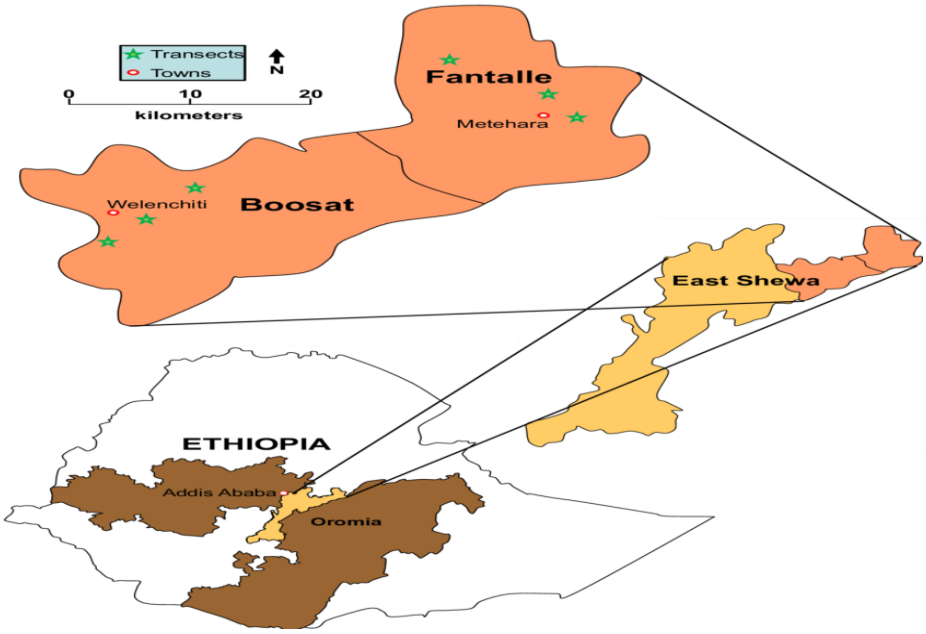


Figure: 3.1 map of the study area

The factory started sugar production in 1970. Formed as Share Company between the then Ethiopian government and the constructing company, it was the third sugar mill to the nation. It currently has more than 10,000 hectares of land covered with sugarcane. Its average production capacity is 136,692 tons of sugar a year.

Through an expansion project conducted, it came up with an ethanol producing plant by the end of 2010. Currently the factory's ethanol plant has a capacity of producing 12,500 Meter Cube ethanol a year. It also generates 9 Mega Watt electric powers and satisfies its own power demand by itself. It is a factory which has applied Kaizen appropriately and has won trophies at national competition. It has received trophies as well as medals from FDRE Prime Minister Hailemariam Desalegne in September, 2015 for its work in making Kaizen perpetual.

3.2 Study Design

Ornstein (2013, p. 43) defined research design as a strategic framework for action that serves as a bridge between research questions and the execution or implementation of the research. Saunders & Lewis (2014, p. 63) outlined different types of research methodology into categories as exploratory, descriptive and explanatory. An explanatory design was employed in the current study to assess the determinants of supply chain management performance in Metehara Sugar Factory. The reason for using this design was that it enables to determine causality; to observe variation in the variable that is assumed to cause the change in the other variable and then measure the changes in the other variable using statistical methods. It enables us to understand the very nature of what we are actually looking at the different factors that affect the performance of the sugar factory as they exist.

3.3. Research Approach

The study problem was answered through quantitative approach in order to reduce the limitation and increase the quality and flexibility of the data (Robinson 1998).

3.4 Unit of Analysis

The unit of analysis of the study includes employees who work at supply chain department at Metehara sugar factory. Therefore, the unit of analysis was at employee's level. The data obtained from primary sources were triangulated with the secondary data to draw a valid conclusion.

3.4.Sampling and Sample design

3.5.1 Target Population

Thus, employees of the factory working in relevant departments/units were the constituents of the target population of the study. The factory has five departments and the target population were consist of 1,200 workers working in the segments of production/agriculture and factory operation/, supply and facility management, human resource and finance. In addition to these top and middle level managers of the factory were the target population.

3.5.2. Sample Size Determination

In order to get a reasonable sample size, sample determination table at 95% level of confidence will be used to select a sample of 125 workers of Metehara sugar factory. A high level of sample size of 125 employees of Metehara was taken to get a representative sample size (Carvalho 1984).

Table 3.1. Population and Sample Size

	Sample Size		
Population	**Low**	**Medium**	**High**
51-90	5	13	20
91-150	8	20	32
151-280	13	32	50
281-500	20	50	80
501-1,200	32	80	125
1,201-3,200	50	125	200
3,201-10,000	80	200	315
10,001-35,000	125	315	500
35,001-150,000	200	500	800

Source: (Carvalho 1984)

3.5.4. Sampling Technique

A representative sample for questionnaire was selected from the employees of the factory based on probability sampling of proportional stratified simple random sampling. Stratified sampling was employed based on the strata of the departments and simple random sampling using random table was done accordingly. The reason for using stratified simple random sampling is that first, we can have more precise information inside the sub-population about the variables we are studying. And second, we can raise precision of the estimate of the variables of the whole

population. Accordingly, the 5 key departments from the strata. From each segment, employees were selected systematically by random sampling techniques. A stratified sampling technique was applied so as to get a reasonable sample size and give equal chance to the respondents. From each cluster one sample was taken. Hence, the five departments were considered that comprise of 1,200 employees of Metehara sugar factory as a sample frame. A sample size of 125 employees of Metehara sugar factory were taken to get a reasonable sample size (Carvalho 1984, p.125).

Table 3.2: Number of target population and sample

No	Department	Total Number of employee	Sample taken	Percentage
1	Agriculture operation	385	40	11
2	Factory operation	350	36	11
3	Supply and facility management	300	31	10
4	Human resource	85	9	11
5	Finance	75	9	12
	Total	1200	125	100

In order to get proportional sample size, the total sample size (125) was distributed proportionally across the all departments in the factory.

3.5.Data Source and Type

The researcher used primary and secondary data collection methods. Standard questionnaire can be employed as a primary data gathering mechanism and secondary data was collected from annual reports, journal articles, books, online sight and others. Data related to organizational level variables was collected from a variety of sources such as financial records, Activity and financial reports and surveys of Chief Executive Officers (CEO), who are presumed to be representing of their organization. Self-administered close ended questionnaire was used to collect data from employees at different levels. The indicators of supply chain management performance is measured using a five point Likert scale (1=strongly disagree; 5=strongly agree) where higher values indicated stronger determinant on supply chain management performance. The study adopt a standard questionnaire used by (Marwah et al. 2014).

The literature in the study was used as a guideline for reviewing of the questions in the questionnaire. Besides, questions in the questionnaire was adapted from other sources (Marwah et al. 2014). The questions that were used in the questionnaire were five-point Likert scale type questions. The type of scales used to measure the items on the instrument was continuous scales that ranges from strongly agree to strongly disagree.

The layout of the questionnaire was kept very simple to encourage meaningful participation by the respondents. The questions were also being kept as concise as possible with care taken to the actual wording and phrasing of the questions. The reason for the appearance and layout of the questionnaire are of great importance in any survey where the questionnaire is to be completed by the respondent.

3.6.3. Data Collection Methods

Self-administered close ended questionnaire was used to collect data from employees at different departments and levels of the factory. The study was adopt a standard questionnaire used by Marwah et al. (2014, p. 49). In this study, both primary and secondary sources of data were used as important sources of data. The researcher gathered primary data from Metehara Sugar Factory operators working in through questionnaire. Primary data gathered through questionnaires allows the researcher to test the current perceptions of participants towards a business circumstance under investigation (Boyer & Swink 2008, p.34). This technique is also quicker, cheaper and more anonymous to administer than face-to-face interviews or direct observations, as a large number of respondents can be given the questionnaire to complete at their convenience (Veal 2005, p.37).The questionnaire contains close-ended questions and the close-ended items were constructed in such a way that they are measured on a five-point Likert Scale format range from strongly agree to strongly disagree. Moreover, the study was employ documentary analysis of secondary data from the Federal Sugar Corporation office reports, government documents, books, journals, published and/or unpublished research papers.

3.7 Data Processing and Analysis

3.7.1 Data Processing

The questionnaires were administered, and the mass of raw data collected was systematically organized in a manner that facilitated analysis. All data collected was checked for consistency of responses and cleaned before entry into computer file. The study employed manual and computerized data processing techniques. The data processing activities such as editing, coding, classification and tabulation were done. Those actions are help to clean up and detect errors and omissions. Missing data was manipulated or analyzed by using SPSS to identify any missing information on the respondent's responses. Multivarient and normality valuation were also conducted to identify any unique combination of characteristics

3.7.2 Data Analysis

In this study, both quantitative and qualitative methods were employed. The aim of the quantitative approach was to describe the determinant factors affecting the performance of supply chain management performance in Metehara sugar factory and to examine the relationship between demographic variables and factors affecting the performance of supply chain management. The data was analyzed by computer Statistical Package software for Social Sciences version 20 and Alpha value of 0.05 used for significance test analysis.

The appropriate analytical techniques such as descriptive statistics (frequency counts, percentage, mean & standard deviation) and inferential statistics (Correlation, Regression& T-test) analysis were applied in order to summarize data and test the significance of the differences in opinions of the respondents.

3.7.3. Model Specification

Linear Regression Model was applied in explaining the relationship between dependent and independent variables since the outcome variable is continuous variable that ranges from strongly disagree to strongly agree.

The study adopted Pearson correlation and simple linear regressions to identify the determinants of supply chain management performance. The regression equation was:

$$\mathbf{Y= \beta_0+ \beta_1X_1+\beta_2X_2+ \beta_3X_3+\alpha}$$

Where: **Y:** is the dependent variable (Supply Chain Management Performance),

β_0**:** is the regression coefficient/constant/**Y**-intercept,

β_1**,** β_2**,** β_3**,** β_4 **and** β_5**:** are the slopes of the regression equation,

$\mathbf{X_1}$**:** is Supplier-Buyer Relations

$\mathbf{X_2}$**:** is External Supply Chain

$\mathbf{X_3}$**:** is Environmental Factors,

$\mathbf{X_4}$**:** Human Metrics,

$\mathbf{X_5}$**:** is Information Sharing,

The dependent variable is "Supply Chain Management Performance", which stands for the agreement of the employees in the activities of supply chain management performance as a proxy for the measurement of supply chain performance. In this research survey respondents were asked if they do agree or disagree in the activities of supply chain management performance working in Metehara Sugar Factory.

Accordingly, the independent variable takes 1 if the i^{th} employee does strongly disagree in the supply chain management performance action and 5 otherwise as stated in the questionnaire. The explanatory variables are supplier-buyer relations, external supply chain factors, environmental factors, human metrics and information sharing sources used in Metehara sugar factory. It was generally assumed that agreement or disagreement of the employees of Metehara sugar factory, within the business process plays important role for supply chain management performance.

3.8. Ethical Consideration

An official letter from Addis Ababa University, College of Commerce was offered to Metehara sugar factory and the researcher was secured consent from the sugar factory. The respondents were participating in this research voluntarily. They were given adequate information regarding the purpose of the study and were expressing their consent verbally. Arrangements were made to keep the dignity and freedom of each participant. Participants were assure that the information they provide are confidential and was not be disclosed to anyone else including their family members, schools, and vicinities.

3.9. Validity Test

Prior to main study data collection, piloting was made. The aim of the pilot test was to solve ambiguity (clarity, language, and translation and structure problems) and to check validity, reliability and feasibility of the instruments. Two experts were selected and given the English versions of the adapted supply chain performance to check the validity of the questionnaire. The selection of the experts were based on their knowledge on the areas of supply chain management performance and the relation of their work with the research topic. The experts were recommend wordings and language on the items and incorporated accordingly.

3.10 .Reliability Tests

Item-total correlation was computed for each sub-scales of supplier-buyer relations, information sharing, external supply chain, environmental factors, human metrics and supply chain management performance sub-scales. Based on the criterion of Cronbach's alpha > 0.9 Excellent, alpha > 0.8 Good, alpha > 0.7 Acceptable, alpha> 0.6 Questionable, alpha > 0.5 Poor, and alpha< 0.5 Unacceptable (George and Mallery 2003) the items are accepted or rejected. After the pilot testing, minor wordings were made to the adapted items in order that they fit the purpose of the study.

Internal consistency reliability of the the instrument was determined for the total as well as for the sub-scales using Cronbach's alpha. The computed Cronbach's alpha coefficients were between 0 and 1 for specific sub-scales of supplier-buyer relations, information sharing, external supply chain, environmental factors, human metrics and supply chain management performance.

Table 3.3 Reliability Statistics

Cronbach's Alpha	N of Items
.836	63

Source: Own survey result, 2019

The Cronbach's Alpha coefficient of the study was 0.836. George and Mallery (2003), states that at least a value of 0.7 is recommendable and therefore the instrument was accepted as highly reliable

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1. Introduction

Under this chapter the analysis and interpretation were carried out based on the data collected through questionnaire from five departments (i.e. Human resource, supply chain management, finance, factory and agriculture) which work along the line of supply chain. The data was analyzed using Statistical Package for Social Science (SPSS v.20). Based on the methodologies, research design and tools of the proposal the data was collected from 113 respondents. From the total 125 questionnaire distributed 113 were returned from which 12 were not returned. Therefore 113 were effectively used for analysis that shows response rate of 91 percent. This is a good response rate based on Fowler (2002) a 75 percent response rate is considered adequate. Data analysis, discussion and interpretation of the results are presented in the following subheadings: presentation of demographic data and frequency of respondents, analysis of mean, analysis of correlation and regression coefficient.

4.2 Data cleaning

Data cleaning, in the context of the scientific research process, is a stage following data collection that aims to eliminate any potential for introducing biases into the results (Hair et al. 2006). It typically includes three assessments, which identify (1) missing data, and (2) multicollinearity (Tabachnick & Fidell 2007, Hair et al. 2010) and outliers and normality.

4.2.1 Missing data

When a questionnaire is used as a data collection instrument, it is possible that some of the data required for the subsequent analyses will be missing. This typically occurs when a respondent fails to answer one or more questions in the survey. Presence of missing or incomplete data will lead to the reduction of the sample size available for analysis. If this problem is significant, the previously adequate sample may become inadequate. In addition, any statistical results based on data affected by non-random missing items could be biased, leading to inaccurate or erroneous conclusions (Hair et al. 2006, Hair et al. 2010). Thus, it is essential to check the data for any missing values

and assess their impact on the validity of the results. This is particularly important in multivariate data analysis. In this study, as the table below indicated that there was no missing value.

Table 4.1 Missing data

	N	Mean	SD	Missing		No. of Extremes[a]	
				Count	Percent	Low	High
Supplier Buyer relation	113	1.7124	.54747	0	.0	0	3
External supply chain	113	1.7301	.29342	0	.0	0	1
Human Metrics	113	1.8119	.42093	0	.0	0	0
Environmental Factors	113	2.3843	.64156	0	.0	0	0
Information sharing	113	1.5501	.44925	0	.0	0	1
SCMP	113	1.9447	.63098	0	.0	0	0

a. Number of cases outside the range (Q1 - 1.5*IQR, Q3 + 1.5*IQR).

Source: Own survey result, 2019

4.2.2 Multicollinearity

Multicollinearity is the extent to which a particular construct can be explained by other constructs in the analysis (Hair et al. 2006). It occurs when the variables that appear distinct and unrelated actually measure the same thing. Hence, when the dependent variables are highly correlated, this phenomenon is referred to as multicollinearity (Pallant 2005). High correlation among variables may be harmful for multiple regression analysis and other multivariate data analyses.

Table 4.2 Multicollinearity

Model	Collinearity Statistics	
	Tolerance	VIF
Supplier Buyer relation	.951	1.052
External supply chain	.712	1.405
Human Metrics	.674	1.484
Environmental Factors	.843	1.186
Information sharing	.842	1.188

a. Dependent Variable: Supply chain management performance

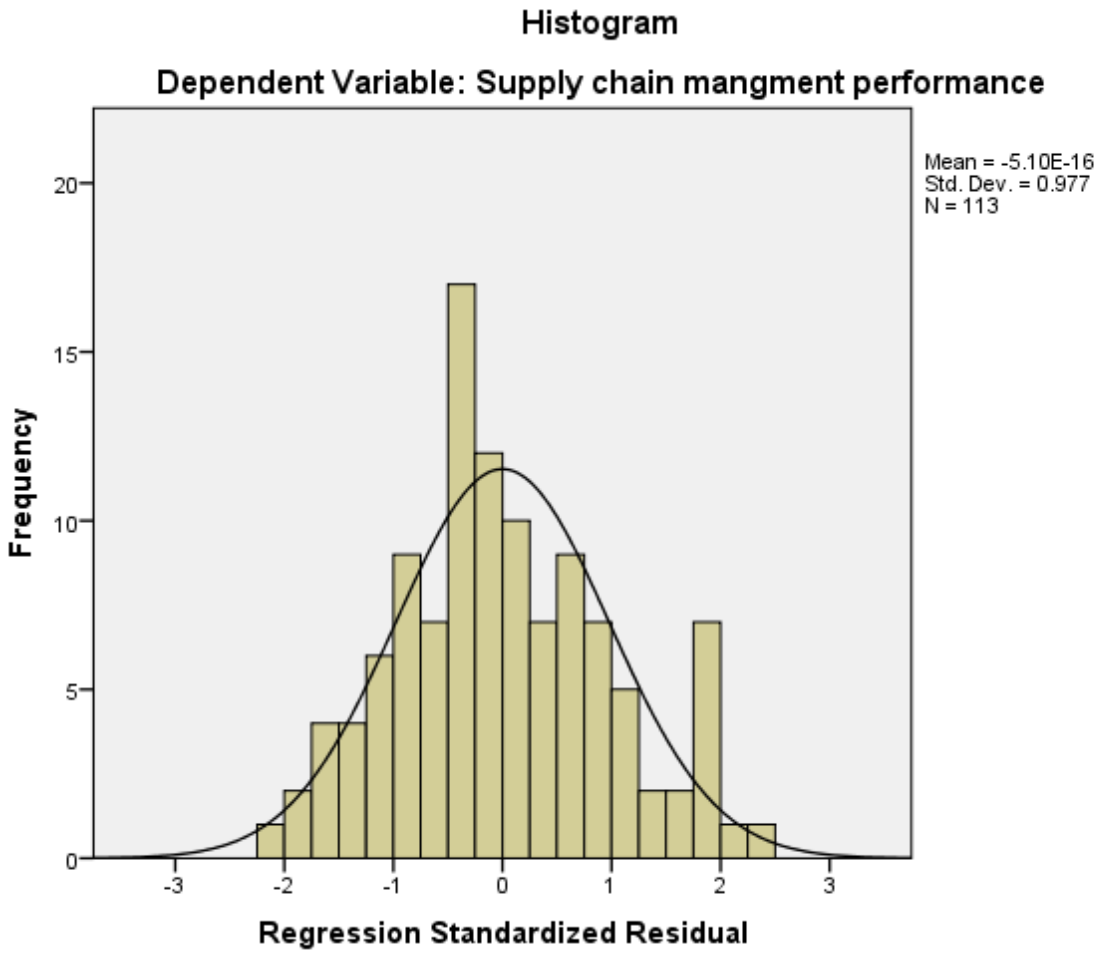
Source: Own survey result, 2019

Table 4.2 indicated that the VIF values are less than 10 and the tolerance values are more than 0.2. This indicates that there is no multi-collinearity within the independent variables of the study.

4.2.3. Outliers and normality

The data collected from the employee at different level were assessed to determine normality of distribution because multiple regression analysis need variables to be normally distributed. The distribution of variables to be used in the analysis was checked for normality (Hair et al. 2006, p.124).

Figure: 4.1 Normal probability plot

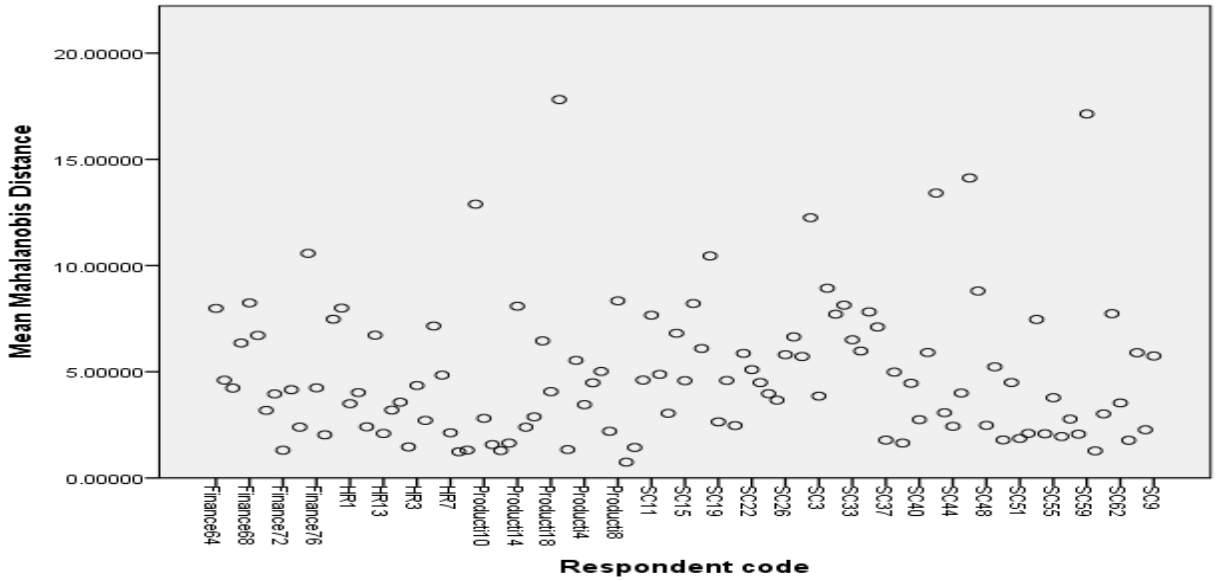


Source; Survey Results, 2019

As we can see from the normal probability plots of the residuals (errors in predicting sample data), indicated a normal distribution of the values, and meet the assumption of normality. Consequently, the data is free from normality problem.

Multivariate outliers can be detected by calculating the Mahalanobis distance (independent variables: all survey items, dependent variable: case no.) and then create a line chart based on this distance.

Figure.4.2 Mahalanobis distance



Source; Survey Results, 2019

Figure 4.2 elaborates that the Mahalanobis distance of most cases were in a small region (between 0.00 and 10.00) and thus indicated that there are no multivariate outliers in the study. The other issue in data screening is kurtosis and skewness value of the variables .A variable with an absolute value of Kurtosis index greater than 10.0 indicates there is a problem with normality and values greater than 20.0 indicate a more serious normality problem (Kline 2005, p.11). Therefore, the acceptable absolute value of skewness and kurtosis should not exceed three and ten respectively.

Table: 4.3 skewness and Kurtosis

	N	Mean	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Supplier Buyer relation	113	1.7124	1.063	.227	1.127	.451
External supply chain	113	1.7301	.834	.227	.529	.451
Human Metrics	113	1.8119	.291	.227	-.834	.451
Environmental Factors	113	2.3843	.303	.227	-.268	.451
Information sharing	113	1.5501	.843	.227	.129	.451
SCM performance	113	1.9447	.669	.227	-.426	.451

Source; Survey Results, 2019

4.3. Demographic data presentation and analysis

Observing the demographic trend or characteristics of our sample population before starting the data analysis is useful to make the analysis more meaningful for the reader. This part of the questionnaire requested limited amount of information related to personal and demographic status of respondents. The purpose of demographic analysis in this research is to describe the characteristics of the sample such as proportion of male and female in the sample, department of respondents, academic qualification of respondents and experience of respondents. Accordingly these variables are summarized and described in tables shown below.

4.3.1 Departments of the Respondent

The table below depict that most respondent were working in supply chain management department with 63 respondents (55.3 %) and, while the least respondent were from human resource department with 15 respondents (13.2%). And also the department of production counts 16.7 percent and finance 14 percent. The result indicated that, all the target departments were incorporated on the study at a significant rate.

Table: 4.4 Departments of Respondents

	Frequency	Percent	Cumulative Percent
Finance	16	14.0	14.9
HR	15	13.2	28.1
Production	19	16.7	44.7
SC	63	55.3	100.0
Total	113	100.0	

Source: Own survey result, 2019

4.3.2 Gender Categories

Table 4.5: Gender Categories of the Respondents

	Frequency	Percent	Cumulative Percent
Male	70	61.9	61.9
Female	43	38.1	100.0
Total	113	100.0	

Source: Own survey result, 2019

As indicated in table 4.5, the gender proportion of female respondents were 38.1 % while the male respondents were 61.9 %. Though the ratio of the respondents not proportional and varied. But both category of gender were participated in the survey. This enables the researcher that there is no bias in the survey instrument related to the gender of the respondents

4.3.3 Age of The respondents

Data related to the age of the respondents was collected and tabulated as presented on Table 4.6. The highest number of sample respondents in the sector were 18- 34 Years old having a representative of 67.3%. 32.7% were the age of 35-49 years. So the study included all the age groups.

Table 4.6: Age level of the respondents

	Frequency	Percent	Cumulative Percent
18-34	76	67.3	67.3
35-49	37	32.7	100.0
Total	113	100.0	

Source: Own survey result, 2019

4.3.4 Education level of the respondents

As summarized in the table 4.4, majority of the respondents (78.8 %) were qualified in first degree and seventeen (17) respondents i.e. 15 % were qualified in diploma. This is an indication that the majorities of the respondents have bachelor degree which enables them to provide more reliable information for this study and enable the respondents to have idea of the objective of the study.

Table 4.7: Education level of the respondents

	Frequency	Percent	Cumulative Percent
Grade 10 /12 completed	4	3.5	3.5
Certificate	3	2.7	6.2
Diploma	17	15.0	21.2
Degree and above	89	78.8	100.0
Total	113	100.0	

Source: Own survey result, 2019

4.3.5 Experiences of the Respondents

Table 4.8 Experiences of the Respondents

	Frequency	Percent	Cumulative Percent
1-2 year	15	13.3	13.3
3-4 years	35	31.0	44.2
5-10 years	35	31.0	75.2
More than 10 years	28	24.8	100.0
Total	113	100.0	

Source: Own survey result, 2019

The output in Table 4.8 indicated that, 62 percent of the respondents indicated that they had work experience of 3 to 10 years while 13.3 percent of the respondents said they had experience of 1 to 2 years and also 24.8 percent of the respondents replied that they have worked for more than 10 years. The results indicates that majority of the respondents have an experience in work area between 3 to 10 years which is an indication that they understand the factors affecting supply chain management performance because they had the chance to work in different areas in different positions where it paves a way to analyze the circumstances of different problems.

4.4. DESCRIPTIVE ANALYSIS

The mean or average is a measure of central tendency that offers a general picture of the data without unnecessarily covering one with each of the observations in the data set. The mean of respondents in each dimensions of supply chain management performance suggest that the average amount that each dimension has positive or negative response of respondents. In this case, the mean of each item together with their respective dimension overall mean/average mean was calculated in order to conclude the overall supply chain management performance of Metehara

Sugar factory. The mean statistical values of the items were based on the 5 point Likert scale and will be illustrated through the following assumptions: if the mean (M) score is below 2.5 it implies that the respondents‟ disagree with the statement, if the mean score is equal to 2.5 it indicates that the respondents‟ prefer to stay Neutral, and finally if the mean score is above 2.5 it implies that the respondents‟ agree with the statement.

Accordingly, the mean scores have been computed for all the five supply chain management performance factors that includes supplier buyer relationship, information system, Human relation, environmental factor and external supply chain and also the dependent variable supply chain management performance by equally weighting the mean scores of all the items under each dimension. The average mean result of each independent and dependent variables were separately presented, analyzed and interpreted as follows.

4.4.1. Supplier buyer relationship

Table 4.9 Supplier buyer relationship

	N	Mean	Std. Deviation
Supplier Buyer relation	113	1.7124	.54747

Source: Own survey result, 2019

A successful strategic alliance and integrated relationship with suppliers and buyers is very much needed. It should be revolved around trust, loyalty, positive sum game (a win-win relationship), cross-functional teams, achieving common goals and collaboration (Chandra and Kumar 2000, p.46).Generally the supplier buyer relationship scored an average mean of (M=1.71 and SD=0.54) and the result showed the disagreement of the employee towards the constructs. But in supply chain management strategies, supplier relationship activities play an important role (Wisner 2003, p.19). Through close relationship supply chain partners are willing to share risks and reward, and maintain the relationship on long term basis (Cooper and Ellram 1993, p.17). A long-term perspective between the buyer and supplier increase the intensity of firm-supplier integration (Toni and Nassimbeni 1999, p.21). Therefore the factory should focus on this construct for further improvement.

4.4.2 External supply chain

External supply chain can increase efficiency both in terms of performance and timely delivery and it has a number of positive results: reducing entire supply chain costs, facility costs, and labour and transportation costs. This in turn will reduce the price of products and services and enhance volume of sales (Simchi-Levi et al. 2000, p. 69).

Table 4.10 External supply chain

	N	Mean	Std. Deviation
External supply chain	113	1.7301	.29342

Source: Own survey result, 2019

Table: 4.10 showed the average respondents' level of agreement on external supply chain practice of their organizations. The external supply chain constructs scored (M=1.73 and SD= 0.293), which is below the average. The organization works towards achieving the common goal with their SC partner and the existence of alliance to alliance relationship and feeling were the neglected issues in the factory. The sense of belonging to this SC relationship, risk sharing on supply chain partner and readiness for mutual investments on certain project were also the other cases ignored by the factory.

4.4.3. Human Metrics

Table 4.11 depicts the average mean value with regard to the human metrics and the dimension scored an average value of (M=1.81 and SD=0.42) and the figues pointed out the disagreement of the respondents towards the dimension.

Table 4.11 Human metrics

	N	Mean	Std. Deviation
Human Metrics	113	1.8119	.42093

Source: Own survey result, 2019

The human metrics has also a lower value (M=1.81) and this conditions significantly affecting the SCM effectiveness (Tony and Kelvin 2007, p.19) and SCM managers are a critical factor in

achieving strategic and operational objectives and changes in the supply chain (Hoek et al. 2002, p.24). In addition, leadership management factors contribute to the effective business relationships of SCM. The result scored a low score for leadership management construct and The leadership management encompasses compatible culture/values, respects confidentiality, accepts responsibility, demonstrates positive management skills, positive attitude, makes decisions quickly, demonstrates ability to evolve, behaves professionally, engages in ethical practices, provides an atmosphere of continuous improvement and regularly reviews performance and capabilities (Meier et al. 2004, p.33).

4.4.4. Environmental Factors

Environmental factor is another core dimension of supply chain management performance. The depict table 4.12 pinpoints the mean value of each item related to environmental factor with its aggregate average.

Table 4.12 Environmental factor

	N	Mean	Std. Deviation
Environmental Factors	113	2.3843	.64156

Source: Own survey result, 2019

The environmental factor constructs scored a value less than the average and this clearly indicated that the effects of globalization, technology and the growing need for environmental responsibility and sustainability is forcing organizations and individuals to make changes in the way of the factory towards environmental factors.

4.4.5. Information sharing

Information sharing is another element of supply chain management performance. Table 4.13 depict the mean value of information sharing. It seems surprising that, the respondents are under complain due to the absence of informing trading partners in advance of changing needs and sharing proprietary information. Respondents also show their disagreements on existence of informing about issues that affect the business and sharing of business knowledge of core business processes by trading partners.

Table 4.13 Information sharing

	N	Mean	Std. Deviation
Information sharing	113	1.5501	.44925

Source: Own survey result, 2019

The above result clearly shows that there is a problem of information sharing in Metehara sugar factory. But recent technological developments in information systems and technologies have the potential to facilitate the coordination among different functions, allowing the virtual integration of the entire supply chain. Therefore the factory should be practiced information technology and systems for reducing the time-lag between measuring the performance and applying them for any corrective actions. Low information transparency within the network, e.g. in inventory levels or planned customer demand, is a major weak point. It is generally agreed that a lack of information may be a `killer criteria‘in a customer oriented, competitive market (Simatupang and Sridharan 2002, p.39).

4.4.6 Supply chain management performance

Table: 4.14 shows that the average mean of dependent dimensions is between 1.81 and 2.13, with standard deviation between 1.01 and 1.25, which indicate that there is a disagreement in Metehara sugar factory on implementation of the dependent dimensions. The dependent variable scored an average value of M=1.94 and SD=0.63.

Table 4.14 supply chain management performance

	N	Mean	Std. Deviation
Supply chain management performance	113	1.9447	.63098

Source: Own survey result, 2019

The analysis depicts that the respondents disagreed on the existence of activities to meet special customer specification and adjustment of capacity to accelerate or decelerate production in response to changes in customer demand. The respondents were also provided their disagreement on the issue of introduction of large numbers of product improvements and the level of communication and coordination between all functions.

4.4.7. Summary of Dependent and independent variables

Table 4.15. Summary of Dependent and independent variables

	N	Mean	Std. Deviation
Supplier Buyer relation	113	1.7124	.54747
External supply chain	113	1.7301	.29342
Human Metrics	113	1.8119	.42093
Environmental Factors	113	2.3843	.64156
Information sharing	113	1.5501	.44925
Supply chain management performance	113	1.9447	.63098

Table 4.15 depict that the overall calculated mean scores of all the five independent variables and supply chain management performance dimensions that have discussed above. The mean of all independent and dependent variables are below the average and skewed to the disagreed side.

4.5. CORRELATION ANALYSIS

Under research investigation we are expected to understand concepts beyond the means and standard deviations of the dependent and independent variables so we need to know how one variable is related to another which comes with the concept of correlation. Correlation is the relationship between two variables. So, we would like see the nature, direction, and significance of the bivariate relationship of the variables used in the study. The Bivariate Correlations procedure computes the pair wise associations for a set of variables and displays the results in a matrix. It is useful for determining the strength and direction of the association between two scale and ordinal Bivariate Correlations. As noted above, a Pearson correlation matrix indicates the direction, strength, and significance of the bivariate relationships of all the variables in the study. According to Field (2005) correlation coefficient is a very useful means to summarize the relationship between two variables with a single number that falls between -1 and +1.The general symbol for the correlation coefficient is ‘r’. So, a perfect positive relationship (r=+1.00) indicates a direct relationship and an ‘r’of -1.00 indicates a perfect negative relationship. Hence, in this study Bivariate Pearson Coefficient (r) was used to examine the relationship between the five supply chain dimensions by using a two-tailed test of statistical significance at the level of 95% significance, P< 0.05. Interpretation of correlation coefficient (r) size is as follows: if the correlation coefficient falls between 0.1 to 0.20, it is slight correlation or small; if it is between 0.20 to 0.40 is low correlation or weak relationship, if it lies between 0.40 to 0.70 moderate; if it

falls along 0.70 to 0.90 high correlation or substantial relationship and if it is within 0.90 to 1.00 it is very high correlation or very strong correlation between variables (B.Burns & R.Burns 2008).

Table 4.16. Correlation of independent variables with dependent variables.

		SBR	ESC	HM	EF	IS	SCMP
SBR	Pearson Correlation	1					
	Sig. (2-tailed)						
ESC	Pearson Correlation	.173	1				
	Sig. (2-tailed)	.067					
HM	Pearson Correlation	.139	.471**	1			
	Sig. (2-tailed)	.143	.000				
EF	Pearson Correlation	.139	.167	.372**	1		
	Sig. (2-tailed)	.143	.077	.000			
IS	Pearson Correlation	.133	.361**	.271**	.010	1	
	Sig. (2-tailed)	.161	.000	.004	.916		
SCMP	Pearson Correlation	.361**	.290**	.386**	.335**	.252**	1
	Sig. (2-tailed)	.000	.002	.000	.000	.007	

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

The results showed that there is moderate correlation between human metrics and external supply chain with the value of 0.471. Besides table 4.16. showed hat, a low correlation between Human metrics and supplier buyer relationship (r=0.139), environmental factor and supplier buyer relationship (r=0.139), environment factor and External supply chain (r=0.167), environment factor and human metrics (r=0.372), information system and supplier buyer relationship (r=0.133), information system and external supply chain (r=0.361),), information system and Human metrics (r=0.271), information system and environment factor (r=0.1), Supply chain management and performance and supplier buyer relationship (r=0.361), Supply chain management and performance and External supply chain (r=0.29), Supply chain management and performance and human metrics (r=0.386), Supply chain management and performance and environment factor (r=0.335) and Supply chain management and performance and information system (r=0.252).

A firm‘s success is linked to the strength of its relationship with supply chain partners and it could reduce and increase revenue (Spekman et al. 1998, p.14). Previous research found that collaborative relationship between customer and supplier has positive significant influence to SCM performance improvement (Fearne and Hughes 1999, p.12 and Ounnar et al. 2007, p22). Therefore the study results is supported by prior research and the supplier satisfaction and contribution lead to customer satisfaction and SCM performance (Alfred Wong 2002). Therefore, a good, trust-

based and long-term relationship with customer and supplier will lead to high performance of supply chain.

Frequent meetings and transparent communication system such as web based information systems will be helpful to overcome barriers that arise due to behavioral and political factors (Gunasekaran & Kobu 2007). Thus, there is significant positive relationship was obtained between human metrics and SCM performance. Supply chain is also defined as a system whose constituent parts include material suppliers, production facilities, distribution services and customers linked together via the feed forward flow of materials and the feedback flow of information.‘‘(Stevens 1989). Hence, a significant positive relationship between information sharing and SCM performance was obtained from the result and the result also in line with this prior researches. .

4.6. REGRESSION ANALYSIS

Regression analysis is a way of predicting an outcome variable from one predictor variable (simple regression) or several predictor variables (multiple regressions) (Andy field 2009). The model of regression shows how much of the variance in the measure of supply chain management model is illustrated by the underlying dimensions of predictors of supply chain model.

Table 4.17. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.548[a]	.300	.267	.54006

a. Predictors: (Constant), Information sharing, environmental Factors, Supplier Buyer relation, External supply chain , Human Metrics

Source: Own survey result, 2019

The model summary displays the significance and percentage of variation in supply chain management performance which is caused by independent variables. Multiple correlations R of +0.54 represent the combined correlation of all the independent variables. Adjusted R^2 tells us that 26.7 % of the variation in supply chain management performance can be explained by variation in the five independent variables taken together. This leaves 73.3% unexplained. Because, there are other supply chain performance parameters in the factory greatly affect the management performance constructs.

Table 4.16. ANOVAa

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	13.383	5	2.677	9.177	.000[b]
Residual	31.209	107	.292		
Total	44.592	112			

a. Dependent Variable: Supply chain management performance

b. Predictors: (Constant), Information sharing, Environmental Factors, Supplier Buyer relation, External supply chain , Human Metrics

Source: Own survey result, 2019

In the ANOVA sub table we have the F value of 9.177 which is significant with p <.001.This informs us that the four independent variables taken together as a set are significantly related to the dependent variable

In order to see the contribution of factors that affect supply chain management, regression analysis of supply chain management performance were employed. Table 4.17, provides the result of multiple regression analysis beta coefficient and significance.

Table 4.17. Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.170	.358		-.476	.635
Supplier Buyer relation	.317	.096	.275	3.316	.001
External supply chain	.136	.206	.063	.658	.512
Human Metrics	.305	.148	.203	2.063	.042
Environmental Factors	.206	.087	.209	2.372	.019
Information sharing	.190	.124	.136	1.538	.127

a. Dependent Variable: Supply chain management performance

Source: Own survey result, 2019

The regression model was as follows:

$Y= 0.317X_1+0.136X_2+ 0.305X_3+ 0.206X_4+ 0.19X_5-0.17$

Where: Y is the dependent variable (supply chain management performance),

X_1: is Supplier Buyer relation

X_2: is External supply chain

$X_{3:}$ is Human Metrics

$X_{4:}$ is Environmental Factors

$X_{5:}$ is Information sharing

The standardize beta value showed that the number of standard deviations that the outcome will change as a result of one standard deviation change in predictor. The standard deviation units are directly comparable; therefore, they provide a better insight in to the importance of a predictor in the model. The large value of beta coefficient in an independent variable has the more important determinant in predicting the dependent variable. The standardize beta value for Supplier Buyer relation dimension is 0.317. This implies that, this variable has relatively strong determinants of supply chain management performance than others. Respectively, the standardized beta value for human metrics, environmental Factors, information sharing and external supply chain are 0.305, 0.206, 0.19 and 0.136 respectively.

According to the regression equation established, taking all factors (supplier buyer relationship, human metrics, environmental Factors, information sharing and external supply chain) constant at zero, supply chain management performance will be –0.17 as a result of these independent variables. The data findings analyzed also shows that taking all other independent variables at zero, a unit increase in supplier buyer relationship will lead to a 31.7 % increase in supply chain management performance. Different research indicated that firm‘s customer relationship practices can contribute to the organizational success in supply chain management practices efforts as well as its performance (Scott and Westbrook 1991; Ellram 1991 and Turner 1993). Previous research found that collaborative relationship between customer and supplier has positive significant influence to SCM performance improvement (Fearne and Hughes 1999; Humphreys et al. 2001 and Ounnar et al. 2007).

A unit increase in human metrics will lead to a 30.5 % increase in supply chain management performance. The result is supported by the study conducted by Akyuz et al. (2010) and it stated the human factors affect management at various stages and processes in a supply chain as employees are the key asset to drive supply chain performance. Correspondingly, a unit increase environmental Factors will lead to a 20.6 % increase in supply chain management performance.

The highest determinants of supply chain management performance is therefore supplier buyer relationship, human metrics and environmental factors. It is closely followed by environmental factors and information sharing. The least influence is external supply chain.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter provides the summary of major findings, conclusions and recommendation of the study.

5.2 Summary of the findings

Metehara sugar factory is one of the three large-scale sugar establishments in the Ethiopia and established on in the Awash Basin. Metehara Sugar Factory, which was brought on stream in 1969 by HVA (Handlers-Vereenging Amsterdam) at Metehara, developed 9919 hectares and has a capacity to process 115,000 tons of sugar annually. In this study, the researcher looked for the determinants of supply chain management performance in case of Metehara Sugar factory. The study also illustrated the relationship that exists between the supply chain management performance and factors affecting dimensions and also along the dimensions of determinants of supply chain management performance with the intent of knowing the strength of the relationship of the dimensions in this particular case. In order to achieve these objectives, data were collected from the employees of the factory at different level and departments and processed in both quantitative and qualitative approach of descriptive approach and also used regression analysis.

From the demographic characteristics of respondents‟, the lion share is taken by (61.9%) was male and the remaining (38.1%) were female respondents. Besides, the large number of respondents who participated in the study survey were from the department of supply chain and material management covering more than half of the total participants which is 55.3%. In relation to their qualification level, the respondents had a minimum of diploma in which we can infer that it is stacked with educated employees. Finally, when we came to the work experience of the respondents, they had adequate exposure to the work area and had a potential of bringing change to the enterprise which reasonably increase the validity (as a whole the quality) of this research.

The analysis result depicts that the mean score values for supplier buyer relation (1.72), human metrics (1.81), and external supply chain (1.73), environmental Factors (2.38) and information sharing (1.55) dimensions were below the average mean value (only between 1.55 and 2.38) which really indicates the disagreement of the respondents towards independent variables. The study also found a positive correlation among the five (supplier buyer relation, human metrics, external supply chain, environmental factor and information sharing) supply chain managements performance determinants.

Furthermore, the value of regression analysis showed that supplier buyer relation, human metrics and environmental factor have a statistical significant effect on supply chain management performance.

5.3 Conclusions

Sugar cane constitutes a strategic agro-industrial product in fulfilling basic needs of community as well as for food industry. Under this study, the major determining factors of supply chain management performance identified based on the response of employees were Supplier Buyer relation (B=0.317), Human Metrics (B=0.305), Environmental Factors (B=0.206), Information sharing (B=0.190) and external supply chain (B=0.136).

Five determinants of supply chain management performance were developed and addressed in this research and unfortunately all the dimensions were rated below the average mean value of 2.5. In other words, it shows little emphasis was given to wards the determinants factors in the factory. Supply chain management performance and operational performance are positively and significantly related. The results show that there is moderate correlation between human metrics and external supply chain with the value of 0.471 but the other constructs are a low correlations with each other.

The presence of informing trading partners in advance of changing needs and sharing proprietary information existence of informing about issues that affect the business, sharing of business knowledge of core business processes by trading partners, exchange of information that helps establishment of business planning are critical issues which are neglected by the factory.

The power of the factory to ask the SC partner to readjust their Product and the understanding of the factory and the SC partner towards their strengths and weaknesses, the interest of pursuing

advice for each other when doing marketing analysis, the provision of training support to other supply chain partner, the power of the factory to readjust price Strategy of SC partner and the interest to inform everything about new developments to SC partner are vital points ignored by the enterprise.

The issue of quality consideration as a number one criterion in selection, problems solving jointly with the suppliers Support for suppliers to improve their product quality and continuous improvement programs for key suppliers are also given a less emphasis by the factory.

This implies that the employees need an improvement along the identified determinants of the factory. The results given on the conclusion entails us that the practice of the five determinants developed in this study were considerably rated low by the employees which actually indicates the determinants factors are not at the required level of its employees. Regarding the correlation, it is possible to conclude that there is a low and positive relationship among the five independent variables which this study was relied on. All the independent variables in the study influenced supply chain performance at 30% with the highest influence being the supplier buyer relationship and human metrics and the least being external supply chain and environment.

5.4 Recommendation

By relying on the study findings, the researcher suggests the following points as credible recommendations to the problem.

- The factory should strengthen their supply chain management by putting greater effort to the implementation of some key best practices. Specifically, the following practices should be improved on sharing of information through information Technology, Reduction of pollutant emissions, prequalification of Suppliers, formal partnerships with Suppliers, Setting up a SC data base, preparation of specifications with Suppliers, development of an outsourcing policy, Procurement of recyclable Material and reverse logistics.
- In order to improve the supply chain management performance, the factory needs to create a long-term strategic supplier relationship for strategic items. So the factory should first classify effectively the goods and services being procured based on strategic significance, then it should create long supplier relationship for items which have high value and high importance in the factory with the right suppliers. The factory can also benefit in

transactional value of the goods and services, claim handling, after sales service support, different technical and training support, and new technology assistances to reduce longer lead times and supply disruptions.

- Understanding of determinants of supply chain management performance with in the factory is a primary activity in any organization. The factory should have to give a critical emphasis on alignment among departments through better data integration & creating continuous interdepartmental contact among internal functions.

The study recommends the following areas for further study;

- A study that will assess the challenges affecting supply chain management performance in sugar factories.
- Future researches should also conduct a study that will focused on all sugar factories located in the country. Such study will have a significant contribution for policy and decision making in the sugar sector.

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Annex :1

Addis Ababa University

College of Commerce

Department of Logistics and Supply Chain Management

Post Graduate Program

Part One: Socio-demographic characteristics

This study focuses on the determinants of supply chain management performance in Metehara Sugar Factory. The purpose of this questionnaire is to gather information regarding the determinants of supply chain management performance in Metehara Sugar Factory. This questionnaire has two parts in general: first part has demographic and socio-economic questions about the respondents; the second part has Likert scales on the determinants of supply chain management performance. The information you provide has a very important input in the direction and completion of this study, so please try to be honest and careful. There is no one to judge you because there is no right or wrong answer for the questions. This information will be kept confidential and only applied for this study purpose. Yours right information helps to reach the goals of this study. Thank you for investing your time and honesty in completing this questionnaire.

Instructions

- ✓ No need of writing your name.
- ✓ For Likert scale type statements questions indicate your answers with a check mark (✓) in the appropriate block and for multiple choice questions please circle them.
- ✓ Write the correct answer on the blank spaces provided.

Part One: Background Information

1. Age
   A. 18-34
   B. 35-49
   C. 50-64
   D. above 64
2. Sex ☐ Male ☐ Female

3. Your residence in this locality/how many years have you lived in?
   A. Less than one year
   B. 1-2 years
   C. 3-4 years
   D. 5-10 years
   E. More than 10 years
4. Educational Level
   A. Below grade 10/12
   B. Grade 10/12 complete
   C. Certificate
   D. diploma
   E. degree and above
5. Your monthly income
   A. 1,000-2,000 Birr
   B. 2,000-4,000 Birr
   C. 4,000-6,000 Birr
   D. 6,000-8,000 Birr
   E. 8,000-10,00 Birr
   F. Above 10,000 Birr

Part Two: Supply Chain Management Performance

Please indicate the extent of Supplier-Buyer Relations

SN	**Supplier-Buyer Relations** (1) Strongly Disagree, (2) Disagree, (3) Neutral ,(4) Agree, (5) Strongly Agree	**1**	**2**	**3**	**4**	**5**
1	We consider quality as our number one criterion in selecting suppliers					
2	We regularly solve problems jointly with our suppliers					
3	We have helped our suppliers to improve their product quality					

4	We have continuous improvement programs that include our key suppliers					
5	We include our key suppliers in our planning and goal- setting activities					
6	We actively involve our key suppliers in new product development processes					

Please indicate the extent of External Supply Chain

SN	**External Supply Chain** (1) Strongly Disagree, (2) Disagree, (3) Neutral ,(4) Agree, (5) Strongly Agree	**1**	**2**	**3**	**4**	**5**
1	Our supply chain partner feels like "part of the family" in this supply chain relationship					
2	Our supply chain partner feels "emotionally attached " to this supply chain relationship					
3	This supply chain relationship has a great deal of personal meaning for our supply chain partner					
4	Our supply chain partner feels a strong sense of belonging to this supply chain relationship					
5	Our supply chain partner works towards achieving the common goal					
6	Our supply chain partner shares risk with you.					
7	Our supply chain partner is afraid of what might happen if he leaves the supply chain relationship					
8	Our supply chain partner believes that a factory must always be loyal to its supply chain relationship					
9	Our supply chain partner thinks that the factory these days move from alliance to alliance too often					
10	Jumping from alliance to alliance seems unethical to our supply chain partner					
11	Our supply chain partner work towards reputation of the factory rather that profitability					
12	Our supply chain partner is ready for mutual investments on certain projects					

Please indicate the extent of Human Metrics

SN	**Human Metrics** (1) Strongly Disagree, (2) Disagree, (3) Neutral ,(4) Agree, (5) Strongly Agree	**1**	**2**	**3**	**4**	**5**
1	The degree of dealings between us and our supply chain partner is very high					

2	The relationship between us and our supply chain partner is very stable					
3	We are quite involved in the marketing and planning efforts of our supply chain partner					
4	We and our supply chain partner seek advice for each other when doing marketing analysis					
5	We and our supply chain know the strengths and weaknesses of each other very well					
6	Our factory is powerful enough to ask our supply chain partner to readjust price Strategy					
7	Our factory is powerful enough to ask our supply chain partner to readjust their Product					
8	Our factory can provide training support to our supply chain partner					
9	Our supply chain partner perceives that our factory is perfectly honest and truthful					
10	Our supply chain partner perceives that our factory is perfectly having high integrity					
11	We would like to inform our supply chain partner everything about new developments					
12	We willingly share all information that might help your supplier make better decisions					

Please indicate the extent of Environmental Factors

SN	**Environmental Factors** (1) Strongly Disagree, (2) Disagree, (3) Neutral ,(4) Agree, (5) Strongly Agree	**1**	**2**	**3**	**4**	**5**
1	We are affected by mergers and Acquisitions					
2	Globalization has helped in our Performance					
3	We are affected by the infrastructure facilities provided by the government					
4	Customers' needs are unpredictable					
5	Customers' requirements regarding product features are difficult to forecast					
6	Customers' product preferences change over the year					
7	The properties of materials from suppliers can vary greatly within the same batch					

8	Suppliers' engineering level is Unpredictable					
9	Suppliers' product quality is Unpredictable					
10	Suppliers' delivery time can easily go Wrong					
11	Competitors' actions are unpredictable					
12	Competition is intensified in our industry					
13	Competitors are from different industries					
14	Competitors are from different countries					
15	Competitors often introduce new products unexpectedly					
16	Technology is changing significantly in our industry					
17	Technological changes provide opportunities for enhancing competitive advantage in our industry					
18	Technological breakthrough results in many new product ideas in our industry					
19	Improving technology generates new products frequently in our industry					

Please indicate the extent of Information Sharing

SN	**Information Sharing** (1) Strongly Disagree, (2) Disagree, (3) Neutral ,(4) Agree, (5) Strongly Agree	**1**	**2**	**3**	**4**	**5**
1	We inform trading partners in advance of changing needs					
2	Our trading partners share proprietary information with us					
3	Our trading partners keep us fully informed about issues that affect our business					
4	Our trading partners share business knowledge of core business processes with us					
5	We and our trading partners exchange information that helps establishment of business planning					
6	We and our trading partners keep each other informed about events or changes that may affect the other partners					

Please indicate the extent of Supply Chain Management Performance

SN	**Supply Chain Management Performance** (1) Strongly Disagree, (2) Disagree, (3) Neutral ,(4) Agree, (5) Strongly Agree	**1**	**2**	**3**	**4**	**5**

1	Our supply chain is able to meet special customer specification					
2	Our supply chain is able to rapidly adjust capacity so as to accelerate or decelerate production in response to changes in customer demand					
3	Our supply chain is able to rapidly introduce large numbers of product improvements/variations					
4	There is high level of communication and coordination between all functions in our factory					
5	There is a high level of integration of information systems in our factory					
6	Our factory fills customer orders on time					
7	Our factory has short order-to-delivery cycle time					
8	Our factory has fast customer response time					

Annex 2: Supplier buyer relationship

	N	Mean	SD
We consider quality as our number one criterion in selecting suppliers	113	1.46	.856
We regularly solve problems jointly with our suppliers	113	1.55	.926
We have helped our suppliers to improve their product quality	113	1.83	1.274
We have continuous improvement programs that include our key suppliers	113	1.66	1.057
We include our key suppliers in our planning and goal- setting activities	113	1.81	1.243
We actively involve our key suppliers in new product development processes	113	1.96	.958
Average		1.71	.54

Source: Own survey result, 2019

Annex 3: External supply chain

	N	**Mean**	**SD**
Our SC partner feels like "part of the family" in this supply chain relationship	113	2.38	.957
Our SC partner feels "emotionally attached " to this supply chain relationship	113	2.16	.714
This SC relationship has a great deal of personal meaning for our SC partner	113	1.48	.877
Our SC partner feels a strong sense of belonging to this SC relationship	113	1.85	1.143
Our SC partner works towards achieving the common goal	113	2.56	1.060
Our supply chain partner shares risk with you.	113	1.33	.687
Our SC partner is afraid of what might happen if he leaves the SC relationship	113	1.35	.678
Our SC partner believes that a factory must always be loyal to its SC rship	113	1.28	.574
Our SC partner thinks that the factory these days move from alliance to alliance too often	113	2.42	1.266
Jumping from alliance to alliance seems unethical to our supply chain partner	113	1.32	.710
Our SC partner work towards reputation of the factory rather that profitability	113	1.27	.698
Our supply chain partner is ready for mutual investments on certain projects	113	1.36	.856
Average		**1.73**	**.293**

Source: Own survey result, 2019

Annex 4: Human metrics

	N	Mean	SD
The degree of dealings between us and our supply chain partner is very high	113	1.45	.768
The relationship between us and our supply chain partner is very stable	113	1.49	.825
We are quite involved in the marketing and planning efforts of our SC partner	113	1.69	1.094
We and our sc partner seek advice for each other when doing marketing analysis	113	2.07	1.230
We and our SC know the strengths and weaknesses of each other very well	113	2.37	1.344
Our factory is powerful enough to ask our SC partner to readjust price Strategy	113	1.99	1.313
Our factory is powerful enough to ask our SC partner to readjust their Product	113	2.50	1.383
Our factory can provide training support to our supply chain partner	113	2.00	1.210
Our SC partner perceives that our factory is perfectly honest and truthful	113	1.55	.886
Our SC partner perceives that our factory is perfectly having high integrity	113	1.63	.956
We would like to inform our SC partner everything about new developments	113	1.70	1.133
We willingly share all information that might help your supplier make better decisions	113	1.31	.757
Average		**1.81**	**.42**

Source: Own survey result, 2019

Annex 5: Environmental factor

	N	Mean	SD
We are affected by mergers and Acquisitions	113	2.35	1.580
Globalization has helped in our Performance	113	1.80	1.262
We are affected by the infrastructure facilities provided by the government	113	1.39	.958
Customers' needs are unpredictable	113	2.26	1.406
Customers' requirements regarding product features are difficult to forecast	113	2.10	1.281
Customers' product preferences change over the year	113	2.00	1.239
The properties of materials can vary greatly within the same batch	113	2.33	1.199
Suppliers' engineering level is Unpredictable	113	2.10	1.094
Suppliers' product quality is Unpredictable	113	2.30	.885
Suppliers' delivery time can easily go Wrong	113	2.01	1.292
Competitors' actions are unpredictable	113	2.76	1.104
Competition is intensified in our industry	113	2.96	1.435
Competitors are from different industries	113	3.03	1.430
Competitors are from different countries	113	2.62	1.566
Competitors often introduce new products unexpectedly	113	3.10	1.172
Technology is changing significantly in our industry	113	2.74	1.406
Technological changes provide opportunities for enhancing competitive	113	2.40	1.418
Technological breakthrough results in many new product ideas in our industry	113	2.49	1.019
Improving technology generates new products frequently in our industry	113	2.58	1.259
Average		**2.38**	**.64**

Source: Own survey result, 2019

Annex 6: Information sharing

	N	Mean	SD
We inform trading partners in advance of changing needs	113	1.31	.614
Our trading partners share proprietary information with us	113	1.40	.830
Our trading partners keep us fully informed about issues that affect our business	113	1.85	1.324
Our trading partners share business knowledge of core business processes	113	1.52	1.019
We and our trading partners exchange information that helps establishment of business planning	113	1.47	.887
We and our trading partners keep each other informed about events or changes that may affect the other partners	113	1.75	.750
Average		**1.55**	**.44**

Source: Own survey result, 2019

Annex 7: supply chain management performance

	N	Mean	SD
Our supply chain is able to meet special customer specification	113	1.97	1.114
Our supply chain is able to rapidly adjust capacity so as to accelerate or decelerate production in response to changes in customer demand	113	1.81	.981
Our SC is able to rapidly introduce large numbers of product improvements	113	2.04	1.339
There is high level of communication and coordination between all functions	113	1.84	1.098
There is a high level of integration of information systems in our factory	113	2.13	1.257
Our factory fills customer orders on time	113	1.71	1.015
Our factory has short order-to-delivery cycle time	113	2.01	1.013
Our factory has fast customer response time	113	1.99	1.146
Average		**1.94**	**.63**

Source: Own survey result, 2019