CHAPTER 1: ORIENTATION

1.1 Introduction

Effective supply chain management (SCM) has become a potentially valuable way of securing competitive advantage and improving organizational performance since competition is no longer between organizations, but among supply chains (Li *et al*., 2006). Therefore, organizations have begun to realize that it is not enough to improve efficiencies within an organization, but their whole supply chain has to be made competitive. The understanding and practicing of supply chain management has become an essential prerequisite for staying competitive in the global race and for enhancing profitably (Tan *et al*., 2002).

This chapter comprises the general overview of manufacturing industries in Ethiopia, research objectives, problem statement and research questions. It also contains research hypotheses, significance and delimitations of the study.

1.2 General overview of Manufacturing Industries in Ethiopia

The history of industrial enterprises in Ethiopia is a very short one in view of the nations early civilization and independence dating back over three thousand years (Daniel, 2006). Modern manufacturing was introduced to the Ethiopian economy towards the end of the 19th century with the emergence of a strong central government and political stability. Its introduction was more facilitated by the completion of the Ethio – Djibouti rail way (B & M Development Consultants PLC., 2004).

In Ethiopia, the manufacturing industry is classified as large and medium scale industries (LMSMI), mining and quarrying, small scale industries and handicrafts, electricity and water, and construction sectors. According to the Ethiopian ministry of Industry, manufacturing firms with paid up capital of more than Ethiopian birr 500,000 (around 30,000 US dollar) are classified as medium and large. The share of the

manufacturing industry to GDP has been in the range of 9 and 11 percent since the early 1960s (EEA, 2006). This indicates that the development of the sector is yet in its infancy. As a result, the sector forms only a small part of the economy; because of this the country's industrial base is very low. Moreover, the sector is heavily dependent on imports of semi-processed goods, raw materials, spare -parts and fuel.

Comparatively the contribution of the industrial sector, particularly manufacturing, to the overall national income is one of the lowest in the world. In 2003/04 the industrial contribution composed of manufacturing, construction, mining and electricity was only about 11.4% of the GDP and that of manufacturing sector was only about 6.4% of the GDP. On the other hand in 2003, the industrial sector of Sub Saharan African countries and the world had an average share of about 29% and 28% respectively which implies that Ethiopia is one of the least industrialized economies in Sub-Saharan Africa and the world at large (EEA, 2005).

As far as the industrial growth is concerned over the past two decades, the trend of growth in the sector was lethargic and changing at an insignificant rate. From 1991/92 to 2003/04 the sector was growing at an average growth rate of 6.1% annually and similar average growth rate was also recorded in the manufacturing sector whereby it grew at an average rate of 7.1% within the specified period (EEA, 2005).

Currently, the contribution of the manufacturing industry to the overall national income is one of the lowest in the world. According to the Ethiopian National Bank Annual Report (2007/08), in 2007/2008, the contribution of industry composed of manufacturing, construction, mining and electricity was only about 11.6 percent of the GDP and that of the manufacturing sector was only about 6.4 percent of the GDP.

According to the Central Statistics Agency (2010) LMSMI survey report, the total number of large and medium scale manufacturing establishments in the country as a whole stood at 2203 in 2008/2009. This shows an increase of 273 establishments or 14.1 percent compared to that of the previous year (see table 1.1). For the country as a whole, establishments classified under manufacture of Other Non-Metallic Mineral Products industrial group constituted the largest share accounting for 27.6 percent of the total. The output of these industries include: glass and glass products, structural

clay products, cement, lime and plaster and article of concrete, cement and plaster among others. Manufactures of food products and beverages, and furniture which represented 25.5 and 16.5 percent of the total number of establishments respectively, were in second and third position. That means the share of the three industrial groups combined was 69.6 percent of the total number of manufacturing industries indicating that the Ethiopian large and medium scale manufacturing industry is characterized by a high concentration of a limited range of manufacturing activities.

On the other hand, the distribution of large and medium scale manufacturing industries by regional states of the country is notably unbalanced. More than forty percent of the total number of large and medium scale manufacturing industries, which were operating in the reference year, were located in Addis Ababa. There were 148,817 employees in the sector and the number of employees showed an increase of 12.9 percent compared to that of the previous year. The increase in the number of employees could be attributed to the increase in the number of establishments covered in the year 2008/2009.

The percentage distribution of value added, which indicates the contribution level of large and medium scale manufacturing industries, to the total value added in the manufacturing sector by industrial groups is also given for the year 2008/2009 (CSA 2010) (see Table 1.1).

Table 1.1 Number of LMSMI establishments, employees and gross value added of production (2008/09).

s/n	Major Industrial Group	No. of establishments		No. of employees		Value added in %
		Number	%	Number	%	
1	Food Products and Beverages	562	25.5	44,957	30.21	37.2
2	Tobacco Products	1	0.0	1,122	0.75	4.9
3	Textiles and textile products	88	4.0	25,863	17.38	5.7
4	Lather and lather products	89	4.0	8,750	5.88	2.9
5	Wood and Products of Wood, Except Furniture	48	2.2	2,111	1.42	0.4
6	Paper Products and Printing	127	5.8	8,822	5.93	5.7
7	Chemicals and Chemical Products	75	3.4	8,031	5.40	8.9
8	Rubber and Plastic Products	87	3.9	11,958	8.04	5.9
9	Non-Metallic Mineral Products	608	27.6	19,790	13.30	16.4
10	Basic metals and engineering, N.E.C.	155	7.0	9,468	6.36	9.6
11	Furniture and N.E.C.	363	16.5	7,945	5.34	2.4
	Total	2,203	100.0	148,817	100.0	100.0

Source: WWW.CSA.gov.et.

Note: - N.E.C. - Not Elsewhere Classified

1.3 Basic Metal and Engineering Industries (BMEIs) in Ethiopia

The types of industries covered under this study are large and medium sized public and private BMEIs located within the radius of 50Km of the capital Addis Ababa. Large and medium establishments of BMEIs considered for the study are those industries which engage ten persons and above and use power-driven machinery. According to the survey conducted by the Ethiopia Central Statistical Agency (2010), the total number of LMSMI under the BMEI sub-sector around Addis Ababa and in the different regional

states of the country was 71 and 84 respectively. The numbers of industries which are the focus of this study are classified in major groups as shown in Table 1.2.

Table 1.2: Distribution of large and medium public and private BMEIs, around the capital Addis Ababa and the rest of the country's Regional States, (2008/2009).

ISIC No.	Major BMEI sub-group	No. of BMEIs in Ethiopia		Total No. of BMEIs in Ethiopia
		Addis Ababa	Regional states	
27	Manufacture of Basic Iron and Steel	13	5	18
28	Manufacture of Fabricated Metal Products Except Machinery and Equipment	45	75	120
29	Manufacture of Machinery and Equipment N.E.C.	3	2	5
34	Manufacture of Motor Vehicles, Trailers and Semi-Trailers	10	2	12
	Total	71	84	155

Source: - Central Statistical Agency, Report on LMSMI, 2009.

Note: - ISIC No. is International Standard Industrial Classification number of all Economic Activities, Revision 3.1.

Asmamaw and Zelalem (2009) indicated that basic metals and engineering industries play a vital role in enhancing the economic development of both developing and developed countries. The value of metals processing as a development tool is based on the principles that it helps enhance the rate of foreign exchange earnings by promoting standard quality product exports; create jobs and increase income as well as offering an opportunity of technology transfers to the country.

Over the years Ethiopian basic metals and engineering industries were limited in achieving these objectives due to many reasons. There has been minimal benefit

created with a net drain on government resources. However, during the last five years, the basic metal and engineering sector in Ethiopia is growing relatively well following the consistent economical growth of the nation. Though there is a rapid development in the sector, the benefit obtained is still low.

1.4 Research Objectives

The study has the following objectives:-

a. To assess the level of practical implementation of SCM practices in Ethiopian BMEIs,
b. To analyze the relationship between SCM practices and organizational performance in BMEIs,
c. Based on the research findings, to provide recommendations that could be helpful to improve the organizational performance of BMEIs.
d. To create awareness about the concept of SCM and its practices in Ethiopian BMEIs,

1.5 Problem statement

Ethiopian basic metals and engineering industries have serious weaknesses and facing obstacles hampering their productivity and competitiveness. Most of the these manufacturing industries are plagued with the problem of low financial and managerial capacity, lack of machineries and facilities, inability to satisfy customer demands, and shortage of highly qualified workers. Moreover, they have poor or under capacity utilization and low level of total resource productivity. Even if the contribution of the sector to import-substitution has increased over the last few years, the unexploited potential, low market share of the manufacturing industry and unutilized capacity show that there is a lot that remains to be done.

Thus, one of the problems which contributed a lot towards the above limitations and backwardness of the sector could be the lack of conceptual framework and basic

knowledge of SCM amongst the business practitioners. Moreover, even though some of the practitioners have realized the importance of SCM, they lack an understanding of what constitutes a comprehensive set of SCM practices.

In this regard, the researcher could hardly find studies related to the know-how and implementation of SCM practices as well as their impact on organizational performance in Ethiopian basic metals and engineering industries. Therefore, the researcher needed to study commonly advocated SCM practices used in previous researches Li *et al.,* (2005), Li *et al.,* (2006), Lori *et al.,* (2011) that include strategic supplier partnership, customer relationship, degree of information sharing as well as internal lean practices in Ethiopian BMEIs.

1.6 Research questions

Considering the above stated research problem, the following major research questions are established.

a. To what extent do the Ethiopian BMEIs implement supply chain management practices?
b. Is there any relationship between supply chain management practices and organizational performance in Ethiopian BMEIs?

1.7 Research hypotheses

According to Leedy *et al.,* (2010), the research hypothesis is a reasonable conjecture, an educated guess and its purpose is to provide a temporary objective, an operational target, a logical framework that guides researchers as they collect and analyze data. Therefore, based on the above mentioned literature and research problem the following null (H_o) and research hypothesis (H_a) were used in the study:

H_o1: Strategic supplier partnership practice is not weak in Ethiopian BMEIs.
H_a1: Strategic supplier partnership practice is weak in Ethiopian BMEIs.

H_o2: Customer relationship practice is not weak in Ethiopian BMEIs.

H_a2: Customer relationship practice is weak in Ethiopian BMEIs.

H_o3: Information sharing practice is not weak in Ethiopian BMEIs.

H_a3: Information sharing practice is weak in Ethiopian BMEIs.

H_o4: Internal lean practice is not weak in Ethiopian BMEIs.

H_a4: Internal lean practice is weak in Ethiopian BMEIs.

H_o5: There is no relationship between the strategic supplier partnership and organizational performance in Ethiopian BMEIs.

H_a5: There is relationship between the strategic supplier partnership and organizational performance in Ethiopian BMEIs.

H_o6: There is no relationship between the customer relationship and organizational performance in Ethiopian BMEIs.

H_a6: There is relationship between the customer relationship and organizational performance in Ethiopian BMEIs.

H_o7: There is no relationship between information sharing and organizational performance in Ethiopian BMEIs.

H_a7: There is relationship between information sharing and organizational performance in Ethiopian BMEIs.

H_o8: There is no relationship between internal lean practice and organizational performance in Ethiopian BMEIs.

H_a8: There is relationship between internal lean practice and organizational performance in Ethiopian BMEIs.

1.8 Significance of the study

The significance of this research is to establish a conceptual framework and enhance the level of understanding about supply chain management practices in BMEI members in Ethiopia.

Moreover, the researcher believes that the study has explored how strategic supplier partnership, customer relationship, information sharing and internal lean practices have influenced the organizational performance of BMEIs. The research also points a way to

solve the problems encountered by BMEIs related to supply chain management which ultimately help them to increase their contribution to import-substitution and GDP.

1.9 Delimitations of the study

This study is focused on the impact of supply chain management practices on those large and medium scale basic metal and engineering industries' organizational performance situated within a 50km radius of the Ethiopian capital, Addis Ababa. The total numbers of these industries under public and private ownership inside the specified area are 71 (Central Statistics Agency, 2010).

BMEIs related to the Ministry of National Defense and other BMEIs located out of 50km radius of Addis Ababa as well as micro and small level basic metal and engineering enterprises are not considered in this research. The study is also limited to manufacturers of basic iron and steel, manufacturing of fabricated metal products except machinery and equipment, machinery and equipment manufacturers, and manufacturers of motor vehicles, trailers and semi-trailers categorized under ISIC code numbers 27, 28, 29 and 34 (see Table 1.2).

1.10 Definition of Terms

- Manufacturing:

According to International Standard of Industrial Classification (ISIC) Revision-3.1 manufacturing is defined as the physical or chemical transformation of materials or components into new products, whether the work is performed by power-driven machines or by hand, whether it is done in a factory or in the worker's home, and whether the products are sold at wholesale or retail. The assembly of the component parts of manufactured products is also considered as manufacturing activities.

- Basic Metal and Engineering Industries (BMEIs):

BMEIs are one of the sub-sectors under the manufacturing industries classifications and engaged in production of basic Iron and steel as well as metal engineering products.

Manufacture of basic metals includes the activities of smelting and/or refining ferrous and non-ferrous metals from ore, pig or scrap, using electro metallurgic and other process of metallurgic techniques. Units in this division also manufacture metal alloys and super-alloys by introducing other chemical elements to pure metals. The output of smelting and refining, usually in ingot form, is used in rolling, drawing and extruding operations to make sheet, strip, bar, rod or wire, and in molten form to make castings and other basic metal products classified under ISIC number 27. Whereas, engineering activities concerned in manufacture of “pure” metal products (such as parts, containers and structures), usually with a static, immovable function classified under ISIC number 28. It also include divisions under ISIC number 29 and 34 concern combinations or assemblies of such metal products (sometimes with other materials) into more complex units that, unless they are purely electrical, electronic or optical, work with moving parts. These divisions cover the manufacture of fabricated metal products, machinery and equipment as well as motor vehicles, trailers and semi-trailers (ISIC Revision3.1, 2002).

Ethiopian basic metal industries are those industries which produce primary products, like billets, wire road, reinforcement bars, solid round and section bars etc., by melting, heating and rolling technology. Whereas, the engineering industries are those industries which produce different machinery components, tools, spare parts, household utensils, motor vehicle body manufacturers and assembly plants, etc., using their raw material from local and foreign basic metal products. The production technology these engineering industries use are casting, machining, welding, shearing and forging etc.

1.11 Outline of the research report

This research contains five chapters. Chapter 1 presents an overview of the study, the research problem and research questions. Chapter 2 contains a survey of the existing literature on SCM. Chapter 3 details the research design and methodology. Chapter 4 contains the results obtained. In Chapter 5 the results of the study are discussed, and conclusions and recommendations on the basis of the results are made.

CHAPTER 2: LITRATURE REVIEW

2.1 Introduction

In this chapter, the researcher reviewed literatures which are relevant to the core theme of the project and research title. Moreover, the researcher presents the theoretical framework of the research.

2.2 Supply chain management (SCM)

2.2.1 The concept of supply chain

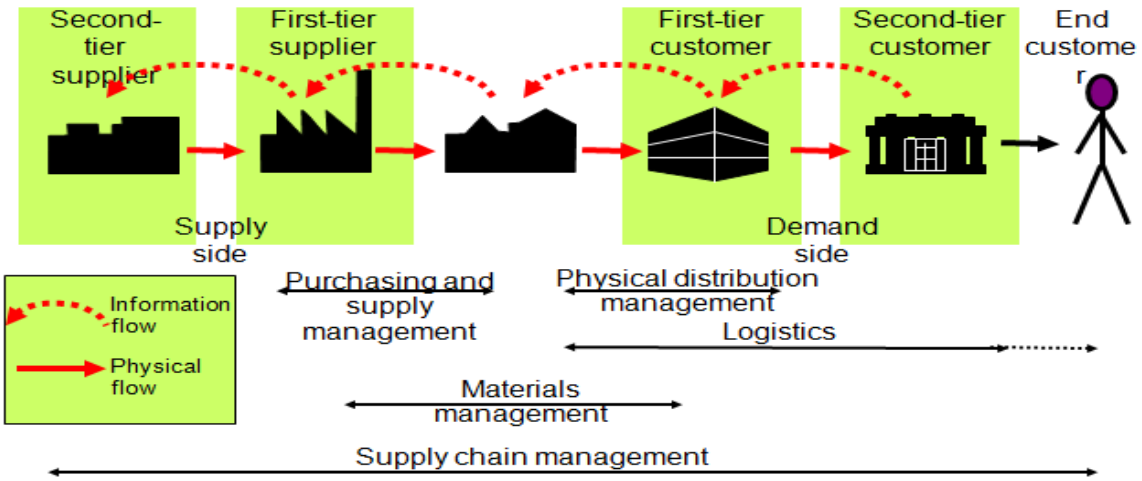
Organizations are facing different kinds of challenges in their effort of competing in today's dynamic global markets. To remain competitive, organizations must recognize the importance of supply chain practices that improve not only their own organizational performance, but also coordinate with their supply chain partners to improve their joint performance. Yet, despite the significant advances in research and practices, many organizations continue to struggle to understand the complex issues associated with the coordinated planning and supply activities amongst the members of their supply networks (Lori *et al.*, 2011).

To understand the term SCM in depth, the term supply chain must be clarified first before the definition of management and the role of management as a base for complete definition of SCM is given. According to Handfield (2002), supply chain includes internal divisions of the company as well as external suppliers that provide input to a focal company. A supplier for one company has its own set of suppliers that provide input (also called second tier supplier). Supply chains are essentially a series of linked suppliers and customers until products reach the ultimate customer.

Based on a comprehensive research study conducted by several co-authors, Mentzer (2001), consolidated the definition of "supply chain" as a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of

products, services, finances, and/ or information from a source to a customer" (Figure 2.1).

Figure 2.1 Tiers of supply chain management



Source: Supply chain management module (MBL93HY-2011) UNISA

2.2.2 Definition of SCM

The lack of a universal definition of supply chain management is, in part, due to the way the concept of supply chain has been developed (Simon *et al.,* 2000). In fact, as it will be explained in the next section, the concept of supply chain has been considered from different points of view in related body of literature.

Stadtler and Kilger (2005) define the supply chain as a network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer. The chain involves two or more legally separated organizations that are linked together by material, information or financial flows and includes the ultimate customer. Supply Chain Management has the objective of governing all parts of the supply chain as a unit, instead of single organizational elements, in order to achieve increased competitiveness.

For the purpose of meeting customer needs better than what the competitors can do, companies have tried to design effective business models as success depends on building processes that can design, make, and deliver the innovative, high-quality, low cost products and services that customer demands. However, most companies lack the necessary resources and skills. Therefore, managers are beginning to look more proactively beyond their companies' wall to consider how the resources of suppliers and customers can be used to create value. These efforts to align goals, share resources, and collaborate across company boundaries are the essence of supply chain management (Fawcett *et al.*, 2007). Hence, SCM has attracted the attention of many researchers from the academicians, consultants, and business managers, over the last two decades. It is concerned with cost effective way of managing materials, information and financial flows from the point of origin to the point of utilization to satisfy customer requirements (Narasimha, 2007).

According to Simchi-Levi, Kaminsky, and Simchi-Levi, (2004) SCM is defined as a set of approaches used to efficiently integrate suppliers, manufacturers, warehouses, and stores so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time in order to minimize system wide costs while satisfying service-level requirements. Despite the diversity in the way SCM is defined in the literature, central to all these definitions is "customer satisfaction" as a shared objective of the whole supply chain (Keivan and Peter, 2007).

Wisner *et al.,* (2005) also observed that the practice of supply chain management is a recent trend because many businesses are only beginning to realize the benefits and problems that accompany an integrated supply chain. The implication is that businesses that practice supply chain management concepts continually improve their ability to reduce waste, decrease time, be flexible and cut costs which ensures future profitability. However, as competitive situations, products, technology and customers change, the priorities for the supply chain should also change. Supply chains always require being more flexible in responding quickly to these changes.

2.2.3 Basic objective of supply chain management

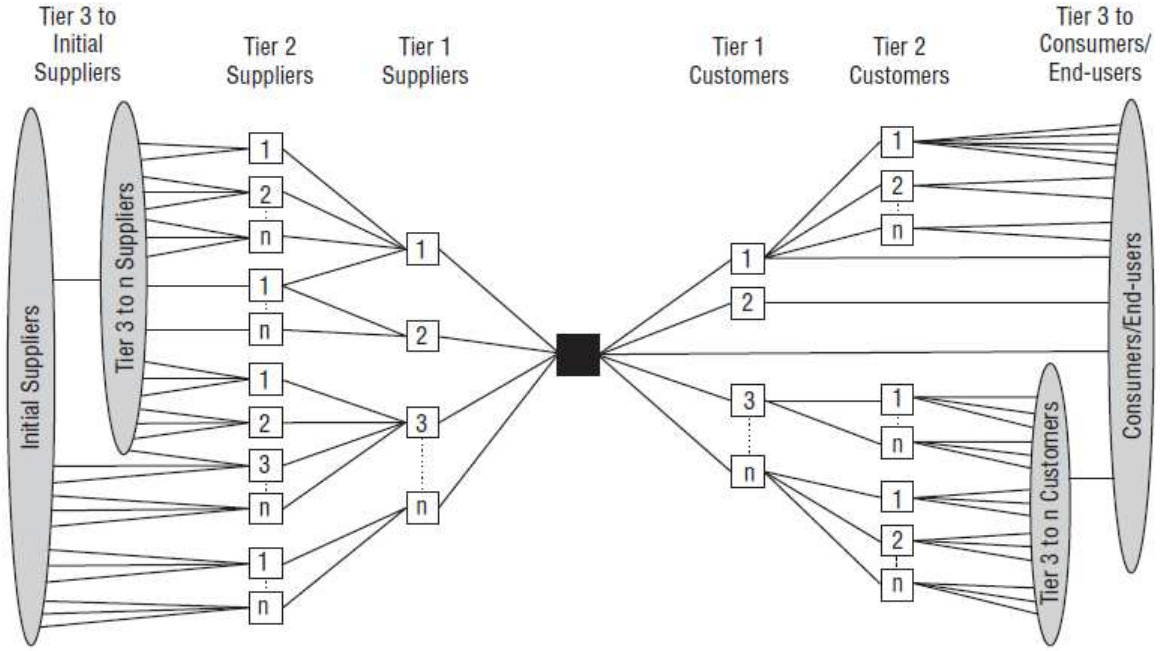
The basic objective of supply chain management is to optimize performance of the chain to add as much value as possible for the least cost possible. In other words, it aims to link all the supply chain agents to jointly cooperate within the firm as a way to maximize productivity in the supply chain and deliver the most benefits to all related parties (Finch, 2006). Moreover, Mentzer (2001) suggested that the major importance of SCM is as a systematic, strategic coordination of the traditional business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long term performance of the individual companies and the supply chain as a whole. The short-term objectives of SCM are primarily to increase productivity and reduce inventory and cycle time, while long-term objectives are to increase market share and profits for all members of the supply chain (Li *et al*., 2006). According to Lambert, (2008) SCM offers the opportunity to capture the full potential of intra and inter-company integration and management. Therefore, SCM deals with business process excellence and represents a new way of managing the business and relationships with other members of the supply chain. Lambert (2008) added that if executives understand the supply chain management processes and how they should be implemented, they will be able to create more integrated supply chains which will lead to higher revenues and increased profitability for all member firms.

2.2.4 Scope of SCM

The scope of SCM has expanded over time, and its importance has increased. Originating from purchasing and supply management, SCM research has now evolved into a body of knowledge focusing primarily on integration, customer satisfaction and business results. Although SCM efforts sometimes fail to achieve the desired results it is now a strategic tool to improve competitive position and is of a major concern to top-level managers (Kenneth, Ron & Michael, 2006). In reality, a supply chain is much more complex than shown in Figure 2.1. For a company in the middle of the supply chain like a consumer goods manufacturer, the supply chain looks like an uprooted tree (see Figure 2.2) where the root system represents the supplier network and the branches of

the tree represent the customer network. However, the supply chain will look different depending on a firm's position in it.

Figure 2.2: Supply chain network structure



Source: Douglas M. Lambert, Supply Chain Management; Processes, Partnerships, Performance, Sarasota, Florida: Supply Chain Management Institute, 2008.

Therefore, SCM is increasingly being recognized as the management of relationships across the supply chain and the supply chain is not a chain of businesses, but a network of businesses and relationships (Lambert, 2008).

2.2.5 Activities/ functions of Supply chain

Several models have been proposed for understanding the activities required to manage supply chain across organizational and functional boundaries. According to *Wikipedia free encyclopedia* supply chain activities can be grouped into strategic, tactical, and operational levels as follows:

Strategic level

- Strategic network optimization, including the number, location, and size of warehousing, distribution centers, and facilities.
- Strategic partnerships with suppliers, distributors, and customers, creating communication channels for critical information and operational improvements such as cross docking, direct shipping, and third-party logistics.
- Product life cycle management, so that new and existing products can be optimally integrated into the supply chain and capacity management activities.
- Information technology chain operations.
- Where-to-make and make-buy decisions.
- Aligning overall organizational strategy with supply strategy.
- It is for long term and needs resource commitment.

Tactical level

- Sourcing contracts and other purchasing decisions.
- Production decisions, including contracting, scheduling, and planning process definition.
- Inventory decisions, including quantity, location, and quality of inventory.
- Transportation strategy, including frequency, routes, and contracting.
- Benchmarking of all operations against competitors and implementation of best practices throughout the enterprise.
- Milestone payments.
- Focus on customer demand and habits.

Operational level

- Daily production and distribution planning, including all nodes in the supply chain.
- Production scheduling for each manufacturing facility in the supply chain (minute by minute).
- Demand planning and forecasting, coordinating the demand forecast of all customers and sharing the forecast with all suppliers.

- Sourcing planning, including current inventory and forecast demand, in collaboration with all suppliers.
- Inbound operations, including transportation from suppliers and receiving inventory.
- Production operations, including the consumption of materials and flow of finished goods.
- Outbound operations, including all fulfillment activities, warehousing and transportation to customers.
- Order promising, accounting for all constraints in the supply chain, including all suppliers, manufacturing facilities, distribution centers, and other customers.
- From production level to supply level accounting all transit damage cases and arrange to settlement at customer level by maintaining company loss through insurance company.

2.3 SCM practices

Supply chain management practices have been defined as the set of activities undertaken in an organization to promote effective management of its supply chain. It is also proposed to be a multi-dimensional concept, and hence viewed as a more comprehensive concept than the narrower view (the supplier side, the internal side or the customer side) taken in most prior researches (Li *et al.*, 2005).

Several studies have examined SCM practices which involve various dimensions. For example, Zhou *et al*., (2007) propose that SC practices consist of supply chain planning, Just-In-Time production and delivery practices. On the other hand, Chow *et al*., (2008) suggest that supply chain features, integration, and customer services are typical SCM practices. Chin *et al.,* (2004) viewed SCM practices rather loosely as a set of practices consisting of customer channel, supplier channel, material flows, information technology and corporate culture. In contrast, Chen *et al*., (2004) used a more structured approach to describe SCM practices and this involves dimensions of strategic purchasing, supply management, logistics integration and supply network coordination. Li *et al.,* (2006) propose that for an effective SCM the firm should consider the following practices:

strategic supplier partnership, customer relationship, level of information sharing, quality of information sharing, and postponement.

Recently, organizations have identified SCM practices as a basis for enhancing organizational performance as well as a source of competitive advantage (Hassini, 2008).

2.4 Organizational performance

Organizational performance refers to how well an organization achieves its market-oriented goals as well as its financial goals (Yamin *et al*., 1999). Financial metrics have served as a tool for comparing organizations and evaluating an organization's behavior over time (Holmberg, 2000). Any organizational initiative, including supply chain management, should ultimately lead to enhanced organizational performance. A number of prior studies have measured organizational performance using both financial and market criteria, including Return On Investment (ROI), market share, profit margin on sales, the growth of ROI, the growth of sales, the growth of market share, and overall competitive position (as cited in Li *et al*., 2006).

There have been various definitions of organizational performance, with some studies emphasizing operational measures, while others stressed financial measures. For example, Li *et al*., (2005b) used delivery dependability and time to market as performance measures, while firm performance defined by sales growth, market share growth and profitability are used in other studies (Narasimhan *et al*., 2008; Narasimhan and Kim, 2002). Many studies have selected a combination of pertinent operational and financial measures to reflect overall organizational performance. For instance, Vereecke and Muylle (2006) used factor analysis to extract five components of performance related to delivery, cost, flexibility, procurement and quality. Tracey *et al.,* (2005) measure performance through four separate dimensions including perceived value, customer loyalty, market performance and financial performance. Similarly, Tan *et al*., (2002) used six items for performance including product quality, customer service, competitive position, market share, average selling price and return on assets. Chen

and Paulraj (2004a, b) used supplier performance and buyer performance to assess the financial performance of the buying firm. Vickery *et al.,* (2003) used customer service performance followed by financial performance as the performance constructs. Finally, Jin (2006) assessed operational supply chain role performance via three levels of performance criteria: strategic, operational and financial. Strategic performance was measured by market share and sales growth, operational performance was measured by lead-time performance and financial performance was assessed through return on investments and return on sales. Based on other SCM studies, organizational performance was defined as a combination of operational and financial results relative to competitors. The operational measures selected were commonly used to evaluate operational excellence and measures a company's relative performance with its main competitors on three competitive priorities: speed, delivery and quality. Financial performance was measured by the company's cost and profit-related performance as compared to their direct competitors. These metrics were commonly used to assess an organization's financial performance (as cited in Lori *et al*., 2011).

2.5 SCM practices and Organizational performance

Effective supply chain management has become a potentially valuable way of securing competitive advantage and improving organizational performance since competition is no longer between organizations, but among supply chains (Li *et al*., 2006). In their research Li *et al.,* (2006) had conceptualized and developed five dimensions of SCM practices (strategic supplier partnership, customer relationship, level of information sharing, quality of information sharing, and postponement) and tested the relationships between these SCM practices and organizational performance (market and financial performance). The result indicated that higher levels of SCM practice can lead to enhanced organizational performance.

Similarly, Tracey *et al*., (2004) had tested the impact of supply-chain management (SCM) capabilities on business performance so as to determine to what degree customer-oriented SCM issues influence organizational performance. The result showed that considerable positive relationships were existed among three types of SCM

capabilities (outside-in, inside-out, and spanning) and business performance (perceived customer value, customer loyalty, market performance, and financial performance).

2.6 SCM practices in Ethiopian BMEIs

Ethiopia‘s economy is based on agriculture which in 2008/2009, contributed about 43 percent of the gross domestic product (GDP), 86 percent of foreign currency earning, and 85 percent of rural employment. Generally, the overall economic growth of the country has been highly associated with the performance of the agricultural sector (Ethiopian Investment Guide, 2010).

The country adopted a free market economic policy in 1992, and in line with this has promoted private investment. With the introduction of a free market economy, Ethiopia has implemented a number of reforms including the privatization of state owned enterprises, liberalization of foreign trade, deregulation of domestic prices, and devaluation of the exchange rate. With its enormous resources, the country has untapped investment opportunities, huge market access and low cost of doing business. The country has an excellent climate, fertile soil and huge domestic raw material base. Its location is strategically close to the lucrative markets of the Middle East, Asia and Europe (Embassy of FDRE in London, 2011).

However, Ethiopia has not benefiting from these resources and opportunities available due to several reasons including poor infrastructure in transport and communication as well as shortage of electric power supply which created a challenge for most companies in doing business in the country.

Limitations in physical infrastructure increase the cost of transportation and also hinder the fast movement of products, information and money in business transactions. Poor infrastructure also limits the size of the market available in nearby countries such as Sudan and Kenya which could provide a potential source of customers for Ethiopian business people. Air transport is also very limited access and at the same time the carrier cost to use this route is too high.

Since SCM is concerned with cost effective ways of managing materials, information and financial flows from the point of origin to the point of utilization to satisfy customer requirements (Narasimha,2007), it is difficult to consider that SCM is properly practiced in Ethiopian business environment.

Basic metal and engineering industries are indispensable to build up any country's physical economic base. In Ethiopia, however, since these industries are not developed enough to meet emerging demand from user industries both quantitatively and qualitatively, it is necessary to rely heavily on imports. Manufacturing and delivery of basic metal and engineering product involve many parties that encompass foreign and local suppliers of different kinds of inputs like metal scrap, ferroalloys, chemicals and others; manufacturers of basic metals and engineering products, and distributors up to the end users.

Supply of raw materials for the basic metal and engineering industries heavily depend on imports. It is hard to distinguish clearly between imported and domestic materials as final users often buy from agents without earmarking. However, most basic metal industries which have melting furnaces are also using the main input-metal scrap from the local suppliers that are operating on both a formal and informal basis.

Like other businesses activities in the country, the flow of money along the supply chain of basic metal and engineering industries is conducted in cash and cheque transactions or transfers to the beneficiary account, while information about business transactions are transferred through FAX, telephone, and internet.

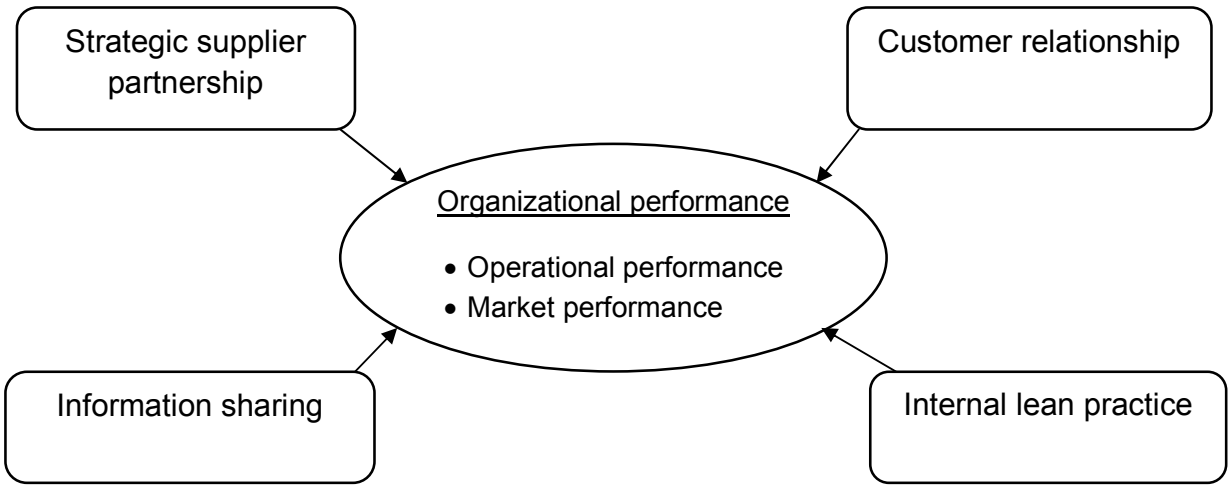
2.7 Research framework

Mentzer *et al.,* (2004) had proposed seven elements of supply chain practice such as agreed vision and goals, information sharing, risk and award sharing, cooperation, process integration, long-term relationship and agreed supply chain leadership. Likewise, using factor analysis, Tan *et al.,* (2002) mentioned six elements of supply chain practices: supply chain integration, information sharing, supply chain

characteristics, customer service management, geographical proximity and Just-in-time (JIT) capability.

Considering the various dimensions of supply chain management practices and measurement of organizational performance proposed by several researchers, the researcher adapted a research framework that encompasses the following four dimensions of supply chain management practices: strategic supplier partnership, customer relationship, quality and degree of information sharing and internal lean practice. For organizational performance measurement three operational (on-time delivery, product and service quality, operating costs) and two market (sales growth, market share growth) performance measurements were adapted.

Figure 3.1 Research framework



According to the literature review the four SCM practices proposed in this research framework are described as follows:

- Strategic supplier partnership

According to Li *et al.,* (2006) strategic supplier partnership is defined as "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". Gyaneshwar *et al.,* (2010) also suggested that strategic partnership emphasizes direct, long-term association and encourages mutual planning and problem solving efforts. Such strategic partnerships are entered into to promote shared benefits among the parties and ongoing participation in one or more key strategic areas such as technology, products, and markets. Strategic partnerships with suppliers enable organizations to work more effectively with a few important suppliers who are willing to share responsibility for the success of the products.

- Customer relationship

Customer relationship comprises the entire array of practices that are employed for the purpose of managing customer complaints, building long-term relationships with customers, and improving customer satisfaction (Li *et al*., 2006). Gyaneshwar *et al.,* (2010) also suggested that close customer relationship allows an organization to differentiate its product from competitors, sustain customer loyalty, and dramatically extend the value it provides to its customers. Close customer relationship allows companies to be more responsive in fulfilling customers' demand and improving customer satisfaction by proactively seeking customers' requirements and needs. The ability to build close relationship with customers will bring companies into a lasting competitive edge (Bowersox, 1999).

- Information sharing

A key element of supply chain partnering is the sharing of various types of information between partners, including real-time communication, planning and operational data, and even financial information. Information sharing is seen as one of the key success factors in the functioning of strategic alliances and enables supply chains to be agile in responding to competitive challenges (Andraski, 1998).

Integrating effective supply chain practices with effective information sharing becomes critical for improving supply chain performance. The two aspect that information sharing

comprises are information content and information quality. Information content refers to the information shared between manufacturers and customers. Information quality measures the quality of information shared between manufacturers and customers (Zhou *et al*., 2007).

Information quality includes such aspects as the accuracy, timeliness, adequacy, and credibility of information exchanged (Monczka *et al*., 1998). While information sharing is important, the significance of its impact on SCM depends on what information is shared, when and how it is shared, and with whom (Chizzo, 1998; Holmberg, 2000). Jarrell (1998) also noted that sharing information within the entire supply chain can create flexibility, but this requires accurate and timely information (as cited in Li *et al*., 2005). Fiala (2005) added that information sharing of customer demand has an impact on the bullwhip effect and in general it is very important issue for coordinating actions.

Information sharing is an important aspect in achieving seamless integration in a supply chain (Lee, 2000). Cross functional integration and inter organizational integration require the visibility of information across the supply chain. Weak information sharing between partners in a supply chain will result in poor coordination that will lead to many serious problems such as high inventory levels, inaccurate forecast, low utilization, and high production costs (Lee and Whang, 2000). Indeed, information sharing is highly considered as the way to reduce demand uncertainty (Lee, 2002).

- Internal lean practices

In addition to upstream and downstream integration, SCM also emphasizes the importance of both effectiveness and efficiency of a firm's internal operations on its performance (Handfield and Nichols, 1999). A firm's internal operations are the basis for creating best organizational performance before embarking into external integrations. Weak internal operations can lead to failure in coordinating with external partners.

As Li *et al*., 2005 argued citing Womack and Jones, 1996; McIvor, 2001; Taylor, 1999 internal lean practices are the practices of eliminating waste (cost, time, etc.) in a

manufacturing system, characterized by reduced set-up times, small lot sizes, and pull-production. The term ‘‘lean’’ is used to refer to a system that uses less input to produce at a mass production speed, while offering more variety to the end customers. Elimination of waste is a fundamental idea within the lean system. Shah *et al*., (2003), also define lean practices as a multi-dimensional approach that encompasses a wide variety of management practices, including just-in-time, quality systems, work teams, cellular manufacturing, supplier management, etc. in an integrated system. The core thrust of lean practices are that these practices can work synergistically to create a streamlined, high quality system that produces finished products at the pace of customer demand with little or no waste.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

There are practical steps through which the researcher must pass in the journey of research in order to find answers to the research questions. The path to finding answers to the research questions constitutes research methodology.

This chapter provides details of the research methodology which was used in the study. It is also includes a description of the research design, study population and sampling techniques as well as instruments used to collect the relevant data. Furthermore, data analysis strategies and the ethical considerations aspects are also addressed respectively.

3.2 Research design

According to Leedy *et al.,* (2010), there are two paradigms or categories that research studies are normally grouped into, and they are (1) Qualitative and (2) Quantitative research methodologies. The purpose of quantitative research is to make explanations and predictions that will be generalized to other persons and places. In contrast, qualitative research is used for better understanding of complex situations which is sometimes exploratory in nature, and researchers may use their observations to build theory from the ground up. Table 3.1 lists some common research methodologies and the types of problems for which each is appropriate.

Table 3.1 Methodology and concomitant research goals

Method	**Characteristics of the method and the research goals the method attempts to achieve**
Case study	A type of qualitative research in which in-depth data are gathered relative to a single individual, program or event for the purpose of learning more about unknown or poorly understood situation.
Content analysis	A detailed and systematic examination of the contents of a particular body of material for the purpose of identifying patterns, themes etc. within the material.
Correlational research	A statistical investigation of the correlation between two or more variables. It looks at surface relationship but does not necessarily probe for causal reasons underling them.
Ethnography	A type of qualitative inquiry that involves an in-depth study of an intact cultural group in a natural setting
Observation study	A type of quantitative research in which a particular aspect of behavior is observed systematically and with as much objectivity as possible.
Phenomenological research	A qualitative method that attempts to understand participants' perspective and views of social realities.
Survey research	A study designated to determine the incidence, frequency, and distribution of certain characteristics in a population.

Source: Leedy 2010. Practical research: planning and design (9th edition).

Leedy *et al.,* (2010) explained that descriptive survey involves acquiring information about one or more groups of people through asking them questions and tabulating their answers. The ultimate goal of survey research design is to learn about a large population by surveying their representative sample, summarizing their responses in percentages, frequency, or more sophisticated statistical tools.

Since the quantitative approach of descriptive survey is the easiest and economical method of obtaining information through email and postal service from samples across a geographically widespread area, the researcher have preferred to use descriptive and Inferential statistics in the study.

Based on the literature review of Li *et al.,* (2005), Li *et al.,* (2006), Lori *et al.,* (2011) the researcher has adapted research instruments to collect data for the study. In this respect, a five-point Likert scale was used to measure the respondents` strength of likelihood with the research variables because this rating scale method is more useful when a perception, behavior, attitude, or other phenomenon of interest needs to be evaluated (Leedy *et al*., 2010). Moreover, the Likert scale that was used in this research is considered as categories, not numerical points (1 - not at all, 2 - to a small extent, 3 - to a moderate extent, 4 - to a great extent 5 - not applicable).

3.3 Research population and sample

According to Diamantopoulos *et al.,* (2000), a population is the totality of an entities in which the researcher has an interest, means it is the collection of individuals, objects or events in which the researcher wants to make inferences. A sample, on the other hand, is defined as part of or subset of a given population and it is used to generalize the findings to the entire population. Furthermore, sampling is the process by which respondents are picked out of the population to represent that population. This process can either be done through probability or non-probability methods (Leedy *et al*., 2005).

The population for the study includes 71 large and medium basic metals and engineering firms classified under four categories as manufacturers of basic iron and steel, manufacturing of fabricated metal products except machinery and equipment, machinery and equipment manufacturers, and manufacturers of motor vehicles, trailers and semi-trailers located within a 50 Km radius of the capital, Addis Ababa, where the majority of the country's industry population is located. The population was drawn from the Ministry of Industry, the 2009 Business directories of Addis Ababa Chamber of

Commerce, and Ethiopian Association of Basic Metals and Engineering Industries (EABMEIs) data bases.

Based on the available resources of the researcher, 30 large and medium basic metals and engineering firms, making up 42% of the population, were selected randomly to get a total number of 90 respondents (3 respondents from each company) for the research. This fulfills the minimum sample size (30) requirement to conduct statistical procedure (Diamantopoulos *et al*., 2000). Respondents were top managers and executives who were expected to have experience about the operation and management of supply chain practice in their organization, such as General Managers of the companies, Commercial Managers and Production and Technical Managers.

3.4 Validity and Reliability

According to Leedy *et al.,* (2010), validity of a measurement instrument is defined as the extent to which the instrument measures what it is actually intended to measure. Whereas reliability of measurement instrument is defined as the extent to which the instrument yields consistent result when the characteristics being measured has not changed. Leedy *et al.,* (2010) further defined the different forms of validity and reliability as follows:

- ✓ Validity
  - Content validity: is the extent to which the instrument is representative of the content area being measured,
  - Construct validity: is the extent to which the instrument measures characteristics that are not obtainable by observation,
- ✓ Reliability
  - Inter-rater reliability: is the extent to which two or more researchers evaluating the same characteristic give the same results,
  - Internal consistency reliability: is the extent to which similar items in the instrument yield the same results.

To develop the research instrument and insure their validity and reliability Li *et al.,* (2005), Li *et al.,* (2006) and Lori *et al.,* (2011) had passed through different phases such

as item generation, pre-pilot study, pilot study, large-scale data analysis as well as interviews with academic experts and practitioners in the field. In this process the reliabilities of instruments to measure SCM practice and organizational performance were properly assessed. Therefore, the researcher believed that the adapted instruments have high level of validity and reliability to conduct this study.

Moreover, to insure the validity and reliability of the instrument the researcher had consulted with two local academicians and three SCM practitioners and adjustments were made accordingly (Appendix B).

3.5 Data collection approach

In order to collect the data from respondents, the questionnaire with a covering letter which explained the objective of the study were distributed in person and via e-mail. Additional follow-up and clarification were provided through telephone to selected respondents, as required, to ascertain appropriate understanding was achieved.

3.6 Data analysis approach

All hypotheses are tested with the help of the Statistical Package for Social Science (SPSS-19) software. In order to analyze the data the two sets of Statistics: Descriptive and Inferential statistics are used. Descriptive statistics summarizes and describes quantitative information in the form of frequency distribution and measures of central tendency, whereas inferential statistics is used to make conclusions.

During data analysis chi-square test is used to test for significance of differences between the observed and the expected distributions of data, while Spearman rank correlation is used to measure the direction and strength of the relationship between the research variables. Furthermore, Kruskal-Wallis test is conducted to determine whether the independent variables (strategic supplier partnership, customer relationship, quality and degree of information sharing and internal lean practices) have an effect on dependent variable (organization performance).

3.7 Ethical issue

According to Leedy *et al.,* (2010), most ethical issues fall into one of the following four categories. Therefore, the researcher has considered these issues for the study.

- Informed consent: all participants had been briefed about the research and joined with their full consent.
- Right to privacy: the researcher has kept the nature and quality of participants' performance strictly confidential.
- Security: the researcher has not exposed the participants to unusual stress, embarrassment, or loss of self-esteem.
- Honesty: the researcher has reported the findings in complete honesty.

CHAPTER 4: RESEARCH RESULTS

4.1 Introduction

This chapter presents the results of a statistical analysis of the data obtained from the respondents. The results focus on answering the research questions stated in chapter one. Therefore, demographic profile of respondents as well as descriptive statistics of supply chain management practices currently experienced in Ethiopian basic metal and engineering industries are presented first, followed by testing the null hypotheses.

4.2 Descriptive statistics and respondents profile

Descriptive statistics in the form of frequencies, arithmetic means and standard deviations are computed for the various dimensions of demographic profile of respondents and their perception on SCM practices in their respective companies.

4.2.1 Demographic profile of respondents

The demographic profile of the respondents which is considered crucial for this study is presented as follows.

Table: 4.1: Employment position of respondents at the time of the study

Job title		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	General Manager	14	15.6	25.9	25.9
	Commercial manager	17	18.9	31.5	57.4
	Production/technical manager	16	17.8	29.6	87.0
	Marketing manager	7	7.8	13.0	100.0
	Total	54	60.0	100.0	
Missing	System	36	40.0		
Total		90	100.0		

Table 4.1 provides details of the employment positions of the respondents that participated in this study. As indicated in Table 4.1, most of the respondents were Commercial managers (31.5%), Production and technical Managers (29.6%) and General Managers (25.9%) accounting for 87.0% of the total valid respondents. At these managerial positions, they expected to be well informed about SCM practices as applied in their industries. Therefore, their responses are expected to be reliable.

Figure 4.1**:** Employment positions of respondents at the time of the study

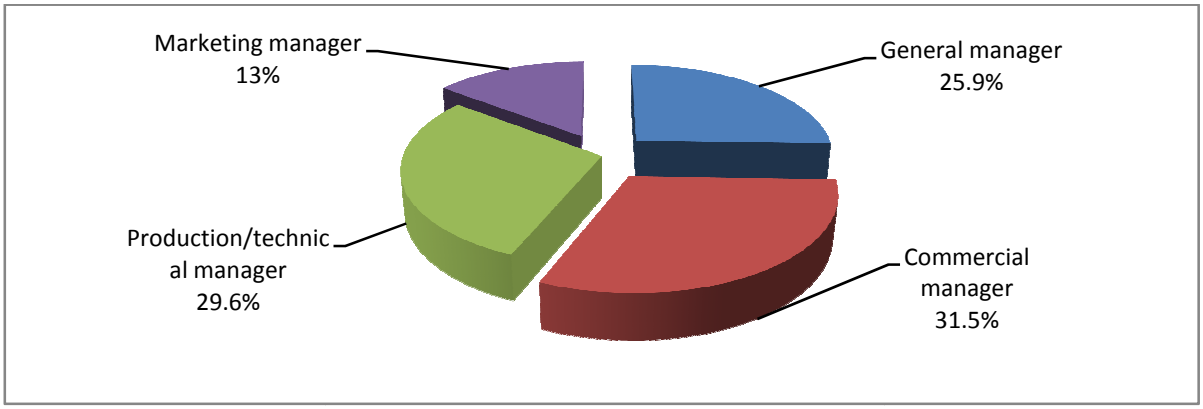
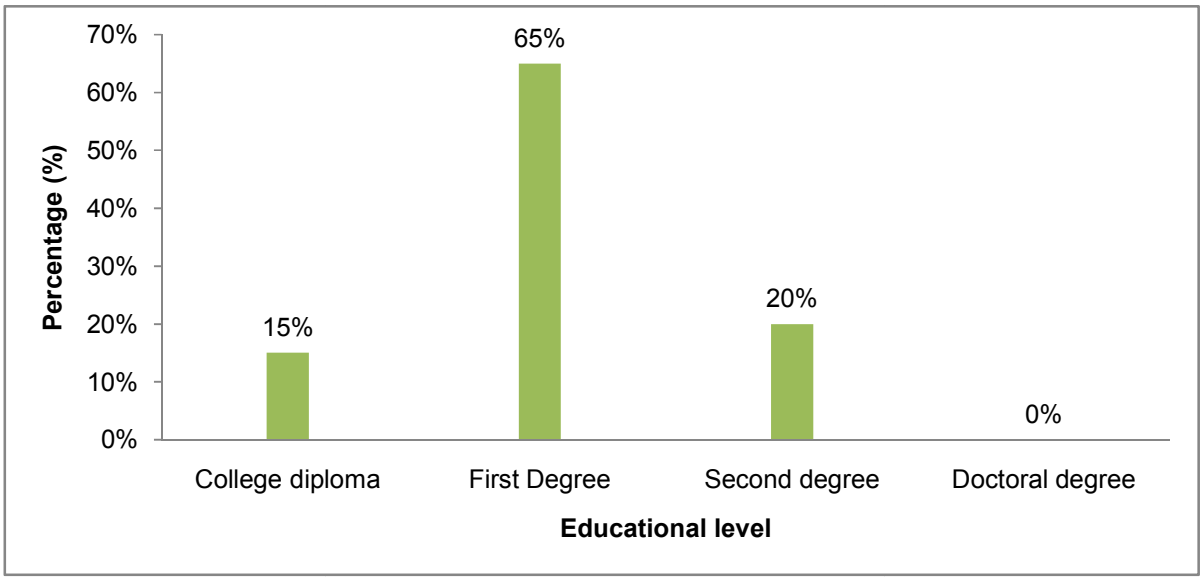


Figure 4.2 Educational levels of the respondents



As illustrated in Figure 4.2, the education level of most of the respondents is first degree (65%), and second degree (20%). The remaining (15%) have their college diploma. This

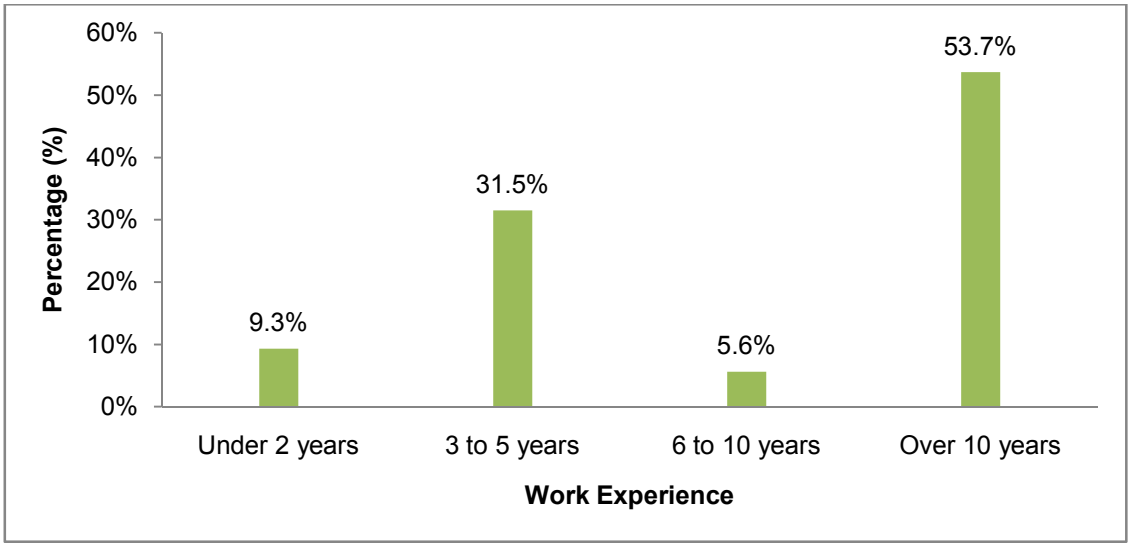
implied that the majority of respondents are well educated and have the ability to understand the questions they were presented with.

Table: 4.2: Work Experience of respondents in the present company

Work Experience		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Under 2 years	5	5.6	9.3	9.3
	3 to 5 years	17	18.9	31.5	40.8
	6 to 10 years	3	3.3	5.6	46.3
	Over 10 years	29	32.2	53.7	100.0
	Total	54	60.0	100.0	
Missing	System	36	40.0		
Total		90	100.0		

As indicated in Table 4.2, more than half of the total respondents (53.7%) were serving at their present industry for above 10 years, 31.5% for 3 to 5 years and 5.6 % for 6 to 10 years. The remaining 9.3% were serving for less than 2 years. This shows that the respondents are well knowledgeable about their company supply chain management practices.

Figure 4.3: Number of service years of respondents



4.2.2 Categories of selected Basic Metal and Engineering Industries by sub-sector

Table: 4.3: Categories of selected Basic Metal and Engineering Industries by sub-sector

ISIC No.	Sub-Sector	Population		Sample		Respondent		Industry ownership of respondent companies			
								Public		Private	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
27	Manufacture of Basic Iron and Steel	13	18.3	11	36.6	5	27.8	0	0	5	29.4
28	Manufacture of Fabricated Metal Products Except Machinery and Equipment	45	63.4	12	40.0	9	50.0	1	100.0	8	47.0
29	Manufacture of Machinery and Equipment N.E.C.	3	4.2	2	66.7	2	11.1	0	0	2	11.8
34	Manufacture of Motor Vehicles, Trailers and Semi-Trailers	10	14.1	4	13.3	2	11.1	0	0	2	11.8
	Total	71	100.0	30	100.0	18	100.0	1	100.0	17	100.0

Table 4.3 shows the type of industries situated within a 50 km radius of Addis Ababa categorized by sub-sector, 13(18.3%) are basic iron and steel industries, 45(63.4%) manufacturers of fabricated metal products except machinery and equipment, 3(4.2%) manufacturers of machinery and equipment N.E.C. and 10(14.1%) manufacturers of motor vehicle trailers and semi-trailers. Among these industries, 11(36.6%) are basic iron and steel industries, 12(40.0%) manufacturers of fabricated metal products except machinery and equipment, 2(66.7%) are manufactures of machinery and equipment N.E.C. and 4(13.3%) manufacturers of motor vehicle trailers and semi-trailers. Samples were randomly selected and 5(27.8%), 9(50.0%), 2(11.1%), 2(11.1%) of them were able to return the feedback of the questionnaire respectively. Only one of them belongs to the government while the remaining 17(94.4%) are privately owned.

4.2.3 Perception of respondents on the extent of SCM practices and organizational performance

The purpose of this section is to understand the extent of practical implementation of SCM practices in BMEIs. Therefore, data related to each of the SCM practices: strategic supplier partnership, customer relationship, quality and degree of information sharing and internal lean practices are summarized and the results are presented in the same format as in the questionnaire.

4.2.3.1 Strategic supplier partnership

Respondents were asked to indicate the extent to which the five variables under strategic supplier partnership practice were experienced in their respective industries. These variables include the extent of the companies' practices in identifying reliable suppliers, regularly solving problems jointly with suppliers, having long term contract agreement with reliable suppliers, organizing continuous improvement programs that include key suppliers, involvement of suppliers in problem solving as well as goal-setting activities.

Table 4.4: Extent of the current strategic supplier partnership practices

Variables	Not at all (%)	Small extent (%)	Moderate extent (%)	Great extent (%)	Mean	Std. deviation
Quality as number one criterion in selecting suppliers	1.9	13.0	59.3	25.9	3.09	0.680
Regularly solving problems jointly with suppliers	9.3	53.7	25.9	11.1	2.39	0.811
Long term contract agreement with reliable suppliers	18.5	63.0	13.0	5.6	2.06	0.738
Continuous improvement programs that include key suppliers	11.1	66.7	11.1	11.1	2.22	0.793
Involvement of key suppliers in planning and goal-setting activities	38.9	29.6	22.2	9.3	2.02	1.000

It is clear from means of values of variables mentioned in Table 4.4 that suppliers are selected based on the quality of their performance to a 'moderate extent' (3.09), but that the remaining means of values of variables are between 2.02 and 2.39. This implies that experiences related to joint problem solving with suppliers, long term contractual ties with reliable suppliers as well as involvement of key suppliers on continuous improvement program and other critical activities were practiced "-to a small extent". Accordingly, one can conclude that strategic supplier partnership practices were not properly applied in Ethiopian basic metal and engineering industries.

4.2.3.2 Customer relationship

In this sub-section respondents were asked to rate their practice of customer relationship practices in five variables. These variables include the extent of the companies' practice in terms of frequent interaction with customers to set reliability and responsiveness, measure of customer satisfaction and expectation, facilitate customers' ability to seek assistance as well as establishing long-term contract with reliable customers.

Table 4.5: Extent of the current customer relationship practices

Variables	Not at all (%)	Small extent (%)	Moderate extent (%)	Great extent (%)	Mean	Std. deviation
Frequent interaction with customers to set reliability, responsiveness, and other standards	0.0	11.1	42.6	46.3	3.35	0.677
Frequent measure of customer satisfaction	5.6	38.9	35.2	20.4	2.70	0.861
Frequent determination of future customer expectations	11.1	20.4	53.7	14.8	2.72	0.856
facilitate customers' ability to seek assistance	7.4	42.6	46.3	3.7	2.46	0.693
Long term contract agreement with reliable customers	27.8	35.2	24.1	13.0	2.22	1.003

As indicated in Table 4.5, most of the respondents (42.6% and 46.3%) stated that they had frequently worked together with their customers to set reliability, responsiveness, and other standards from moderate up to great extent. On the other hand, mean values of other practices such as frequent measure of customer satisfaction (2.70), frequent determination of future customer expectations (2.72), facilitate for customers to get assistance (2.46) and long term contract agreement with reliable customers (2.22) were practiced between small and moderate extent.

4.2.3.3 Information sharing practices

Respondents were asked to assess their information sharing practice in terms of forecast of demands, exclusiveness, timeliness, reliability and the means that information were exchanged.

Table 4.6: Extent of the current information sharing practices

Variables	Not at all (%)	Small extent (%)	Moderate extent (%)	Great extent (%)	Mean	Std. deviation
We inform trading partners in advance of changing needs	16.7	51.9	24.1	7.4	2.22	0.816
Sharing proprietary information with trading partners	25.9	53.7	20.4	0.0	1.94	0.685
Information exchange between our trading partners and us is timely	5.6	66.5	22.2	5.6	2.28	0.656
Information exchange between our trading partners and us is reliable	11.1	57.4	29.6	1.9	2.22	0.664
We use web-based data exchange with our trading partners	16.7	59.3	13.0	11.1	2.17	0.863

Table 4.6 indicates that 51.9 % and 24.1% of the respondents had informed their trading partners about changing needs to a small and moderate extent respectively, while 16.7% of them did not provide such information at all. On the contrary, only 7.4%

of the respondents experienced such type of practice to a great extent. Regarding proprietary information exchange with trading partners, 53.7% of respondents rated their experience as being limited to a small extent and the remaining 25.9% noted they lacked experience in this area. On the other hand, with respect to timeliness 66.7%, reliability of information exchange 57.4% and web-based data and information exchange with supply chain partners 59.3% of the respondents indicated that they had such type of experience to a small extent.

Since all individual mean values of the above five variables in Table 4.6 are close to the average mean value (2.17) then it can be concluded that information sharing among supply chain partners in BMEIs is practiced to a smaller extent.

4.2.3.4 Internal lean practices

Respondents were asked to indicate the extent to which the five variables under internal lean practice were experienced in their respective industries. These variables include the extent of the companies' practices related to reduction of set-up time; applying continuous quality improvement program and a ''Pull'' production system. It also contain variables that could show how industries are pushing for shorter lead-times as well as facilitating the processes of ordering, receiving and other paperwork from suppliers.

Table 4.7: Extent of the current internal lean practices

Variables	Not at all (%)	Small extent (%)	Moderate extent (%)	Great extent (%)	Mean	Std. deviation
Our firm reduces set-up time	0.0	46.3	38.9	14.8	2.69	0.722
Our firm has continuous quality improvement program	7.4	22.2	66.7	3.7	2.67	0.673
Our firm uses a ‘‘Pull’’ production system	3.7	5.6	48.1	42.6	3.30	0.743
Our firm pushes suppliers for shorter lead-times	14.8	22.2	37.0	25.9	2.74	1.013
Our firm streamlines ordering, receiving and other paperwork from suppliers	11.1	14.8	46.3	27.8	2.89	0.927

As can be seen from Table 4.7, 48.1% of the respondents indicated that they had moderate levels of practice with respect to applying ‘‘Pull’’ production system and 46.3% indicated that their firms have been streamlining of ordering, receiving and other paperwork from suppliers while 42.6% and 27.8% of the respondents indicated that they had practiced these variables to a great extent respectively.

On the other hand, the mean values for these two supply chain practices, which are 3.30 and 2.89 respectively, were more than the average mean value(2.86), whereas mean values of other practices such as reduction of set-up time (2.69), continuous quality improvement endeavors (2.67) and pushing suppliers for shorter lead-times (2.74) were under the average mean value (2.86).

4.2.3.5 Organizational performance

In this sub-section respondents were asked to rate their level of organizational performance in comparison to their competitors using five variables. These variables

were used to assess the relative performances of each industry with respect to on-time delivery, product and service quality, operating costs as well as the extent to which industries' sales and market share are growing. In this stage the researcher used relative organizational performance measures because firms may not be willing to provide actual financial performances.

Table 4.8: Extent of organizational performance

Variables	Not at all (%)	Small extent (%)	Moderate extent (%)	Great extent (%)	Mean	Std. deviation
Our on-time delivery performance is better than our competitors	5.6	40.7	46.3	7.4	2.56	0.72
Our product and service quality is better than our competitors	5.6	13.0	53.7	27.8	3.04	0.80
Our operating costs are lower than our competitors	29.6	31.5	35.2	3.7	2.13	0.89
Our sales is growing	11.1	48.1	40.7	0.0	2.30	0.66
Our market share is growing	16.7	44.4	35.2	3.7	2.26	0.78

As indicated in table 4.8, 53.7 % and 46.3% of the respondents had stated that product and service quality as well as on-time delivery of their industries had moderate performance. In response to the other dimensions of organizational performances: sales growth, market share growth and reduction of operating costs of industries, 48.1%, 44.4% and 31.5% of the respondents were agreed that they had relatively small level of performance respectively. Similarly, the mean values of the same responses 2.30, 2.26 and 2.13 were also observed under the average mean values (2.46) respectively.

4.3 Hypotheses testing

The two main objectives of this research study were (1) to determine the extent to which the supply chain management practices were implemented and (2) to determine the

significance of relationships between supply chain management practices and organizational performance of BMEIs in Ethiopia.

In order to address these research objectives and guide the research, eight hypotheses were formulated. The aim of the empirical data was to either accept or reject the null hypotheses. In this study the supply chain management practices (strategic supplier partnership, customer relationship, information sharing and internal lean practices) are independent variables while organizational performance which includes five variables (on-time delivery, product and service quality, operating costs, sales and market share growth) are dependent variables. The statistical nonparametric tests that were conducted were the chi-square and Spearman's rank-order correlation tests. The reason why only nonparametric analysis was conducted was because the data were ordinal.

The first four hypotheses (H1 up to H4) were tested by chi-square statistical test to determine whether there was a significant difference between the expected frequencies and the observed frequencies in one or more categories. To test these null hypotheses the researcher assumed that the expected and observed frequencies are equally categorized. It means that half (50%) of the respondents will fail in the category of rating from "not at all" to "moderate extent" (categorized as weak supply chain management practices) while the remaining half (50%) of the respondents fall in the category of "to a great extent" (categorized as strong supply chain management practices).
Based on the critical chi-square value and frequency distribution, it is possible to test whether or not the null hypothesis was valid or not. Therefore, if the calculated chi-square value was greater than the significance value ($p= 0.05$), then there was no evidence to reject the null hypotheses in favor of alternative hypostases. The reverse was true if the calculated chi-square value was less than the significance value. Accordingly, hypotheses H1 up to H4 were tested as follows.

4.3.1 Hypothesis 1

H_o1: Strategic supplier partnership practice is not weak in Ethiopian BMEIs.

H_a1: Strategic supplier partnership practice is weak in Ethiopian BMEIs.

Table 4.9: Statistical chi-square test for strategic supplier partnership practices

	Quality as number one criterion in selecting suppliers	Regularly solving problems jointly with suppliers	Long term contract agreement with reliable suppliers	Continuous improvement programs that include key suppliers	Involvement of key suppliers in planning and goal-setting activities
Chi-Square [a]	40.074	27.333	43.333	50.000	10.148
df	3	3	3	3	3
Asymp. Sig.	.000	.000	.000	.000	.017

[a] 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 13.5.

As indicated in Table 4.9 the calculated chi-square values of all variables were less than the critical value of 0.05. Therefore, the null hypothesis, H_o1: "strategic supplier partnership practice is not weak in Ethiopian BMEIs" was rejected in favor of the alternative hypothesis, H_a1: "strategic supplier partnership practice is weak in Ethiopian BMEIs". This clearly shows that Ethiopian BMEIs have serious weaknesses in practicing strategic supplier partnership practices. It also implies that Ethiopian BMEIs are far behind in applying modern SCM practices in terms of selecting suppliers on the basis of quality performance, regularly solving problems jointly with suppliers, establishing long term contract agreement with reliable suppliers, participating key suppliers in continuous improvement programs and planning activities.

4.3.2 Hypothesis 2

H_o2: Customer relationship practice is not weak in Ethiopian BMEIs.

H_a2: Customer relationship practice is weak in Ethiopian BMEIs.

Table 4.10: Statistical chi-square test for customer relationship practices

	Frequent interaction with customers to set reliability, responsiveness, and other standards	Frequent measure of customer satisfaction	Frequent determination of future customer expectations	Facilitate customers' ability to seek assistance	Long term contract agreement with reliable customers
Chi-Square[a]	20.648	15.037	24.667	32.963	5.556
df	2	3	3	3	3
Asymp. Sig.	.000	.002	.000	.000	.135

[a] 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 13.5.

The chi-square test results indicated in Table 4.10 show that all calculated chi-square values except long term contract agreement with reliable customers were less than the level of significance 0.05. Therefore, the null hypothesis "customer relationship practice is not weak in Ethiopian BMEIs" was rejected while the alternative hypothesis "customer relationship practice is weak in Ethiopian BMEIs" was supported.

This shows that Ethiopian BMEIs have challenges with working frequently together with customers to set reliability, responsiveness, and other standards; frequent measure of customer satisfaction and determination of their future expectations as well as facilitating customers' ability to seek assistance. On the contrary, they are relatively strong in building and maintaining long term contract agreement with reliable customers.

4.3.5 Hypothesis 3

H_o3: Information sharing practice is not weak in Ethiopian BMEIs.

H_a3: Information sharing practice is weak in Ethiopian BMEIs.

Table 4.11: Statistical chi-square test for information sharing practices

	We inform trading partners in advance of changing needs	Sharing proprietary information with trading partners	Information exchange between our trading partners and us is timely	Information exchange between our trading partners and us is reliable	We use web-based data exchange with our trading partners
Chi-Square[a]	23.778	18.278	54.000	38.889	31.889
df	3	2	3	3	3
Asymp. Sig.	.000	.000	.000	.000	.000

[a] 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 13.5.

In Table 4.11 all calculated chi-square values for the five variables related to information sharing practices were less than the level of significance 0.05. Therefore, the null hypothesis "information sharing practices in Ethiopian BMEIs is not weak" was rejected and in contrast the alternative hypothesis "information sharing practice is weak in Ethiopian BMEIs" was supported.

As it is mentioned in the literature review, information exchange among business partners is very important issue for coordinating actions and has an impact on the bullwhip effect. However, Ethiopian BMEIs are not using it as an effective way of creating value for customers yet.

4.3.5 Hypothesis 4

H_o4: Internal lean practice is not weak in Ethiopian BMEIs.

H_a4: Internal lean practice is weak in Ethiopian BMEIs.

Table 4.12: Statistical chi-square test for internal lean practices

	Our firm reduces set-up time	Our firm has continuous quality improvement program	Our firm uses a ‘‘Pull’’ production system	Our firm pushes suppliers for shorter lead-times	Our firm streamlines ordering, receiving and other paperwork from suppliers
Chi-Square[a]	16.204	54.148	36.222	5.556	18.000
df	2	3	3	3	3
Asymp. Sig.	.000	.000	.000	.135	.000

[a] 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 13.5.

As indicated in table 4.12 the calculated chi-square values of all variables except pushing suppliers for shorter lead-times were less than the critical value of 0.05. Therefore, the null hypothesis “internal lean practice is not weak in Ethiopian BMEIs” was rejected in favor of the alternative hypothesis “internal lean practice is weak in Ethiopian BMEIs”. It is evident from the result found that Ethiopian BMEIs have weaknesses in terms of reducing set-up time, having continuous quality improvement program, using a ‘‘Pull’’ production system as well as simplifying ordering, receiving and other paperwork from suppliers. In contrast, they are relatively strong in pushing suppliers for shorter lead-times.

4.3.5 Hypothesis 5

H_o5: There is no relationship between strategic supplier partnership and organizational performance in Ethiopian BMEIs.

H_a5: There is relationship between strategic supplier partnership and organizational performance in Ethiopian BMEIs.

The purpose of this hypothesis was to determine whether there was a correlation between strategic supplier partnership on the supply side of BMEIs and their organizational performance compared to their rivals. In order to determine this

correlation, Spearman correlation coefficients were calculated using SPSS 19 and tested for significance. Spearman's rank-order correlation coefficient is appropriate measure of association in a situation in which both variables concerned are ordinal. The correlation coefficient **r**, ranges from -1 to +1, with value close to zero indicating little or no association between the variables concerned. Correlation in the middle range (for example, those in the 0.40s and 0.50s, positive or negative) indicate a moderate correlation (Diamantopoulos *et al*., 2000). Furthermore, to assess the impact of SCM practices on organizational performance, the organizational performance measure was compared between responses with high and low level of SCM practices using nonparametric test (Kruskal-Wallis). Prior to this test analysis, responses were divided according to the level of SCM practices, which means responses from 1 - "not at all" up to 3 - "to a moderate extent" were considered as low level of SCM practices while four 4 – " to a great extent" was as high level of SCM practices.

Figure 4.4: Proposed relationships (correlations) between independent and dependent variables.

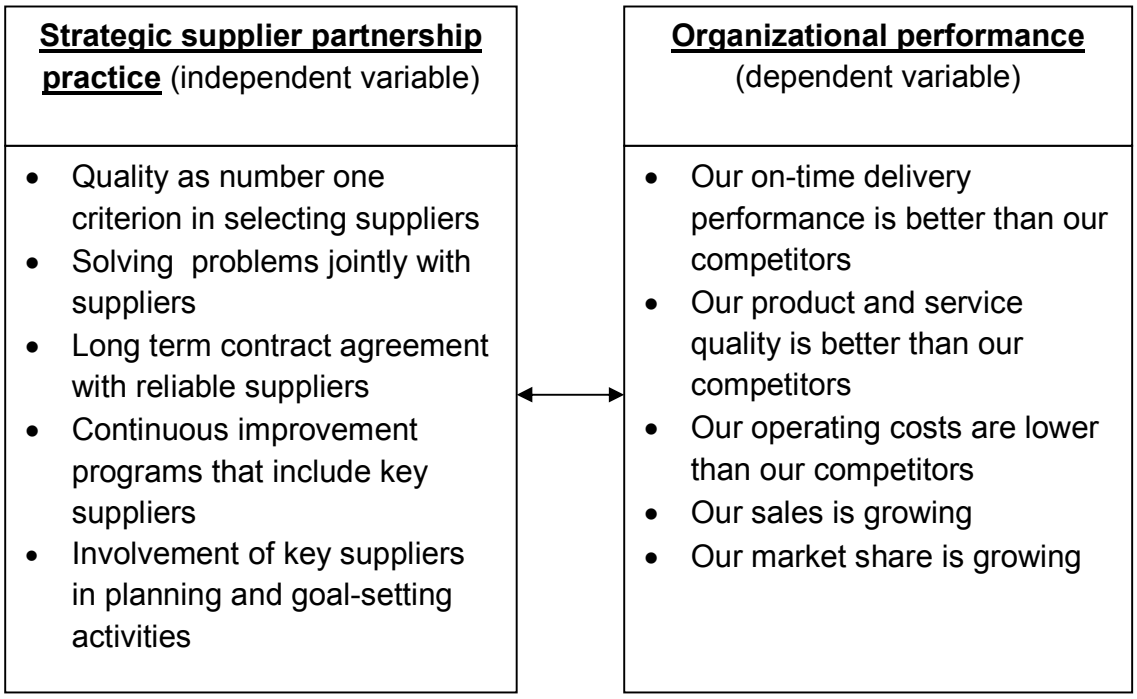


Figure 4.4 exhibits the group of strategic supplier partnership practices that may have had relationships with the organizational performance of BMEIs. The questionnaire (appendix B) was designed using this model. The test results are presented in Table 4.13.

Table 4.13: Correlations between strategic supplier partnership and organizational performance

			Strategic supplier partnership	Organizational performance
Spearman's rho	Strategic supplier partnership	Correlation Coefficient	1.000	.167
		Sig. (2-tailed)	.	.228
		N	54	54
	Organizational performance	Correlation Coefficient	.167	1.000
		Sig. (2-tailed)	.228	.
		N	54	54

As indicated in Table 4.13 the statistical result which equals 0.228 is well above the significance value of 0.05. Therefore, there is no evidence to reject the null hypothesis "there is no relationship between the strategic supplier partnership and organizational performance in Ethiopian BMEIs" in favor of the alternative hypothesis "there is relationship between the strategic supplier partnership and organizational performance in Ethiopian BMEIs".

Accordingly, it is evident that there is no statistically significant relationship between the independent variable (strategic supplier partnership) and the dependent variable (organizational performance). The calculated correlation coefficient 0.167 shows that there was a very weak positive relationship between the strategic supplier partnership and organizational performance in Ethiopian BMEIs, as correlation coefficients between .00 and .40 are considered weak (Diamantopoulos *et al*., 2000).

This finding was also tested with nonparametric test (Kruskal-Wallis) to determine whether the strategic supplier partnership has an effect on organizational performance.

Table: 4.14: Kruskal-Wallis test result for strategic supplier partnership practices and organizational performance

	Organizational performance
Chi-Square	1.060
df	1
Asymp. Sig.	.303

Grouping Variable: Strategic supplier partnership

The test statistics Table 4.14 presents the Chi-square value, the degrees of freedom and the significance level. The Kruskal-Wallis test value indicated that strategic supplier partnership did not influence on the organizational performance of BMEIs because the calculated p-value (0.303) was greater than 0.05 significant value.

4.3.6 Hypothesis 6

Ho6: There is no relationship between customer relationship and organizational performance in Ethiopian BMEIs.

Ha6: There is relationship between customer relationship and organizational performance in Ethiopian BMEIs.

The aim of this hypothesis was to determine whether there was a correlation between customer relationship in the demand side of BMEIs and their organizational performance compared to their rivals.

Table 4.15: Correlations between customer relationship and organizational performance

			Customer relationship	Organizational performance
Spearman's rho	Customer relationship	Correlation Coefficient	1.000	.164
		Sig. (2-tailed)	.	.237
		N	54	54
	Organizational performance	Correlation Coefficient	.142	1.000
		Sig. (2-tailed)	.306	.
		N	54	54

As indicated in Table 4.15 calculated significance value 0.237 was well above the critical value of 5% significance; as a result, the null hypothesis “there is no relationship between customer relationship practices and organizational performance in Ethiopian BMEIs” was not rejected. This implies that there was no relationship between independent variable (customer relationship) and the dependent variable (organizational performance). The calculated correlation coefficient 0.164 shows that there was a very weak, which is almost zero, relationship between the two variables. This finding was also tested with Kruskal-Wallis test.

Table: 4.16: Kruskal-Wallis test result for customer relationship practices and organizational performance

	Organizational performance
Chi-Square	2.038
df	1
Asymp. Sig.	.153

Grouping Variable: customer relationship

As can be observed from Table 4.16 the Kruskal-Wallis test value indicated that customer relationship did not influence the organizational performance of BMEIs since the calculated p-value (0.153) was greater than 0.05 significant value.

4.3.7 Hypothesis 7

Ho7: There is no relationship between information sharing and organizational performance in Ethiopian BMEIs.

Ha7: There is relationship between information sharing and organizational performance in Ethiopian BMEIs.

The purpose of this hypothesis was to determine whether there was a correlation between information sharing with supply chain partners of BMEIs and their organizational performance as compared to their competitors.

Table 4.17: Correlations between information sharing and organizational performance

			Information sharing	Organizational performance
Spearman's rho	Information sharing	Correlation Coefficient	1.000	-.047
		Sig. (2-tailed)	.	.736
		N	54	54
	Organizational performance	Correlation Coefficient	-.047	1.000
		Sig. (2-tailed)	.736	.
		N	54	54

As indicated in Table 4.17 calculated significance value 0.736 was well above the critical value of 5% significance; as a result, the null hypothesis “there is no relationship between information sharing and organizational performance in Ethiopian BMEIs” was not rejected. This implies that there was no relationship between independent variable (information sharing) and the dependent variable (organizational performance). The calculated correlation coefficient -0.047 shows that there was a very weak relationship between the two variables. This finding was also tested with Kruskal-Wallis test.

Table: 4.18: Kruskal-Wallis test result for information sharing practices and organizational performance

	Organizational performance
Chi-Square	1.000
df	1
Asymp. Sig.	.317

Grouping Variable: information sharing

As can be observed from table 4.18, information sharing did not influence on the organizational performance of BMEIs since the calculated p-value (0.317) was greater than the significant value of 0.05.

4.3.8 Hypothesis 8

Ho8: There is no relationship between internal lean practice and organizational performance in Ethiopian BMEIs.

Ha8: There is relationship between internal lean practice and organizational performance in Ethiopian BMEIs.

The aim of this hypothesis was to determine whether there was a correlation between internal lean practices of BMEIs and their organizational performance as compared to their competitors.

Table 4.19: Correlations between internal lean practice and organizational performance

			Internal lean practice	Organizational performance
Spearman's rho	Internal lean practice	Correlation Coefficient	1.000	.339(*)
		Sig. (2-tailed)	.	.012
		N	54	54
	Organizational performance	Correlation Coefficient	.339(*)	1.000
		Sig. (2-tailed)	.012	.
		N	54	54

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

From Table 4.19 it can be seen that the calculated significance value 0.012 was less than the critical value of 5% significance; as a result, the null hypothesis “there is no relationship between internal lean practice and organizational performance in Ethiopian BMEIs” was rejected. This implies that there was a positive relationship between internal lean practice and organizational performance. The calculated correlation coefficient 0.339 shows that there was a weak positive relationship between the two variables, because correlation coefficients between .00 and .40 are considered weak (Diamantopoulos *et al*., 2000). This finding was also tested with Kruskal-Wallis test.

Table: 4.20: Kruskal-Wallis test result for internal lean practices and organizational performance

	Organizational performance
Chi-Square	7.894
df	1
Asymp. Sig.	.005

Grouping Variable: internal lean practice

As can be observed from Table 4.20, the calculated p-value (0.005) was far below the critical significant value of 0.05. One could therefore conclude that internal lean practices of Ethiopian BMEIs had an impact on their organizational performance.

CHAPTER 5: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this chapter, the outcome of this research study is discussed with cross-references to other relevant studies as covered in the literature review. This chapter considers each of the propositions discussed and the results obtained in the previous chapter. Finally, conclusions and possible recommendations are given.

5.2 Discussion on research results

This study was expected to answer the following two main research questions:

a. To what extent do the Ethiopian BMEIs implement supply chain management practices?
b. Is there any relationship between supply chain management practices and organizational performance of Ethiopian BMEIs?

To answer these questions four key dimensions of SCM practices (strategic supplier partnership, customer relationship, quality and degree of information sharing and internal lean practices) and one dependent variable (organizational performance) were used.

5.2.1. Strategic supplier partnership practices

As was mentioned in the literature review, "strategic supplier partnership is designed to leverage the strategic and operational capabilities of individual participating organizations to help them achieve significant ongoing benefits" (Li *et al.,* 2006). Gyaneshwar *et al.,* (2010) also suggested that strategic partnership emphasizes direct, long-term association and encourages mutual planning and problem solving efforts. Such strategic partnerships with suppliers enable organizations to work more effectively with a few important suppliers who are willing to share responsibility for the success of the products.

However, the result of the first null hypothesis testing mentioned in section 4 showed that strategic supplier partnership practices in Ethiopian BMEIs is weak. The practices

are weak in terms of selecting suppliers on the basis of quality performance, regularly solving problems jointly with suppliers, establishing long term contract agreement with reliable suppliers, participating key suppliers in continuous improvement programs and planning activities.

Therefore, Ethiopian BMEIs have not properly understood and benefited from modern strategic supplier partnership practices that could have brought significant success for their respective organizations.

5.2.2. Customer relationship practices

Close customer relationship allows an organization to differentiate its product from competitors, sustain customer loyalty, and dramatically extend the value it provides to its customers. Applying good customer relationship practices is also used to build long-term relationships with customers so that they keep buying the product or service and recommending it to others.

In this regards, reference to the second null hypothesis test result mentioned in section 4 showed that Ethiopian BMEIs have serious problems in working frequently together with customers to set reliability, responsiveness, and other standards; frequent measure of customer satisfaction and determination of their future expectations as well as facilitating customers' ability to seek assistance. However, they are relatively strong in building and maintaining long term contract agreement with reliable customers.

5.2.3. Degree and quality of information sharing practices

As was mentioned in the literature review, a key element of supply chain partnering is the sharing of various types of information between partners, including real-time communication, planning and operational data, and even financial information. Information sharing is one of the key success factors in the functioning of strategic alliances and enables supply chains to be flexible in responding to competitive challenges.

Integrating effective supply chain practices with effective information sharing is critical for improving supply chain performance. Information exchange is also very important for

coordinating actions of supply chain members. Increased information flows can reduce uncertainty and bullwhip effect in the supply chain.

Like the previous two null hypothesis the third one which states “Information sharing practice is not weak in Ethiopian BMEIs” is also rejected. This shows that Ethiopian BMEIs are not leveraging proper information sharing practices as a means of improving their organizational performance.

5.2.4. Internal lean practices

Internal lean practices are used to reduce unnecessary and unproductive tasks as well as activities in the work environment. Thus, elimination of wastes (cost, time, etc.) in a manufacturing system, characterized by reduced set-up times, small lot sizes, and pull-production would help the company and its personnel focus on the requirements and demands of the customer. Ultimately, internal lean practices not only reduce operational costs but also aim to boost, restore and significantly raise organizational performance.

It is evident from the forth null hypothesis test result mentioned in section 4 that Ethiopian BMEIs have weaknesses in terms of reducing set-up time, having continuous quality improvement program, using a ‘‘Pull’’ production system as well as simplifying ordering, receiving and other paperwork from suppliers. However, they are relatively strong in pushing suppliers for shorter lead-times.

5.2.5. Organizational performance

Based on the literature review, SCM practice can have a bottom-line influence on the organizational performance. The implementation of SCM practices may directly improve an organization’s financial and marketing performances in the long run. As compared to their competitors, organizational performance of Ethiopian BMEIs was assessed in terms of on-time delivery, product and service quality, operating costs as well as the extent to which the industries’ sales and market share were growing. From the result of this assessment it was observed that most of the respondents had rated their organizational performance from “moderate to small extent” as compared to their competitors. Based on the above four hypothesis test result and related discussions it could be considered that higher organizational performance was not attained due to the

weak supply chain management practices experienced in Ethiopian BMEIs. This is also one of the reasons why Ethiopian BMEIs are still not able to perform well in the area of import substitution of metal and engineering products that could have helped the country to save a significant amount of scarce foreign currency expenditures.

5.2.6. Relationship between supply chain management practices and organizational performance in Ethiopian BMEIs

The last four consecutive null hypotheses (H_o5 up to H_o8) were established to test whether there is a relationship between supply chain management practices and organizational performance in Ethiopian BMEIs. Thus, as it was observed in the previous chapter, with the exception of internal lean practices, the other SCM practices have no relationship with organizational performance. Therefore, it is obvious that, even though it is weak, internal lean practices have positive relationship with organizational performance of BMEIs. Notably, strategic supplier partnership, customer relationship, quality and degree of information sharing practices had no impact on organizational performance of Ethiopian BMEIs.

5.3 Conclusion

The central objective of the study was to assess the level of practical implementation of SCM practices; and to analyze the relationship between SCM practices and organizational performance in Ethiopian BMEIs. For this purpose, four key dimensions of supply chain management practices as well as operational and market-oriented performance indicators were used as research variables. The results of the survey show that the implementation of modern SCM practices is weak in Ethiopian BMEIs with the exception of some efforts that are limited to internal lean practices. Similarly, except that of the internal lean practices, no positive relationship was observed between the other SCM practices and organizational performance in this sector. It can, therefore be concluded that the sector is doing business as usual and no attention was given to modern SCM theories and practices in the sector yet. However, the existing literature

advocates that the implementation of SCM practices can considerably improve organizational performance.

5.4 Recommendation

Based on the research findings, the following recommendations are made to assist Ethiopian BMEIs in implementing modern supply chain management practices to improve organizational as well as supply chain performance.

Basic metal and engineering industries are indispensable in the process of developing all economic sectors of any country. In Ethiopia, however, it has become critical to rely heavily on imports since these industries are not developed enough to meet emerging demand from user industries both quantitatively and qualitatively. Such heavy reliance on imports increase demands for scarce foreign currency which negatively affecting the foreign trade balance of the country. Therefore, to develop the effectiveness and competitiveness of this sector an integrated supply chain management effort that encompasses importation and local sourcing of different kinds of inputs like metal scrap, ferroalloys, chemicals and others; manufacturing of basic metals and engineering products; as well as transportation and distribution of products up to the end users is required.

- Accordingly, BMEIs should involve key suppliers and customers in joint planning and problem solving activities as well as organizing continuous improvement programs on different issues to reduce some challenges of the sector like inferior product quality, extended delivery time and low competitive prices of the products. Establishing long term contract agreement with dependable suppliers/ customers could also reduce time and cost for supply chain members.

- Sharing of accurate and proprietary information in the supply chain could benefit Ethiopian BMEIs in minimizing the Bullwhip effect and reduce the existing inventory costs, enhance meaningful coordination among supply chain partners and improve the current low capacity utilization of the industries. Establishing effective communication up and down the supply chain can help build processes

that enable the entire chain to make and deliver winning products and services, and this could ultimately ensuring customer satisfaction. For this purpose, the use of appropriate information communication technology is very essential. In this regards, the Ethiopian government needs to play a key role in strengthening the current infrastructure and education development programs in this area. Moreover, great effort is required from the sector to determine exactly what type of information is needed and then to get it to the right decision maker so that better operational and strategic decision can be made and executed.

- Implementation of internal lean practices in terms of reducing set-up time, small lot sizes, having a continuous quality improvement program, working together to identify and eliminate waste wherever it exists, using a pull-production system is also recommended not only to reduce operational costs but also to boost, restore and significantly raise the competitiveness of the sector. This could also enable the supply chain members to be more customer-focused, flexible and profitable.

- Finally, to develop efficient supply chain management it is important to deliver both theoretical and practical SCM training for those managers and decision makers in the sector. For this purpose, concerned governmental bodies, metal industries and learning institutions have to work together.

5.5 Suggestions for future research

The current study has limited number of observations however, when sufficient time and other resources are available, future studies can include large number of samples from the population that encompasses other regions of the country. Future research study can also consider additional dimensions of SCM practice such as logistics integration and cross-functional coordination.