ADDIS ABABA UNIVERSITY, COLLEGE OF BUSINESS AND ECONOMICS
SCHOOL OF COMMERCE

THE EFFECT OF INFORMATION SYSTEM ON SUPPLY CHAIN

(THE CASE OF MOHA SOFT DRINKS INDUSTRY S.C.)

BY

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A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF ADDIS ABABA UNIVERSITY, SCHOOL OF COMMERCE IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF ARTS IN LOGISTICS AND SUPPLYCHAIN MANAGEMENT

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Declaration

I, SELAMAWIT BEFEKADU declare that this thesis is a result of my independent research work on the topic entitled "The Effect of Information System on Supply Chain the Case of MOHA Soft Drinks Industry S.C." in partial fulfilment of the requirements for the Degree of Masters of Art in Logistics and Supply Chain Management at Addis Ababa University School of commerce. This work is original in nature and has not been presented for a degree in any other University. All the references are also duly acknowledged.

Selamawit Befekadu

Signature_____

Date _____

Confirmation

This is to certify that Selamawit Befekadu has carried out this thesis proposal on the topic entitled "The Effect of Information System on Supply Chain the Case of MOHA Soft Drinks Industry S.C." under my supervision. Accordingly, I here assure that his work is appropriate and standard enough to be submitted for the partial fulfilment of the requirements for the award of the degree of Masters of Art in Logistics and Supply Chain Management.

Dr. Mengistu Bogale (PhD)

Signature_____

Date _____

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Acronyms

EDI:- Electronic Data Interchange

GE:- General Electric

ICT: - Information Communication technology

ISS:- information system Strategy

JIM:- Just In Time Manner

LAN:- Local Area Networks

MOHA:- Mohammed Hussein Ali-Amoudi

OEM:- Original Equipment Manufacturer

ROI:- Return On Investment

S.C:- Share Company

SC :- Supply Chain

SCIT :- Supply Chain Information Technology

SCM: - Supply Chain Management

SCP:- Supply Chain Performance

SDSS:- Strategic Decision Support Systems

SPSS:- Statistical Packages for Social Science

WAN:- Wide Area Networks

XML:- Extended Mark up Language

Abstract

Effective and efficient supply chain performance (SCP) has become a potentially valuable way of securing competitive advantage through enhancing SC and improving firm performances since competition is no longer between organizations, but among supply chains.(Qrunfleh and Tarafadar, 2006) The present study made an effort to investigate the effect of information systems (ISs) on supply chain From sample design of 109 respondents questionnaires were distributed and 105 were returned from which 1 was not correctly filled and rejected. Therefore, 104 were effectively used for analysis that shows response rate of 95%. A total of 39 statements were presented to workers in the MOHA SOFT DRINKS S.C through the structured questionnaire to measure their degree of agreement or disagreement over company's Information system, supply chain performance and organizational performance. IS for efficiency, flexibility and comprehensiveness decision has a positive significant correlation with supply chain performance. The correlation between supply chain performance and firm performance has been tested. There is a medium positive relationship between Supply chain performance and organizational performance. The causal relationship were analysed using regression analysis and the result of the analysis shows information system has influence on SCP and SCP also has influence on organizational performance. Therefore in order to achieve better organizational performance it is better for the organization to give due attention to further support the supply chain management by application advanced information technologies.

Key Word: Information System, Supply Chain Performance, case study, MOHA soft drink s.co.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

In a competitive business community of today's world, firms need to better their rivals in every sense. One of the major competitive areas to come on top of the cut throat competition that a firm faces is working on the areas of supply chain management. In turn in order to improve the capabilities of the supply management practices, technology based supply chain management come to the fore.

Besides the need to equip the supply chain management with information system applications, measuring the performance of the implementations of such information system applications also provide a step by step plat form for future improvement of the supply chain management capabilities to step ahead of the pack with regard to retaining the built competitive edge of firms.

Miles and Snow (1978) identified three different business organizational types which employ information technology: (1) defenders; (2) prospectors; (3) analyzers. Defenders are organizations which have narrow product-market domains. They always try to focus on improving the efficiency of their existing operations by developing a single core technology that is highly cost-efficient. Prospectors are organizations which continually search for market opportunities. They always focus on being innovative which creates uncertainty in the market. Analyzers are organizations which focus on improving their existing operations and also seek new market opportunities (innovative). They argue that there are three types of ISS (IS for efficiency, IS for flexibility, and IS for comprehensiveness) corresponding to the defenders", prospectors", and analyzers" business strategies, respectively. They found that, for defenders, an IS for efficiency strategy is oriented towards intra and inter organizational efficiencies and long term decision making. An IS for flexibility strategy is focused on market flexibility and quick strategic decisions (suitable for the prospectors). Finally, an IS for comprehensiveness strategy enables comprehensive decisions and quick responses through knowledge of other organizations (suitable for the analyzers).

The impact of Information technology on supply chain management would be measured through the performance of the supply chain management in line with the capabilities created

in the areas of operations, procurement, vendor relationship management, logistics and the firm itself. Further, the ultimate performance of the supply chain would be measured through the supply chain efficiency, flexibility and comprehensiveness of the implemented supply chain management system accordingly, after the implementation of information system applications in MOHA Soft Drinks Industries PLC.

In a nut shell, the use of Information technology is considered as a pre-requisite for the effective control of today's complex supply chains. Thus it is argued that the benefit of Information in supply chain management include mainly, improving the supply chain agility, reducing the cycle time, achieving higher efficiency and delivering products to customers in timely manner. Hence, the study focused on the measurement of the impact of information system had on the supply chain and firm performance in general and specifically on the case company.

1.2 Statement of the Problem

Information systems play the role of integration coordination between different parts of the supply chain and the performance of this system has a direct impact on the efficiency of supply chain performance (Amid et al., 2007).

Business in this emerging networked world is as much about process as it is about product. This is because market forces, driven by the speed of communications that electronic networks now make possible, are making product life cycles shorter and shorter. Customer tastes and requirements change quickly. Product inventories are always in danger of becoming obsolete (Hugos, 2003).

To counter this trend, companies are building up their expertise and efficiencies in the process of designing and building new products and in the process of delivering and servicing existing products. Accordingly, building a strong supply chain management with the support of information system capabilities would give a company the required extra edge in improving the performance of its supply chain management. In 2013, $300 billion was spent on SCIT by firms globally, an increase by 1.8% and 3.8% compared to 2012 and 2011, respectively (Akhadian, 2015). With such significant investments, firms face risks of eroded financial performance if SCIT does not perform as expected (Ibid).

However, there is evidence that supply chain coordination and integration are facilitated by the use of integrated information technologies (IT) (Vickery et al.,2003) and IT integration capabilities (Rai etal.,2006), and lead to improved firm performance. Shah et al., (2002) suggest that supply chain practices such as supply chain integration, and initiatives such as building long-term strategic relationships with suppliers require extensive use of electronic data interchange (EDI) and web- based interchange; and thus the support of inter-organizational information systems. Arguing that supply chains at different levels of integration and coordination require different levels of technology integration, they propose a conceptual frame work suggesting that a high (low) level of supplier integration must be matched with a high (low) level of IT integration in order to achieve superior supply chain performances. Premkumar et al., (2005) examine procurement- related information processing needs (from uncertainties in the product market environment and supplier relationships) and information processing capabilities (through the deployment of electronic procurement applications), and use Galbraith's (1973) information processing theory (IPT) to show that aligning the two enhances supply chain performance. Thus, it is increasingly being recognized that the design of supply chains should include consideration of corresponding and specific information processing requirements and accompanying implications for deploying particular IS.

Despite such research relating to IT investment and utilizing of information technology in a SCM context, the impact of supply chain information technology (SCIT) on firm performance remains unclear. In particular, the extant literature has reported contradictive results regarding relationships between SCIT and firm performance. Therefore, the purpose of this study is to conduct a systematic investigation of impact of information system in Supply chain performance and hence on firm performance. and the main important reason the researcher took under consideration for studying this specific topic is because; the rising demand of soft drinks in Ethiopia need more attention and further studies to enhance improvement in the industry since there are few studies have been undertaken previously. Among rival soft drink producing companies, MOHA soft drinks is selected for this case study.

Thus, the study attempted to explore the effect of information systems applications on the improvement of the performance of supply chain Management and firm performance in Moha soft drinks industries S.C and deduced its overall result to indicate its relationship. The

paper explores the effect of information system for efficiency, flexibility and comprehensiveness on supply chain performance and organizational performance in the case company.

1.3 Objectives

1.3.1 General Objective

The main objective of the paper is to explore the effect of information system applications adopted in the case company, on the improvement of the supply chain and firm performance.

1.3.2 Specific objective:

- Explore the effect of information system for efficiency on the supply chain performance of the company;
- Explore the effect of information system for flexibility on the supply chain performance of the company;
- Explore the effect of information system for comprehensiveness on the supply chain performance of the company and;
- Explore the effect of supply chain performance on overall firm performance

1.4 Research Question

Based on the background of the study, the statement of the problem and the objective of the study, the paper intended to answer the following research questions:

- What is the effect of information on supply chain regarding efficiency?
- What is the effect of information on supply chain regarding flexibility?
- What is the effect of information on supply chain regarding comprehensiveness?
- What is the effect of supply chain performance on overall organization performance?

1.5 Significance of the study

As the study explores the relationship between supply chain management and Information system, it has the significance of further illustrating the level of understanding on how much effect a better application of information system would have on resultant positive effect it would have in raising the level of supply chain management performance. helps the organizations to develop the strategies accordingly in order to sustain or increase the quality of information system so as to improve the supply chain effectiveness.

Furthermore, as it examines the effect of information system on the performance of the supply chain management in MOHA Soft Drinks Industries S.Co, It would also benefit the academia as it would explore even further with the supply chain management and further shed light to the field of study.

1.6 Scope of the Study

The study is generally focused on the exploration of the effect of information system has on the supply chain management performance and deduce its result there off. The performance measures to be employed which are used to indicate the level of improvement include efficiency, flexibility, comprehensiveness, IT capabilities, responsiveness, building partnership, information accuracy.

More specifically, research endeavours are limited within MOHA soft drinks industry S.C. This study, which is undertaken in the area of the impact of information system on supply chain management performance of MOHA soft drinks industry S.C, will contribute to the development and effective utilization information system for supply chain management by MOHA Soft drink company also underline the importance of sufficient and relevant information for planning and making successful decisions about the supply chain management.

1.7 Limitations

The present study mainly relied on quantitative data obtained from a sample of respondents of the population comprising only employees under study through distributed questionnaires and thus is not showing the detailed reasoning behind each response. Thus, a focus group discussion as well as interview with more departmental heads and supervisors is believed to assist in further elaborating the views and perception of employees this would have been helpful to better assess gaps and challenges in the system.

Since the supply chain management strategy of the company is peculiar to itself, it is difficult to generalize the findings of the study to other firms in the soft drink industry in Ethiopia. Besides the study assessed the effects of supply chain strategy practices from the stand point of the focal company (Moha soft drinks industry s.c) it did not involve the other members of the supply chains (customers and suppliers) reaction or responses towards the company in addition the research is limited on Moha soft drinks industry s.c offices Addis Ababa area this is due to time and resource limitation. Finally, the supply chain performance measures presented in the study are only a proportion of the potentially relevant variables that might have been included these measures only serve as examples and special attention is rather paid for structuring the vast major of measures.

1.8 Definition of Terms

a. **Supply Chain**: - encompass the companies and the business activities needed to design, make, deliver, and use a product or service, (Hugos, 2003).
b. **Supply Chain Management performance**: - is defined as the overall efficiency and effectiveness of Supply chain Management (Gunasekaran et al., 2001; Beamon, 1998; Beamon, 1999; Kiefer and Novack, 1999; Spekman *et al*., 1998).
c. **Information system**: -are composed of technology that performs three main functions: data capture and communication; data storage and retrieval; and data manipulation and reporting, (Hugos, 2003).
d. **Information System for supply chain management** can be described as the strategic use of ICTs to integrate core business process where the whole business is potentially affected. Its benefit include: lower prices from suppliers, improvement on time and flexibility, lower transaction costs, higher customer service levels and lower stock investment along the supply chain (Ibid).

1.9 Organization of the Study

The study is organized into five chapters; the first chapter discusses the introductory part, in which the back ground, statement of problem, objectives, definition of terms, research question, significance, scope, as well as organization of the study is included. Chapter two briefly reviews the theoretical and empirical literatures in relation to the effect of Information system on supply chain management performance. Chapter three looks at the type and design of the research, the sources of data, the data collection tools, the procedures of data collection, and the methods of data analysis used is described. Chapter four briefly presents the results/findings of the study and interprets and/or discusses the findings. Finally, chapter five comprises conclusions and recommendations of the study.

CHAPTER TWO:

LITRATURE REVIEW

The chapter reviews literature related to the study and it is composed of basic theories which provide definition and explanation about supply chain management, Information system strategy, firm performance and related works which is presented by different scholars and finally the conceptual framework of the study which is constructed based on the reviewed literatures.

2.1. Literature Review

2.1.1. Definition of Supply Chain Management

According to Dawei (2011**)** Supply chain management is simply and ultimately the business management, whatever it may be in its specific context, which is perceived and enacted from the relevant supply chain perspective. Further, he explains that any supply chain management practice and activities is captured by the three conceptual components that include:

i. **Supply chain Configuration: -** is about how a supply chain is constructed from all its participating firms. This includes how big is the supply based for Original equipment manufacturer (OEM); how wide or narrow is the extent of vertical integration (which is the single ownership of consecutive activities along the supply chain); how much of the OEM's operations are outsourced; how the downstream distribution channel is designed; and so on. It is also known as supply chain architecture. The decision on supply chain configuration is strategic and at a higher level.

ii. **Supply chain Relationship**: - is about inter-firm relationships across the supply chain albeit the key focus of relationship is often around the OEM and its first tier suppliers and first tier customers and the relationship in between. The type and level of the relationship is determined by the content of inter-organizational exchanges. The relationship is likely to be 'arm's length' if they only exchanged the volume and price of the transaction; on the other hand, the relationship would be regarded as close partnership if the parties exchanged their vision, investment planning and detailed financial information. The decision on supply chain relationship is both strategic and operational.

iii. **Supply chain Coordination: -** refers mainly to the inter-firm operational coordination within a supply chain. It involves the coordination of continuous material flows from the suppliers to the buyers and through to the end-consumer in a preferably just in time manner (JIM). Inventory management throughout the supply chain could be a key focal point for the coordination. Production capacity, forecasting, manufacturing scheduling, even customer services will all constitute the main contents of the coordination activities in the supply chain. The decision of the supply chain coordination tends to be operational.

Ayeres, (2001) in his hand book of Supply chain Management defines that Supply Chain Management as both the supply chain formulation and its subsequent operation and maintenance. As Mentzer, (2000) Supply Chain Management has been conceptualized with two different components- an integrative business philosophy and implementation actions- to manage the flow of a distribution channel from the supplier to the ultimate user..." (Cited in Ensermu, 2013).

2.1.2. Flows in Supply Chain

Supply chain integrates different components of the supply of a product or service and hence along the chain there are four intrinsic flows as clearly indicated by (Dawei, 2011**)**.

a. Material Flow: - all manufacturing supply chains have material flows from the raw materials at the beginning of the supply chain to the finished products at the end of the supply chain.

b. Information Flow: - all supply chains have and make use of information flows. Throughout a supply chain there are multitude of information flows such as demand information flow, forecasting information flow, production and scheduling information flows and design and NPI information flows. Unlike the material flow the information can run both directions, towards upstream and downstream alike. Interestingly most of them are unique to the specific supply chain

c. Finance Flow: - All supply chains have finance flow. It is basically the money flow or the blood stream of a supply chain. Without it, a supply chain will surely demise. However, for any supply chain, there is only one single source of such finance flow- the en-consumer. This understanding of single source of finance has led to a concept of 'single entity' perspective of a supply chain, which is a very useful foundation for supply chain integration and collaboration.

d. Commercial Flow: - all supply chain represents a transactional commercial flow. This, means that the material flow that run through the supply chain changes its ownership from one company to another, from supplier to buyer. The transactional process of buying and selling shifts the material flow's ownership from the supplier to the buyer repeatedly until the end of the supply chain-the end-companies. On the other hand, if it is with an organization there will be material flow, but no ownership change and hence no commercial flow.

2.1.3. Decisions in a supply chain

Companies in any supply chain must make decisions individually and collectively regarding their actions in five areas (Zigiaris, 2000):

a. ***Production***: -What products does the market want? How much of which products should be produced and by when? This activity includes the creation of master production schedules that take into account plant capacities, workload balancing, quality control, and equipment maintenance.

b. ***Inventory***: -What inventory should be stocked at each stage in a supply chain? How much inventory should be held as raw materials, semi-finished, or finished goods? The primary purpose of inventory is to act as a buffer against uncertainty in the supply chain. However, holding inventory can be expensive, so what are the optimal inventory levels and reorder points?

c. ***Location***: - Where should facilities for production and inventory storage be located? Where are the most cost efficient locations for production and for storage of inventory? Should existing facilities be used or new ones built? Once these decisions are made they determine the possible paths available for product to flow through for delivery to the final consumer.

d. ***Transportation***: - How should inventory be moved from one supply chain location to another? Air freight and truck delivery are generally fast and reliable but they are expensive. Shipping by sea or rail is much less expensive but usually involves longer transit times and more uncertainty. This uncertainty must be compensated for by stocking higher levels of inventory. When is it better to use which mode of transportation?

e. ***Information***: - How much data should be collected and how much information should be shared? Timely and accurate information holds the promise of better coordination and better decision making. With good information, people can make effective decisions about what to produce and how much, about where to locate inventory and how best to transport it.

2.1.4. Information Technology and Supply Chain Management

Supply chain management is driven by the customer. It requires communication to all participants in the supply chain of the customer's needs and wants as well as how well these needs and wants are being met. To facilitate managing the linkages in the supply chain, many types of software tools have been developed. These software programs are not the strategy; rather they are tools to implement a firm's strategy. The strategy is to focus the entire supply chain on satisfying the needs of the customer (Fredendall & Ed Hill, 2001).

Installing and using these tools is not the goal of the firm; the goal is to improve management of the supply chain. The information technology is an enabling technology that allows managers to do their job better because they have information that is more complete and more accurate than they would otherwise have. Technologies that are simplifying the process of integrating the supply chain from the customer order to the supplier's product delivery include relational database system with real-time data, local area networks (LAN), wide area networks (WAN), and improved communications capabilities including the Internet and the World Wide Web.

2.1.5. Information Systems Strategy

The information systems strategy (ISS) according Bakos and Treacy, (1986) is to improve the efficiency and effectiveness of organizations. In his definition Earl, (1989) defines Information System Strategy as "The long-term, directional plan which decides what to do with IT".

The Information System Strategy outlines the applications/technology needed to support an organization's goals. The ISS provides a clear understanding of the role of IS in organizations. Based on the above analysis, this study considers three types of ISS: (1) Information System for efficiency-a strategy that is oriented towards operational support of internal and inter-organizational efficiencies, (2) Information Systems for flexibility-a strategy that is focused on market flexibility and quick strategic decisions support, and (3)

Information Systems for comprehensiveness- a strategy that enables comprehensive decisions and quick responses (both efficiency and flexibility) (Qrunfelh, 2010).

a. Information System for Efficiency

According Sabherwal and Chan, (2001) IS for efficiency is defined in this study as a strategy that is oriented toward operational support of intra and inter-organizational efficiencies. A good example of ISS for efficiency is investing in operational support systems (i.e. enterprise resource planning). This application helps in monitoring and controlling the day-to-day operations that are expected to facilitate operational efficiency.

ISS helps organizations to be more efficient by improving the internal operational efficiency of a single firm, and the inter-organizational efficiencies through better coordination with customers and suppliers (Bakos and Treacy, 1986). For example, one might connect the production planning systems of a firm with the order entry system of suppliers to lower the amount of inventory in process and the turnaround time for new orders. Therefore, improving coordination and collaboration of information across suppliers will increase the information availability and process capability, which will result in reducing the coordination cost and therefore result in being more efficient (Clemons et al., 1993).

In summary, internal and inter-organizational operations can be made more efficient if organizations have an ISS that support being more efficient and cost effective.

b. Information System for Flexibility

IS for flexibility is a strategy that is focused on market flexibility and quick strategic decision support (Sabherwal and Chan, 2001). For example, strategic decision support systems (SDSS) help organizations make strategic decisions quickly and effectively by enabling executives to analyze (threats, opportunities, strengths, and weaknesses), describe strategic situations, select alternative strategies, and monitor performances (Belardo et al., 1994).

When a distributor company decided to use IS to allow customers to enter their orders directly, customers started to order directly from the distributor company. Additionally, customers began to request new items that are not previously carried by the company. The company decided to use the order data proactively, by becoming closely involved with their customers and tracking and forecasting their preferences. As a result, IS was able to help the

company to speed up the response time, introduce new products, and introduce potential new customers (Rockart and Morton, 1984).

According to Porter and Millar, (1985) IS leads to flexibility and new product development. They provided an example of how planning for IS at the strategic level could lead to achieving flexibility. When General Electric (GE) decided to rebuild its Erie locomotive facility, they decided to use IS to help them in the design of motors. As a result, GE was able to design different types of motor frames without the need to use manual adjustments. This really helped GE to respond faster to the market.

Furthermore, Clemons et al., (1993) elaborated planning to use IS to select fewer suppliers, monitor their performance, or store information regarding complaints about the suppliers will help in coordinating decision making with suppliers through information sharing. Hence, sharing information with suppliers will lead to increased flexibility and improve timeliness of production.

c. Information System for Comprehensiveness

Organizations need to face the challenges of both "low cost and efficient" and of "speed and flexibility" (Allen and Boynton, 1991). According to them in order for organizations to meet the challenges of the market, organizations need to combine elements of both (low cost and flexibility) through a revamped IS architecture.

IS for comprehensiveness is defined as a strategy that enables comprehensive decisions and quick responses (both efficiency and flexibility) (Sabherwal and Chan, 2001). There are two extreme ways to achieve IS for both efficiency and flexibility: First, organizations must decentralize the IS an application so that IS becomes the responsibility of every level of operating management, and inter-link communications of those applications with suppliers. This is what they refer to in their study as "the low-road" solution, which will result in companies achieving a low-cost production and being more efficient. Second, organizations must centralize IS applications by having common/standardized application systems that help achieve flexibility. This is what they refer to in their study as "the highroad" solution. The result of their study shows that companies must combine both solutions (the high and low-road solutions) to achieve IS for efficiency and flexibility in order for firms to meet the challenges of the market (Allen and Boynton, 1991). Moreover, ISS plays an important role

in supporting organizational capabilities which convert inputs into outputs, by improving the operational efficiency and flexibility (Zhang and Lado, 2001).

Market information systems help organizations observe the market in order to respond very quickly to market changes. So that IS for comprehensiveness should help organizations understand and monitor the market (external analysis) to seek any opportunity (by making quick decisions), to introduce new products, and to help organizations maintain their position in the market. In other words, IS should assist in, first understanding the market, then making quick decisions to introduce new products and to maximize any opportunities for growth (Sabherwal and Chan, 2001).

2.1.6. The Relationship between Information System and Supply Chain Management

Papers published between 2000 and 2014 in the impact of Information Technology on supply chain performance, it has proven to have a direct and indirect impact on the supply chain performance, but there are many questions that must be handled to investigate the relationship between these two complex components, and meet the needs of both managers and researchers (Samadi, 2016).

Supply Chain Management literature particularly highlights the importance of supply chain information technology (SCIT). SCIT is a subset of information technology (IT) that is utilized within and across firm boundaries (Autry, et al., 2010). In other words, IT is SCIT when it is used in the context of SCM. SCIT has been viewed as a key enabler of effective supply chain management activities (Sanders & Premus, 2002). In particular, SCIT facilitates the flow of information and finances across firms with supply chain partners by enabling coordination, information sharing, and integration processes (Malone et al. 1987).

Information System Integration helps firms to use data from existing, heterogeneous, distributed sources by providing integration capabilities that support the illusion that a single integrated Information System is being used in the supply chain. At the operational level, Integration System Integration offers supply chain members the possibility of increased productivity and customer responsiveness (Jitpaibron, 2005).

Furthermore, Information System Integration enhances the firm's operational performance by integrating similar functions over different areas and by curtailing unnecessary activities, thus enhancing the firm's capability to cope with sophisticated customer needs and to meet

product quality standards, improve product quality, enhance productivity, increase equipment utilization, reduce space requirements, and expand logistics efficiency and flexibility (Bardi, Raghunathan, and Bagchi, 1994; Gross, 1984; Kaltwasser, 1990).

In the other hand some literatures have also reported contradictive results regarding relationships between SCIT and firm performance. That is, SCIT has been shown to be positively correlated, uncorrelated, or even negatively correlated with firm performance (Bharadwaj, 2000; Jeffers, et al., 2008). For example, SCIT is positively associated with financial and operational performance in some studies (Rai, et al., 2006; Ranganathan, et al., 2011), but negatively associated with operational performance in other studies (Jeffers, et al., 2008). In contrast, another study finds that SCIT is not correlated with operational performance (Apigian, et al., 2006). Several studies have tried to reconcile these disparate findings through resolving potential methodological problems (Santhanam & Hartono, 2003), including lagged effects of SCIT on performance (Hendricks, et al., 2007) and addressing theoretical limitations (Iyer, et al., 2009). However, consistent relationships between SCIT and firm performance have yet to emerge (Vickery, et al., 2003; Zhang, et al., 2011).

2.1.7. The Role of Information system in Supply Chain Performance

Christopher, (2005) argues that leading organizations have long recognized that the key to success in supply chain management is the information system. However, what we are now learning is that there is a dimension to information that enables supply and demand to be matched in multiple markets, often with tailored products, in ever-shorter time-frames. This extension of the information system beyond the classical dimensions of simple planning and control enables time and space to be collapsed through the ability to link the customer directly to the supplier and for the supplier to react, sometimes in real time, to changes in the market.

The rationale for investing in supply chain management software systems is the same as that required for investment in material requirements planning and enterprise resource planning software systems. The goal is to reduce inventory levels while improving customer service (Fredendall & Ed Hill, 2001).

Further, Ensermu, (2013) in his book Logistics and Supply Chain Management summarizes the role of information system as: Supply chain information systems link logistics activities

in an integrated process based on four levels of functionality. The transaction system provides the foundation by electronically taking the order, initiating order selection and shipment, and completing appropriate financial transactions. Management control systems record functional and firm operating performance and provide appropriate management reporting.

Decision analysis systems assist management in the identification and evaluation of logistics alternatives. Strategic planning systems provide top management with insight regarding the impact of strategic changes such as mergers, acquisitions, and competitive actions. While the transaction system provides the foundation, management control, decision analysis, and strategic planning systems are becoming critical for high performance supply chain management.

ERP or legacy systems are the backbone of most Supply Chain Information System because of their integrated database capabilities and modular transactions. The communication systems facilitate information exchange internally within the firm's functions as well as externally across global sites and with other supply chain partners. The execution systems are becoming more critical for controlling warehouse and transportation operations. Supply chain planning systems will likely become the critical competitive differentiator for the future as firms strive to improve their asset productivity through reduced inventory and physical assets.

2.1.8. Supply chain Management Performance Measurement Dimensions

There are three dimensions of Supply chain management performance are intended to cover the three types of performance measurement suggested by Beamon, (1999): supply chain flexibility (flexibility measures), supply chain integration (resources measure), and customer responsiveness (output measure).

Table 2.1: SCM Performances, Definitions and its Measurement Dimensions

Construct	Definition	Measurement Dimensions
Supply Chain Flexibility	The ability of supply chain partners to effectively adaptor respond to change that directly impacts an organization's customer.	***Product Flexibility***: - or the ability to customize product to meet specific customer demand.
		Volume Flexibility: - the ability to adjust capacity to meet changes in customer quantities.
		New Product Flexibilities: - the ability to launch new revised products.
		Distribution Flexibility: - the ability widespread access to products.
		Responsiveness Flexibility: - the ability to respond to target markets.
Supply Chain Integration	The extent to which all the activities within an organization, suppliers, and customers are integrated together.	***Information Integration***: - refers to the sharing of information and knowledge among members of the supply chain i.e. demand information, inventory status and capacity plans.
		Coordination: - which refers to the redeployment of decision-making authority, work and resources to the best-position in the supply chain.
		Organizational Linkage: - which means tight organizational relationships with supplier's i.e. joint performance measurement.
Customer Responsiveness	A firm's ability to respond in a timely manner to customers" needs and wants.	Measuring customer responsiveness includes lead time, stock out probability, order fill rate, total cycle time, average backorder levels, total respond time to an order, order lateness or earliness and backlog profile.

Source: (Qrunfelh, 2010)

2.1.9. Firm Performance

Firm performance refers to how well a firm achieves its market oriented goals as well as its financial goals (Li et al., 2006). 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 (Tan et al., 1998). Financial metrics have served as a tool for comparing organizations and evaluating an organization's behaviour over time (Holmberg, 2000). Any organizational initiative, including supply chain management, should ultimately lead to enhanced firm performance. A number of prior studies have measured firm 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 (Qrunfleh, 2010 and Li et al., 2006). In line with the above literature, the same items adopted to measure firm performance in this study.

Market share, return on investment, the growth of market share, growth in return on investment, profit margin on sales and overall competitive position are adapted as firm performance measures in this study.

2.2. Empirical Study:

Most of the empirical studies on the use of Information technology in supply management focus on two streams (Auramo *et al*., 2014). The first stream focuses on a specific technology or application area, and the second stream studies the application and benefits of IT in general. Iacovou *et al*., (1995); Mukhopadhyay *et al*., (1995); Tuunainen, (1998) studied on the adoption factors and impact of Electronic Data Interchange (EDI). Mukhopadhyay *et al*., (1995) studied cost reduction objectives. Tuunainen, (1998) associated the adaption of EDI links with volume of transactions between supply chain partners. Nurmilaakso et al., (2002) studied the use of Extended Markup Language (XML) for supply chain integration. As for research focusing on specific application areas, for example, the tracking systems and their importance for the efficient coordination of logistics flows have been widely studied (Harris, 1999; Stefansson and Tilanus, (2001); Ala-Risku *et al*., (2003); karkkainen *et al*., (2003). According to this body of literature, tracking is needed especially in situations with in-transit consolidation, and in project-oriented businesses. These tracking studies, however, are not

empirically founded and thus, do not reveal how tracking systems and tracking information is actually utilized by companies.

As compared to the research focusing on specific technologies or application areas, research on the use and benefits of IT in SCM without the focus on specific technology is fewer in number (Auramo *et al*., 2014). The research on the benefits of the use of IT in SCM includes a number of surveys investigating the impact of IT on supply chain integration, customer integration and service (Closs and Savitskie, 2003), supply chain time performance (Jayaram *et al*., 2000), financial performance, or a combination of these (Vickery et al., 2003). Meanwhile, Auramo *et al*., (2014) performed an exploratory multiple case study on the benefits of IT in SCM, and McLaren *et al*., (2004) conducted a multiple case study on how different SCM IS capabilities support different operations environments.

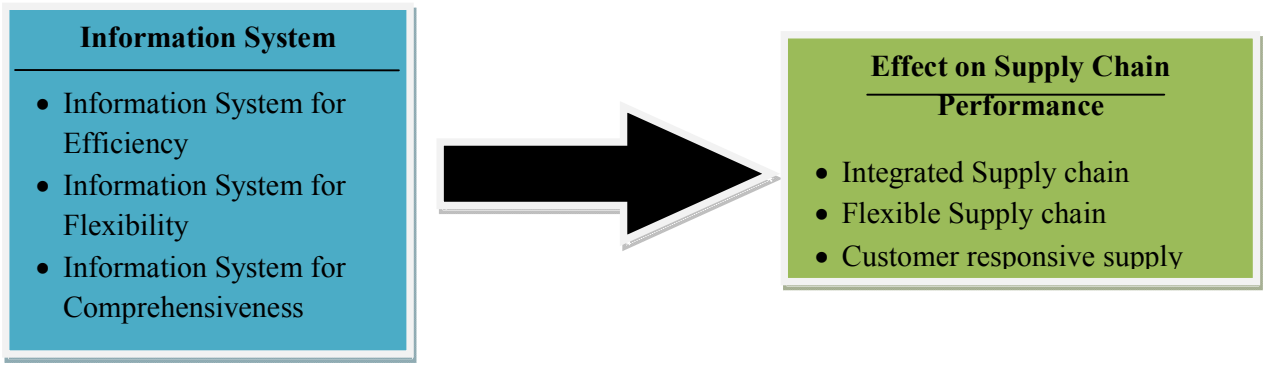
Bagchi and Skjoett-Larsen, (2002) examine the role of IT and organizational integration in supply chain integration and propose an IT integration path from low, through medium, to high integration. Themistocleous *et al*., (2004), in turn, use the scale of low, medium, to high to describe the integrative-ness of different IT alternatives. The focus of these studies being on assessing the levels of supply chain integration, they do not describe how IT is actually used for SCM purposes. Meanwhile, in their research, Kauremaa *et al*., (2004) have focused on the ways companies use IT in SCM and choose to classify the use of IT in SCM to transaction execution and information sharing. Based on the rarity of using IT for information sharing among their sample of companies studied, they hypothesize that the drivers and prerequisites of using IT in transaction execution and in information sharing differ, and that the benefits of IT in transaction execution are easier to quantify. Furthermore, they suppose that companies use IT for transaction execution in situations with high transaction volumes and stable business relationships, while IT is used for information sharing especially in environments with demand uncertainty and frequent product introductions.

In conclusion, based on the empirical literature review, there is a scarcity of research on the impact of information system applications adopted, on the improvement of the supply chain performance via its level of flexibility, integration and consumer responsiveness. Furthermore, the research findings are contradicting each other and there is a limited knowledge on how companies actually utilize IT in the management of their supply chains. These identified shortcomings of prior research create a need for research that this study aims to address.

2.3. Conceptual Framework

Based on overall review of related literature and particularly from the work of Qrunfelh, (2010) the following conceptual frame work in which this study is governed was developed.

Figure 2.1 Conceptual Frame Work of the Study



Source: (Qrunfelh, 2010)

The conceptual frame work of the study basically relies on the effect of the information system application on the supply chain performance in general and the case firm in particular. Accordingly, as clearly depicted in the above figurative presentation, the information system applied could be manifested through data capture and communication, data storage and retrieval and data manipulation and reporting.

Such applications would have an effect on the supply chain performance through integration, flexibility and responsiveness of the supply chain to ultimately enhance the firm performance via improved market presence and financial outcomes.

2.4. Company Background

MOHA soft drinks industry S.C was established in 1965 GC which was then known as Pepsi cola factory and later named "Abbay- Mesk Soft Drinks Factory".

There were two factories in Addis Ababa Nefasilk and T\Haimanot Plant. The Nefasilk plant was a property of two Ethiopians and one foreigner and named as Pepsi cola factory and started to operate with 88 employees. The T/Haimanot plant was first established to produce and export the traditional Ethiopian drink which is known as "Yemartej" in modern style but the product's first aim was failed because it cannot compete in the market and because of its higher price which have led the company to bankruptcy. To overcome this, the management decided to change the company's product to soft drinks and started to produce drinks like lemonade, tangerine, and Canada dry, and Pepsi cola.

After the company started to produce soft drinks, the government of Ethiopia at the time decided to merge the two companies together to achieve a better result, so they collaborated together with the capital of Birr 1,114,605.00 under the trade name of "Abbay- Mesk Soft Drinks Factory".

Following the change of the government and privatization policy of public enterprises in 1991GC, Abbay- Mesk Soft Drinks Factory was sold to an Ethiopian investor called Sheik Mohammed Hussein Ali-Amoudi and named after him as "Moha Soft Drinks Industry S.C". It was formed and registered under the commercial code of Ethiopia on the 15th of May 1996. The transfer of the companies was finalized on the 4th of April 1996. Now a days the company has a total of Eight branches throughout Ethiopia from this Eight three of them are in Addis Ababa including the newly added Summit plant and the rest are in Awassa, Desse, Gonder, Mekelle and Bure from all the Nifasilk plant is the largest of all (Gebreyesus, 2016).

The very reason that the researcher selected Moha as a case study are the researcher can access the required data as well as examine the information system that is applied in the organization without restriction. Besides from different companies that were contacted, Moha Soft drinks S.Co was the one willing enough to cooperate to let the study be conducted on the company, as well as willing to give the necessary data. Therefore, the researcher selected the company basically for the reason mentioned so as to assess the effect of information system on supply chain performance.

The information system MOHA uses starting by providing all staff having standard desktop tools. They should have access to email, Internet and Intranet. IT infrastructure being continuously upgraded as allowed by the company's resources and budget. Systems and networks at the company's head-quarters and in the field being standardized and centrally managed. A centralized team should provide IT assistance to staff and a wide range of IT training. The company uses ERP systems at the head-quarters.(MOHA soft drinks.co.annualreport,2017)

Enterprise Resource Planning (ERP) is one of the fastest growing segments of Information Technology today. It is a software suit that helps organizations to integrate their information flow and business processes. They typically support the different departments and functions in the organization by using a single database that collects and stores data in real time. When ERP systems are fully realized in a business organization, they can yield many benefits: reduce cycle time, enable faster information transactions, facilitate better financial management, lay groundwork for e-commerce, and make tacit knowledge explicit (Davenport, 2011).

Supply chain of the case company starting from, supply Chain Management spans all movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption. It also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers.

The Cycle View of Supply Chain There are five stages in a supply chain (Supplier Manufacturer Distributor Retailer Customer) and four supply chain process cycles (customer order, replenishment, manufacturing, procurement cycle)

The Push/Pull View of Supply Chain**,** With push process execution is initiated in anticipation to a customer order. MOHA has a seasonal demand. Just in time concept is applicable in a non-seasonal period and not applicable in seasonal period. All processes that are part of the procurement cycle, manufacturing cycle, replenishment cycle, and customer order cycle are push processes.

MOHA Sales order and processing: The Shipping Manager receives sales order from Sales Team, distributors through telephone, fax & email one day before dispatch. The sales are made to base distributors on advance payment against orders then shipping manager plans according to the demand of distributors on daily basis.

The supplier of MOHA since 2013, SIDEL services like, the raw materials for the production,CO2 production, steam, syrup, generator, water treatment plant and piping. /https://www.beveragedaily.com/

Regarding the customers of MOHA ,The company distributes its products through different channels mainly through Agents to wholesalers and retailers, Manual Distribution Centers and Depots to reach its consumers**.** (Aregawi Gebreyesus ,2016)

Mean a while, now a days The beverage industry uses the following information systems, GAO Work-in-Process RFID (WIP) Asset Tracking System is a flexible item and assembly tracking solution that provides automated logging of WIP data as they pass through each production stage, drastically improving both production time and product quality on the manufacturing shop floor. Enabling RFID technology to track WIP during manufacturing production provides vital data that can be accessed in real-time to give managers greater visibility into the production process. RFID Software gives you the power to control and know how your assets move for maximum productivity. GIS is basically a computer based spatial decision support tool that enables the input, management, analysis, output and dissemination of geo-referenced data and information.

The utility of conventional MIS, which are now evolving into Decision Support Systems

(DSS) can be improved by incorporating the analytical and visualization capabilities of

GIS. There is also H2O2 sterilizing system which uses hydrogen peroxide. Features of H2O2 are, Causes no thermal degradation of products, Enables reduction of bottle weight, long-term continuous production, transport and storage at room temperature, extension of best-before dates, Allows greater freedom in bottle designs (Burrough (1986), Longley et al., (2005)).

2.5 Literature Gaps Identified

Generally, the above reviewed articles and research papers have the following major gaps; failure to make enterprise general conclusion, considering the enterprise as a takeover to others, poor sampling method, failure to justify sample size selection and lacking focus. The researcher contributes to the existing literature by sum up of all activates that under taken to enterprise to give the whole picture of activities and show the main activity filer in the area.

CHAPTER THREE:

RESEARCH DESIGN AND METHODOLOGY

Research methodology provides a means to systematically solve a research problem. This chapter explains the methodological approach adopted when conducting the research. This includes the research design; population and sampling technique, tool of data collection and method of data analysis are briefly explained.

3.1. Research Design

As the study examines the effect information system on supply Chain Management of MOHA soft drinks industry, the study basically used explanatory research design.

An explanatory research tries to establish relationship that exists between variables. It aims at identifying how one variable affects the other; it seeks to provide an empirical explanation to the causality and causes and effects relationship between one or more variables (Saunders et al., 2000, 2007; Malhotra & Birks, 2007; Cooper & Schindler 2006)

3.2. Source of Data

The study used both primary and secondary data collection method to acquire the required data for the study.

3.2.1. Primary Data:- primary data was collected from employees of the company by using a self-administered questionnaire that consist both open and more of closed ended questions that is designed to collect responses for qualitative and quantitative analysis respectively. Empirical studies like (Qrunfleh, 2010, Patterson *et al.,* 2003) have used five point likert scales for measuring the impact of information system on supply chain management. The likert scale measurement approach helps to ask respondents to rate their opinion for the items of various dimensions. In addition standard questionnaire adopted from the study (Qrunfleh, 2010) was used to collect the necessary information for the study.

3.2.2. Secondary data: - The sources of secondary data for this research were different annual reports and journals as a stepping board for the research.

3.3. Data Gathering Tools/instruments

For the data collection purposes, questionnaire was used.

3.3.1. Questionnaire: It is prepared based on the review of the related literature. it is constructed based on (Qrunfleh, 2010, Patterson *et al.,* 2003)

Because the numbers of respondents are large, this tool is appropriate to gather the necessary data. The items are close ended supplemented with few open-ended items to get more opinions of the respondents. The questionnaire carefully developed in a way that measure the impact of the proposed independent variables on the dependent variable. The type of questions, form, wording and sequences considered carefully.

3.4. Sample Design

3.4.1. Target Population

The target population is said to be a specified group of people or object for which questions will be asked to develop the required data structures and information so as to arrive at findings and conclusion there off.

Hence, for the study, the target populations were employees of MOHA soft drinks industry S.C Addis Ababa area branches and the head office Employees. The study only limited the target population in the Head office and Addis Ababa area branches, because of the time and budget constraint to reach the employees outside of Addis.

3.4.2. Sampling Technique

For the purpose of this study, the researcher was used non probability & probability sampling particularly stratified sampling technique since the total population of the study is large and heterogeneous in type stratified sampling technique is preferred to ensure that all employees or departments are adequately presented in the study. The target population for the study is classified in different strata based on the departments and section in the firm. Then the samples were selected randomly after the population has been stratified. The sample frame for this study includes permanent employees who are working in departments of Purchasing and Procurement, Marketing & Sales, Manufacturing, (Co2 plant, Production control & scheduling and quality control), Technique (Technique and Vehicle maintenance), Administration (CEO, Managements, Human resource, Corporate Planning, Legal Affairs)

and Finance is considered. The selection of the departments was based on purposive non probability sampling based on their attachment and proximity to the supply chain management process in the organization. It is believed that the departments under consideration provided accurate and reliable data for the study and subject matter as they are in direct contact with supply chain management.

3.4.3. Sample Size

The larger the sampling size of a research, the more accurate the data generated (Zikmund, 2003). However, due to time and financial limitations and the nature of the population, sample determination method developed by Carvalho, 1984, was employed as a method to determine the sample size. "Archival application of mathematical sampling techniques",(1984) (Quoted by national Archive report Richmond, 2005).

Table 3.1: Sample size determination

Population size	Small	Medium	Large
51-90	5	13	20
91-150	8	20	32
151-280	13	32	50
281-500	20	50	80
501-1200	32	80	125
1201-3200	50	125	200
3201-10,000	80	200	315
10,001-35,000	125	315	500
35,001-150,000	200	500	800

Source: (Carvalho ,1984) as quoted by (national Archive report Richmond, 2005)

Table 3.2: Permanent staff composition of MOHA soft drinks industry S.C head office and three branches located in Addis Ababa

S. No.	Departments	Head Office	N/Silk Branch	T/Haimanot Branch	Summit Branch
1	CEO	4	0	0	0
2	Administration	22	116	81	89
3	Corporate Planning	13	0	0	0
4	Legal Affairs	0	8	0	0
5	Manufacturing	0	285	130	153
6	Co2 plant	0	32	0	10
7	Quality Control	13	26	22	39
8	Technique	3	48	28	46
9	Vehicle Maintenance	0	27	14	13
10	Marketing & Sales	4	305	225	126
11	Purchasing & Procurement	6	21	18	24
12	Finance	7	33	26	21
13	Cafeteria	0	0	0	24
14	Total	72	901	538	545

Source: MOHA Soft Drinks Industry Human resource Department, 2017

Table 3.3: Sample Size Determination for the study

S. No.	Strata (Departments)	Total Population of each stratum	Target population of each stratum	Sample size of each stratum
1	Purchasing & Procurement	69	69	13
2	Marketing & Sales	660	468	50
3	Finance Department	87	87	13
4	Administration	333	120	20
5	Manufacturing Department	710	52	13
7	Total	2038	797	109

Source: MOHA Soft Drinks Industry Human resource Department, 2017

3.5. Methods of Data Analysis

After the questionnaires were first checked, the data was edited, coded, classified and tabulated for ease of interpretation and further analysis. To analyse the data Statistical Package for Social Sciences (SPSS) was used. The research used both descriptive and inferential (regression) analysis. Frequency, mean and standard deviation employed to describe the data in terms of frequency of occurrence, central tendency, and dispersion. Correlation analysis was used to determine the relationship between information system and supply chain performance and supply chain performance and firm performance.

3.6. Ethical Clearance

A support letter was written from Addis Ababa University, School of Commerce, Department of Logistics and Supply Chain Management to MOHA Soft Drinks Industry S.C. The data collection was started after getting consent of the concerned parties. The result of the study is to be used for academic purpose only and the response of the participant is fully confidential. The information that the respondents was given were analysed without any change by the researcher. Moreover, the work that is used in this research was cited appropriately as the researcher respect the work of previous studies.

3.7. Validity and Reliability

Validity indicates the degree to which an instrument measures what it is supposed to measure. The scientific soundness of a research finding is determined by the validity of the instruments used. All possible efforts were exerted to make the data collection instruments easily understandable by the respondents so that the intended information can be collected thereby increasing trustworthiness of the ultimate findings. After the questionnaire was constructed, pre-testing was done with individuals who have knowledge of the area by allowing them to read and comment on it. Constructive comments were collected from the individuals and the questionnaire was adjusted accordingly. Then, validation of the instrument was given by academic advisor prior to the data collection. Reliability has to do with the accuracy and precision of a measurement procedure (a measuring instrument is reliable if it provides consistent results). According to Pallant, (2005) when the reliability values for all constructs are confirmed as greater than 0.7, they are considered as ideal. Therefore, for this study the test result is summarized in table below and all the results are much higher than the acceptable threshold value.

Table 3.7 Reliability Statistics

Variable	Cronbach's Alpha	No. Of Items
A. Information System		
Information System for efficiency	.794	7
Information System for flexibility	.798	6
Information System for comprehensiveness	.717	6
B. Supply Chain performance		
Flexibility	.886	6
Integration	.888	4
Responsiveness	.882	3
C. Organizational performance	.831	6

Sources: SPSS Output, 2018

CHAPTER FOUR:

DATA PRESENTATION, ANALYSIS AND DISCUSSION

This chapter presents an analysis of data collected and discusses the findings on the relationship between information system (IS for efficiency, IS for flexibility and IS for comprehensiveness) on supply chain performance and the effect of supply chain performance on overall firm performance.

4.1 Response Rate

The survey was conducted during in one week time. From the total 109 questionnaires distributed 105 were returned from which 1 was not correctly filled and rejected. Therefore, 104 were effectively used for analysis that shows response rate of 95%. Table below shows the overall response rate.

Table 4.1 Response Rate

No.	Name of Branch	No. of Questioner Distributed	No. of Questionnaire Collected	No. of Questionnaire Uncollected
1	Head Office	17	17	-
2	N/Silk Branch	34	32	2
3	T/haimanot Branch	29	27	2
4	Summit Branch	29	29	-
	Total	109	105	4

Source: Survey Data, 2018

4.2 Respondent Profile

Table 4.2 Profile of Respondent

Educational Qualifications	**Frequency**	**Percent**
College Diploma	31	29.8
First Degree	69	66.3
Second Degree and above	4	3.8
Total	104	100.0
Job Title	**Frequency**	**Percent**

Educational Qualifications	Frequency	Percent
Director	2	1.9
Manager	13	12.5
Other	89	85.6
Total	104	100.0
Work Experience	**Frequency**	**Percent**
Under 2 year	10	9.6
2–5 years	23	22.1
6–10 years	31	29.8
over 10 years	40	38.5
Total	104	100.0
Working Unit	**Frequency**	**Percent**
Purchasing & Procurement	12	11.5
Marketing & Sales	48	46.2
Finance Department	13	12.5
Administration	19	18.3
Manufacturing	12	11.5
Total	104	100.0

Sources: SPSS output, 2018

The analysis of the respondents profile in terms of their Educational qualification, Job title, work experience and department/work units in line with Table 4.2 is presented as follows.

Educational Qualification: with regards to educational qualification of respondents, 31 respondents have college diploma which is 29.8% of the total, 69 respondents which are the majority respondents in terms of educational qualifications have first degree and they represent 66.3% of the total respondents. The above table 4.2 also tell us that 4 respondents have second degree and above and accounted for 3.8% from total respondents. From the educational background of respondents, 73 respondents (70.2%) are first and second degree holders. According to the response, the respondents provide relevant and reliable information needed for the study and they are fit in line with the response of the questionnaire.

Job title: As the table 4.2 shows 2 respondents (1.9%) of them are Directors of the company, 13 respondents (12.5 %) are Managers of the company, the rest 89 respondents (85.6 %) are sales/marketing officers, procurement and supply officers and supervisors, production unit workers and supervisors, finance officers and different department heads . According to the response, all the respondents are directly and indirectly involved in the supply chain practices of their firm and hence, their information can be considered as reliable and relevant for the study.

Work Experience: From the total respondents, 10 respondents (9.6%) fall at a work experience of less than 2 years, 23 respondents (22.1 %) fall at a work experience level of 2-5 years, 31 respondents (29.8%) are with 6-10 years experience and the rest 40 respondents (38.5 %) are at a work experience of more than 10 years. From this it can be concluded that the majority of respondents, 71 respondents (68.3%) fall at a work experience above five years. This implies the fact that most of the respondents were senior and have sufficient knowledge about the company.

Working Unit/Department: with regard to working unit of respondents, 12 respondents are working in Purchasing & Procurement department which is 11.5% of the total; the above table 4.2 also tell us that 48 respondents are working in Marketing & Sales department, which is 46.2% of the total respondents. 13 respondents are working in Finance department, which is 12.5% of the total respondents. In the department of Administration there are 19 respondents accounted for 18.3% from total respondents. From the total respondents the department of Manufacturing accounted 12 and the percentile from the total respondents accounts 11.5%. This implies the fact that all the respondents are directly and indirectly involved in the operations of supply chain management of their firm and hence, their information can be considered as reliable and relevant for the study.

4.3 Descriptive Statistics

4.3.1 On IS dimensions and SCP

Illustration of the descriptive statistics for each main constructs and its dimensions using mean and standard deviation is given on this part. Information system is represented by three conceptual dimensions. A total of 39 statements were presented to workers in the MOHA SOFT DRINKS S.C through the structured questionnaire to measure their degree of agreement or disagreement over company's Information system practice and supply chain performance. A statistical mean value and standard deviation which is calculated based on employees' response on the questionnaire for three constructs is presented.

The research questionnaire designed using 5 point Likert scale to collect appropriate responses, in relation to this the respondents indicated the extent they agree with the statements by choosing: 1-Strongly Agree, 2-Agree, 3-Neutral, 4-Disagree and 5-Strongly Disagree. Based on the response of the respondents mean (M) score of 0-1.5 means that the respondents strongly agreed, between 1.50 to 2.50 means they agreed, 2.50 to 3.50 means the

respondents were neutral, 3.50-4.50 means they disagreed and a mean above 4.50 means the respondents strongly disagreed.

Table 4.3 Descriptive Statistics of IS dimensions and SCP

Information System	Mean	Standard Deviation
IS for Efficiency	2.19	0.738
IS for Flexibility	2.21	0.867
IS for Comprehensiveness	2.21	0.784
Supply Chain Performance	2.32	0.992

Source: SPSS Output, 2018

As shown in table 4.3 from all IS dimensions IS for flexibility and IS for comprehensiveness have the highest mean value of (2.21) with standard deviation (0.867) & (0.784) respectively whereas, IS for efficiency has the lowest mean value (2.19) with standard deviation (0.738). The dependent variable, Supply Chain Performance has a mean value of (2.32) along with standard deviation of (0.992). High Standard Deviation means that the data are wide spread, which means that customers give variety of opinion and the low standard deviation means that customers express close opinion.

4.3.2 On IS for efficiency

Descriptive statistics was conducted on the seven items in IS for efficiency which company employees were rated using the five point likert scales with the highest being strongly disagree and the lowest-strongly agree. The result of the descriptive statistics shows to what degree employees agree or disagree on Information System for efficiency. The lowest indicate high level of agreement with the scale item while the highest mean figure shows high level of disagreement with the particular item being tested.

Table 4.4 Descriptive Statistics of IS for Efficiency

Information System for Efficiency	Mean	Standard Deviation
Improve the efficiency of operation between our suppliers and us	2.01	1.075
facilitate negotiation with our suppliers	1.98	0.995
monitor performance of our suppliers	2.06	0.95
Manage inventory between our suppliers and us	2.17	0.97
Manage material requirement planning of our facility	2.31	1.115
Manage production control between our suppliers and us	2.19	1.062

Information System for Efficiency	Mean	Standard Deviation
Coordinate (production and information) efficiently across suppliers and product lines	2.34	1.120

Source: SPSS Output, 2018

As you can see from the above table 4.4 the statements called "Coordinate (production and information) efficiently across suppliers and product lines" has the highest mean value (2.34) which means most respondents agree in low level that the company are not coordinating efficiently across suppliers and product lines. While the statement "Facilitate negotiation with our suppliers" has the lowest mean value (1.98) and the lowest mean value implies that respondents have high level of agreement regarding company's Information system effort to facilitate negotiation with suppliers.

4.3.3 On IS for Flexibility

Descriptive statistics was conducted on the six items of IS for flexibility in which company employees were rated using the five point likert scales with the highest being strongly disagree and the lowest-strongly agree. IS for flexibility is defined in this study as a strategy that is focused on market flexibility and quick strategic decision support (Sabherwal and Chan, 2001). For example, strategic decision support systems (SDSS) help organizations make strategic decisions quickly and effectively by enabling executives to analyze (threats, opportunities, strengths, and weaknesses), describe strategic situations, select alternative strategies, and monitor performances (Belardo et al., 1994).

Table 4.5 Descriptive Statistics on IS for Flexibility

Information System for Flexibility	Mean	Standard Deviation
Introduce new product(s) and/or services in our market (s)	2.11	1.19
Monitor changes in our market	2.21	1.085
Quickly share information within our firm	1.91	1.071
Change the design of our product (s)	2.31	1.199
respond to changes in the market	2.15	1.012
model possible future outcomes and identify alternative courses of action	2.17	0.932

Source: SPSS Output, 2018

Based on the statistical results of table 4.5 the statement which says "Change the design of our product (s)" has got the highest mean value (2.31), which represents that the majority respondents perceived or agreed in low level that the company Information system for

flexibility to change the design of products is not more flexible; whereas, the statement that says" Quickly share information within our firm" has the lowest mean value (1.91) which implies that on average that employees have high level of agreement over the statement that the company has flexibility on sharing information quickly within a firm.

4.3.4 On IS for comprehensiveness

Allen and Boynton, (1991) suggest that regarding comprehensiveness, organizations need to face the challenges of both "low cost and efficient" and of "speed and flexibility". They argue that in order for organizations to meet the challenges of the market, organizations need to combine elements of both (low cost and flexibility) through a revamped IS architecture.

Table 4.6 Descriptive Statistics of IS for Comprehensiveness

Information System for Comprehensiveness	Mean	Standard Deviation
Interact with customer	1.93	0.998
Interact with suppliers	2.08	0.925
Provide sufficient information to support careful decision making	2.14	1.194
Provide detailed analysis of major decisions	2.26	1.097
Provide support for decision making	2.08	0.962
Adopt well analyzed view when making major decisions	2.27	1.134

Source: SPSS Output, 2018

Based on the statistical results of table 4.6 the statement which says "interact with customers" has got the lowest mean value (1.93), which represents that the majority respondents perceived or agreed in high level that the company's Information System has a great role to comprehensive decision; whereas, the statement that says"Adopt well analyzed view when making major decisions" has the highest mean value (2.27) which implies that on average the employees have low level of agreement that the company are not in place for adopting well analyzed view when making major decisions.

4.3.5 On Supply Chain Performance Dimensions

Descriptive statistics was conducted on the thirteen items of Supply chain in which company employees were rated using the five point likert scales with the highest being strongly disagree and the lowest-strongly agree. There are three dimensions of Supply chain management performance intended to cover three types of performance measurement suggested by Beamon,(1999): supply chain flexibility (flexibility measures), supply chain integration (resources measure), and customer responsiveness (output measure).

Table 4.7 Descriptive Statistics of SCP Dimensions

Supply Chain Performance Dimension	Mean	Standard Deviation
Supply Chain Flexibility		
handle difficult nonstandard orders	2.13	1.191
meet special customer specification	2.25	1.022
produce products characterized by numerous features options, sizes and colors	2.2	0.959
rapidly adjust capacity so as to accelerate or decelerate production in response to changes in customer demand	2.26	1.07
rapidly introduce large numbers of product improvements/variation	2.29	1.204
handle rapid introduction of new products	2.33	1.055
Supply Chain Integration		
There is a high level of communication and coordination between all functions in our firm	2.04	1.088
Cross-functional teams are frequently used for process design and improvement in our firm	2.23	1.125
There is a great amount of cross-over of the activities of our firm and our trading partners	2.13	0.995
There is a high level of integration of information systems in our firm	1.88	1.146
Supply Chain Responsiveness		
Our firm fills customer orders on time	2.21	1.002
Our firm has short order-to-delivery cycle time	2.36	1.088
Our firm has fast customer response time	2.48	1.149

Source: SPSS Output, 2018

Based on the statistical results of table 4.7 the statement which says "Our firm has fast customer response time" has got the highest mean value (2.48), which represents that the majority respondents perceived or agreed in low level for company's customer responsiveness on supply chain due to the customer do not get fast response. whereas, the statement that says" There is a high level of integration of information systems in our firm" has the lowest mean value (1.88) which implies that on average the employees agreed or level of agreement is enough that the company are in place for level of integration of information systems in the firm on supply chain.

4.3.6 On Firm Performance

Firm performance refers to how well a firm achieves its market oriented goals as well as its financial goals (Li et al., 2006). 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 (Tan et al., 1998).

Table 4.8 Descriptive Statistics of Firm Performance

Firm Performance Dimension	Mean	Standard Deviation
Market share	3.54	1.182
Return on Investment	3.78	1.123
The growth of market share	3.77	1.081
Growth in return on investment	3.77	1.168
Profit margin on sales	3.48	1.285
Overall competitive position	3.44	1.328

Source: SPSS Output, 2018

According to response of the respondents the 5 point Likert scale indicates the extent they agree with the statements that is: 1-significant decrease, 2- decrease, 3-same as before, 4-increase and significantly increase. A mean (M) score of 0-1.5 means that the respondents agreed that firm performance significantly decrease, between 1.50 to 2.50 means it has decreased, 2.50 to 3.50 means the same as before, 3.50-4.50 means increased and a mean above 4.50 means it has significantly increased. Based on the findings on Table 4.8, majority of firm performance dimensions had mean scores greater than 3.5, which imply the respondents agreed to the fact that their business performance is good.

4.4 Correlation Analysis

Correlations are the measure of the linear relationship between two variables. A correlation coefficient has a value ranging from -1 to 1. Values that are closer to the absolute value of 1 indicate that there is a strong relationship between the variables being correlated whereas values closer to 0 indicates that there is little or no linear relationship (Pallant, 2005).

Table 4.9 Correlation Interpretation Guideline

Correlation Value in Range	Interpretation
0.10 – 0.29	Small Correlation
0.3 – 0.49	Medium Correlation
0.5 – 1	Strong Correlation

Source: (Pallant, 2005)

In this section, correlation analysis conducted in the light of each research objectives and this provided correlation Coefficients which indicated the strength and direction of relationship. The p-value also indicated the probability of this relationship's significance.

4.4.1 Correlation Analysis between IS for efficiency and Supply chain performance

Table 4.10 Correlation between IS for Efficiency and SCP

		IS for Efficiency	Supply Chain Performance
IS for Efficiency	Pearson Correlation	1	.774**
	Sig. (2-tailed)		.000
	N	104	104
Supply Chain Performance	Pearson Correlation	.774**	1
	Sig. (2-tailed)	.000	
	N	104	104

**. Correlation is significant at the 0.01 level (2-tailed). Source: SPSS Output, 2018

As can be witnessed on table 4.10 above, which depicts the relationship between Information system for efficiency and supply chain performance, IS for efficiency has significant correlation with supply chain performance since two-tailed significance test values are less than 0.01. Further, the Pearson correlation value illustrates that IS for efficiency (r=.774) has strong positive correlation with supply chain performance. According Qrunfelh, 2010 acquiring specific IS applications for efficiency that help firms manage, coordinate, and improve production and information sharing will result in better communication and coordination between firms and their suppliers. This will result in better supply chain

integration which could not only benefit the suppliers, but also help the firm to achieve its market and financial goals.

4.4.2 Correlation Analysis between IS for efficiency and SCP

Table 4.11 Correlation between IS for Flexibility and SCP

		IS for Flexibility	Supply Chain Performance
IS for Flexibility	Pearson Correlation	1	.774**
	Sig. (2-tailed)		.000
	N	104	104
Supply Chain Performance	Pearson Correlation	.774**	1
	Sig. (2-tailed)	.000	
	N	104	104

**. Correlation is significant at the 0.01 level (2-tailed). Source: SPSS Output, 2018

Table 4.11 illustrates the relationship between information system for flexibility and supply chain performance. IS for flexibility is found to have significant correlation with supply chain performance since two-tailed significance test values are less than 0.01. As shown in the table IS for flexibility is found to have strong correlation (r=.774) with supply chain performance. Thus IS for efficiency has significant strong positive correlation with supply chain performance. The result is similar with study of Qrunfleh, 2014 which states that IS for efficiency positively affects supply chain performance

4.4.3 Correlation Analysis between IS for Comprehensiveness and SCP

Table 4.12 Correlation between IS for comprehensiveness and SCP

		IS for Comprehensiveness	Supply Chain Performance
IS for Comprehensiveness	Pearson Correlation	1	.811**
	Sig. (2-tailed)		.000
	N	104	104
Supply Chain Performance	Pearson Correlation	.811**	1
	Sig. (2-tailed)	.000	
	N	104	104

**. Correlation is significant at the 0.01 level (2-tailed). Source: SPSS Output, 2018

As shown in the table 4.12 above IS for comprehensiveness is found to have significant correlation with supply chain performance since two-tailed significance test values are less than 0.01. IS for comprehensiveness is found to have strong correlation (r=.811) with supply chain performance. Hence, IS for comprehensiveness has significant strong positive correlation with supply chain performance. The result is similar with (Qrunfelh, 2010), the study mentioned that having an information system that enables comprehensive decisions and quick responses will positively interact with the supply chain performance by achieving mass customization and responsiveness; this interaction will result in better customer satisfaction. Therefore, Planning for IS to support comprehensive and quick decisions will result in better understanding of customer requirements. This would lead firms to maximize any opportunities they are seeking for market and financial growth.

Table 4.13 Correlation between Aggregate Information System and SCP

		Information System	Supply Chain Performance
Information System	Pearson Correlation	1	.865**
	Sig. (2-tailed)		.000
	N	104	104
Supply Chain Performance	Pearson Correlation	.865**	1
	Sig. (2-tailed)	.000	
	N	104	104

**. Correlation is significant at the 0.01 level (2-tailed). Source: SPSS Output, 2018

As indicated on the above the Pearson correlation test was conducted between Information system Strategy (collective representative of three building blocks of information system) and SC Performance, the results shows that there is significantly strong correlation between aggregate information system (IS for efficiency, IS for flexibility and IS for comprehensiveness) and SC Performance. In other words Information system and SC Performance have positive relationship with correlation coefficient of 0.865 (r=0.865) and significance value less than 0.01. Also (Samadi and Kassou, 2016) mentioned on their finding that there is a causal relationship between Information system and SC Performance.

4.4.4 Correlation Analysis between SCP and Organizational Performance

Table 4.14 Correlation between SCP and Organizational Performance

		Supply Chain Performance	Organization Performance
Supply Chain Performance	Pearson Correlation	1	.477**
	Sig. (2-tailed)		.000
	N	104	104
Organization Performance	Pearson Correlation	.477**	1
	Sig. (2-tailed)	.000	
	N	104	104

**. Correlation is significant at the 0.01 level (2-tailed). Source: SPSS Output, 2018

According to Table 4.14 it can be concluded that the Supply chain performance and organizational performance has a moderate and positive relation based on Pearson correlation coefficient of 0.477 (r=0.477) significance value is less than 0.01. This significance tells that there is a medium positive relationship between Supply chain performance and organizational performance. On the finding of IshtiaqIshaq, Khaliq, Hussain, Waqas, 2012 mentioned that organizational success depends on supply chain success.

4.5 Regression Analysis

Regression is a statistical technique to determine the linear relationship between two or more variables. Regression is primarily used for prediction and causal inference. Regression thus shows us how variation in one variable co-occurs with variation in another. In this study regression analysis is conducted to know to what extent the independent variable explains the dependent variable. It is also used to understand by how much each independent variable (IS for Efficiency, IS for Flexibility, IS for comprehensiveness) explains the dependent variable that is Supply Chain Performance and how supply chain performance (independent variable) explains firm performance (dependent variable).

4.5.1 Multicollinearity Test

The researcher has checked if multicollinearity problem exist or not before running the regression. Multicollinearity refers to the situation in which the independent/predictor variables are highly correlated. When independent variables are multicollinear, there is "overlap" or sharing of predictive power. Multicollinearity can be checked using the tolerance and variance inflation factors (VIF) which are the two Co linearity diagnostics factors.

Table 4.15 Multicollinearity Statistics

Model	Co linearity Statistics		Model	Co linearity Statistics	
	Tolerance	VIF		Tolerance	VIF
(Constant) IS for Efficiency	.397	2.516	(Constant) Flexibility	.374	2.676
IS for Flexibility	.331	3.019	Integration	.321	3.114
IS for Comprehensive	.377	2.654	Responsiveness	.303	3.297

a. Dependent variable: Supply Chain performance b. Dependent Variable: firm performance

Source: SPSS output, 2018

Tolerance is an indicator of how much of the variability of the specified independent variable is not explained by the other independent variables in the model and is calculated using the formula $1–R^2$ for each variable. If this value is very small (less than 0.10), it indicates that the multiple correlation with other variables is high, suggesting the possibility of multicollinearity.

Accordingly as per table 4.15 the tolerance value for all independent variables is greater than 0.1, which implies that there is no multi co linearity problem in connection with tolerance. Variance Inflation Factor (VIF) which calculates the influence of correlations among independent variables on the precision of regression estimates. The VIF factor should not exceed 10, and should ideally be close to one. As per the above table 4.15 for all independent variables VIF value is less than 10, which implies there is no multicollinearity problem.

4.5.2 Regression Analysis between IS Dimensions and SCP

Multiple regression is a model for the relationship between a dependent variable and a collection of independent variables. It also used to model the value of a dependent scale variable based on its linear relationship or "straight line" relationship to one or more predictors. The researcher determine the relationship between a dependent variable (Supply Chain Performance) and multiple independent variables (IS for Efficiency, IS for Flexibility, IS for comprehensiveness) using multiple regression analysis.

Table 4.16 Regression Model between IS Dimensions and SCP

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.865[a]	.748	.745	.501

a. Predictors: (Constant), Information System

b. Dependent Variable: Supply Chain Performance

Source: SPSS output, 2018

The model summary in the above table 4.16 reports the strength of relationship between the independent variable (Information System dimensions) and the dependent variable (Supply chain performance). In the above table the R is a Pearson correlation between predicted values and actual values of dependent variable, with a value of 0.865. R^2 is multiple correlation coefficients that represent the amount of variance of dependent variable i.e. Supply chain performance explained by the combination of three independent variables of Information System (IS for Efficiency, IS for Flexibility, IS for comprehensiveness) and 74.5% variance of Supply Chain Performance is explained by the three predictors. Value of R square implies 74.8% of the variance in the dependent variable (Supply Chain Performance) can be predicted from the independent variables.

Table 4.17 ANOVA Result between IS Dimensions and SCP

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	76.414	3	25.471	102.519	.000[b]
	Residual	24.845	100	.248		
	Total	101.259	103			

a. Dependent Variable: Supply Chain Performance

b. Predictors: (Constant), Comprehensive decision, Efficiency of IS, Flexibility of IS

Source: SPSS output, 2018

The ANOVA tells us whether the model, overall, results in a significantly good degree of prediction of the outcome variable. F-ratio is the test statistic used to decide whether the model as a whole has statistically significant predictive capability, considering the number of variables needed to achieve it. Since the significance result on the ANOVA table 4.17 is 0.000 which is $p< 0.05$ and the regression mean square is greater than residual mean square with F value 102.519, the regression model fit to a good degree of prediction.

Table 4.18 Regression Coefficients between IS Dimensions and SCP

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-.332	.162		-2.051	.043		
	IS for Efficiency	.417	.105	.310	3.948	.000	.397	2.516
	IS for Flexibility	.248	.098	.217	2.519	.013	.331	3.019
	IS for Comprehensive	.540	.102	.427	5.294	.000	.377	2.654

a. Dependent Variable: Supply Chain Performance

Source: SPSS output, 2018

The β values indicate the relationship between Supply chain Performance and each predictor. If the value is positive; it shows that there is positive relationship between predictor and the outcome; whereas a negative coefficient represents negative relationship. According to table 4.18 all the three predictors have positive β value which indicates positive relationship.

Therefore, one can say that based on β value in table 4.18 that all independent variables have a positive relationship with Supply chain Performance. Un standardized coefficient β value indicates the degree of influence or effect of each IS dimensions towards Supply chain Performance. Highest β value mean the independent value has highest influence or effect on dependent value. Therefore as per table 4.18, comprehensiveness has the highest β value (0.540), which implies that out of all independent variables comprehensive decision has the highest effect on Supply chain Performance. The rest predictors i.e IS for efficiency and IS for flexibility have β value of (0.417) and (0.248) respectively. Hence, IS for ccomprehensiveness is the best predictor of all independent variables and a lot attention must be given for it.

4.5.3 Regression Analysis between SCP and Organization Performance

Table 4.19 Regression Model between SCP and Organization Performance

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.477[a]	.225	.214	4.63288

a. Predictors: (Constant), Supply Chain Performance

b. Dependent Variable: Firm Performance

Source: SPSS output, 2018

Table 4.20 ANOVA Result between SCP and Organization Performance

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.920	1	8.920	5.131	.000[b]
	Residual	177.330	102	1.739		
	Total	186.250	103			

a. Dependent Variable: Firm Performance

b. Predictors: (Constant), Supply Chain Performance

Source: SPSS output, 2018

Table 4.21 Regression Coefficients between SCP and Organization Performance

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	2.642	.331		7.992	.000		
Supply Chain Performance	.297	.131	.477	2.265	.000	1.000	1.000

a. Dependent Variable: Firm Performance

Source: SPSS output, 2018

Based on the above tables there is causal relationship between Supply chain Performance and organizational performances. The value of adjusted R Square is .214, which implies that supply chain performance can account for 21.4% of the variation in Organizational Performance. Although there might be many factors that can explain the variable on organizational performance, approximately 21.4% of it is explained by supply chain performance. This shows that the remaining 78.6% of the variation in organizational performance cannot be explained by Supply chain Performance. The P value and positive β coefficient also implies that supply chain performance have a positive and significant influence on organizational performance. The result is similar with the finding of Toyin (2012) which confirmed that Supply chain Performance has positive influence on organizational performances.

CHAPTER FIVE:

SUMMARY OF MAJOR FINDINGS, CONCLUSION AND RECOMMENDATION

This chapter mainly deals about the study findings, conclusions and recommendations based on the analysis conducted in the previous chapter.

5.1 Summary of Major Findings

According to the data analysis in the previous section, summary of the findings presented as follows.

- The majority responses on the information system dimensions (IS for efficiency, IS for flexibility and IS for comprehensiveness) and Supply chain performance mean scores less than 2.5, which imply the respondents perceived that the company's information system has positive impact and supported the supply chain management of the company.

- The responses on supply chain performance and organizational performance indicates majority of the respondents agreed that the supply chain performance is medium and the performance of the company is also good.

- The finding from correlation test between Information System for efficiency and Supply Chain Performance shows that there is significantly strong correlation between Information System for efficiency and Supply Chain Performance with correlation coefficient of 0.774 (r=0.774) and significance value less than 0.01 and the regression analysis shows

- The result from the study shows that there is significantly strong correlation between Information System for flexibility and SC Performance, with correlation coefficient of 0.774 (r=0.774) with significance value less than 0.01.

- The result from the study also shows that there is significantly strong correlation between Information System for comprehensiveness and SC Performance, with correlation coefficient of 0.811 (r=0.811) with significance value less than 0.001.

- Regarding the aggregate information system (IS for efficiency, IS for flexibility and IS for comprehensiveness) and supply chain performance the result shows that information system and Supply chain performance has strong and positive relation based on Pearson correlation coefficient of 0.865 (r=0.865) significance value is less than 0.001. This significance tells that there is strong and positive relationship between information system and Supply chain performance. On the other hand regression analysis confirms that 74.5% of variability of supply chain performance is explained by Information system on aggregate. Among the predictors IS for comprehensiveness has the highest β value (0.540), which implies that out of all independent variables comprehensive decision has the highest effect on Supply chain Performance. The rest predictors i.e IS for efficiency and IS for flexibility have β value of (0.417) and (0.248) respectively.

- Regarding Supply chain performance and organizational performance from the study it can be concluded that Supply chain performance and organizational performance has moderate and positive relation based on Pearson correlation coefficient of 0.477 (r=0.477) significance value is less than 0.01. This significance tells that there is a medium positive relationship between Supply chain performance and organizational performance. Moreover, the regression result of SC performance and organizational performance indicates that SC performance can explain about 21.4% of organizational performance.

5.2 Conclusion

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

Based on the responses majority of respondents agreed to the fact that the company information system is good and enabled the supply chain to perform well. Moreover, from the results it can be concluded that there is strong and positive relationship between Information system (IS for efficiency, IS for flexibility and IS for comprehensiveness) and supply chain performance and moderate and positive relation between supply chain performance and organizational performance. In addition, information system has strong positive influence on supply chain performance and SCP has moderate influence on over all firm performance.

5.3 Recommendation

- As the study clearly indicate the effect of Information system on supply chain performance and effect of Supply chain on organization performance, thus MOHA Soft Drinks Industry S.C should give further attention in investing in information technology for efficient delivery of service, effective production control and comprehensive decision making.
- The company should focus on Coordinating (production and information) efficiently across suppliers and product lines to further enhance the Supply chain performance.
- IS for the Flexibility to change the design of company's product should have to get good attention to increase the customer's demand.
- The study clearly shows that the company also has a long order-to-delivery cycle time and has a slow customer response time. So, the company should have to minimize order-to-delivery cycle time and should have to give customer response on time to enhance firm Performance.
- In order to achieve advancement in better organizational performance in the long run through enhancing supply chain performance, it is better for the organization to give due emphasis on Supply chain performance.

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ANNEX

ADDIS ABABA UNIVERSTY

SCHOOL OF COMMERCE

DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGENMENT

GRADUATE PROGRAM

QUESTIONNAIRE

Dear respondents, this questionnaire is developed from (Qrunfleh, .2010) designed to collect information for the research topic "The Impact Information System on supply chain management of MOHA Soft Drinks Industry S.C." The study is conducted for academic purpose for partial fulfilment of the requirements of Master of Art in Logistics and Supply Chain Management. Hence, your responses will be kept confidential. The soundness and validity of the findings highly depend on your kind and genuine responses. Therefore, I kindly request you to respond to each items of the question very carefully.

Thank you in advance!

GENERAL DIRECTIONS

1. No need of writing your name

2. Please put a tick (√) mark in the box for your answer and for the number of your choice for the alternatives given.

3. If you require further clarification or details, please contact me with either of the following address: Email:selamawitbefekadu@yahoo.com

Part one. Information about Demographic Data

1.1 Educational Qualification

Grade 12 completed Certificate	
Certificate	
College Diploma	
First Degree	
Second Degree and above	

1.2 Job title

CEO/President /V/President ☐ Director Manger ☐

Other_____

1.3 Years stayed at the organization:

Under 2 year ☐ 2–5 years ☐ 6–10 years ☐ over 10 years ☐

1.4 Your department/work unit _____

Part Two: Main Questionnaire questions

1. With Regards to Information Systems in your firm, please indicate the choice that accurately reflects your firms' present conditions:

1.1. With Regard to ***efficiency***, the Information systems applications we acquire/develop help us to:

	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)	N/A (6)
Improve the efficiency of operation between our suppliers and us						
facilitate negotiation with our suppliers						
monitor performance of our suppliers						
Manage inventory between our suppliers and us						
Manage material requirement planning of our facility						
Manage production control between our suppliers and us						
Coordinate (production and information) efficiently across suppliers and product lines						

1.2. With Regard to ***flexibility***, the information systems application we acquire/develop help us to:

	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)	N/A (6)
Introduce new product(s) and/or services in our market (s)						
Quickly share information within our firm						
Monitor changes in our market						
Change the design of our product (s)						
respond to changes in the market						
model possible future outcomes and identify alternative courses of action						

1.3. With regard to ***comprehensiveness decisions***, the information systems applications we acquire/develop help us to:

	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)	N/A (6)
interact with customer						
interact with suppliers						
Provide sufficient information to support careful decision making						
Provide detailed analysis of major supplier's decisions						
Provide support for decision making						
adopt a rather conservative view when making major decisions						

2. With regard to performance of supply chain management in your firm, please indicate the choice that accurately reflects your firm's present conditions.

	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)	N/A (6)
2.1 Supply chain flexibility – our supply chain able to:						
handle difficult nonstandard orders						
meet special customer specification						
produce products characterized by numerous features options, sizes and colors						
rapidly adjust capacity so as to accelerate or decelerate production in response to changes in customer demand						
rapidly introduce large numbers of product improvements/variation						
handle rapid introduction of new products						
2.2 Supply Chain Integration						
There is a high level of communication and coordination between all functions in our firm						
Cross-functional teams are frequently used for process design and improvement in our firm						
There is a great amount of cross-over of the activities of our firm and our trading partners						
There is a high level of integration of information systems in our firm						
2.3 Responsiveness to Customers our firm						
Our firm fills customer orders on time						
Our firm has short order-to-delivery cycle time						
Our firm has fast customer response time						

3. As a result of the acquisition/development and use of supply chain applications, please indicate the choice that accurately reflects your firm's overall performance:

	Significant decrease (1)	Decrease (2)	Same as before (3)	Increase (4)	Significant Increase (5)	Not applicable (6)
Market share						
Return on Investment						
The growth of market share						
Growth in return on investment						
Profit margin on sales						
Overall competitive position						