



**Supply chain integration and its impact on supply chain performance:  
Perception of employees in ethiotelecom**

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# **ADDIS ABABA UNIVERSITY SCHOOL OF GRADUATE STUDIES**

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## DECLARATION

I, the undersigned, declare that, this study “Supply chain integration and its impact on supply chain performance: Perception of employees in ethiotelecom” is my original work and has not been presented for a degree in any other university, and that all sources of materials used for the study have been duly acknowledged.

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## **CERTIFICATION**

This is to certify that **Getasew Yaregal** has carried out this research work on the topic entitled “**Supply chain integration and its impact on supply chain performance: Perception of employees in ethio telecom**” under my supervision. This work is original in nature and has not been presented for a degree or masters in any University and haven't been published previously it can be submitted for the partial fulfillment of the requirements for the award of the degree of Masters of Art in Logistics and Supply Chain Management.

**ShiferawMitiku(PhD)**

**Signature** \_\_\_\_\_

**Date** \_\_\_\_\_

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# **TABLE OF CONTENTS**

ACKNOWLEDGEMENTS.....	i
TABLE OF CONTENTS .....	ii
LIST OF ACRONYMS AND ABBREVIATIONS.....	v
<i>ABSTRACT</i> .....	vi
CHAPTER ONE .....	1
INTRODUCTION.....	1
1.1. Background of the study.....	1
1.2. Statement of the problem.....	2
1.3. Research Questions .....	4
1.4. Research objectives .....	4
1.4.1. General objective .....	4
1.4.2. Specific objectives .....	4
1.5. Definition of terms .....	5
1.6. Significance of the study .....	6
1.7. Scope of the study/Delimitation of the study .....	6
1.9. Organization of the research report.....	7
CHAPTER TWO .....	8
RELATED LITERATURE REVIEW.....	8
2.1. Introduction.....	8
2.2. Theoretical Review .....	8
2.2.1. Supply Chain .....	8
2.2.2. Supply Chain Integration.....	9
2.2.3. Supply Chain Integration dimensions .....	10
2.2.4. Supply Chain Performance .....	15
2.3. Empirical Review .....	18
2.4. Conceptual Framework .....	20
CHAPTER THREE.....	21
METHODOLOGY OF THE RESEARCH .....	21
3.1. Introduction.....	21
3.2. Case study approach.....	21

3.3.	Study area Description and population .....	21
3.4.	Sample and sampling techniques .....	22
3.4.1.	Sampling techniques .....	22
3.4.2.	Sample Size .....	22
3.5.	Source and tools of data collection .....	23
3.6.	Methods of data analysis .....	24
3.7.	Validity and Reliability .....	24
3.7.1.	Validity test.....	24
3.8.	Ethical Considerations.....	25
CHAPTER FOUR .....		26
RESULTS AND DISCUSSION .....		26
4.1.	Introduction.....	26
4.2.	Descriptive Analysis .....	26
4.2.1.	Demographic Description.....	26
4.2.2.	Supply Chain Integration Analysis .....	27
4.2.3.	Supply Chain Performance Analysis .....	32
4.3.	Inferential statistics .....	37
4.3.1.	Correlation analysis .....	37
4.3.2.	Regression Analysis .....	40
4.4.	Discussion of results.....	43
CHAPTER FIVE.....		46
SUMMARY, CONCLUSION AND RECOMMENDATIONS .....		46
4.3.	Summary of major findings .....	46
4.4.	Conclusions.....	47
4.5.	Recommendations .....	47
References.....		49

## LIST OF TABLES

<i>Table 3-1 Published Table for sample size determination</i> .....	22
<i>Table 3-2 Sample size from each strata</i> .....	23
<i>Table 3-3 Reliability test:</i> .....	24
<i>Table 4-1 Demographic analysis</i> .....	27
<i>Table 4-2 mean and STD of SCI elements</i> .....	28
<i>Table 4-3 mean and STD of supplier integration items</i> .....	29
<i>Table 4-4 mean and STD of Internal Integration items</i> .....	31
<i>Table 4-5 mean and STD of customer Integration items</i> .....	32
<i>Table 4-6 mean and STD of operational performance variables</i> .....	32
<i>Table 4-7 mean and STD of flexibility</i> .....	34
<i>Table 4-8 mean and STD of time/speed</i> .....	34
<i>Table 4-9 mean and STD of quality</i> .....	35
<i>Table 4-10 mean and STD of cost</i> .....	36
<i>Table 4-11 Bivariate Pearson's Correlation (r) Among Independent Variables, Dependent variables, and between Independent and Dependent Variables</i> .....	38
<i>Table 4-12 Collinearity statistics</i> .....	41
<i>Table 4-13 Results of Multiple Regressions Analysis (ANOVA)</i> .....	41
<i>Table 4-14 Results of Multiple Regressions Analysis (Coefficients)</i> .....	42

## LIST OF FIGURES

<i>Figure 1 Conceptual Framework</i> .....	20
<i>Figure 2 Linearity test</i> .....	40

## **LIST OF ACRONYMS AND ABBREVIATIONS**

**A.A:** - Addis Ababa

**CRM:** - Customer Relationship Management

**ERP:** - Enterprise Resource Planning

**HQ:** - Head Quarter

**OP:** - Operational Performance

**SCI:** - Supply Chain Integration

**SCM:** - Supply Chain Management

**SPSS:** - Statistical Package for Social Sciences

**STD:** - Standard Deviation

**VIF:** - Variance Inflation Factor

## **ABSTRACT**

*The purpose of this study is to examine the current level of supply chain integration and to analyze its influence on ethiotelecoms' supply chain performance. The study is considered as a case study. This research conceptualizes and develops three dimensions of supply chain integration (supplier integration, customer integration and internal integration) and examines the relationships among supply chain integration dimensions and between SCI and supply chain performance (SCP). The data collection instrument used was a questionnaire which was administrated to a total sample of 286 employees using stratified sampling techniques. Statistical techniques such as descriptive statistics, correlation, and multiple regressions were employed to analyze the data. Measured from the three dimensions of SCI, it can beconcluded that the current level of SCI of the company is low. The company has a relatively better internal integration, but its external integration (supplier and customer integrations) is week. The result of the analysis also proved thatthere is strongand significant relationship between supply chain integration and supply chain performance. Besides, SCI have a strong and positive influence on supply chain performance. The results also indicated that customer integration had the highest effect on SCP, followed by supplier integration and internal integration. Therefore, for improving SCP, the current study recommendsimproving the three components of SCI together as they are strongly interrelated.*

**Keyword:** *supply chain Integration, Customer Integration, Supplier Integration, supply chain performance*

# CHAPTER ONE

## INTRODUCTION

This first chapter will give a general view of the research. It started with the description of the research background and then a clear statement of the main problems of the research is described. It then approaches the objectives; and the research questions that were answered in the research. This is followed by stating the significances or purposes and scope/limitation of the study. Finally, the organization of the research paper was described.

### **1.1. Background of the study**

Supply chain management is a fundamentally different philosophy of business organization and is based upon the idea of partnership in the marketing channel and a high degree of linkage between entities in that channel. The supply chain as a whole is closely coordinated in order that total channel inventory is minimized, bottlenecks are eliminated, time-frames compressed and quality problems eliminated (Sebastian Kot. 2014). Lambert and cooper, 2000) stated that supply chain management requires integration and coordination for satisfying and responding to changes in consumer demand.

A higher level of interaction between supply chain members can be explained in terms of building close and long-term relationships based on mutual understanding. Collaboration among supply chain actors is needed in order to compete in today's business environments. Long-term relationships that are created between supply chain partners based on collaboration need to be underpinned by mutual understanding and willingness to maintain the relationship (Ismail Abushaikha, 2014).

Supply chain integration (SCI) is the degree to which a manufacturer strategically collaborates with its supply chain partners and collaboratively manages intra- and inter-organization processes. The goal is to achieve effective and efficient flow of products and services, information, money and decisions, to provide a maximum value to customer at low cost and high speed (Flynn, Huo and Zhao, 2010). And many researchers like Flynn

*et.al*, 2010 and BaofengHuo, 2012 pointed out that supply chain integration influences performance.

The case company has upstream relationship with its suppliers which provide different types of materials including network materials, voucher cards, SIM cards, etc. and for delivering its services it has relationship downstream with wholesalers, retailers and customers. The company has been implementing ERP (Enterprise Resource Planning) and CRM (Customer Relationship Management) systems for improving functional/departmental integration internally and with suppliers and customers externally.

Therefore, it was worth to study the effect of integration of supply chain processes and activities on supply chain performance, so this study had investigated the current level of SCI and its impact on supply chain performance of ethiotelecom.

## **1.2. Statement of the problem**

Supply chain integration is the degree to which a manufacturer strategically collaborates with its supply chain partners and collaboratively manages intra- and inter-organizational processes, in order to achieve effective and efficient flows of products and services, information, money and decisions, to provide maximum value to the customer (Flynn*et.al*, 2010).

Supply chain integration is one of the key elements in improving firm performance. The key to SCI is to develop uninterrupted link with upstream suppliers and downstream customers along with total functional synergy internally. Therefore, integration could be achieved through three major interrelated activities – customer relationship management, internal SCM and supplier relationship management (Alfalfa-Luque .R, Medina-Lopez .C and Kumar dey. P.,2012).

For successful implementation of SC, all firms within a SC must overcome their own functional silos and adopt a process approach. The key processes typically include customer relationship management, customer service management, demand management, order fulfillment, manufacturing flow management, supplier relationship management,

product development and commercialization and returns management (Lambert and Cooper (2000), cited inAlfalla*et.al.*2012).

One important visage of integration is the level of integration which can be identified by the number of activities through one dimension. In today's global competition, companies strongly need to adopt advanced practices to achieve a high integration within their supply chain. So knowing the level of supply chain integration is a key factor for each company to improve their integration (ZahraLotfi, *et al.* 2013).

The case company, ethiotelecom has many supply chain related performance problems which includes warehouse storage space problems, higher level of inventory for low movable items, obsolescence etc. In addition different departments are concerned with achieving their own objectives separately. Such problems happened due to poor supply chain management in general and supply chain integration problems in particular. So through analyzing the level of supply chain integration, this study will help to identify improvement areas that can solve supply chain performance problems.

Ethiotelecom has an initiative to integrate the functions of different departments internally and with customers and suppliers externally through ERP and CRM systems. According to Li *et.al*, 2006, any organization initiative including supply chain integration practices should ultimately lead to enhanced organizational performance. So through this study the impact of these initiatives on the integration capabilities internally and externally and its impact on supply chain performance was assessed.

Many studies have found that integration across the supply chain has a positive impact on organizational performance(e.g. Flynn *et al.*, 2010, BaofengHou, 2012, La Hatani, 2013; Sohail, S.M., 2009).

Despite the importance of supply chain practices on supply chain performance there is a lack of studies in Ethiopia that link supply chain integration practices and supply chain performance. In addition previousresearches are limited in manufacturing industry and organizational performance, but this researchhadextended the study of supply chain integration and supply chainperformance toservice providing company. Therefore this

study could contribute in filling these gaps by examining the level of supply chain integration and its impact on supply chain performance of ethiotelecom.

### **1.3. Research Questions**

This study examines the level of supply chain integration, which consists of internal integration, supplier integration and customer integration, and its relationship to supply chain performance which consists of flexibility, time/speed, quality and cost.

Hence, the following question will be answered:

- ✓ What is the current level of supply chain integration at ethiotelecom?
- ✓ What is the relationship between supply chain integration and operational performance at ethiotelecom?
- ✓ How can supply chain integration impact on supply chain performance of ethiotelecom?

### **1.4. Research objectives**

#### **1.4.1. General objective**

The research project therefore sought to explore and investigate the level of supply chain integration and its impact on supply chain performance of ethiotelecom.

#### **1.4.2. Specific objectives**

The specific objectives of the study are:

- I. To examine the current level of supply chain integration at ethiotelecom
- II. To determine the relationship between supply chain integration(customer, supplier and internal integration) and supply chain performance
- III. To analyze the impact of supply chain integration(customer, supplier and internal integration) on supply chain performance

## 1.5. Definition of terms

In this study, the following conceptual and procedural will be used:

**Supply Chain Integration:** the degree to which a manufacturer strategically collaborates with its supply chain partners and collaboratively manages intra- and inter-organizational processes, in order to achieve effective and efficient flows of products and services, information, money and decisions, to provide maximum value to the customer (Flynn *et al.*, 2010).

**Customer Integration:** The process of building and maintaining a strong relationship and partnership with the customers. It includes sharing the knowledge, experiences, products, services, and suggestions with customers (Zahra Lotfi *et al.* 2013). It was measured by specific items no. 1-11 (Appendix I).

**Supplier Integration:** The process of cooperation between supplier and organization that facilitate sharing of information, knowledge, materials and experiences (Stank, *et al.* 2001). It was measured by specific items no. 12-21 (Appendix I).

**Internal Integration:** The process of maintaining cross-functional cooperation and collaboration within the organization that intends to achieve organizational strategic goals (Flynn, *et al.* 2010). It was measured by specific items no. 22-31 (Appendix I).

**Supply chain Performance:** Group of supply chain standards and benchmarks that are adopted and used by the organizations to achieve supply chain related performance (Vaidya and Hudnurkar, 2012). In this study supply chain operational performance was measured by the following dimensions: Flexibility, Time (Speed), Quality, and Cost.

**Flexibility:** The ability of organization to adapt to fluctuation in demand in term of product or service specification, volume, and on-time delivery (Rosenzweig, *et al.* 2002). It was measured by specific items no. 32-36 (Appendix I) that reflect the ability of the organizations to overcome these fluctuations in demand.

**Time (Speed):** Delivery time that is required by the company to provide the product or and services to the customer according to agreed timetable (Gimenez, *et al.* 2011). It was

measured by selected items no. 37-42(Appendix I) that reflect the speed in delivering the products and services to customers.

**Quality:**In this study quality defined as the degree to which supply chain integration meets customer needs and demands (Juran and Godfery, 1998). It was measured by items no. 43-48(Appendix I) that embodied the concept of quality.

**Cost:** The total costs and expenses that are incurred by completing all/ and or specific activities and operations within supply chain (Bowersox, et al. 2009). It was measured by selected items no. 49-54 (Appendix I) that reflect the total incurred costs and expenses.

## **1.6. Significance of the study**

The study findings are beneficial to various stakeholders. Above all, the study tried to determine the relationship between the supply chain integration and supply chain performance of ethiotelecom. This study would be helpful to ethiotelecom managers as it helps to identify the areas/variables that the company should react to improve the level of supply chain integration and hence improving supply chain performance. It can also be helpful to local managers seeking for ways to enhance supply chain performance by embracing supply chain integration.

Future scholars could use the results of this study as a source of reference as it aimed to deepen knowledge in supply chain integration and their impact on supply chain performance.

## **1.7. Scope of the study/Delimitation of the study**

This research was conducted as a case study on ethiotelecom at Addis Ababa city from October 2016 to May 2017. Due to time and experience limitations, the research was conducted from the focal/case company perspective and data regarding supply chain integrations and supply chain performance was collected from different departments or functions within the company.

Three dimensions of supply chain integration i.e. customer, supplier and internal integration were assessed. In terms of supply chain performance measurements only

relevant variables for the case company i.e. flexibility, time/speed, quality and cost were considered.

This study was carried out on ethiotelecom, which is a sole telecom service providing company, so generalizing the results of this organization on other industry is questionable.

### **1.8. Organization of the research report**

This research paper was organized into five chapters: Chapter one contains the introduction part dealing with background of the study, the research problem, objectives of the study, scope, significance and limitation of the study. The second chapter discussed the review of related literature about the subject matter. In chapter three the methodologies used for the study were presented. In chapter four results, discussion and interpretation of the study were presented and finally, in chapter five, the summary of major findings, conclusion and recommendations were discussed.

# CHAPTER TWO

## RELATED LITERATURE REVIEW

### 2.1. Introduction

Supply chain integration is about collaboration, cooperation and coordination among different players of supply chain which enhances organization's performance. Different authors defined supply chain integration and operational performance in different ways, each definition is tailored according to the nature of the study, industry, and research objective. The following section will explore the concepts of supply chain integration and operational performance, as well as, the relationship between them.

### 2.2. Theoretical Review

#### 2.2.1. Supply Chain

A supply chain is defined as a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer (Mentzer, *et.al.* 2001).

Supply chain is considered as a system that includes group of activities, processes and sub-processes such as procurement, operations, transportation, warehousing. It aims to provide the products and/or services either to consumer or customer starting with purchasing materials and equipment then transforming it to semi- finished products that will be reprocessed again to produce the final products. Supply chain as an association of customers and suppliers who, working together yet in their own best interests, buys, converts, distributes, and sell goods and services among them resulting in the creation of a specific end product. Thus, every company is necessarily part of at least one supply chain (National Research Council, 2000).

Supply chain management (SCM) is a holistic approach to demand, sourcing and procurement, production and logistics process management (Chow et al., 2008; Chopra and Meindl, 2010). It is a network consisting of all parties involved (e.g. manufacturer,

supplier, retailer, customer, etc), both downstream and upstream, directly or indirectly, for manufacturing and delivering a product or service to the end customers (Mentzer et al., 2001).

The concept of supply chain has been evolved over time. Chopra and Meindal (2007) said that supply chain consists of all parties involved directly or indirectly in fulfilling customer demand, it includes all functions involved in receiving and fulfilling a customer's requests. These functions include manufacturers and suppliers, warehouses, transporters, retailers, and final customers. Chopra and Meindal (2007) added that the objective of every supply chain is to maximize the overall value created. Wheelen and Hunger (2012) stated that "Supply chain management is the forming of networks for sourcing raw materials, manufacturing products or creating services, storing and distributing the goods, and delivering them to customers and consumers". Then they added that the concept of supply chain is used first to reduce costs, and then to improve customer service and get new products to market faster than others. Finally, Krajewski, *et al.* (2013) defined supply chain as it is the interrelated series of processes within a firm and across different firms that produce a products or service to the satisfaction of customers.

### **2.2.2. Supply Chain Integration**

Due to the intense of global competition, the organizations create cooperative and mutually beneficial relationship among supply chain partners (Wisner and Tan, 2000). Bowersox et al. 1999, Westbrook and Frohlich (2001), pointed out that organizations or companies need to implement supply chain integration to meet the new challenges of the global competitive environment.

Many studies propose different supply chain definitions. Committee on Supply Chain Integration, 2000 defined it as

*“An association of customers and suppliers who, using management techniques, work together to optimize their collective performance in the creation, distribution, and support of an end product. It may be helpful to think of the participants as the divisions of a large, vertically integrated corporation, although the independent companies in the chain are*

*bound together only by trust, shared objectives, and contracts entered into on a voluntary basis”*

According to Flynn et. al, (2010), Supply chain integration is the degree to which a manufacturer strategically collaborates with its supply chain partners and collaboratively manages intra- and inter-organizational processes, in order to achieve effective and efficient flows of products and services, information, money and decisions, to provide maximum value to the customer).

Supply chain integration, if applied effectively, is known to bring about a significant improvement to all companies. The target of seamless supply chain is to enhance material and information flows within a company and also connect it with other supply chain members. With the technology available today, very intimate, beneficial and profitable supply chain integrations can be structured (Zahra et.al. 2013).

### **2.2.3. Supply Chain Integration dimensions**

Previous studies analyze and measure SCI considering three main approaches: (1) external (with supplier and customer) and internal integration, (2) process integration and (3) information/data and physical materials flows integration (Alfalla-Luque et al., 2012).

Although the internal and external integration is the key element for SCI, there is much emphasis on customer and supplier integration only, ignoring the important central link of internal integration. They argue that the diverse dimensions of SCI can ultimately be collapsed into three dimensions: customer, supplier and internal integration.

Internal integration and external integration play different roles in the context of SCI. while internal integration recognizes that the departments and functions within a manufacturer should function as part of an integrated process, external integration recognizes the importance of establishing close, interactive relationships with customers and suppliers (Flynn et al., 2010).

At the start, the organizations were focusing on what they were able to do to manage the business and achieve their goals which were represented by the profitability and customer satisfaction, so the main focus was on managing internal processes between the

departments which were effective at that time. Later, the concept of organizational performance was coupled with supply chain performance, so the organizations that plan to continue, compete, survive, and being superior over the other competitors started to adopt this concept and tried to expand the scope of managing the relationship with the other supply chain parties (suppliers and customers).

Today, companies use enterprise system packages to integrate their internal functions. By achieving internal integration with enterprise systems, shared database will be used for company's all functions, there will be gains such as improvements in information flow and processes in the company. Transactions between companies will be performed more effectively by information sharing in supply chain with integrating with customers and suppliers. The internal integration and external integration of the companies in the supply chain will ensure that companies to be more competitive (Ozdemir, A.I. and Asla, E. 2011).

Basic Enterprise Resource Planning (ERP) is one of various software systems that used to make the integration between the three processes (stages). ERP is a system that effectively integrates all information required by the operating process functions including finance, accounting, human resources, production, material management, quality management, allocation and distribution, and sales by organization or process reengineering and information technology (Stephen, 2000, cited in Adaileh, J.M. and Abu-alganam, M.K. 2010). Adaileh, J.M. and Abu-alganam, M.K. 2010 studied the role of ERP on supply chain integration (internal and external). The results showed that both internal and external integration are positively related with ERP.

Many researches and academic papers have been written about supply chain management and its elements. Some investigated supply chain integration. Others were studied supply chain performance, while others discussed mediating factors that affect supply chain integration or performance and/ or both of them. Finally, some studies have addressed both elements together (supply chain integration and performance).

Flyn, *et al.* (2010) analyzed the impact of SCI dimensions (customer, supplier and internal) and SCI pattern on business and operational performance. The results showed that internal integration and customer integration are more strongly related to performance than supplier integration.

La Hatan *et al.* (2013) studied the impact of supply chain integration on company performance using competitive advantage as relationship mediation. Zhang and Huo (2012) focused on dependence and trust and its impact on external integration (supplier and customer). Zhao, *et al.* (2011) emphasized on internal integration, and concluded that internal integration is the source of both customer and supplier integration through relationship commitment to customer and relationship commitment to supplier.

Sohailet *al.*(2009) studied the relationship between organizational strategy, supply chain integration, environmental uncertainty and organizational performance. Results showed that organization strategy does have a positive impact on the supply chain integration, while environmental uncertainty has negative impact on supply chain integration.

Hosseini, *et al.*(2012) investigated the impact of supply chain integration (customer, internal and supplier) on competitive capabilities. The results showed that Integration with customers directly and positively influences on competitive capabilities. But internal integration is not directly related with competitive capabilities. This variable affects competitive capabilities positively through integration with other partners of supply chain.

Huo (2012) examined the impact of supply chain integration (Supplier, Internal and customer integration) on three types of company performance (supplier-related, customer-related and financial performance) using supplier related and customer related performance as a mediating variables. Huo (2012) concluded that internal integration improves external integration, and both integration directly and indirectly enhance company performance.

Xu, *et al.* (2014) explored intra-organizational resources (Top management support and Information technology) and inter-organizational capabilities (Supplier and Customer integration) and its effect on competitive advantage (Performance). They found that interorganizational resources were vital enablers of supply chain integration. In addition, both supplier and customer integration have significant effect on business performance. Zhao, *et al.* (2013) investigated the impact of supply chain risk (supply delivery, and demand delivery risk) on supply chain integration (supplier, internal, and customer integration) and company performance (schedule attainment, competitive performance, and customer satisfaction).

Based on previous studies regarding to the importance of all supply chain elements, this study intended to investigate all the supply chain variables/dimensions: Supplier, Internal, and Customer integration variables.

## **I. Supplier Integration**

Supplier integration refers to acquiring operational, technical and financial information with the suppliers. Manufacturers and suppliers may share information including production plans, demand forecasts and levels of inventory. This information sharing results in enhancing the product and production requirements and better utilizing the supplier's and the firm's capability and structure of cost (Zahra Lotfiet al.2013).

Stank, *et al.* (2001), defined supplier integration as "the degree to which a firm can partner with its key supplier members". Some authors use the term downstream integration to express supplier integration. Scannell, *et al.* (2000) has focused on upstream integration, analyzing the integration with suppliers. Flynn,*et al.* (2010), also comment on supplier integration as it involves core competencies related to coordination with critical suppliers.

Accordingly, in this study supplier integration was measured by specific items no. 12-21 (Appendix I) that reflect the nature of relationship, partnership, and other relevant issues between supplier and ethiotelecom.

## **II. Internal Integration**

Internal integration is integration within all internal departments from incoming material to distribution. It involves integration across departments and functions under the control of the manufacture in order to fulfill customers' requirements. This suggests that more consideration should be given to interplay in the middle of functional departments, for instance production, procurement, logistics, inventory, marketing, sales and distribution (Zahra Lotfiet al.2013).

Internal integration mainly involves data and information system integration through the use of enterprise resources planning (ERP), real-time searching of inventory and operating data, and integration of activities in different functional areas. Internal integration also involves cross-functional cooperation, or working together across different functions in

process improvement or new product development. Internal integration recognizes that different functions within a firm should not act as functional silos, but instead as part of an integrated process (Zhao, *et al.* 2011).

Flynn, *et al.* (2010) defined internal integration as "the degree to which a manufacturer structures its own strategies, practices and processes into synchronized, collaborative processes to fulfill its customers' requirements and efficiently interact with suppliers". Accordingly, in this study supplier integration was measured by specific items no. 22-31 (Appendix I).

### **III. Customer Integration**

Customer integration is supply chain integration downstream. It is the outgoing set of products and services and the incoming set of data from customers to suppliers. Customer integration leads to creating a relationship with customers and hence gaining a better and clearer understanding of customers' references (Zahra Lotfiet *al.* 2013).

Customer integration was discussed and defined by different researchers' perspectives. Flynn, *et al.* (2010) defined that customer integration involves core competencies derived from coordination with critical customers. Kulp, *et al.* (2004) studied the integration with buyers. Van der Vaart and Van Donk (2008) analyzed supply chain integration from different perspectives: attitudes, pattern, and practices. While other authors have studied integration with customers and suppliers such as Flynn, *et al.* (2010) and Zhao, *et al.* (2011) considered a broader perspective for supply chain integration as internal integration and external integration. Huo, B. (2012) said that both supplier integration and customer integration can be classified as external integration.

In this study customer integration was measured by selected items no. 1-11 (Appendix I) explore the relationship and partnership and related issues like sharing the knowledge, experiences, products, services, and suggestions with customers.

#### 2.2.4. Supply Chain Performance

A typical firm already has a certain number of performance metrics such as return on investment (ROI) for assessing its financial performance, but supply chain related performance metrics have not been widely adopted and businesses are typically uninformed of them (AsawinPasutham, 2012).

Academicians and researchers have investigated supply chain performance from many different perspectives. Wang, *et al.* (2009) developed supply chain performance measures based on efficiency. Gimenez, *et al.* (2011) studied profits, delivery speed and transportation costs as a performance measures. Vanichchinchai, 2014 investigated firm's supply performance that composed of flexibility, cost, relationship and responsiveness.

Many researchers assume it to be improved by SCI take very different types of performance into account: from pure operational logistics performance (such as inventory level, response time, service quality or logistics cost) to broad strategic performance (e.g. improved competitive position, profitability and growth), often including customer value and satisfaction. They also look at performance for differing units of analysis such as the wholesupplychain,acompany,abusinesunitoraplant.Inrespectofhowperformance is measured the majority includes items related to logistics and SCM performance (Fabbe-Costes, 2008 cited inAsawinPasutham, 2012).

Bowersox, *et al.* (2000) and Croxton,*et al.* (2001) said that the use of external linkage performance metrics leads to the creation of endcustomer value through integrating activities and communication with other member firms along the supply chain. Harrison and New (2002) pointed out the importance of operational performance metrics as a standard framework to assess operational performance which includes internal and external firm links. Vaidya and Hudnurkar (2012) presented the criteria of performance evaluation through cost, customer service, productivity, asset measurement, quality, time, innovativeness, price, flexibility / adaptability, ability to collaborate, supplier profile, and marketing measures.

This study considered the supply chain performance as a group of standards and benchmarks that are adopted and used by the organizations to achieve customer satisfaction

and maximum level of profitability. Therefore supply chain operational performance was measured by the following dimensions: Flexibility, Time (Speed), Quality, and Cost because they are considered the most common dimensions that are investigated in the previous studies.

### ***I. Flexibility***

Building the competitive strategy to be flexible requires the commitment toward certain actions and activities, among these are educating the employee for different tasks, motivate employee for more flexible work schedules, working in teams, and enhancing communication in the organization.

Rosenzweig, *et al.* (2002) defined flexibility as "the ability of the firm to develop flexible operations in hypercompetitive environment to meet the frequent changes in volume, product mix and schedules occur". In this research it was measured by specific items no. 32-36 (Appendix I) that reflect the ability of the organizations to overcome these fluctuations in demand.

### ***II. Time (Speed)***

The traditional dimensions to measure performance are expressed by delivery time and lead time. Different studies defined time, lead time, and cycle time. Cycle time is the time between one completion jobs or tasks to another, i.e. from starting one process or task to start the same process or task again. Lead time is the time that is required from setting the order by customer to deliver the product or service (company and supplier) including manufacture, transportation, processing, warehousing, and delivering the product or service to the final customer (Gimenez, *et al.* 2011).

The researcher adopts delivery time that is required by the company to provide the product or services to the customer according to agreed time table. It was measured by selected items no. 37-42 (Appendix I) that reflect the speed in delivering the products and services to customers.

### ***III. Quality***

Juran and Godfrey (1998) emphasized on two definitions of quality 1). "Quality is those features of products which meets customer needs and thereby provide customer satisfaction". 2) "Quality means freedom from deficiencies-freedom from errors that require doing work over again (rework) or that result in field failures, customer dissatisfaction, customer claims, and soon. In this sense, the meaning of quality is oriented to costs, and higher quality usually costs less".

Supply chain integration requires that quality be more than a set of abstract standards. Quality must be a systemic way of doing business that is instilled in all participants in the chain. Quality has become critical in supply chains using just-in-time manufacturing with low inventory level(Committee on Supply Chain Integration, 2000).

In this study quality was measured by items no. 43-48 (Appendix I) that embodied the concept of quality of products/services and processes.

### ***IV. Cost***

The most common and important measure in evaluating operational supply chain is cost. Bowersox, *et al.* (2009) defined the cost as the total cost incurred to accomplish specific operation. Vaidya and Hudnurkar (2012) defined cost as the summation of all costs that includes: inbound and outbound freight, warehouse cost, third party storage cost, order processing cost, direct labor cost, administrative and service costs. Cirtita, H. and Segura, D.A.G. 2012 defined the cost as "the total costs associated with operating the supply chain". Building the strategy based on reducing the overall costs entail to run out the following: reducing inventories, maximum utilization of resources, work- in- process inventory turnover, and eliminating non value added activities.

In this research cost will be measured by selected items no. 49-54 (Appendix I) that reflect the total incurred costs and expenses.

Referring to the above previous studies and the referring to the importance of supply chain management and the resulting of substantial benefits as a result of integration, the researcher investigated the supply chain integration as an independent variable represented

by: supplier, internal, and customer integration, and the operational performance as a dependent variable represented by: cost, quality, time, and flexibility.

### **2.3. Empirical Review**

In the above theoretical literature reviews, it was shown that there is a strong relationship between supply chain integration and performance. Some studies claimed that there is a strong relationship between supplier and customer integration and organizational performance, other studies comments the presence of relationship between upstream and downstream interactions and operational performance, another group of studies assured the inevitability of relationship between supplier, internal, and customer integration with the overall organizational performance.

Almost all studies concluded that the supply chain integration is considered as vital process that affects operational performance, consequently the organizations' overall business performance.

Scannell, *et al.* (2000) concluded that supply chain practices were positively associated with aggregation measures of cost and flexibility. Salvador, *et al.* (2001); Westbrook and Frohlich (2001); and Vickery, *et al.* (2003) found a positive and direct relationship between information technology integration and supply chain integration. Chen and Paulraj, (2004) said that: internal integration of different departments within a firm should act as integrated process. Kulp, *et al.* (2004) and Gimenez and Ventura, (2005) showed the importance of downstream integration. Bagchi, *et al.* (2005) stated that supply chain integration affects operational performance, and the degree of integration influences cost and efficiency. Swink, *et al.* (2007) and Flynn, *et al.* (2010) pointed out that external integration emphasizes the importance of cooperation and collaboration with suppliers and customers.

Westbrook and Frohlich (2001), Swink, *et al.* (2007), Van der Vaart and Van Donk, (2008), and Zhao, *et al.* (2011) suggested that supplier integration and customer integration play different roles in performance improvement and capability development. Xiao, *et al.* (2010) found a significant role of both relationship commitment and trust in improving cooperation performance and operational performance. Flynn, *et al.* (2010) found that internal integration and customer integration were more strongly related to performance

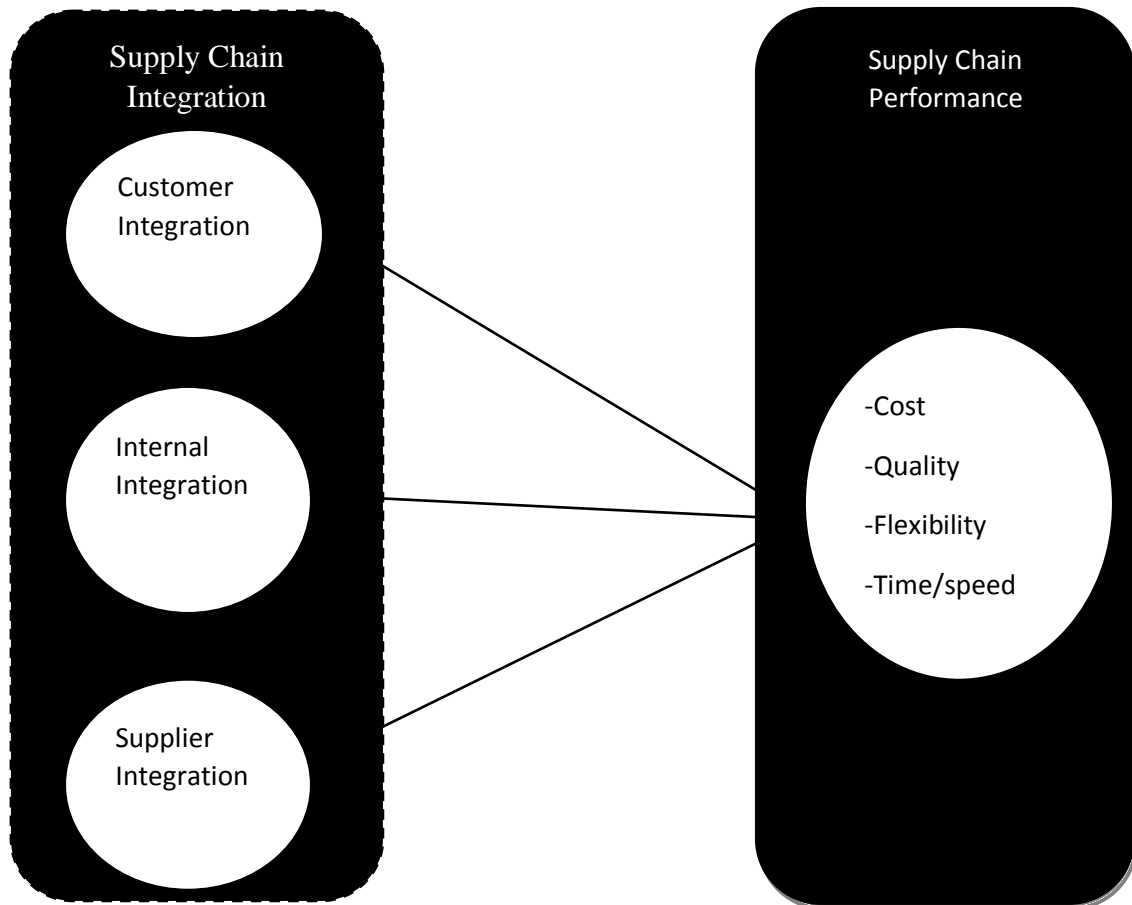
improvement than supplier integration. Gimenez, *et al.* (2011) found that a positive effect of integration on performance in terms of profits, delivery speed, and transportation cost. Alam, *et al.* (2014) mentioned that due to integration supplier get closer to their customers and may involve customers in shaping and fabricating the products or service in a way to satisfy customers' demand.

The current study considered supplier integration, internal integration, and customer integration as independent variables, while operational performance elements (cost, quality, time, and flexibility) as dependent variable. More specifically, the purpose of the current study was to analyze the level of supply chain integration and investigate the impact of supply chain integration on operational performance at ethiotelecom.

## 2.4. Conceptual Framework

Based on overall review of related literature, and particularly the work of BaofengHuo, 2012 the following conceptual framework was used to govern the study.

**Figure 1 Conceptual Framework**



Source: BaofengHuo, 2012

## **CHAPTER THREE**

### **METHODOLOGY OF THE RESEARCH**

#### **3.1. Introduction**

In this chapter the methodology used for the study will be discussed. First, the research design will be described. Second, the study area and the population under study will be described. Third, sample size and sampling techniques will be discussed. Fourth, sources of data collection and methods of analysis were discussed. Finally, validity and reliability tests results will be discussed.

#### **3.2. Case study approach**

This study employs case study approach to examine the supply chain integration elements and its impact on supply chain performance at ethiotelecom. It starts with literature review to develop the currently used measurement model and explore the supply chain integration profile of ethiotelecom. Then the items included in the questionnaire; and the reliability and validity of the questionnaire was carried out. Finally, the survey was conducted, and the results were compared with previous researches work.

#### **3.3. Study area Description and population**

This study was conducted as a case study at ethiotelecom, Addis Ababa city. It focused on analyzing the level of supply chain integration and its impact on supply chain performance of ethiotelecom.

The target populations were employees of ethiotelecom particularly who have a job roles of professionals, specialist, supervisors, managers and above and who are working at Head Quarter (HQ) and Addis Ababa city.

The departments/divisions considered as strata includes: sourcing department (HQ), logistics and supply department (HQ), enterprise sales dep't (A.A), marketing division (HQ), Finance accounting dep't (HQ) and Network operation and maintenance dep't (A.A). The total population from the mentioned six departments is 1235 employees.

### 3.4. Sample and sampling techniques

#### 3.4.1. Sampling techniques

Since the information required for the study needs different people who have knowledge and awareness about different supply chain integration dimensions and supply chain performance of the company, the sample need to have the right proportion of people from every concerned department or division. Therefore, stratified probability sampling technique was used for the study. The target population was classified into six strata based on the departments and sections in the company which are directly related with SC of the organization. Then the samples were selected from each stratum according to their proportion to the total population.

#### 3.4.2. Sample Size

For determining the sample size the following published table by Israel, Glenn. D was used.

**Table 3-1 Published Table for sample size determination**

(Sample Size for  $\pm 3\%$ ,  $\pm 5\%$ ,  $\pm 7\%$  and  $\pm 10\%$  Precision Levels where Confidence Level is 95% and  $P=0.5$ .)

Size of population	Sample size(n) for precision(e)			
	$\pm 3\%$ ,	$\pm 5\%$	$\pm 7\%$	$\pm 10\%$
500	a	222	145	83
600	a	240	152	86
700	a	255	158	88
800	a	267	163	89
900	a	277	166	90
1000	a	286	169	91
2000	714	333	185	95
3000	811	353	191	97
4000	870	364	194	98
5000	909	370	196	98
6000	938	375	197	98
7000	959	378	198	99
8000	976	381	199	99
9000	989	383	200	99
10000	1000	385	200	99

a = Assumption of normal population is poor; The entire population should be sampled.

Source: Israel, Glenn D. 1992

The total target population (N) for the study is 1235. Using the above table for 95% confidence level and  $P=0.5$ , a total 286 sample sizes was used for the study. Proportional allocation of samples for each stratum was as follows;

$n_i = n \cdot p_i$ ,  $p_i = N_i/N$  where  $N_i$  is the total population in each stratum

$n_1 = 286 \cdot 102/1235 = 24$ ,  $n_2 = 286 \cdot 147/1235 = 34$ ,  $n_3 = 286 \cdot 189/1235 = 44$ ,  
 $n_4 = 286 \cdot 131/1235 = 30$

$n_5 = 286 \cdot 68/1235 = 16$ ,  $n_6 = 286 \cdot 598/1235 = 138$

**Table 3-2 Sample size from each stratum**

Strata/department	Total population	Sample size
Sourcing dep't(A.A)	102	24
Logistics and supply dep't(A.A)	147	34
Enterprise sales(A.A)	189	44
Marketing division(HQ)	131	30
Finance accounting dep't(HQ)	68	16
Network operation and maintenance dep't(A.A)	598	138
Total	1235	286

*Source: survey 2017*

A total number of 286 questionnaires were distributed. Then the researcher collected 271 valid questionnaires which form 94.7% response rate of total units of analysis.

### **3.5. Source and tools of data collection**

Primary and secondary sources of data collection methods were used in this research. The method of data collection from primary sources was by distributing the questionnaire to the employees, managers and executives from the case company. The proposed framework was tested using the latest version of Statistical Package for Social Sciences (SPSS)24.0.0.0 for testing the measurement model.

Whereas secondary data was collected from different sources such as journals, working papers, researches, thesis, articles and worldwide web and the case company; ethiotelecom.

### 3.6. Methods of data analysis

This research is an empirical study which employed quantitative method. In order assess the level of supply chain integration at ethiotelecom descriptive statistics analysis such as frequency distribution, mean and standard deviation was used to analyze quantitative data.

Inferential statistics particularly the Pearson's correlation was also used to show the relationship and the strength/degree as well as direction of associations between variables. The other inferential statistics used is regression analysis so that to show interdependence of independent variables and dependent variable. Thus, both the strength of the relationship between variables and the influence of independent on dependent variable and statistical significance were assessed.

### 3.7. Validity and Reliability

#### 3.7.1. Validity test

Among three types of validity tests i.e. content validity, predictive validity, and construct validity this study addressed content validity through the review of literature and adapting instruments used in previous research.

#### 3.7.2. Reliability Test (Cronbach's Alpha)

Since multiple items in all constructs were used, the internal consistency/reliabilities of supply chain integration constructs and operational performance were assessed with Cronbach's Alpha. The following table shows the summary of reliabilities of all constructs.

The reliability is considered high if the value is near to 1 (Sekaran 2003). As shown in bellow table (3.1) that Cronbach's Alpha coefficient value for independent variables were ranging from 0.793 and 0.897 and for dependent variables were ranging between 0.776 and 0.919 which means that Cronbach's Alpha coefficient value is accepted and highly reliable.

**Table 3-3 Reliability test:**

Variables	No. of items	Cronbach's Alpha
Customer integration	11	0.846

Supplier Integration	10	0.793
Internal Integration	10	0.897
Supply Chain Integration	3	0.852
Flexibility	5	0.919
Time/speed	6	0.906
Quality	6	0.883
Cost	6	0.776
Operational Performance	4	0.920

Source: survey 2017

### **3.8. Ethical Considerations**

Confidentiality of responses, secrecy of respondents, integrity in collecting and handling of data and honesty in reporting the findings of the study were the ethical practices considered during this study. Disclosing of information by employees to a third party can and will expose the institution to potential legal conflict, due to this ethical issue the respondents might be fearful to disclose such information. However, this fear was addressed by explaining the objective of the study and providing assurance that the data will be handled professionally and is only going to be used for the thesis. With regard to references all the materials and sources used in the research were properly acknowledged.

# CHAPTER FOUR

## RESULTS AND DISCUSSION

### 4.1. Introduction

As discussed in previous chapter, this study attempted to examine the supply chain integration and its impact on operational performance in the case of ethiotelecom. Therefore, the findings of the study are presented and discussed in this chapter. The questionnaires were developed in five scales (Likert scale) ranging from five to one; where 5 represents strongly agree, 4 agree, 3 Neutral, 2 disagree, and 1 strongly disagrees. A total of 286 questionnaires were distributed to employees and 271 (94.75%) questionnaire were obtained valid and used for analysis. The collected data were presented and analyzed using SPSS (version 24) statistical software.

First, the study variables were analyzed and described from statistical point of view by using means, standard deviations. Second, the researcher used correlation analysis, specifically Pearson correlation to measure the degree of association between different variables under consideration. Third, Regression Analysis was also used to test the effect of independent variables on dependent variable.

### 4.2. Descriptive Analysis

#### 4.2.1. Demographic Description

Table (4.1) shows the general characteristics of the respondents in terms of educational qualification, position, department, and experience.

**Academic qualification:** Most of the respondents hold Bachelor degree with 238 (87.8%) respondents, while 22(8.1%) respondents hold Second Degree and above. The least academic qualification is diploma with 11 respondents (4.1%). This shows most of the respondents have a good academic qualification to understand the concept of the variables and answer the research questionnaires.

**Position:** Most respondent are professional level employees with 187 respondents (68.6%), while the least respondents regarding position are officers with 18 (14.9%) respondents.

**Department:** It seems that the most respondent are working in the network division/department with 128 respondents (47.2 %) while the least respondent are from Finance accounting department with 16 respondents (5.9%).

**Years of experience:** Experiences of most respondents is between 2 and 5 years with 150 respondents (55.4%), while a total of 121 respondents (44.6%) have stayed at the organization for more than 6 years. This indicates that most of the respondents selected have good experience regarding the company and their response can be considered genuine.

**Table 4-1 Demographic analysis**

<b>Dimensions</b>		<b>Frequency</b>	<b>Percent</b>
<b>Educational Qualification</b>	College Diploma	11	4.1
	First Degree	238	87.8
	Second Degree and above	22	8.1
<b>Job Title</b>	Officer	2	0.7
	Manager	9	3.3
	Supervisor	19	7.0
	Specialist	55	20.3
	Professional	187	68.6
<b>Experience</b>	2-5 years	150	55.4
	6-10 years	74	27.3
	Over 10 years	47	17.3
<b>Department/Division</b>	Enterprise	40	14.8
	Finance	16	5.9
	Logistics	34	12.5
	Marketing	29	10.7
	Network	128	47.2
	Sourcing	24	8.9

Source: survey 2017

#### **4.2.2. Supply Chain Integration Analysis**

This part of analysis tried to describe both independent and dependent variables from statistical point of view through means, standard deviations.

Question 1, what is the current level of supply chain integration in ethiotelecom?

To answer this question, the researcher used descriptive statistics like Mean and Standard Deviation.

**Table 4-2 mean and STD of SCI elements**

	N	Mean	Std. Deviation
Customer Integration	271	2.6900	.72473
Supplier Integration	271	2.8421	.65980
Internal Integration	271	3.3742	.43290
Company Supply Chain Integration	271	2.9688	.53936

Source: survey 2017

Table 4.2 shows that the mean value of independent variables is between 2.690 and 3.37 with standard deviations between 0.43 and 0.72. The overall mean of the three variables is 2.96 with standard deviation 0.5, which mean there is an agreement among ethiotelecom employees on lower implementation of supply chain integration in the company.

Based on the Means of independent variables, internal integration is relatively highly implemented with mean value of 3.37. It is due to the fact that the company has been implementing ERP (Enterprise Resource Planning) system as an effort to integrate internal functions. Customer integration shows the least implemented integration dimension with mean value of 2.69. Supplier integration is also the least implemented dimension with mean value of 2.84. This shows that the company's external integration is low.

According to Flynn, *et al.* (2010) any supply chain with lower external integration cannot have a higher supply chain integration. But as Zhaho, *et al.* (2011) described, companies with a lower level of internal integration will less likely have adequate capability to integrate with external partners, whereas companies with a high level of internal integration are more likely, and in a better position, to integrate their processes with customers' or suppliers' processes. Therefore, though the company's supply chain integration is low in general and its external integration in particular, the company has a good position for improving its integration as it has a relatively better internal integration.

Based on the comments from the survey the supply chain department in the company doesn't play a great role in determining and improving the supply chain integration. Its role is limited to functions of logistics, inventory management and warehouse management. Other important functions like procurement are managed in a different department. Moreover, relationship management within the supply chain has not been articulated and incorporated into the responsibilities of the supply chain department. This also shows that the organization has not understood the strategic importance of supply chain integration in particular and supply chain management in general.

#### 4.2.2.1 *Supplier Integration*

The respondents were given statements that denote the practice of integration with major suppliers. They were asked to show the extent to which they agreed with such practices as taking place in company. They responded as given in table 4.3.

**Table 4-3 mean and STD of supplier integration items**

		N	Mean	Std. Deviation
SIQ1	We have high level of information exchange with our major supplier through information network	271	3.19	1.151
SIQ2	We have established quick ordering systems with our major supplier	271	3.10	1.176
SIQ3	The level of strategic partnership with our major supplier is high	271	2.59	1.088
SIQ4	Our major suppliers participate in the process of procurement	271	3.14	1.653
SIQ5	Our major supplier shares their production schedule with us	271	2.81	1.141
SIQ6	Our major supplier shares available inventory with us	271	2.83	1.156
SIQ7	We share our production plans with our major supplier	271	2.61	1.126
SIQ8	We share our demand forecasts with our major supplier	271	2.61	1.103
SIQ9	We share our inventory levels with our major supplier	271	2.74	1.165
SIQ10	We help our major supplier to improve its process to better meet our needs	271	2.81	1.138
	Supplier Integration		2.8421	.65980

Source: survey 2017

The Table (4.3) shows the mean of supplier integration items is between 2.59 and 3.19 with the standard deviation between 1.08 and 1.6. The overall mean of the supplier integration

items is 2.84 with standard deviation 0.65, which means there is an agreement among employees on the lower implementation of supplier integration variables.

The highly practiced or implemented item is information exchange with major suppliers with mean of 3.19. The involvement of suppliers during procurement has also a relatively higher implementation with mean value of 3.14. On the other hand the level of strategic partnership with major suppliers is the least implemented item with mean value of 2.59. This shows that the company doesn't build a strategic partnership with major suppliers. Sharing production plan and demand forecasts are also the least implemented items with mean value of 2.61.

#### ***4.2.2.2. Internal Integration***

The respondents were given statements that denote the practice of integration among different functions of the company. They were asked to show the extent to which they agreed with such practices as taking place in company. They responded as given in table 4.4.

The bellow table (4.4) shows the mean of internal integration items is between 2.99 and 3.79 with the standard deviation between 0.933 and 1.166. The overall mean of the internal integration items is 3.37 with standard deviation 0.432, which mean there is an agreement among employees on the relatively higher implementation of internal integration variables.

The highly practiced or implemented item is enterprise application integration among internal functions with mean value of 3.79. Integrative inventory management within the company has also a relatively higher implementation with mean value of 3.54. This result shows the implementation of enterprise application system i.e. ERP system in the company. Whereas real time integration and connection among all internal functions from input management through production, shipping and sales is the least implemented item with mean value of 2.99. This shows that though there is high implementation of ERP (enterprise application system), the real time integration and connection among the function within the supply chain is low. This is may be due to the fact that the ERP system doesn't incorporate some important functions like sales.

**Table 4-4 mean and STD of Internal Integration items**

		N	Mean	Std. Deviation
IIQ1	There is high level of data integration among internal functions of the company	271	3.27	.933
IIQ2	We have enterprise application integration among internal functions	271	3.79	.949
IIQ3	Our company has integrative inventory management	271	3.54	.984
IIQ4	We have real time searching of the level of inventory or logistics related operating data	271	3.10	.982
IIQ5	The company holds training program to increase the employees competencies	271	3.41	.934
IIQ6	The company involves different departments during the preparation of strategic plan	271	3.47	.957
IIQ7	We have utilized periodic interdepartmental meetings among internal functions	271	3.13	.988
IIQ8	The company uses cross functional teams in process improvement	271	3.04	.986
IIQ9	The company uses cross functional teams in new product/service development	271	3.08	1.017
IIQ10	There is real time integration and connection among all internal functions from input management through production, shipping and sales	271	2.99	1.166
	Internal Integration	271	3.3742	.43290

Source: survey 2017

#### ***4.2.2.3. Customer Integration***

The respondents were given statements that denote the practice of integration with major customers. They were asked to show the extent to which they agreed with such practices as taking place in company. They responded as given in table 4.5.

Table (4.5) shows the mean value of customer integration items is between 2.31 and 3.15 with the standard deviation between 1.07 and 1.209. The overall mean of the internal integration items is 2.69 with standard deviation 0.72, which mean there is an agreement among employees on the lower implementation of integration with major customers.

**Table 4-5 mean and STD of customer Integration items**

		Mean	Std. Deviation
CIQ1	We have high level of linkage with our customer through information networks	2.57	1.120
CIQ2	We have computerized orders for our major customers	3.15	1.200
CIQ3	We share market information with our major customer	2.44	1.200
CIQ4	We have high level of communication with our major customer	2.80	1.145
CIQ5	We have established quick ordering systems with our major customer	2.31	1.072
CIQ6	We Follow up our major customers for feedback	2.55	1.140
CIQ7	We have high frequency of period contacts with our major customer	2.85	1.181
CIQ8	Our major customer shares point of sales information with us	2.96	1.209
CIQ9	Our major customer shares demand forecast with us	2.48	1.151
CIQ10	We share our available inventory with our major customer	2.67	1.141
CIQ11	we share our production plan with our major customer	2.81	1.144
	Customer Integration	2.6900	.72473

Source: survey 2017

The highly practiced or implemented item is the level of communication with major customers with mean value of 3.15. Sharing point of sales information with major customers has also a relatively higher implementation with mean value of 2.96. Whereas establishing quick ordering system for major customers is the least implemented item with mean value of 2.31. This shows that there is no ordering system implemented for major customers (retailers and distributors).

#### 4.2.3. Supply Chain Performance Analysis

This section presents information on the measures that were used to measure organization performance. The results were presented as follows.

**Table 4-6 mean and STD of operational performance variables**

		N	Mean	Std. Deviation
1	Flexibility	271	3.0258	.71414
2	Time/Speed	271	3.0264	.64151
3	Quality	271	3.1187	.67856
4	Cost	271	2.8044	.72399
	Operational Performance	271	2.9938	.59928

Source: survey 2017

As shown on table 4.6 the average mean value of operational performance variables is between 2.80 and 3.11 with standard deviation between 0.64 and 0.72. The overall mean value of the four dimensions is 2.99 with standard deviation 0.599, which indicate that there is an agreement among ethiotelecom employees that there is a lower supply chain performance.

As shown on the table above there is a relatively higher supply chain performance regarding quality with mean value of 3.11. With a mean value of 2.80 the company has the lowest supply chain performance regarding to cost variable.

#### ***4.2.3.1. Flexibility***

The researcher identified some measures of flexibility in which the respondents were required to state their level of agreement. The response was presented in table 4.7.

As shown on the below table the mean value of flexibility items is between 2.88 and 3.47 with the standard deviation between 0.95 and 1.04. The overall mean of the internal integration items is 3.02 with standard deviation 0.71, which means there is an agreement among employees on the medium supply chain performance regarding to flexibility.

With respect to flexibility dimension the company has the highest performance regarding to the ability to respond to and accommodate periods of poor supplier performance with mean value of 3.47. On the other hand the company has the lowest performance regarding to its ability to respond to and accommodate periods of poor delivery performance with mean value of 2.88.

**Table 4-7 mean and STD of flexibility**

		N	Mean	Std. Deviation
FQ1	The company chooses suppliers who are flexible in responding to requests of the company when needed	271	3.13	.988
FQ2	The company is characterized by openness to new ideas at work	271	2.98	1.011
FQ3	The company gives its customers pay facilities after checking their financial status	271	2.89	1.040
FQ4	We are have the ability to respond to and accommodate periods of poor supplier performance	271	3.47	.957
FQ5	We have the ability to respond to and accommodate periods of poor delivery performance	271	2.88	1.040
	Flexibility	271	3.0258	.71414

Source: survey 2017

#### 4.2.3.2. Time/Speed

The researcher identified some measures of time or speed in which the respondents were required to state their level of agreement. The responses are presented in table 4.8.

**Table 4-8 mean and STD of time/speed**

		Mean	Std. Deviation
TQ1	The company is committed to provide fast service to its customers	3.13	.988
TQ2	The company is committed to deliver orders to customers within the agreed delivery times	2.89	1.040
TQ3	Suppliers are committed to supply orders by the agreed timetables	3.08	1.017
TQ4	The company reserves the minimum limit of stock which could continue of work in the case of raw material/input delay	2.77	1.082
TQ5	The company bears the differences in transportation costs in order to meet the deadlines of supplying orders to customers	2.83	1.049
TQ6	The company is characterized by quick exchange of information with stakeholders	3.41	.934
	Time/Speed	3.0264	.64151

Source: survey 2017

As shown on the above table the mean value of time/speed variable items is between 2.77 and 3.13 with the standard deviation between 0.93 and 1.08. The overall mean of the internal integration items is 3.01 with standard deviation 0.84, which means there is an

agreement among employees that the company has a medium performance regarding to time or speed variable.

The company has the highest performance regarding quick information exchange with its stakeholders with the mean value of 3.41, whereas its performance in keeping minimum limit of stock that could continue of work in the case of input delay is the lowest with mean value of 2.77.

#### 4.2.3.3. *Quality*

The researcher identified some measures of quality in which the respondents were required to state their level of agreement. The response was presented in table 4.9.

As shown on the below table the mean value of quality variable items is between 2.71 and 3.41 with the standard deviation between 0.93 and 1.08. The overall mean value of quality variable is 3.01 with standard deviation 0.81, which means there is an agreement among employees that the company has medium performance regarding to quality.

**Table 4-9 mean and STD of quality**

	Mean	Std. Deviation
QuQ1 The company is committed to provide the production according to local and international standards	3.09	1.016
QuQ2 The company produces various forms of products/services to suit customers needs	3.41	.934
QuQ3 The company uses transportation means that maintain the products quality	3.16	1.005
QuQ4 The company is committed to proper storage conditions according to the specifications	2.94	1.029
QuQ5 The company has control tracking system to keep the inventory valid	2.80	1.078
QuQ6 The company chooses its suppliers on the basis of high quality	2.71	1.084
Quality	3.1187	.67856

Source: survey 2017

The company has a better performance in producing various products/services to suit customers needs with mean value of 3.41, whereas its performance in implementing a tracking system to keep inventory valid is lowest with mean value of 2.8.

#### 4.2.3.4. Cost

The researcher identified some measures of cost in which the respondents were required to state their level of agreement. The response was presented in table 4.10.

**Table 4-10 mean and STD of cost**

	Mean	Std. Deviation
CQ1 The company is seeking to reduce the wasteful use of resources	2.83	1.049
CQ2 The company is working to reduce defective materials	3.08	1.017
CQ3 The company has minimum level of scrap and obsolete materials	2.60	1.059
CQ4 The company arrange its internal processes in a manner to shorten performing activities	3.14	1.005
CQ5 The company is working to reduce the inventory to minimum level to the extent that does not hinder the continuation of work	2.72	1.103
CQ6 The company has low inventory holding cost	2.89	1.040
Cost	2.8044	.72399

Source: survey 2017

As shown on the above table the mean value of the cost variable is between 2.60 and 3.14 with the standard deviation between 1.0 and 1.10. The overall mean value of cost variable items is 2.80 with standard deviation 0.721, which means there is an agreement among employees of ethiotelecom that the company has lower performance regarding to cost.

With respect to cost dimension, the company has the highest performance regarding to arranging its internal processes in a manner to shorten performing activities with mean value of 3.08. on the other hand the company has the lowest performance regarding to having minimum level of scraps and obsolete materials and reducing the level of inventory to a minimum level with mean value of 2.60 and 2.72.

### **4.3. Inferential statistics**

#### **4.3.1. Correlation analysis**

Question2. What is the relationship between supply chain integration and operational performance at ethiotelecom?

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.

To answer the above research question, the researcher used Bivariate Pearson's Correlation (r) Among Independent Variables, Dependent variables, and between Independent and Dependent Variables. Correlation Coefficients indicated the strength and direction of relationship whereas the p-value indicates the significance of relationship.

**Table 4-11 Bivariate Pearson's Correlation (r) Among Independent Variables, Dependent variables, and between Independent and Dependent Variables**

		Customer Integratio n	Supplier Integratio n	Internal Integratio n	Company Supply Chain Integration	Flexibility	Time/Spe ed	Quality	cost	Supply chain Performance
Customer Integration	Correlation	1	.863**	.487**	.930**	.823**	.751**	.661**	.878**	.898**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000
Supplier Integration	Correlation	.863**	1	.594**	.953**	.805**	.763**	.784**	.796**	.906**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000	.000
Internal Integration	Correlation	.487**	.594**	1	.728**	.668**	.615**	.615**	.429**	.667**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000	.000
Company Supply Chain Integration	Correlation	.930**	.953**	.728**	1	.875**	.812**	.780**	.833**	.951**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.000
Flexibility	Correlation	.823**	.805**	.668**	.875**	1	.634**	.719**	.660**	.870**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.000
Time/Speed	Correlation	.751**	.763**	.615**	.812**	.634**	1	.647**	.782**	.876**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000	.000
Quality	Correlation	.661**	.784**	.615**	.780**	.719**	.647**	1	.601**	.852**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000
cost	Correlation	.878**	.796**	.429**	.833**	.660**	.782**	.601**	1	.878**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000
Supply chain Performance	Correlation	.898**	.906**	.667**	.951**	.870**	.876**	.852**	.878**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	

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

Source: survey 2017

The correlation between SCI elements with supply chain performance was run as seen in the above table. The result of correlation matrix between each elements and supply chain performance are analyzed as follow:

Bivariate Pearson correlation (r) table (4.11) shows that the relationships among supply chain integration variables are very strong, since r value ranges between 0.487 and 0.863 and P values are less than 0.001. Therefore, the result showed that there are strong positive and significant relationships among supply chain integration variables. The relationships among supply chain performance dimensions are also strong and significant since r value ranges between 0.601 and 0.782 and p values are less than 0.001. These results indicate that there is a strong positive and significant relationship among supply chain performance dimensions.

As indicated in the above table there is a significant positive correlation between customer integration and supply chain performance with correlation coefficient of 0.898 ( $r=0.898$ ) and  $p<0.001$ . Therefore customer integration and supply chain performance have a genuine correlation.

The correlation between supplier integration and supply chain performance have a correlation coefficient value of 0.906 ( $r=0.906$ ) and  $p<0.001$ , which shows that supplier integration and supply chain performance have a strong, significant and positive relationship.

Moreover, the relationship between internal integration and supply chain performance have a coefficient value of 0.667 ( $r=0.667$ ) and  $p<0.001$ , which indicates that internal integration and supply chain performance have a significant and strong relationship. Finally, the table also shows that the relationship between supply chain integration and supply chain performance is very strong since r value is 0.951 and value of p is less than 0.001.

### 4.3.2. Regression Analysis

Question 3 how can supply chain integration elements impact supply chain performance of ethiotelecom?

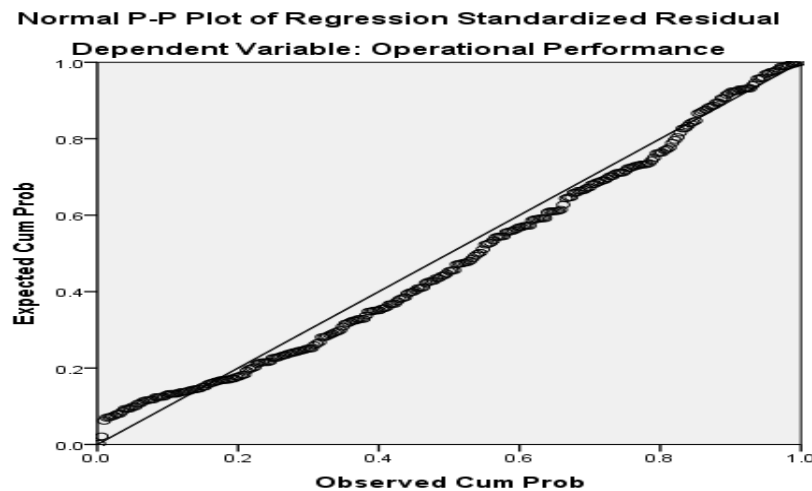
To answer this question multiple regression analysis was used to analyze the effect of the supply chain integration variables on supply chain performance variable. This regression analysis is conducted to know by how much the independent variable explains the dependent variable. The regression was conducted between supply chain integration elements (independent variable) and supply chain performance (dependent variable).

To be able to use multiple regressions, however, the assumptions of validity, reliability, and multi-collinearity should be satisfied. This study addressed content validity through the review of literature and adapting instruments used in previous research. Reliability tests are made using Cronbach's Alpha. The results of the test are provided on table 3.1. Its coefficient values for all variables are accepted and highly reliable. The remaining assumptions are discussed as follows:

#### I. *Linearity test*

Figure (2) shows that the relationships between independent and dependent variables are linear.

**Figure 2 Linearity test**



Source: survey 2017

**II. Multi collinearity test**

VIF (Variance Inflation Factor) and tolerance are used to test multi-collinearity. If VIF is less than 10 and tolerance is more than 0.2, the model does not violate the multi-collinearity assumption.

**Table 4-12 Collinearity statistics**

Variables	Collinearity Statistics	
	Tolerance	VIF
Customer Integration	.254	3.936
Supplier Integration	.216	4.634
Internal Integration	.645	1.550

Dependent variable: supply chain performance

Source: survey 2017

As shown on the above table all of the independent variables have a tolerance value above 0.2 and the values of VIF are less than 10. Therefore there is no multi-collinearity within the independent variable of the study.

Table (4.13) shows the regression of the three independent variables of supply chain integration against the dependent variable (supply chain performance).  $R^2$  shows the fitness of the model for multiple regressions and explains the variance of independent variable on dependent variable.

**Table 4-13 Results of Multiple Regressions Analysis (ANOVA)**

Model	R	R Square	Adjusted Square	R	Sig.
1	.951 <sup>a</sup>	.905	.904		0.00 <sup>b</sup>

a. Predictors: (Constant), Internal Integration, Customer Integration, Supplier Integration

b. Dependent Variable: supply chain performance

Source: survey 2017

As shown on the above table the model is fit and significant as  $R^2$  is 0.905 and p value is less than 0.01. Since  $R^2$  is 90.5% then the independent variables can explain 90.5% of

variation on dependent variable. This implies that Supply chain integration variables can account for 90.5% of the variation in supply chain performance.

Table (4.14) again shows the significance effect of each independent variable on dependent variable.

**Table 4-14 Results of Multiple Regressions Analysis (Coefficients)**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.028	.089		-.320	.749
	Customer Integration	.394	.031	.476	12.741	.000
	Supplier Integration	.332	.037	.366	9.016	.000
	Internal Integration	.302	.032	.218	9.288	.000

Dependent variable: supply chain performance

Source: survey 2017

Table (4.14) shows that there is a positive direct impact of customer integration on supply chain performance, since (Beta= 0.476, p (0.000)<0.05). Supplier integration has also a direct positive impact on supply chain performance, since (Beta= 0.366, p (0.000) <0.05). Internal integration has also a positive significant influence on supply chain performance with a coefficient value of 0.218 and the value of P (0.000) is less than 0.05.

From the above table (4.14), the researcher concludes that all supply chain integration variables have a significant and positive impact on supply chain performance at ethiotelecom. Customer integration has the highest impact (Beta= 0.476, p= 0.000), followed by supplier integration variable (Beta= 0.366, p=0.000), and Internal integration holds the least impact (Beta= 0.218, p=0.000).

The researcher believes that the highest impact of customer integration among supply chain integration variables is due to the fact that customer satisfaction is the ultimate goal that all organizations seek to achieve.

#### **4.4. Discussion of results**

The objective of this study is to examine the current level of supply chain integration through analyzing the underlying dimensions of Supplier, customer and internal integrations and to empirically test a framework identifying the relationships between supply chain integration variables and supply chain performance of the case company ethio telecom. The literature has suggested that there is a relationship between supply chain integration and supply chain performance. The results of the study are discussed as follows:

The study revealed that the overall level of supply chain integration in the company is low. From among the three dimensions under study the company has a better internal integration with mean value of 3.37. It is due to the fact that the company has been implementing ERP (Enterprise Resource Planning) system as an effort to integrate internal functions. Customer integration shows the least implemented integration dimension with mean value of 2.69. Supplier integration is also the least implemented dimension with mean value of 2.84. This shows that the company's external integration is low.

According to Flynn, *et al.* (2010) any supply chain with lower external integration cannot have a higher supply chain integration. But as Zhaho, *et al.* (2011) described, companies with a lower level of internal integration will less likely have adequate capability to integrate with external partners, whereas companies with a high level of internal integration are more likely, and in a better position, to integrate their processes with customers' or suppliers' processes. Therefore, though the company's supply chain integration is low in general and its external integration in particular, the company has a good position for improving its integration as it has a relatively better internal integration.

Based on the comments from the survey the supply chain department in the company doesn't play a great role in determining and improving the supply chain integration. Its role is limited to functions of logistics, inventory management and warehouse management. Other important functions like procurement are managed in a different department.

Moreover, relationship management within the supply chain has not been articulated and incorporated into the responsibilities of the supply chain department. This also shows that the organization has not understood the strategic importance of supply chain integration in particular and supply chain management in general.

The overall mean value of the four supply chain performance is 2.99 with standard deviation 0.599, which indicate that there is an agreement among ethiotelecom employees that there is a lower supply chain performance. The company has a relatively higher supply chain performance regarding quality followed by time/speed and flexibility dimensions. But the company has the lowest supply chain performance regarding to cost variable.

Through correlation analysis, the results of the study showed that there are strong inter-relationships and interactions among the three components of SCI and between SCI components and SCP. The relationships among supply chain integration variables are strong and significant, since  $r$  value ranges between 0.487 and 0.863 and  $P$  values are less than 0.001. The relationships among supply chain performance dimensions are also strong since  $r$  value ranges between 0.601 and 0.782 and  $p$  values are less than 0.001.

The results of regression analysis of the study shows that supply chain integration have a significant and positive impact on supply chain performance at ethiotelecom. This result go in line with different previous studies, such as Huo (2012) who found that supply chain integration had a significant impact on business and organizational performance. Zhao, *et al.* (2011) also suggested that supplier integration and customer integration play different roles in performance improvement and capability development.

The study shows that Supplier integration has a direct positive impact on supply chain performance of ethiotelecom, since (Beta= 0.366,  $p$  (0.000) <0.05). The result doesn't match with the findings of Flynn, *et al.* (2010) that showed internal and customer integrations were more strongly related to performance improvement than supplier integration. The results of this study showed that supplier integration has a strong impact on supply chain performance next to customer integration; and internal integration has the least impact on supply chain performance.

The study shows that internal integration has also a positive significant influence on supply chain performance of ethiotelecom with a coefficient value of 0.218 and the value of  $P$

(0.000) is less than 0.05. This result is supported by Huo (2012) showed that internal integration improves external integration and that internal and external integration directly and indirectly enhance company's performance and that goes directly with the study result about the most important role of internal integration. The study also shows that customer integration have a strong positive direct impact on supply chain performance of ethiotelecom, since (Beta= 0.476, p (0.000)<0.05).

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 4.3. Summary of major findings

The study revealed that the overall level of supply chain integration in the company is low. From among the three dimensions under study the company has a better internal integration with mean value of 3.37. Customer integration shows the least implemented integration dimension with mean value of 2.69. Supplier integration is also the least implemented dimension with mean value of 2.84.

The company has also lower supply chain performance with over all mean value of 2.99. The company has a relatively higher supply chain performance regarding quality but it has lowest supply chain performance regarding to cost variable.

Through correlation analysis, the results of the study showed that there are strong inter-relationships and interactions among the three components of SCI and between SCI components and SCP. The relationships among supply chain integration variables are strong and significant, since  $r$  value ranges between 0.487 and 0.863 and  $P$  values are less than 0.001. The relationships among operational performance dimensions are also strong since  $r$  value ranges between 0.601 and 0.782 and  $p$  values are less than 0.001.

The results of regression analysis of the study shows that supply chain integration have a significant and positive impact on supply chain performance at ethiotelecom. The study shows that Supplier integration has a direct positive impact on supply chain performance of ethiotelecom, since (Beta= 0.366,  $p$  (0.000) <0.05). Internal integration has also a positive significant influence on supply chain performance of ethiotelecom with a coefficient value of 0.218 and the value of  $P$  (0.000) is less than 0.05. Finally customer integration have a strong positive direct impact on supply chain performance of ethiotelecom, since (Beta= 0.476,  $p$  (0.000) <0.05).

#### **4.4. Conclusions**

The study revealed that the overall level of supply chain integration in the company based on the perception of employees is low. From among the three dimensions under study the company has a better internal integration. The second highly implemented supply chain integration dimension is supplier integration, whereas customer integration is the least implemented integration dimension.

The study revealed that the employees of ethio telecom perceived that the company has low supply chain performance measured from four dimensions. The company has a relatively higher supply chain performance regarding quality followed by time/speed and flexibility dimensions. But the company has the lowest supply chain performance regarding to cost variable.

The results of the study showed that there are strong inter-relationships and interactions among the three components of SCI and between SCI components and SCP. The regression result indicates that supply chain integration has a significant and positive impact on supply chain performance at ethiotelecom based on the perception of employees.

Customer integration has the highest impact followed by supplier integration variable and internal integration holds the least impact. The researcher believes that the highest impact of customer integration among supply chain integration variables is due to the fact that customer satisfaction is the ultimate goal that all organizations seek to achieve.

#### **4.5. Recommendations**

On the basis of the finding and the conclusion reached, the following suggestions are forwarded:

- It is recommended that ethiotelecom should work more closely and build strategic partnership with suppliers and customers in order to increase the level of integration which in turn increases its supply chain performance through linking both suppliers and its major customers with advanced information system to facilitate the flow of materials, information, and experiences, in addition to control the inventory.

- The company should engage in sharing production plan and demand forecasts with suppliers to minimize the level of inventory, which in turn will result in a lower cost and a better supply chain performance.
- Since ethiotelecom is a technological oriented company its materials or inputs have a higher rate of obsolescence. So it should also adopt inventory tracking system to keep inventory valid that will result in having minimum level of scraps and obsolete materials. Minimum level of scraps and obsolescence can improve supply chain performance through quality dimension.
- ethiotelecom should arrange its organizational structure in a way that supply chain department plays a great role in determining and improving the supply chain integration of the company. Procurement function, which is one of the main functions in supply chain management, should be managed under the supply chain department. Moreover interface or relationship management should also be incorporated as a responsibility of the department to improve integrations with a sense of ownership.

**Recommendations for academicians and future research:**

- This study is dedicated to the service providing company ethiotelecom, so it is advisable to study the supply chain integration on other service providing companies in order to compare the results and stand on the differences, if available, and provide the suitable interpretations.
- It is recommended that to restudying the same topic on the same company over a period of time to evaluate the progress resulting from the application of supply chain integration.
- It is advised to conduct similar studies by incorporating the perspective of suppliers and customers or from the perspectives of suppliers and customers alone.

## References

- Adaileh, J.M. and Abu-alganam, M.K. 2010. The Role of ERP in Supply Chain Integration. *International Journal of Computer Science and Network Security*. 10(5).
- Alam, A., Bagchi, P.K., Kim, B., Mitra, C., and Seabra, F. 2014. The mediating effect of logistics integration on operational performance. *The International Journal of Logistics Management*. 25(3), pp. 553-580.
- Alfalfa-Luque, R., Madina-Lopez, C. and Kumar dey, P.2012. Supply chain integration framework using literature review. *Production planning and control*. 1(18).
- AsawinPasutham 2012. *Supply chain performance measurement framework: Case studies on the Thai manufactures*. Ph.D. thesis, Aston University.
- Bagchi, P.K., Skjoett-Larsen, T., Ha, B.C., and Soerensen, L.B. 2005. Supply chain integration: a European survey. *International Journal of Logistics Management*. 16(2), pp. 275-294.
- BaofengHuo, 2012. The impact of supply chain integration on company performance: an organizational capability perspective. *Supply Chain Management: an International Journal*. 17(6), pp. 596 – 610.
- Bowersox, D., Closs, D.J., and Stank, T.P. 1999. 21st Century logistics: Making Supply Chain Integration a reality. *Council of logistics management*, Michigan State University, USA
- Chen, I.J., and Paulraj, A. 2004. Towards a theory of supply chain management: the constructs and measurements. *Journal of Operations Management*. 22(2), pp. 119-150.
- Chopra, S. and Meindl, P. 2007. *Supply chain management: Strategy, Planning and operation*, 3<sup>rd</sup>ed. New Jersey: Printice-Hall.
- Committee on Supply Chain Integration, Commission on Engineering and Technical Systems, National Research Council. 2000. *Surviving Supply Chain Integration: Strategies for Small Manufacturers*. Washington, D.C:National Academy Press.
- Cirtita, H. and Segura, D.A.G. 2012. Measuring downstream operational performance. *Journal of Manufacturing Technology Management*.23(3), pp. 299- 314.
- Croxtan, K., Garcia-Dastugue, S.Lambert, D., and Rogers, D. 2001. The supply chain management processes. *The International Journal of Logistics Management*. 12(2), pp. 13-36.

- Flynn, B.B., Hou, B. and Zhao, Xi.2010. The impact of supply chain integration on performance: A contingency and configuration approach. *Journal of operations management*.28(1), pp. 58-71.
- Gimenez, C., Vaart, T.V.D., and Donk, D.P.V. 2011. Supply chain integration and performance: the moderating effect of supply complexity. *Supply Chain Management: An International Journal*. 17(6), pp. 596-610.
- Hatani, L., Zain, D. and WirjodirjoD.B., 2013. Competitive Advantage as Relationship Mediation between Supply Chain Integration and Fishery Company Performance in Southeast Sulawesi (Indonesia). *Journal of Business and Management*, 6(5).
- Harrison, A., and New, C. 2002. The role of coherent supply chain strategy and performance management in achieving competitive advantage: an international survey.*Journal of the Operational Research Society*. 53(3), pp. 263-71.
- Hosseini, M.S., Azizi, S. and Sheikhi, N. 2012. An Investigation on the Effect of Supply Chain Integration on Competitive Capability: An Empirical Analysis of Iranian Food Industry. *International Journal of Business and Management*, 7(5).
- Juran, M.J. and Godfrey, A.B. 1998. *Juran's Quality Handbook*. 5th ed. McGraw-Hill: New York.
- Krajewski, L.J., Ritzman, L.P., and Malhorta, M.K. 2013. *Operation Management: Processes and Supply Chain*. 10<sup>th</sup> ed. England: Pearson Education Limited.
- Kulp, S.C., Lee, H.L., and Ofek, E. 2004. Manufacturer benefits from information integration with retail customers. *Management Science*.50(4), pp. 431-44.
- Ismail Abushaikha, 2014. Supply Chain Integration from a Resource-based View Perspective, Empirical Evidence from Jordan's Garment Manufacturers International Supply Chains, Ph.D. thesis, Heriot-Watt University, School of Management and Languages.
- Israel, Glenn D. 1992. Determining sample size. Program Evaluation and Organizational Development, IFAS, University of Florida.
- Lambert, D. and Copper, M. 2000. Issues in supply chain management.*Industrial marketing management*, 29, pp.65-83.
- Mentzer, T.J., DeWitt, W., Keebler, S.K., Min, S., Nix, W.N., Smith, D.C. and Zacharia, G.Z. 2001. Defining supplychain management. *Journalof business logistics*.22(2), pp. 1-25.
- Hatani, L., Zain, J. and Wirjodirjo, D.B. 2013. Competitive advantage as relationship mediation between supply chain integration and Fishery Company performance in Southeast Sulawesi (Indonesia). *Journal of Business and Management*, 6(5), PP 01-14.

- Ozdemir, A.I. and Asla, E. 2011. Supply Chain Integration, Competition Capability and Business Performance: A Study on Turkish SMEs. *Asian Journal of Business Management*. 3(4), pp. 325-332
- Ragu-Nathan, L., Ragu-Nathan, T.S. and Rao, S.S. 2006. The impact of supply chain management practices on competitive advantage and organizational performance, *International Journal of Management Science*, 34: 107– 124.
- Rosenzweig, E.D., Roth, A.V., and Jr, D.W.J. 2002. The influence of an integration strategy on competitive capabilities and business performance: An exploratory study of consumer products manufacturers. *Journal of Operations Management*. 21, pp. 437-456.
- National Research Council, 2000. *Surviving supply chain integration: strategies for small manufacturers*, Washington, DC:the national academies press.
- Scannell, T.V., Vickery, S.K., and Droge, C.L. 2000. Upstream supply chain management and competitive performance in the automotive supply industry. *Journal of Business Logistics*. 21(1), pp. 23-48.
- Sebastian Kot 2014. *Principles of Global Supply Chain Management*, Student Text book, Częstochowa: University of Technology.
- Sohail, S.M., Sayeed, M.A., Al-Fadhil, A. and Sahin, O.G. 2009. Strategic supply chain integration and its impact on organizational performance: perspectives from an emerging nation. *International Journal of Integrated Supply Management*. 5(1), pp. 62-80.
- Stank, T.P., Keller, S.B., and Closs, D.J. 2001. Performance benefits of supply chain integration. *Transportation Journal*. 41(2), pp. 31-46.
- Vaidya, M., and Hudnurkar, M. 2012. Multi-criteria operational performance evaluation". *International Journal of Productivity and Performance Management*. 62(3), pp. 293- 316.
- Van der Vaart, J.T., and van Donk, D.P. 2008. A critical review of survey-based research in supply chain integration. *International Journal of Production Economics*. 111(1), pp. 42-55.
- Vanichchinchai, A. 2014. Supply chain management, supply performance and total quality management. *International Journal of Organizational Analysis*. 22(2), pp. 126-148.
- Vickery, S.K., Jayaram, J., Droge, C., and Calantone, R. 2003. The effects of an integrative supply chain strategy on customer service and financial performance: an analysis of direct versus indirect relationships. *Journal of Operations Management*. 21(5), pp. 523-539.
- Wang, S., Chang. S., and Wang, R. 2009. Assessment of supplier performance based on product- development strategy by applying multi-granularity linguistic term sets. *Omega*. 37(1), pp. 215-226.

Wheelen,L.T. and Hunger,D.J. 2012. *Strategic Management and Business Policy*, 13<sup>th</sup>ed. New Jersey:Pearson Education Inc. pp. 231-236

Wisner, J.and Tan, K. 2000. Supply chain management and its impact on purchasing. *Journal of Supply Chain Management*. 36(4), 33-35

Westbrook, R. and Frohlich, M.T. 2001. Arcs of Integration: an International study of supply chain strategies. *Journal of Operations Management*. 19, pp. 185-200.

Xiao, Y.C., Zheng, X.Y., Pan, W.N., and Xie, X.X. 2010. Trust, relationship commitment and cooperative performance: supply chain management. *Chinese Management Studies*. 4(3), pp. 231-243.

Xu, D., Huo, B., and Sun, L. 2014. Relationships between intra-organizational resources, supply chain integration and business performance. *Industrial Management & Data Systems*. 114(8), pp. 1186-1206.

Zailani, S. and Rajagopal, P. 2005. Supply chain integration and performance: US versus East Asian companies. *Supply Chain Management*. 10(5).

Zhao, X., Huo, B., Selen, W. and Yeung, J.H. 2011. The impact of internal integration and relationship commitment on external integration. *Journal of Operations Management*. 29(1),pp. 17-32

Zahra Lotfi, Mukhtar, M., Sahran, S., and Zadeh, A.T., 2013. The level of organizational integration framework.*Global Conference on Sustainable Manufacturing*.11, pp. 449-454

## Appendixes

### Appendix I: Thesis Questionnaire

#### ADDIS ABABA UNIVERSITY

#### SCHOOL OF COMMERCE

#### Department of Logistics and Supply Chain Management

#### QUESTIONNAIRE

Dear respondents, the purpose of this questionnaire is to gather data on the supply chain integration and supply chain performance in the case company. The study is purely for academic purpose and thus not affects you in any case; the information you provide is highly confidential. So, your genuine, frank and timely response is vital for successfulness of the study. Therefore, I kindly request you to respond to each items of the question very carefully.

#### *General Instructions*

- ✓ there is no need of writing your name
- ✓ Where answer options are available please tick (✓) in the appropriate box for part I and circle on your response to each statements of part II.

#### **Contact Address**

If you have any query, please do not hesitate to contact me and I am available as per your convenience at (Mobile: 09-30-01-17-85 or e-mail: [getasewyaregal@ethiotelecom.et](mailto:getasewyaregal@ethiotelecom.et)/[getasewyaregal@gmail.com](mailto:getasewyaregal@gmail.com))

**Thank you for sacrificing your precious time in advance!**

#### **PART I: Demographic Information**

1. Educational Qualification:

College diploma  first Degree  cond Degree and above

2. Job title

CO (Chief Officer)   per  M  ager  S  u  p  r  i  s  o  r  s  p  e  c  i  a  l  i  s  t  /  e  x  p  e  r

Professional  Other \_\_\_\_\_

3. Years stayed at the organization:

Bellow 2 years  2–5 years  6–10 years  over 10 years

4. Your department \_\_\_\_\_

## Part II: Instruments for supply chain integration and operational performance

The following 57 items tap into supply chain and its effect on operational performance. Please, answer these questions based on actual and current situation and not on beliefs.

### Section one: Supply chain integration

Please circle the appropriate number to indicate the extent to which you agree or disagree with each statement. The item scales are five-point Likert type scales with [1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree] based on how you feel about the statement.

<b>Customer integration</b>		<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly agree</b>
1	We have high level of linkage with our customer through information networks	1	2	3	4	5
2	We have computerized orders for our major customers	1	2	3	4	5
3	We share market information with our major customer	1	2	3	4	5
4	We have high level of communication with our major customer	1	2	3	4	5
5	We have established quick ordering systems with our major customer	1	2	3	4	5
6	We Follow up our major customers for feedback	1	2	3	4	5
7	We have high frequency of period contacts with our major customer	1	2	3	4	5
8	Our major customer shares point of sales information with us	1	2	3	4	5
9	Our major customer shares demand forecast with us	1	2	3	4	5
10	We share our available inventory with our major customer	1	2	3	4	5
11	we share our production plan with our major customer	1	2	3	4	5
<b>Supplier Integration</b>		<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly agree</b>
12	We have high level of information exchange with our major supplier through information network	1	2	3	4	5
13	We have established quick ordering systems with our major	1	2	3	4	5

	supplier					
14	The level of strategic partnership with our major supplier is high	1	2	3	4	5
15	Our major suppliers participate in the process of procurement	1	2	3	4	5
16	Our major supplier shares their production schedule with us	1	2	3	4	5
17	Our major supplier shares available inventory with us	1	2	3	4	5
18	We share our production plans with our major supplier	1	2	3	4	5
19	We share our demand forecasts with our major supplier	1	2	3	4	5
20	We share our inventory levels with our major supplier	1	2	3	4	5
21	We help our major supplier to improve its process to better meet our needs	1	2	3	4	5
<b>Internal Integration</b>		<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly agree</b>
22	There is high level of data integration among internal functions of the company	1	2	3	4	5
23	We have enterprise application integration among internal functions	1	2	3	4	5
24	Our company has integrative inventory management	1	2	3	4	5
25	We have real time searching of the level of inventory or logistics related operating data	1	2	3	4	5
26	The company holds training program to increase the employees competencies					
27	The company involves different departments during the preparation of strategic plan	1	2	3	4	5
28	We have utilized periodic interdepartmental meetings among internal functions	1	2	3	4	5
29	The company uses cross functional teams in process improvement	1	2	3	4	5
30	The company uses cross functional teams in new product/service development	1	2	3	4	5
31	There is real time integration and connection among all internal functions from input management through production, shipping and sales	1	2	3	4	5

## Section two: Supply Chain Performance

Please indicate the degree to which you agree to the following statements concerning your company's performance. The item scales are five-point Likert type scales with [1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree] based on how you feel about the statement.

<b>Flexibility</b>		<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly agree</b>
32	The company chooses suppliers who are flexible in responding to requests of the company when needed	1	2	3	4	5
33	The company is characterized by openness to new ideas at work	1	2	3	4	5
34	The company gives its customers pay facilities after checking their financial status	1	2	3	4	5
35	We are have the ability to respond to and accommodate periods of poor supplier performance	1	2	3	4	5
36	We have the ability to respond to and accommodate periods of poor delivery performance	1	2	3	4	5
<b>Time/speed</b>		<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly agree integrati</b>
37	The company is committed to provide fast service to its customers	1	2	3	4	5
38	The company is committed to deliver orders to customers within the agreed delivery times	1	2	3	4	5
39	Suppliers are committed to supply orders by the agreed timetables	1	2	3	4	5
40	The company reserves the minimum limit of stock which could continue of work in the case of raw material/input delay	1	2	3	4	5
41	The company bears the differences in transportation costs inorder to meet the deadlines of supplying orders to customers	1	2	3	4	5
42	The company is characterized by quick exchange of information with stakeholders	1	2	3	4	5
<b>Quality</b>		<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly agree integrati</b>
43	The company is committed to provide the production according to local and international standards	1	2	3	4	5
44	The company produces various forms of products/services to suit customers' needs	1	2	3	4	5
45	The company uses transportation means that maintain the products quality	1	2	3	4	5
46	The company is committed to proper storage conditions	1	2	3	4	5

	according to the specifications					
47	The company has control tracking system to keep the inventory valid	1	2	3	4	5
48	The company chooses its suppliers on the basis of high quality	1	2	3	4	5
<b>Cost</b>		<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly agree</b>
49	The company is seeking to reduce the wasteful use of resources	1	2	3	4	5
50	The company is working to reduce defective materials	1	2	3	4	5
51	The company has minimum level of scrap and obsolete materials	1	2	3	4	5
52	The company arrange its internal processes in a manner to shorten performing activities	1	2	3	4	5
53	The company is working to reduce inventory to minimum level to the extent that does not hinder the continuation of work	1	2	3	4	5
54	The company has low inventory holding cost	1	2	3	4	5

**Section Three:**

1. What is the current level of supply chain integration in the company?

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2. What is the impact of supply chain integration on operational performance of the company?\_\_\_\_\_

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If you have any other comment you are well come:\_\_\_\_\_

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**Thank you again very much!!!**