

**The Effects of Supply Chain Integration on Operational Performance: *The Case of Ethiopia Commodity Exchange, (Ecx) Jimma Branch***

*A Thesis Submitted to the School of Graduate Studies of Jimma University in Partial Fulfillment of the Requirements for the Award of the Degree of Master of Arts in Logistic and Supply Chain Management (MA)*

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**JIMMA UNIVERSITY  
COLLEGE OF BUSINESS & ECONOMICS  
MA PROGRAM**

**JUNE, 2021  
JIMMA, ETHIOPIA**

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## **DECLARATION**

I hereby declare that this thesis entitled “The effects of supply chain integration on operational performance in Ethiopia commodity Exchange (ECX) Jimma Branch”, has been carried out by me under the guidance and supervision of Dr. Mekonnen Bogale (PhD) and Mr.Firew Mulatu.(MBA) The thesis is original and has not been submitted for the award of any degree or diploma to any university or institutions.

Researcher’s Name

Date

Signature

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# CERTIFICATE

This is to certify that the thesis entitles “The effects of supply chain integration on operational performance in Ethiopia commodity Exchange (ECX) Jimma Branch”, submitted to Jimma University for the award of the Degree of Supply chain management and is a record of confide research work carried out by Mr. *Abdusalem Usman* under our guidance and supervision.

*Therefore, we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree or diploma.*

*Main Advisor’s Name*

*Signature*

*Date*

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*Co-Advisor’s Name*

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*Signature*

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

## **ACKNOWLEDGEMENTS**

First and foremost, all praise is due to Allah Subhana-wa-ta'ala for bestowing us with health, knowledge and patience to complete this work.

I am also grateful to my main advisors Mekonnen Bogale (PhD) and Firew. Mulatu (MBA) for their constructive comments, support and guidance for the successful completion of this paper.

Besides, I extend my gratitude to the staff members and management body of Ethiopian commodity exchange (ECX) Jimma branch for their cooperation with me via providing necessarily data. My immense gratitude also goes to my Friends for their immeasurable assistance while doing this thesis.

Furthermore, my indebted gratitude expressed to all of my families for their encouragement in completing this research paper.

## **Abstract**

*The purpose of this study is to examine the current level of supply chain integration and to analyze its effect of operational performance. The study is considered as a case study. This research conceptualizes and develops five dimensions of supply chain integration (supplier integration, customer integration and internal integration, warehouse integration and ICT integration) and examines the relationships among supply chain integration dimensions (SCI) and operational performance (OP). Many studies have found that integration across the supply chain has a positive impact on organizational performance practices on supply chain performance there is a lack of studies in Ethiopia that link supply chain integration practices and operational performance. Such problems happened thanks to poor supply chain management normally and provide chain integration problems particularly. The data collection instrument used was a questionnaire which was administrated to a total sample of employees using stratified sampling techniques. Statistical techniques such as descriptive statistics, correlation, and multiple regressions were employed to analyze the data. Measured from the five dimensions of SCI, it can be concluded that the current level of SCI of the ECX in terms of internal integration need a basic emphasis and ICT network and the ordering system with major suppliers and exporters is very poor. The organization has a relatively better human resource in integration of ECX is moderate, but its external integration (supplier and customer integrations) is weak. The result of the analysis also proved that there is strong and significant relationship between supply chain integration and operational performance. Besides, SCI have a strong and positive effect on operational performance. Therefore, for improving operational performance, the current study recommends improving the five components of Supply chain (SC) together as they are strongly interrelated.*

**Keyword:** *Supply chain Integration, Warehouse integration, Customer Integration, Supplier Integration, Internal integration, ICT integration, Operational performance*

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## **List of acronyms**

**ANOVA:** - Analysis of Variance

**ECX:** - Ethiopian Commodity Exchange

**OP:** - Operational

Performance **SCI:** -

Supply Chain

Integration **SI:** -

Supplier Integration

**CI:** - Customer Integration

**ICT:** - Information and Communication Technology

**SC:** - Supply Chain

**SCM:** - Supply Chain Management

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

**WMS:** - Warehouse Management System

# CHAPTER ONE: INTRODUCTION

This chapter contains an outline of the full a part of the study. The contents included here are background of the study, statement of the problem, research questions, and research objectives, significance of the study, delimitation of the study, structure of the paper and definition of key terms /key concepts in sequence. The Ethiopia Commodity Exchange launched trading operations with deals for white and mixed maize, hard and soft wheat, processed and unprocessed haricot beans and began trading coffee in December 2008. The Ethiopian Commodity Exchange was started to benefit and modernize the way Ethiopia was trading its most valuable assets, its commodities (Gabre-Madhin 2006). These the study was focuses on the Effects of Supply Chain Integration on Operational Performance: The Case of Ethiopia Commodity Exchange, (Ecx) in Jimma.

## 1.1 Background of the Study

Technological advancement during this era and enhancement of communication and transportation cause globalization which ends the change of needs and requirements of consumers. As customers need an acceptable product in suitable place at suitable time with top quality and suitable cost, organizations would love to compete in recent hyper-market should match with the above mentioned(Venkatesh, 2013) So customers as fulfill the re customers organizations requirements should improve their operations. Supply chain management may be a system that improves all activities which disbursed by organization. To be able to grow and survive any organization needs to identify its strengths and weaknesses, to re-enforce on strengths and overcome weaknesses (Venkatesh, 2013)

Supply chain mainly has two types of integrations, which are internal and external integration. Internal integration is about interaction, relationship and collaboration among the functional units within the organization; and external integration in another way dealt with relationship and collaboration among different business entities and organizations (Paulraj, (2008)) discussed from the production perspective, supply chain integration framework essential to have smooth and accurate information flows.

Most of the concepts that differentiate supply chain integration are the presence of flow of material/information/data/knowledge, among the principal firm to its customers and suppliers

(Abushaikha, 2014).

Supply chain management requires joining and coordination for fulfilling and reacting to changes in buyer interest (Zelbst, 2009) in this time of business world, client is Perce of progress inside the commercial center. These qualities of the business world pushed associations to adjust their perspectives and lead associations to reevaluate their procedures. Thus, business climate is described by its unpredictability. Hence, embracing a more coordinated way to deal with give anchor is to consumer loyalty (Venkatesh, 2013).

A more prominent degree of connection among store network individuals is depicted as far as building close and long haul connections upheld basic arrangement. Thus coordinated effort among them is required to contend term connections in today that are made between production network accomplices upheld cooperation ought to be supported by compassion and ability to keep up it (Chaiporn, 2005) Supply chain management the executives is a generally extraordinary way of thinking of business association and depends on the possibility of organization in the showcasing channel and a serious level of linkage between elements in that channel. The production network in general is firmly planned all together that complete channel stock is limited, bottlenecks are disposed of, time spans compacted and quality issues dispensed with (Kot, 2014). As indicated by (Lambert, 2000) ) expressed that supply chain management requires understanding and coordination for fulfilling and reacting to changes in consumer demand.

Supply chain integration (SCI) is how much a producer deliberately works together with its store network accomplices and cooperatively oversees intra-and entombs - association measures. The objective is to accomplish viable and effective progression of items and administrations, data, cash and choices, to offer a most extreme benefit to client for minimal price and high velocity and numerous specialists like (Flynn B. Huo, 2010) called attention to that store network stresses on the cycle's administration inside and past hierarchical limits, a proportion of its presentation is fundamental for its successful activity and control. The critical accomplishment of firms will rely upon the executives' capacity to coordinate the organization's intricate organization of business connections, permitting improved dynamic and therefore, decreasing expense and client reaction time.

As supply chain integration is that the extent to which service giving organizations strategically

collaborates with its supply chain partners and collaboratively manages differing types of processes. The most target of integration is to realize effective and efficient flow of products and services, information, money and decisions, so on provide the best value for purchasers. Supply chain integration affects business performance (Zelbst, 2009).

(Flynn, 2010) stated operational performance and business performance are the two widely used measures of firm performance. Operational performance (OP) is a major determinant to the overall supply chain performance, which usually is the merged result from multiple factors and enablers in the system.

According to (Frohlich, 2001), elaborated that performance measures for a supply chain should incorporate indicators in the operational dimension, such as customer satisfaction and the operational responsiveness to the changing market demand.

According to (ECX, 2013) supply chain integration will increase market share and business performance if properly worked on that. Thus, it's important to review the effect of integration of supply chain processes and activities on the operational performance of organizations. Therefore, this study investigated the present level of supply chain integration and its effect on operational performance of ECX.

## **1.2 Background of the Organization**

Ethiopian Commodity Exchange was established in 2008 and new initiative for Ethiopia and the first of its kind in Africa with its end-to-end integrated system of central trading, warehousing, product grade certification, clearing, settlement, delivery, and market information dissemination(Dametew, 2016)

Ethiopian Commodity Exchange (ECX) is a public-private partnership initiative firm; establishment was founded on Proclamation No. 550/2007. This declaration mandate ECX to develop its own rules for the governance of its different operations. ECX is only one of its kind partnerships of market actors, the members of the Exchange, and main promoter is the government of Ethiopia. Ethiopian Commodity Exchange authority has organized by government through declaration in order to abolish market related evils and to make easy transparent, efficient, and innovative marketing system to keep the interests of both producers and consumers (ECX, 2013)

The vision of ECX is to transform Ethiopian old bound agriculture through creating a new market place like that serves all market actors, from farmers to traders to processors to exporters

to consumer and properly implemented and regulated, commodity exchanges can contribute greatly to the achievement of the country strength economic the good deal power of weedy groups such as small farmers (ECX, 2013).

ECX has the following three goals:-

To serve as a market for sellers and buyers, exporters and importers of agricultural commodities in Ethiopian, regional and world markets, To provide reliable commodity market information on supply, demand, prices and their trends in domestic, regional and world markets, To establish fair commodity market prices for both sellers and buyers through a system of competitive and transparent trading on the floor of the Exchange. Price discovery since its establishment, ECX has set up a trading floor at the Mexico sub-city Show Grounds in Addis Ababa, where trading of commodities is conducted. The floor is open for trading limited types of agricultural commodities: crops such as Coffee, Sesame, Haricot Bean, Maize and Wheat (ECX, 2013) trading system is a ring-based trading system. Trading systems in which member's trade is openly and out of their price a designated area. In this system, all the trade participants should be present to the trading ground and hence the best bargain price is discovered. Shouting is essential to draw attention towards the system being quoted by the trader, so that everybody interested in the system assemble the same place (ECX, 2013)

### **1.3 Statement of the Problem**

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. 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).

According to (Zelbst, 2009) supply chain integration is that how much a producer intentionally collaborates with its stock organization assistants and agreeably regulates intra- and between various leveled cycles, to achieve fruitful and compelling movements of things and organizations, information, money and decisions, to convey most noteworthy worth to the customer. One in all of the crucial segments to improve affiliation's show is creation network

joining is to cultivate ceaseless association with upstream suppliers and downstream customers alongside total commonsense joint effort inside. Therefore, joining probably could be refined through interrelated activities (Chaiporn, 2005).

A critical face of combination is that the level of joining which might be recognized by the measure of activities through one estimation. In today get advanced practices to achieve a high compromise inside their store organization. Consequently knowing the proportion of store network compromise could be a basic factor for every association to redesign their integration (Desalew, 2011)

According to (Venkatesh, 2013) efficiency of stock organization blend is wellspring of specific advantage for an association to show better operational execution and improves capacity of regulating relationship with other store network accessories. A couple of examinations have found that compromise across the plan chain remembers a prompt and constructive outcome for progressive execution (Zelbst, 2009)

Supply chain integration are often a reason for reduction in transaction costs which might be realized substantial savings (Chaiporn, 2005) By the year 2020, governments within the Greater Horn of Africa and Eastern Africa (GHA/EA) region have individually set targets for industrialization of the economies. Since the economies are addicted to the agricultural sectors within the respective countries, industrializations of this sector may be a prerequisite for the industrialization of the opposite sectors within the economy. Improved agricultural marketing and trade will contribute immensely to the industrialization of the agricultural sector (ECX, 2013)

The initiative to ascertain agricultural exchange within the country, the Ethiopian commodities exchange, was supported the above concept of industrializing the agricultural sector. If markets function on reward quality, reduce transaction costs of market participation thus increasing returns to promote activity, enable quick capital turnaround thus increasing market volumes, and reduce risk of market participation, then markets will serve the wants of buyers and sellers and contribute to the well-being of all who participate within the economy (ECX, 2013).

To help Ethiopia achieve its national development goals through the adoption of technology and with integration, ECX is moving forward by taking the vision of becoming a number one exchange service in Africa (The World folio, 2016). The common challenge

occurs in the majority industries is continuous changing in customer needs and requirements because of tough competitions among the organizations. This cause difficulties in integrating supply chain activities and processes, which delay providing products and services to customers in suitable place at suitable time and losing of competitive advantage (Huo, 2012) As knowing the amount of supply chain integration could be a key factor for every company to boost their integration (Chaiporn, 2005) ECX has many operational related performance problems which are described hereunder.

According to (Dametew, 2016), studied factors determining farmers' decision to cooperative membership status in Ethiopia. within the study, that they had found that the issues of ECX include: lack of data and transparency problem between farmers and traders, increasingly common practice among private exporters to register as suppliers through sister companies ensuring the chance of reacquiring their own products by bidding higher price which increases the danger of selling the chain non-competitive and also the rigidity of the auction and export processes including the lack of buyers to check the standard of the merchandise (especially coffee) beforehand of sales again creating the next quality export coffee beans (as an example) has created a bootleg market that yields higher profit than exporting, albeit in local currency.

According to (Eleni, 2003) put that ECX has operational problems like limited awareness about the operation and benefits of the exchange by every market player; traders, cooperatives, exporters, farmers, brokers, etc., limited capacity in terms of skills, infrastructure particularly of telecommunications and storage capacity, and also in terms of monetary access by the market actors.

The opposite challenges are longer lead times, supply disruptions caused by global customs, foreign regulations and port congestion, political and/or economic instability within the country, and changes in economics like exchange rates which successively ends up in increasing cost, reduces speed of delivery of product and adaptability of the corporate. Within the year 2017, the amount of traded commodities at ECX had shown a six percent decline from the identical period of 2016 financial year (Zelbst, 2009).

Many studies have found that integration across the supply chain has a positive impact on organizational performance (Flynn et al., 2010, Baofeng Hou, 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 operational performance. Such problems happened thanks to poor supply chain management normally and provide chain integration problems particularly. So through analyzing the extent of supply chain integration, this study will help to identify improvement areas that can solve operational performance Problems (Huo, 2012). So the main target of the study were to examine the supply chain integration of Jimma branch which more focuses on the how does supply chain integration affect the operational performance activities the evidence of Jimma town.

## **1.3 Objective of the Study**

### **1.3.1 General Objective**

The general objective of the study was to investigate the effects of supply chain integration on the operational performance of ECX Jimma branch.

### **1.3.2 Specific objective**

The specific objectives of the study are;

1. To investigate the effect of supplier integration on the operational performance of ECX Jimma branch.
- 2.To examine the effect of ICT integration on the operational performance of ECX Jimma branch.
- 3.To investigate the effect of internal integration on the operational performance of ECX Jimma branch.
4. To examine the effect of customer integration on the operational performance of ECX Jimma branch.
5. To investigate the effect of warehouse integration on the operational performance of ECX Jimma brnach.

## **1.4 Research Hypothesis**

The research has the following hypothesis:-

H0.1: Supplier integration has statically significant effect on operational have performance of ECX Jimma branch.

H0.2: Internal integration has statically significant effect operational have performance of

ECX Jimma branch.

H0.3: Customer integration has statically significant effect on operational direct performance of ECX Jimma branch

H0.4: ICT integration has statically significant effect on operational direct performance of ECX Jimma branch

H0.5: Warehouse integration has statically significant effect on operational performance of ECX Jimma branch.

## **1.5 Significance of the Study**

Studying supply chain integration and its effects on organizations performance is crucial topic for both the organizations and for academicians. This study can be taken as an initiative that explains the effects of supply chain integration on operational performance of ECX in Jimma branch. The study is believed to its contribution for a better understanding of the role of supply chain integration in operational performance of commodity exchange to improve performance. Results of this study are expected to be important for industrial sector a lesson for their sector, Policy makers as inquiring ideas and for researcher as a guiding point.

## **1.6 Scope of the study**

This study tried to examine the effects of supply chain integration in Ethiopian Commodity Exchange service hence the scope was the organization in the Jimma branch and its stakeholders that operate within ECX,,s platform in the fiscal year of 2021. So the study area basically limited only in investigating the operational performance of supply chain integration of ECX due to scarce of time and resource.

## **1.6 Limitation of the study**

This study assessed the effect of supply chain integration on operational performance from the perspective of employees which could be deemed as a limitation. It would be more complete if the perspective of customers was also being incorporated. The other limitation of the study was the place issue. The study covered the perception of employees in Jimma branch only so that it might not reflect the perception of employees in other places of the country where branch offices

and warehouses are located. This study involved employees of the case company working in different departments (CEO, Audit, IT, this may have HR affected) the results as the effect of supply chain integration may vary in each department. Traditional data secrecy behavior of few employees and the bureaucratic nature of the organization since the start of the survey was the challenge of the study. The questionnaires were administered on drop and pick later method that it was challenging in case of some respondents.

## **1.7 Organization of the study**

The paper was organized in a sequence of chapter one, chapter two, chapter three, chapter four and chapter five. Chapter one introduced background of the study, statement of the problem, scope of the study, limitation of the study and definition of terms. Chapter two examined literatures in the area of supply chain integration. The theoretical and empirical studies were discussed and based on that conceptual framework was drawn.

Chapter three focused on research methodology, sample size for the study, data sources and data types used in the research including data collection mechanism. The chapter had methods of data analysis and data interpretation ways. At the end of the chapter, ethical considerations used were explained. Chapter four presented results and discussions. Explanations of the findings of data analysis, discussions and comparisons of output from the research with that of related literatures were illustrated. Chapter five summarized and concluded the findings of the study and had recommendations to improve the performance of the study area. At the end of it, the chapter gave a view of future research direction.

# **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 product 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 inter organizational 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 ECX.

### 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.

### 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 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).

Academics 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 whole supply chain, accompany, a business unit or a plant. In respect of how performance is measured the majority includes items related to logistics and SCM performance (Fabbe-Costes, 2008 cited in AsawinPasutham, 2012). Bowersox, et al. (2000) and Croxton, et al. (2001) said that the use of external linkage performance metrics leads to the creation of end customer 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 form o reflexible 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 that reflect the ability of the organizations to overcome these fluctuations in demand.

## II. Time (Speed)

The traditional dimensions to measures 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 and services to the customer according to agreed time table. It was be 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 Godfery (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. 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 Overview of commodity exchanges in Ethiopia**

### **2.3.1 The Post-Reform Market Challenges**

Other numerous nations like in sub-Saharan Africa, Ethiopian grain economy went through a sensational market change in the mid-1990s with the almost complete progression of the grain market. Preceding these changes, for a very long time until 1990, the Dergue government firmly controlled exchange, through cooperatives and its pastoral office, Agricultural Marketing Corporation (AMC), at first set up in 1976 with World Bank support for the capacity of buying grain and circulating it to buyers (Creswell, 2007) In this period, strategies included fixed skillet regional grain costs, confined private between local grain developments, restricted private area interest, and a maker grain share (Creswell, 2007) Rancher shares to the AMC added up to 10 to half of the reap at fixed AMC costs that were reliably underneath market costs, which discouraged country livelihoods and creation (ECX organization profile, 2013)

In March 1990, a sensational market change lifted, abruptly, all limitations on private exchange and killed official costs and standards. Then, in 1992, the Transitional Government continue changes from one side to another eliminating wheat customer appropriations and thin down the AMC, through shutting every one of the eight zonal workplaces, lessening its branch workplaces from 27 to 11 and its grain buy focuses from 2013 to 80. It was renamed the Ethiopian Grain Trade Enterprise (EGTE) with another order of settling costs and keeping up cushion stocks. Dissimilar to most post-change African states where promoting sheets kept on ruling exchange, the EGTE assumes a moderately minor part, with simply a 2 to 5% portion of the homegrown

market (ECX organization profile, 2013). In 1999, further changes included consolidating EGTE with the Ethiopian Oil Seeds and Pulses Export Corporation (EOPEC) and restoring it as a public undertaking, not, at this point needed to settle grain costs, with the significant target of working for business benefit by zeroing in on exportable grains. Since market changes brought about the almost absolute withdrawal of government mediation from the market, it was considered by an examination in 1998 that the changes instituted in Ethiopia established an especially significant trial of the speculation by the global local area that the progression of business sectors would diminish costs and catalyze development underway (ECX organization profile, 2013).

What at that point were the effects of these market changes? Various examinations have archived the impacts of these approaches (Dametew, 2016). As anticipated, these investigations found that progression did surely bring about a critical re-commitment of the private area in grain exchange, improved market combination, and the decrease of showcasing edges. Notwithstanding, critically, these investigations likewise brought up the changes didn't affect agrarian development and destitution decrease. Why? To begin with, regardless of the narrowing of value spreads or edges, market changes didn't lessen the unpredictability of grain costs and may have in fact exacerbated it. Connected to this, critical requirements to advertise execution remained which prompted the constancy of "thin "markets which markets there are not many buys characterized and as deals. Consequently, in light of the fact that these market requirements limit the scale and Scope of market action, they eventually limit the capability of the market to catalyze Production, development and lift rustic Livelihoods in the country.

The critical limitations of market execution can be recognized as either associated with helpless foundation or to missing establishments. As far as framework, significant nerves are the helpless access of smallholder ranchers to streets, just as restricted broadcast communications and capacity foundation. These shortcomings add to the significant expense of transport just as of other actual showcasing costs, like stockpiling, taking care of, and so forth Subsequently, promoting costs add up to some 40% to 60% of the last cost, of which some 70% is because of transport. Be that as it may, past the infrastructural issues, examines obliging to exchange. These expenses, particular from actual promoting costs, will be costs identified with organizing market exchanges between entertainers, like the expenses of finding for and screening an exchanging accomplice, the expenses of acquiring data on costs, characteristics and amounts of merchandise, the expenses of arranging an agreement, the expenses of checking contract execution, and the

expenses of authorizing contracts. Since these expenses are hard to distinguish and to quantify, they are regularly ignored, yet they offer amazing clarifications of the industriousness of missing business sectors or of market disappointments (Dametew, 2016).

Truth be told, these exchange costs likewise impact the degree of the physical, more discernible, advertising costs. For instance, taking care of expenses in Ethiopian grain markets are around 25% of the edge, which is far over the standard in complex business sectors. These expenses are especially high in Ethiopia on the grounds that the absence of evaluation and norms and the issue of agreement enforceability powers purchasers of grain at each move of proprietorship in the chain to off-load the shipment and re-sack each pack of grain. Likewise, on the grounds that there is little coordination in the vehicle area and along these lines no data in regards to whether transport rates.

In the Ethiopian setting, the presence of restrictively high exchange costs, confirmed by the absence of adequate market coordination among purchasers and merchants, the absence of market data, the absence of trust among market entertainers, the absence of agreement requirement, and the absence of evaluations and principles, suggests that purchasers and dealers work inside limited market channels, that is, just those channels for which they can get data and in which they have a couple of confided in exchanging accomplices. A broad experimental examination of Ethiopian market conduct along these lines uncovers that market entertainers lead business across brief distances, with few accomplices, in couple of business sectors, and with restricted capacity, inferring that chances for growing business sector action, also called exchange across space (shipping huge distances to advertise merchandise) and across time (putting away for critical periods), are restricted (Eleni, 2003). This restricted exchange thusly diminishes the responsiveness of the market to changes in market interest. The shortcoming of the market was most distinctly featured in the food emergency of 2002-2003, when a huge excess of grain in 2002 prompted the breakdown of market costs, altogether trading off provincial earnings and prompting disincentives to additional innovation reception by ranchers.

The steadiness of these market imperatives in Ethiopia focuses to the way that market changes alone, characterized as the evacuation of strategy twists, are vital yet not adequate to improve market execution. This recommends that the new advancement plan, in Ethiopia as well as all through post-change Africa, is to move past market change to showcase improvement.

Notwithstanding strategy motivators, key intercessions are needed to foster fitting business sector organizations and fabricate required framework, (Chaiporn, 2005) in acknowledgment of this, the Government of Ethiopia rebuilt the Ministry of Agriculture and Rural Development and set up a state service on rural information and yield markets in 2004.

### **2.3.2 Ethiopian Commodity Exchange Areas of Operation**

Most trades all throughout the planet have zeroed in on offering a solitary assistance; a well working exchanging stage through which venders and purchasers can meet, find costs and exchange. ECX anyway works in a climate where not many significant related administrations, like warehousing, electronic banking and market information spread, work palatable and in this manner the association has settled on a choice to furnish market entertainers with a total start to finish arrangement (Dametew, 2016)

#### **2.3.2.1 Warehousing and Grading**

To sell agriculture items through ECX, a vender is needed to store products at an ECX distribution center. There the merchandise will be named by type and beginning (on account of espresso) and be given a quality evaluation as indicated by a normalized set of estimations.

For Coffee, grade1 is most noteworthy and grade10 is least. These blends of names (called an image)

together distinguish the kind of item that is being sold, e.g. WSDB3 for Washed espresso from the Sidama B locale of evaluation 3 or ULK 8 for unwashed espresso from the Lekempti area of evaluation 8. Once the reviewing cycle is finished, the dealer is given a stockroom receipt, which can later be offered to a purchaser through the trade ((ECX organization profile, 2013)

#### **2.3.2.2 Trading Operations**

Exchanging happens on an actual exchanging floor situated in Addis Ababa, where purchasers and dealers take an interest in "Open outcry are constantly changing offering all through Exchanging market hours. The ECX utilizes a few different ways to communicate these costs progressively to makers and customers straightforwardly. When an arrangement is made, the ECX credits ware to the purchaser. The purchaser then necessities to gather its merchandise inside 10 days from the stockroom where the item was kept (Zelbst, 2009)

#### **2.3.2.3 Clearing and Settlement Option**

To work with its computerized exchange compromise framework portrayed above, ECX teams up with the significant bank in Ethiopia to have the option to give moves between the records of brokers. A stockroom receipt is additionally consequently and electronically moved to the purchaser. While such frameworks are basic spot in numerous different pieces of the world, it is the principal such framework that has been set up in Ethiopia (Dametew, 2016)

#### **2.3.2.4 Market Surveillance**

The intended benefits of ECX over the previous coffee auction including increasing the confidence and transparency in the market, reducing the market risk and to ensure fair and legal trade .Therefore, ECX market surveillance attempts to keep track of market actors to discover different types of extraordinary behavior, which may initiate further investigation and possibly lead to expelling the trader from further access to the market (ibid)

#### **2.3.2.5 Market Data Dissemination**

High market transparency can be defined as that every market actor has access to the information they are interested in or require to make informed market decisions. The ECX market data department therefore handles the tasks for interpreting current market trends and disseminating.

The market information to the different groups of people along the chain of trade from producer to middlemen to local or foreign buyers and analysts (ibid).

### **2.3.3 Why an Exchange for Ethiopia?**

A country like Ethiopia, the primary source of income for the majority peoples are agricultural activity. So, the benefits of commodity exchange market for the country are unquestionable

.Those is:-

- i. An exchange provides a mechanism for increasing market liquidity
- ii. An exchange enables transfer of price risk,
- iii. An exchange reduces transaction costs by:
  - Facilitating contact between buyers and sellers
  - Enabling centralized grading of products
  - Transmitting information about prices and volumes



- Ensuring that contracts are enforceable
- Providing mechanism for price discovery
- Simplifying transactions with standard contracts

An exchange creates trust, order, and integrity in the market (Dametew, 2016)

## **2.4 Empirical Literature Review**

(Zelbst, 2009) recognize four essential requirements to the improvement of lively product trades in the agricultural nations: market size, frail foundation and immature monetary administrations; and absence of strong lawful and administrative systems. Notwithstanding the above as per (Chaiporn, 2005) the foundation of the ECX tracked down that the Ethiopian grain markets confronted a few requirements, for example, absence of adequate market coordination among purchasers and dealers, absence of market data, absence of trust among market entertainers, absence of agreement authorization, and absence of evaluations and norms, infers that purchasers and merchants work inside limited market channels, that is, just those channels for which they can acquire data and in which they have a couple of believed exchanging accomplices and their decision showed that building up of an item trade will dispose of limitations that the Ethiopian ware market confronted.

(Zelbst, 2009)) in his examination referred to that the shortfall of effectively available market data for ranchers or little dealers prompts absence of market straightforwardness, low haggling force of the purchasers and venders, low and exceptionally factor costs because of market shortcoming, conjunction of excess and deficiency regions because of frail spatial joining of business sectors, high dangers, low produce quality and high misfortunes, high exchange costs and inadequate creation to fulfill buyer interest.

Another significant finding made by (Zelbst, 2009) showed that no apparent requirement for market straightforwardness on the lookout, absence of credit, absence of comprehension of the trade idea, new idea especially for limited scope administrators, including ranchers, protection from change and non-execution on agreements are considered in the investigation as the fundamental imperatives for the effective achievement of item trades.

Simultaneously it faces certain difficulties after foundation. At the point when we see at the KACE, as per (Zelbst, 2009) faces in excess of a couple of difficulties among which the accompanying two are the main: (I) the low quality of item that ranchers convey joined with the

way that most limited scale ranchers think that it's hard to convey in mass which is ideal for a trade and (ii) the greater part of the products in Kenya are vigorously directed by sheets and are developed and promoted in a climate of battling cooperatives, which are wasteful, blundered and have bulky interior organizations.

While (Zelbst, 2009) found that nations with fruitful trades have undeniably more evolved correspondences as well as transportation framework than nations with less effective trades and the analysts added that the genuine test in African ware trade isn't the improvement of evaluations yet the requirement of agreements that utilization those merchandise.

An examination by (Zelbst, 2009) finding upheld the abovementioned and uncovers that correspondences and transportation framework is basic to a working trade and remarkable imperatives, and difficulties to the adjustment of ware costs were distinguished to incorporate the limited scale nature of creation and low degree of additional handling, lackluster showing of state and public foundations, helpless framework which made creation uncompetitive and insufficient market data just as helpless admittance to useful resources. Also, according to his discoveries, one of the main considerations impacting the change of ware costs is repeating pay vacillations in the burning-through nations.

As per (Zelbst, 2009) Communications and transportation foundation is basic to a working trade. In the first place, exchange at a fates trade requires a correspondences network that can furnish merchants with spot market data to gauge the premise. An item trade likewise should be upheld by a solid framework for transportation and dispersion, with the goal that conveyance area can be believably determined in the agreement. In addition, exchange costs should be steady enough for dealers to assess the spread between the spot and prospects contract costs. Framework should uphold the trade, however it should likewise interface different spot markets if the trade is to work effectively. In a perfect world, the physical and correspondences framework will guarantee data with respect to item quality, amount, structure, and cost in all significant business sectors is accessible across different spot markets.

(Zelbst, 2009) as referred to in give an uncommon itemized contextual analysis of the breakdown of a particular agreement. Their investigation of the Di-ammonium phosphate (DAP) prospects contract in the Chicago Board of Trade showed that the agreement at last fizzled on the grounds that the money and fates markets were not adequately all around

connected, making it a helpless supporting device that offered no extra danger the executives support. This contextual analysis shows the trouble of giving a useful, adjusted agreement in any event, when the infrastructural, macroeconomic, and institutional climate is cordial. Without dynamic money markets and solid data in regards to those business sectors, it very well might be hard to foster an appealing agreement to exchange on an African item trade.

As per (Desalew, 2011) most African cereals advertises, an arrangement of evaluations and norms isn't probably going to advance without government contribution. In any case, the genuine test in African business sectors won't be the improvement of evaluations however the authorization of agreements that utilization those products. The general set of laws should guarantee contract implementation and an administrative framework should guarantee that stockrooms don't give numerous receipts for a solitary part. For fates contracts members should have certainty that agreements will be perceived by the overall set of laws and those agreement commitments will be implemented.

(Dametew, 2016) additionally discovered deficient market data, a powerless framework to authorize contracts, absence of norms and grades and inadequacy of the important organizations that help legitimate market working is a portion of the imperatives of espresso market in Ethiopia.

(Desalew, 2011) demonstrated that in most African oats markets such an arrangement of evaluations and guidelines isn't probably going to develop without government inclusion. Nonetheless, the genuine test in African business sectors won't be the advancement of evaluations however the authorization of agreements that utilization them.

## **2.4 Empirical Review**

Empirical studies explored supply chain integration towards operational performances, while others were discussed intermediating elements that effects of the supply chain integration of organizations in a different industry.

### **2.4.1 Supply Chain Integration on Operational Performance**

The point of this part is to examine and examination the connection between store network mix build and operational execution for the situation organizations. The investigation pointed that how much inventory network incorporation of the exhibition the executives exercises influenced, troubles in provider relationship and other operational device. As per Leuschner, Rogers and

Charvet (2013) likewise showed that there is a positive and huge relationship among's SCI and hierarchical execution. Yawar and Seuring (2017) found that production network data frameworks upgrade the connection between lean/nimble inventory network methodology and store network execution. All in all, production network incorporation procedure impacts essentially on the presentation of supply chains however just as an enhancer of the connection between data combination and inventory network execution. Additionally, Qrunfleh and Tarafdar (2014) and Flynn, Huo and Zhao (2010) found that inventory network coordination was identified with both business and operational execution of supply chains. Qi, Huo, Wang and Yeung (2017) noticed that an incorporated production network assist associations with planning the stockpile chains as one or the other lean or deft inventory chains. At the point when a store network is planned towards the lean methodology the mix is outfitted towards accomplishing productivity in the store network rather than quality, cost, and diminished conveyance time. Notwithstanding, the creators likewise declared that light-footed stock chains assist firms to keep an adaptable relationship with their inventory network accomplices. In rundown, store network joining influences the exhibition of supply affixes comparable to how adaptable firms are in reacting to the necessities of their clients. As indicated by Hamad (2013), the impact of store network combination on the authoritative execution, and the job of ecological shakiness have been explored. The investigation proposed to break down the effect of production network mix on authoritative execution.

Zelbst, Jr and Sower (2009) explored the impact of inventory network servitude on production network execution, and furthermore surveyed the linkage and its relationship with production network execution. The investigation tracked down that operational execution influenced by production network mix; these are inner joining, vital reconciliation and outside mix.

### **Relationship between supplier integration and operational performance**

Past scientists saw that coordination among makes and providers emphatically impacts diverse execution results. Providers assume a noticeable part in the exhibition of an association. Helpless item quality and late conveyance of crude materials coming from providers can add huge expense for purchasers as far as investigation, improve and returns and so on along these lines, provider quality, conveyance, adaptability and cost execution are the middle of the road results of the execution of a fitting inventory network technique (Chen, paulraj 2004). Henceforth, this examination depicts provider related execution result (SRPO) as the particular exhibitions that

can be accomplished with an undeniable degree of joining with providers.

The advancement of solid key organization with providers helps in working with their arrangement and expectation of producer's necessities, to all the more likely meet its evolving prerequisites (Flynn et al. 2010). The data dividing between supply accomplices gives a few coordination's benefits (Zhao et al. 2002; Lee et al. 2007) and furthermore deftness and adaptability (Swafford et al. 2008). Provider incorporation helps in diminishing creation costs, authoritative expenses and coordination's costs (Handfield, Nichols 1999; Gimenez, Ventura 2005; Devraj et al. 2007) and consequently decreases the expense of running the framework (Coase 1937).

The incorporation with providers advances collaboration, coordination and joint critical thinking routine (Narasimhan, Jayaram 1998) which lessens waste and repetition of endeavors in overseeing production network exercises across accomplice firms (Swink et al. 2007). Coordination with providers and clients helps in improving time based execution, for example, item advancement time, obtainment lead time (Droge et al. 2004; Rosenzweig et al. 2003).

The contribution of providers in beginning phase of item improvement causes speedier item advancement and presentation time (Droge et al. 2004). The provider mix is imperative to convey better worth than clients (Ragatz et al. 2002). The nearby coordination with providers is significant for diminishing conveyance lead time and decreasing support inventories (Handfield 1993). Provider combination has gotten basic to achievement of organizations since it helps in critical improvement as far as conveyance quality, more limited process duration and diminishes cost and creation lead time (Shin et al. 2000; Ragatz et al. 2002).

### **2.2.2. Relationship between internal integration and Operational Performance**

The significance of inner coordination has been generally featured in SCI writing. Inward combination emphatically affect operational execution of the firm including coordinations execution (Germain, Iyer 2006; Stank et al. 2001) and measure effectiveness (Saeed et al. 2005). It has likewise been found to emphatically affect time based execution builds, for example, "an ideal opportunity to showcase", "time to item" and furthermore accomplishing high client responsiveness (Droge et al. 2004). Interior reconciliation decidedly affects business execution of firm (Flynn et al. 2010).

### **2.2.3. Relationship between customer integration and Operational Performance**

Past specialists saw that joining among maker and clients emphatically impacts diverse execution results. The cozy connection among producer and clients helps in improving the exactness of interest data which helps in decreasing the item plan and creation arranging time for administration. The tight reconciliation with clients decreases stock oldness and furthermore costs (Flynn et al. 2010).

Client's incorporation helps maker in getting more receptive to the need of clients, make more noteworthy esteem and recognize request changes all the more rapidly. Client combination has been found to affect consumer loyalty, both straightforwardly (Homburg, Stock 2004) and in a roundabout way through its relationship to item development execution and item quality execution (Koufteros et al. 2005). The makers who are incorporated with clients can diminish inventories and decline conveyance times and become more adaptable to client requests, henceforth make the store network more effective (Barrat 2004; Clark, Lee 2000).

## **2.5 The effect of supply chain integration on performance**

Various works ensured a mind blowing meaning of store network blend for achieving operational execution (Frohlich and Westbrook, 2001). Nevertheless, a couple of makers found no prompt association between creation network mix and operational execution (Koufteros et al., 2005; Gimenez. C, 2003). Those makers, who recognized a positive association between stock organization Integration and operational execution, show the gainful result of store network joining on cost, quality, transport, flexibility, advancement, measure capability, time delicate execution and collaborations organization execution.

## **2.6 Literature gap**

The literatures reviewed above specially the empirical studies have not directly investigated the effect of supply chain integration on commodity exchange operational performance. Above all, numerous studies that have been conducted to determine the effect and relationship between supply chain integration and operational performance used secondary data in order to analyze the data.

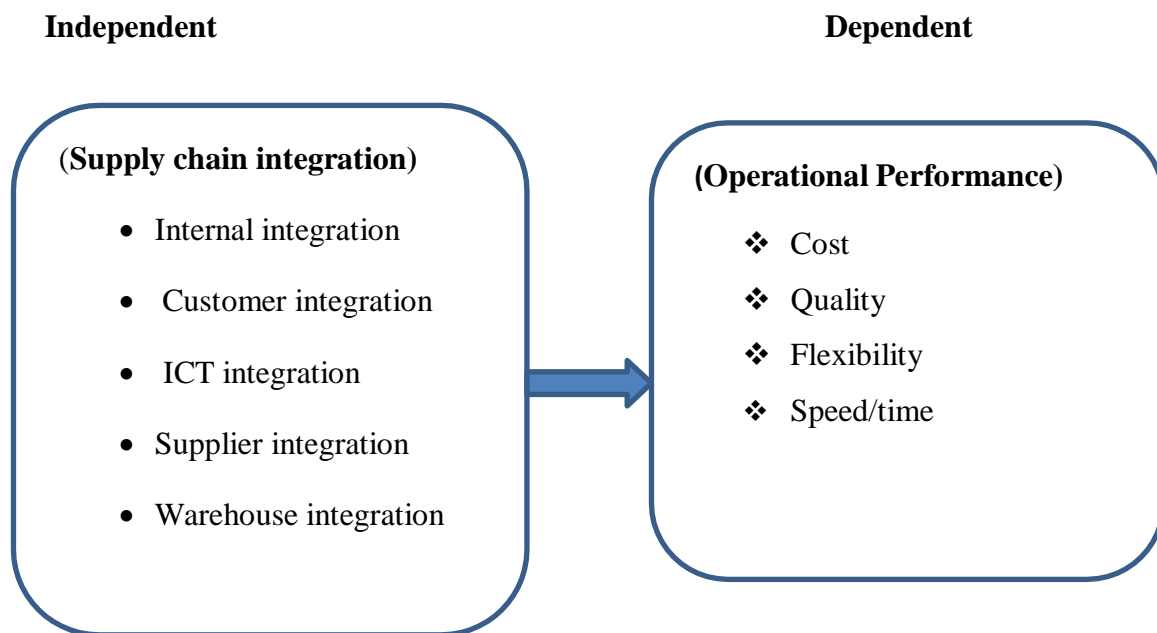
For instance the studies by (Dametew, 2016)who studied supply chain integration and its linkage for improving performance using secondary data from articles and website, (Creswell, 2007) examined the impact of supply chain integration (SCI) on three types of company performance from the perspective of organizational capability using secondary data, (Zelbst, 2009) study titled: "Impact of supply chain linkages on operational performance", aimed at examining the impact of supply chain linkages on operational performance using secondary data, (Creswell, 2007) study titled: —Mediating Effect of Operational Cooperation between Supply Chain Practices and Firm Performance using secondary data

Generally, many researchers identify the challenges of Commodity Exchange like weak infrastructure (Communication and Transportation), price volatility, lack of enforcements implementing of contract, poor quality of product, and lack of credit. But in this study the student researcher try to see the basic internal and external challenges which were included in the other studies and any other challenges which are associated with trading practice, Warehousing challenge, shortfall/losing their weights of products challenges etc. The unique features the study is that are; it can significantly identify the major challenges

of ECX than the other studies conducted thus far because this study considered four warehouse delivery centers. But when we see the previous studies all of them focused in Addis Ababa.

## 2.7 Conceptual framework

Among the different authors who proposed a framework relating supply chain integration and operational performance, this study adapted the works of (Chaiporn, 2005) and (Venkatesh, 2013) drawn it as follows:



Source: (Chaiporn, 2005) and (Venkatesh, 2013)

**Figure 1: conceptual framework of SCI**



## **CHAPTER THREE: METHODOLOGY OF THE STUDY**

### **3.1 Description of the Study Area**

This study was conducted as a case study at ECX, Jimma City. It had focused on analyzing the level of supply chain integration and its effect on the operational performance of ECX based on the perception of employees. Hence, the area of study was the Ethiopian Commodity Exchange in the Jimma branch.

### **3.2 Research Approach**

The main objective of this research is to examine the Supply Chain Integration in ECX operational performance. Considering the purpose of the research and the nature of the phenomenon mixed research approach implemented. Which were used both quantitative and qualitative research approach (Creswell, 2007).

### **3.3 Research Design**

The casual research design was utilized in this examination since it pointed toward explaining the reason/impact connection between SCI components and Operational performance of ECX. The Causal explaining is quantitative in nature just as preplanned and organized in plan. Causal examination endeavors to clarify the circumstances and logical results connection between factors (Chaiporn, 2005) the research design was picked on the grounds that it assisted with seeing the connections between the reliant and free factors and it additionally permitted estimating the impact of SCI on OP.

### **3.4 Unit of Analysis**

According to (Chaiporn, 2005) by making employees as unit of analysis one can explore a perception or attitude as a predictor of employees. For this study employees of ECX working in Jimma branch were chosen as the unit of analysis who were available at the time of distributing the questionnaires and who had filled it because it was not be the firm as unit of analysis rather employees. This was so because the main aim of this thesis was to explain the effects of SCI on operational performance of ECX based on the perception of those employees.

### **3.5 Population of the Study**

Target population was the total group of individuals from which the sample may be drawn Polit

and Hungler (1999). Which is the rationale of the selection of target population is because of the worker number below determination of sample. So, the selection was based on 2021 file of human resource admin report of the ECX which is 201 of 141 employees was selected.

### **3.6 Sample Size Determination**

The sample size of ECX members are 201. The sample size is based on Yamane (1967:886) cited by (Israel 1992) formula to calculate sample size whose precision level is 0.05. Suitability of the Yamane technique is due to its power to generate a large sample on which reliable analysis can be, conducted. This sample was, calculated based on the 95% confidence level, 5% precision level and 10% non-response rate. The Yamane formula is, denoted as:

$$n = N / (1 + N * e^2)$$

Where n is the sample size, N is the populace size and e is the degree of exactness. As it is given over that the populace size is 201.

Test size of this investigation would be:  $n = 201 / (1 + 201 * 0.0025)$

=134 Contingency of 5% of the total sample size =6.7

$$\text{Total} = 141$$

At last, the sample size equations give the sample size should have been gotten. Numerous analysts usually add 5% to the sample size to make up for people that the specialist can't contact (Glenn, 1992).As Tanburn(2015) portrayed, likely errors in the presumptions it very well might be savvy to test more than the base and to be protected, add 5% to an example.

The examination added 5% to the figured outcome in order to engage the expansion number of respondents to get more prominent accuracy and force for making significant determination.

Accordingly the sample size of the examination was:  $134 + 7 = 141$

### **3.7 Sampling Technique**

The data needed for the investigation needs representatives who work in the Jimma part of the association. The example tests expected to have the correct extent of individuals from

each concerned office or division. So the study used to determine the strata's using simple stratified sampling techniques.

As indicated by Hamed (2016) delineated examining is the place where the populace is partitioned into layers (or subgroups) and an irregular example is taken from every subgroup to guarantee that each layer is satisfactorily addressed. Likelihood or irregular testing has the best independence from predisposition (Hamed 2016).

Consequently delineated likelihood examining strategy was utilized for the examination since it permitted every division/office to get appropriate portrayal. The testing was finished by arranging the populace into eleven layers dependent on the divisions and segments in the organization which are straightforwardly related with the activities of ECX. At that point the examples were chosen randomly from every layer as per their extent to the absolute population. For the purpose of study the researcher was used a simple random sampling techniques.

Taking the worker information the investigation took the relative designation of tests for every layer (division) as:

$$n_i = p_i * n / N$$

Where  $p_i$  is rate portion of every office from the absolute

number  $N$  is populace size

$n_i$  is the absolute populace of every

office/layers  $n$  is the example size of the

investigation

Taking the above formula and points the study had the following sample size from each stratum

**Table 1.**sample size

Division/Department	Total population(pi)	n	Sample size(ni)=pi*n/N
CEO	11	141	8
Compliance	16	141	11
Facilities Management	23	141	16
Finance	16	141	11
HR	14	141	10
IT	24	141	17
Audit	8	141	6
Market Operations	23	141	16
Quality Operations	22	141	15
Strategy & Corp communication	16	141	11
Warehouse Operation	28	141	20
Total	201		141

Source: own survey (2021)

### **3.8 Data Sources, Types and Collection Procedures**

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) 23.0 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; ECX. The close-ended Likert type questionnaires are used. This questionnaire type selected because it is easy to administer to groups of people simultaneously; it is less costly and less time consuming than other measuring instruments.

### **3.9 Data Analysis**

The data of this study was analyzed by computer through package software (SPSS: Statistical Package for Social Sciences).In the data analysis the statistical methods to be employed were Using descriptive statistics in form of frequency and percentage the demographic background information of the respondents in ECX was analyzed and presented, Measures of central tendency such as mean and standard deviation were used to assess the practice of supply chain integration ,For the purpose of investigating the effect of supply chain integration on operational

performance, regression analysis was used to observe influence of independent variables on a dependent variable, operational performance. The regression model was checked for normality and fit for the analysis. The analysis was done as in the subtopic below.

### 3.9.1 Regression Analysis

As Wooldridge (2015; Gujarati (2003), Campbell and Campbell (2008) explained regression analysis is the determination of relationship between variables which is used to generate a predicted value or estimates of variables and cause-effect inferences. This section shows the estimated practical models. Study objective one, two and three were addressed using model 1 while objective four was tested using model:

$$\text{That follows} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \epsilon \dots \dots \dots (1)$$

**Where:**

**Independent Variables:**

**X1-** Internal integration

**X2-** Customer integration

**X3-** ICT integration

**X4-** Supplier integration

**X5-** Warehouse integration

**Dependent Variables**

**Y-** Operational Performance

**Regression Parameters:**

**β<sub>0</sub>**- Constant

**β<sub>1</sub>, β<sub>2</sub>, β<sub>3</sub>,** -Regression coefficients

**ε**- Error term

### 3.9 Variables of the study

Based on theoretical literature and related studies in the area of supply chain integration on firms performance review the researcher id variables.

**Independent Variables:** The identified five variables that contribute to ECX,s operation performance (supplier integration, internal integration, warehouse integration, ICT integration

and customer integration) each variable was measured by 4-7 items and the total were 40 items (from item 1 to item 40) in the questionnaire and defined as follows.

**ICT integration:** the sharing of accurate information across members of supply chain, the timely sharing of information across supply chain, coordination in the flow of information among partners and level of utilization of information among supply chain partners (Investopedia2016).

**Internal integration:** integration among internal functions, periodic interdepartmental meetings among internal functions, use of cross functional teams and integrative inventory management Narasimhan& Kim (2002). 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.

**Supplier integration:** defined as the level of information exchange with suppliers through internet, establishment of quick ordering system with major supplier, level of strategic partnership with major supplier and stable procurement through network with major supplier Narasimhan& Kim (2002); Morash& Clinton (1998).

**Warehouse integration:** the degree which a warehouse system integrated with other processes for better accuracy, convenience, handling, control and having better layout systems so as to facilitate the receipt, storage and retrieval of commodities (ECX, 2019).

**Customer integration:** defined as the follow-up with customer for feedback, level of computerization for customer ordering, frequency of periodic contact with customer and level of linkage with customer through information network Narasimhan& Kim (2002); Morash& Clinton (1998).

**Dependent variable:** The researcher identified operational performance as dependent variable.

**Operational performance:** defined as the speed of response by the company to changes in market demand, on time delivery of products by the company to customer, the level of customer service by the company and level of lead time for fulfilling customer order (Frohlich &Westbrook, 2001; Beamon, 1999 Vickey, 2003).Based on the reviews, operational performance has dimensions of flexibility, quality, cost and time/speed. Each of the dimensions was measured by 4 items and a total of 16 items in the questionnaire.

### **3.11 Measurement and Instrumentation**

Narasimhan and Kim (2002) have distinguished provider joining, client coordination, data

combination and inner mix estimation factors. The instrument utilized in the examination was survey. The standard poll used to gather the important data in regards to the investigation was embraced from crafted by Saleh (2015) who contemplated SCI sway on operational execution. As per Saleh (2015) the device he utilized was very suit for evaluating SCI as he created utilizing diverse related investigates and assessed by scholastic board of judges and experts around there. The factors were estimated as follows.

**ICT integration:** estimated through the degree of sharing of precise data across individuals from inventory network the opportune sharing of data across production network, coordination in the progression of data among accomplices and level of use of data among store network accomplices (Investopedia, 2016).

**Internal integration:** estimated through information combination among inward capacities occasional interdepartmental gatherings among inner capacities utilization of cross useful groups and integrative stock administration (Narasimhan & Kim, 2002).

**Supplier integration:** estimated through the degree of data trade with providers through web foundation of fast requesting framework with significant provider level of vital association with significant provider and stable acquirement through network with significant provider (Narasimhan & Kim, 2002 Morash & Clinton, 1998).

**Warehouse integration:** estimated through the degree which a distribution center framework incorporated with different cycles and frameworks in order to work with the receipt, stockpiling and recovery of products based on industry acknowledged evaluations and norms (ECX, 2020).

**Customer integration:** estimated through circle back to client for input, level of computerization for client requesting, recurrence of intermittent contact with client and level of linkage with client through data organization (Narasimhan & Kim, 2002 Morays & Clinton, 1998).

**Operational performance:** estimated through the speed of reaction by the organization to changes in market interest, on time conveyance of items by the organization to client, the degree of client care by the organization and level of lead time for satisfying client request (Frohlich & Westbrook, 2001; Beamon, 1999; Vickey, 2003).

In the survey the Likert-type scale strategy was utilized with a scope of reactions 1='Strongly Disagree', 2='Disagree', 3='Neutral', 4='Agree', - 5='strongly agree' individually. The utilization of this specific scaling technique guaranteed that the examination study represented the capacity to evaluate the reactions and measure the reactions quantifiably so an example or pattern might be delivered to survey research theories.

## **3.12 Validity and Reliability**

### **3.12.1 Validity**

According to Malhotra (2010), there are three sorts of legitimacy test: content legitimacy, inside legitimacy, and develop legitimacy. Legitimacy is characterized as a proportion of truth or deception of the information acquired through utilizing the exploration instrument. It is named inside and outside legitimacy of the estimating instrument Burns and Grove (2001).

Build legitimacy guarantees the actions being utilized compares to the examination ideas. Build legitimacy is accomplished through triangulation of different information sources; a chain of proof, and key witness surveys (Yin, 1994).

On this review, the survey utilized by Saleh (2015) was utilized. Saleh considered The Impact of Supply Chain Integration on Operational Performance at Jordanian Pharmaceutical Manufacturing Organizations. Saleh utilized two techniques to affirm the substance legitimacy. First: content legitimacy, different wellsprings of information (writing like past investigations, master interviews) were utilized to create and refine the model and measures. Second: Face legitimacy, board of judges was done to change the finale rendition of the poll (Sekaran, 2003).

### **3.12.2 Reliability**

The reliability of an estimating instrument is characterized as its capacity to reliably quantify the wonder it is intended to gauge (Ho, 2006). The most well-known method utilized in and steadiness literary works is the utilization of the Cronbach Alpha Statistics (Sekaran, 2003). In this specific investigation, dependability of the free and ward factors was surveyed utilizing Cronbach's  $\alpha$  to Sakaran (2005) if Cronbach's Alpha is at or over 0.70 in an examination, it was considered as solid scale yet any scale with Cronbach's Alpha not exactly this standard were liable and considered as inconsistent. That Cronbach's Alpha coefficient value for independent variables was above 0.70 and 0.914 and for dependent variable was 0.883 which means that Cronbach's Alpha coefficient value is acceptable and reliable.



**Table 2 Reliability test**

Variables	Number of Items	Cronbach's Alpha
Customer integration	5	0.942
Internal integration	7	0.930
Supplier integration	4	0.966
ICT integration	3	0.914
Warehouse integration	5	0.947
Cost	4	0.942
Quality	4	0.883
Time/Speed	4	0.959
Flexibility	4	0.956
Operational Performance	16	0.965

**Source:** own survey (2021)

As shown above in table 3.2 that Cronbach's Alpha coefficient value for independent variables were above 0.70 and 0.914 and for dependent variable was 0.883 which means that Cronbach's Alpha coefficient value is acceptable and reliable.

### **3.12 Ethical Consideration**

At the time of data collection process, appropriate ethical clearance was issued supported by a letter from Jimma University department of business and economics. Before filling questionnaires, confidentiality was ensured for the information by not recording the name of the respondent or other identifiers. While conducting the research, respondents were informed that the data collection process was carried out whenever they were willing to cooperate. In addition to this, any information that was collected via the instrument would never be used for any other purpose other than its academic intent i.e. the data would be kept confidential. The respondents were also made to know that before it is publicized, they will be provided a copy of the publication.

## CHAPTER FOUR: RESULT AND DISCUSSION

### 4.1 INTRODUCTION

It has been discussed in previous chapters that this study attempted to examine the supply chain integration and its effect on operational performance in the case of Ethiopian Commodity Exchange Jimma branch. Hence, the findings of the study presented and discussed in this chapter. The questionnaire was developed in five scales (Likert scale) ranging from one to five where 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree. Exclusion of the "Neutral" responses from the original data set makes a substantial difference in the analysis results making the absolute midpoint 2.5 in a 5 scale Likert Ryan (1980). The study used a cut-point of 2.5 in the mean values of the Likert's Ascaletotalof177 result questionnaires were distributed to employees and 141 (100%) questionnaires were obtained and also valid and used for analysis. The collected data were presented and analyzed using SPSS (version 20.00) statistical software.

The analysis of the data was follows: first the study variables were analyzed and described from statistical point of view by using means, standard deviations, and then Regression Analysis was also used to test the effect of independent variables on dependent variable.

### 4.2 Demographic profile of the respondents

**Table 3. Demographic information (Gender, Academic qualification and years of service)**

Dimensions		Frequency	percent
Gender	Male	122	86
	Female	19	14
Academic qualification	Diploma	2	1.4
	First degree	135	95
	Master's degree	4	4.6
Year of experience	<2	6	4
	3-5	14	10
	6-8	21	15
	9-12	28	20
	>13	72	51
Department/division	Audit	8	6
	CEO	11	8
	Compliance	16	11

Facility Management	11	8
Finance	10	7
HR	17	12
IT	6	4
Market operations	16	11
Quality operations	15	11
Strategy and corporate	11	8
Warehouse operations	20	14

Source; own survey (2021)

According the above table shows the most respondent or employees of ECX Jimma branch is male 86% and the rest 14% female. Based on the results on table 3, most of the respondents hold Bachelor degree (first degree) with 135 (95 %) respondents, while 4 (4.6 %) respondents hold Master Degree. The least academic qualification is diploma with 2 respondents (1.4%). This shows that most of the respondents have good academic qualification so as to understand the concepts of the variables and answer the research questionnaire which has positive effect on quality of data collected.

The respondents were asked to indicate the duration they had served in the organization. The findings show on table 4.1 that a majority (51 %) indicated above 13 years followed by 20% who indicated 9-12 years ,15% 6-8 years and 10% (3-5year) which Only 4% reported less than two years in the organization implies that more than 85 % of the respondents served more than 5 years in the organization. This indicates that the majority of the respondents have good experience regarding the company and their response can be considered genuine which has direct relation with data quality.

### **4.3 Supply Chain Integration of ECX as Perceived by The respondents**

Here the analysis tried to describe the supply chain integration of ECX as perceived by the respondent employees as presented above through means and standard deviations.

**Table 4: Mean and STD of supply chain integration of ECX as Perceived by the Employees.**

No	Items	N	Mean	Std. Deviation
1	Warehouse integration	141	2.2465	0.63111
2	ICT integration	141	2.5399	0.79514
3	Internal Integration	141	2.45977	0.71883
4	Customer integration	141	1.80988	0.648582
5	Supplier integration	141	3.07745	0.80078
	Supply chain integration	141	2.4267	0.718889

Source: own survey (2021)

Table 4 shows that supply chain integration in ECX is low as its mean is 2.4267. The employees show their disagreement on supply chain integration. According to the results on table 4.7 mean values of independent variables is between 1.8 and 3.07 with standard deviations between 0.6311 and 0.8008 the overall mean of the variables is 2.4267 with standard deviation 0.72, which mean there is agreement among employees of ECX on moderate implementation of supply chain integration in the company. Based on the Means of independent variables supply integration is relatively highly implemented with mean value of 3.07. Customer integration shows the least implemented integration dimension with mean value of 1.809. Warehouse integration is also the least implemented dimension with mean value of 2.24.

According to Flynn (2010) any supply chain with lower external (customer and supplier) integration cannot have higher supply chain integration. But as Zhaho (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 in processes. Therefore supply chain though integration is the moderate company's 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 that the company doesn't plan determining and improving the supply chain integration and shows that the organization has not understood the strategic importance of supply chain integration.

#### **4.4 Operational Performance of ECX as Perceived by the Respondents**

This section presents information on the measures that were used to measure organization performance. The results were presented as follows that were derived from survey results of table 4.8 through 4.11 (Appendix.B).

**Table 5: Mean and STD of Operational performance of ECX**

No	Measures	N	Mean	Std. Deviation
1	Cost	141	1.950325	0.521675
2	Time/Speed	141	1.828	0.689538
3	Quality	141	2.918425	0.560053
4	Flexibility	141	1.950325	0.521675
Operational performance		<b>141</b>	2.161769	0.573235

Source: own survey (2021)

As shown on table 5 the overall mean value of the four measures of operational performance is 2.16 with standard deviation 0.57 which indicate that there is an agreement among ECX employees in the Jimma branch that there is a moderate operational performance. The average mean value of operational performance measures is between 1.8 and 2.9 with standard deviation between 0.68 and 0.56. As shown on the table above there is a relatively higher operational performance regarding quality measure with mean value of 2.918. With a mean value of 1.828 the company has the lowest operational performance measure regarding to time/speed.

**Table 6: Correlation analysis**

Pearson's Correlation (r) Among Independent Variables, Dependent variables, and between Independent and Dependent Variables. N=141						
		Internal integration	Supplier Integration	Customer integration	Company supply chain	IcT Integration
Internal integration	Pearson	1	.562**	.872**	.691**	.500**
	Sig. (2-tailed)		.000	.000	.000	.000
Supplier Integration	Pearson		1	.627**	.650**	.448**
	Sig. (2-tailed)			.000	.000	.000
Customer integration	Pearson			1	.770**	.641**
	Sig. (2-tailed)				.000	.000
Warehouse integration	Pearson				1	.769**
	Sig. (2-tailed)					.000
IcT Integration	Pearson					1
	Sig. (2-tailed)					.000

\*\* . Correlation is significant at the 0.00 level (2-tailed).

The correlation between SCI elements with supply chain performance dimensions run as seen in the above table. The result of correlation matrix between each supply chain integration elements and supply chain performance dimensions analyzed as follow: Bivariate Pearson correlation (r) table shows that the relationships among supply chain integration variables are very strong, since R-value ranges between 0.448 and 0.769 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 0.627 and 0.650 and p values are less than 0.000.

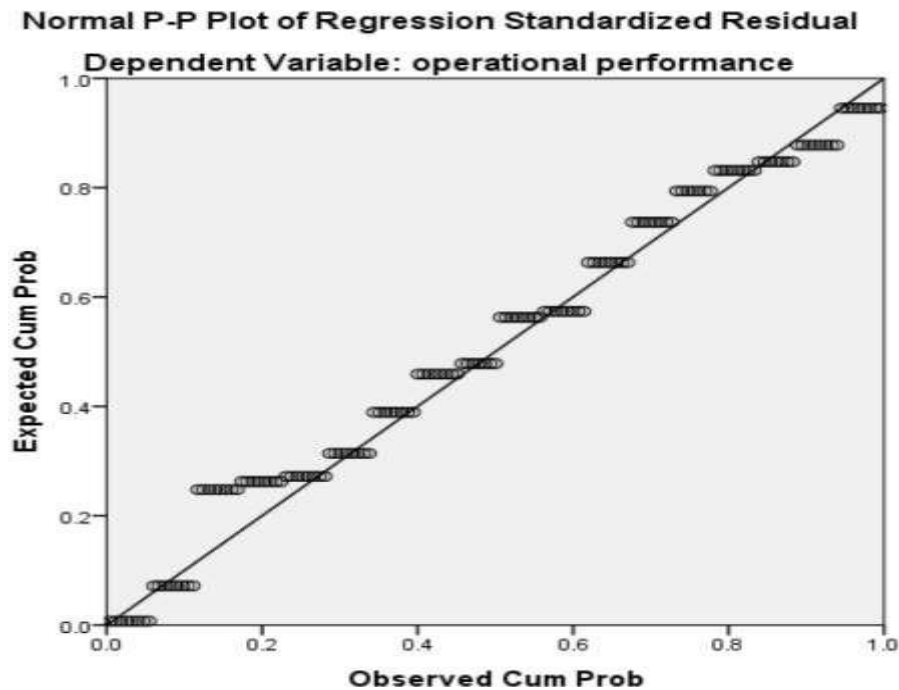
#### 4.4 The Effect of SCI on Operational Performance of ECX

To assess the effect of Supply chain integration on operational performance of ECX, the study applied regression analysis. The results of the regression were presented as follows:

##### 1. Linearity Test

The plot shows there is a linear relationship between operational performance and the independent variables.

Figure 2 : linearity test



The assumption to check is homoscedasticity. The scatter plot of the residuals will appear right below the normal P-P plot in output. Ideally, get a plot that looks something like the plot above. The data looks like shot it out of a shotgun it does not have an obvious pattern, there are points equally distributed above and below zero on the X axis, and to the left and right of zero on the Y axis.

##### 2. Multi collinearity Test

Tolerance and VIF (Variance Inflation Factor) and tolerance are used to test multi-collinearity. As Gujarati (2003) described, a multi collinearity test can be conducted using tolerance or VIF factor and by rule of thumb,  $VIF \leq 10$  or tolerance collinearity problem.

**Table 7 Collinearity test**

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	warehouse	.849	1.177
	ICT	.791	1.265
	Internal integration	.761	1.314
	customer integration	.700	1.429

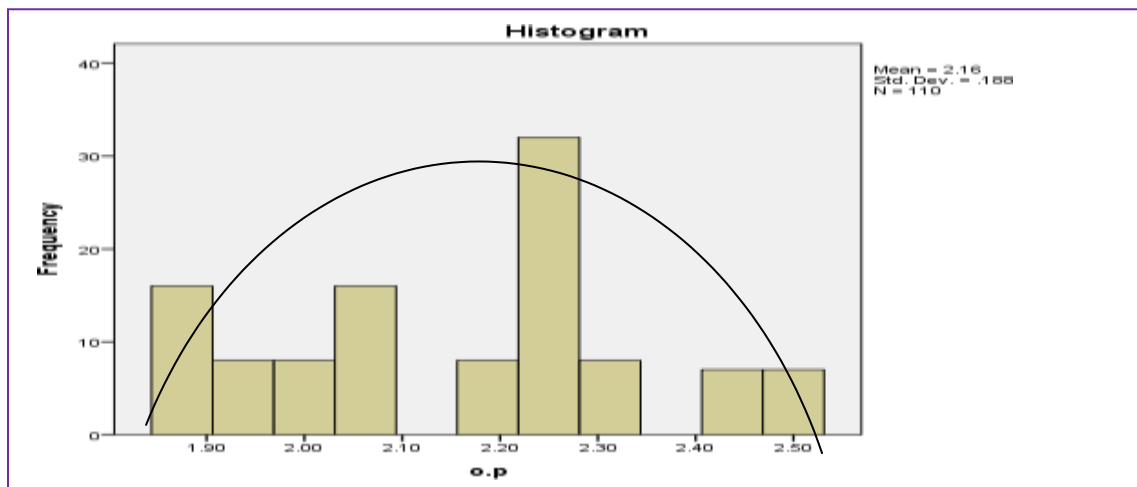
Dependent. Operation performance  
Source: own survey (2021)

The above table leads to a conclusion that there is no multi collinearity effect and the inter relationships among independent variables doesn't cause concern. Therefore, as the indication of statistics that the predictors are not highly correlated and it was not the problem of the study.

### 3. Normality test

This test of assumption can be proved by drawing histogram or Q-Q plot. In the following the histogram follows a normal distribution reveals the residuals are normally distributed and hence the data used were normal.

**Figure 3: Normality test**



Source: spss 20 outputs

### 4. Homoscedasticity

The scatter plot of the residuals looks like a shot it out of a shotgun it does not have an obvious pattern, there are points equally distributed above and below zero on the X axis, and to the left and right of zero on the Y axis. Hence the figure depicted that residuals are equally distributed.

**Table 8: ANOVA test**

ANOVA test							
			Sum of Squares	df	Mean Square	F	Sig.
total * supply integration	Between Groups	(Combined)	641.227	1	641.227	69.367	.000
	Within Groups		1284.915	139	9.244		
	Total		1926.142	140			

\*Dependant variable .operational performance

\*Independent variable; warehouse, Internal integration, customer and supply integration

Source: own compute (2021)

In the table 8, we have the F value of 69.367 which is significant with  $p < 0.000$ . This informs us that independent variables taken together as a set are significantly related to the dependent variable. Hence, the multiple regression models are overall statistically significant. The above assumption tests showed that the regression used was fit for the study and the tests for hypotheses and results were discussed below.

**Table 9: Coefficient of determination**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.861 <sup>a</sup>	.742	.728	.12088
a. Predictors: (Constant), customer integration, supply integration, supply integration, customer integration, human resource, customer integration, customer integration				

Source: own survey (2021)

*H0: Supply chain integration doesn't ( $\alpha \leq 0.05$ ).*

The results in the table 9 above shows positive coefficient imply that SCI has a positive influence on operational performance. Hence there is no evidence to accept the null hypothesis. The result leads to a conclusion that supply chain integration has direct effect on operational performance of ECX Jimma branch.

The coefficient of determination, adjusted R2 is 0.742 meaning that 74.2% of the variation in



operational performance (OP) is explained by the variations in supplier in, customer, and warehouse and ICT integrations. This means that the remaining 25.6% of the variation in operational performance can explain by other exclude variable.

This result goes in line with different previous studies, such as Chavez (2015) and Huo (2012) who found that human resource in integration, Ware house integration and ICT integration had a significant impact on organizational performance.

**Table 10: Coefficients of operational performance**

12		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.971	.114		8.514	.000
	Internal integration	.126	.027	.248	4.606	.000
	supply integration	.092	.026	.219	3.594	.000
	customer integration	.062	.015	.237	4.044	.000
	Ware house integration	.109	.049	.220	2.208	.029
	ICT integration	.119	.012	.633	10.100	.000
a. Dependent Variable: operational performance						

Source: Own survey (2021)

In the following sub-sections, the hypothesis for each SCI items were tested and discussed.

**H01:** *Internal integration has a positive significant effect on operational performance of ECX Jimma branch ( $\alpha \leq 0.05$ ).*

Table 4.17 shows that there is a positive direct effect of Internal integration on operational performance since (Beta= 0.126, t=4.6, sig. 0.000 p<0.05). Therefore the null hypothesis is rejected and the alternative hypothesis is accepted, which indicates that internal integration has direct impact on operational performance of ECX Jimma branch at ( $\alpha \leq 0.05$ ). These result the same with result of Kumar 2017, stank 2001 flyan 2010 and swik 2007.

**H02.** *Supply integration statically direct effect on operational performance of ECX Jimma branch( $\alpha \leq 0.05$ ).*

Table 4.17 shows that there is a positive direct effect of supply integration on operational performance since (Beta= 0.092, t=3.6, sig. 0.000 p<0.05). Therefore the null hypothesis is rejected and the alternative hypothesis is accepted, which indicates that supply integration has direct impact on operational performance of ECX Jimma branch at ( $\alpha \leq 0.05$ ) these result the same with result of Kumar 2017.

Thus, supplier integration has direct effect on operational performance of ECX that goes in line with previous researches for example (Kumar,2017) studied effect of SCI on operational performance and concluded that supplier integration directly affects operational performance. However, Stank,(2001) reported no direct association between supplier integration and operational performance (Flynn,2010), other scholars such as (Swink, 2007;Stank,2001) also found a negative association between supplier integration and operational performance.

***H03. Customer's integration spastically has significant direct effect on operational performance of ECX Jimma branch ( $\alpha \leq 0.05$ ).***

Table 4.17 shows that there is a positive direct effect of customers integration on operational performance since (Beta= 0.062, t=4.044, sig. 0.000  $p < 0.05$ ). Therefore the null hypothesis is rejected and the alternative hypothesis is accepted, which indicates that customers integration has direct impact on operational performance of ECX Jimma branch at ( $\alpha \leq 0.05$ ) these result the same with result of Tollen(2006) and Daselw(2011).

The contradiction comes from the socioeconomic behavior of the country that customers are not considered very important by most firms. The perception of employees at ECX in the HQ may arise from the fact that most business firms Refuting a theory of customer integration has direct impact on performance is difficult one at this level but the researchers believed that the above reason may be a cause of it. The researches of Wantao, (2015), Cousins and Menguc (2006); Homburg and Stock (2004); Koufteros, (2007), for instance contradicts with the above one concluded that customer integration has direct effect on operational performance.

***H04. Warehouse integration statistically significant effect on operational performance of ECX Jimma branch ( $\alpha \leq 0.05$ )***

Table 4.17 shows that there is a positive direct effect of warehouse integration on operational performance since (Beta= 0.109, t=2.208, sig. 0.029  $p < 0.05$ ). Therefore the null hypothesis is rejected and the alternative hypothesis is accepted, which indicates that warehouse integration has direct impact on operational performance of ECX Jimma branch at ( $\alpha \leq 0.05$ ) these result the same with result of Nee (2009) and Gabre (2005).

In the area of warehouse management and operational performance are available that proved warehouse integration has direct effect on operational performance.

***H05. ICT integration statistically significant effect on operational performance of ECX Jimma***

*branch ( $\alpha \leq 0.05$ )*

Table 4.17 shows that there is a positive direct effect of ICT integration on operational performance since (Beta= 0.119, t=10.100, sig. 0.000  $p < 0.05$ ). Therefore the null hypothesis is rejected and the alternative hypothesis is accepted, which indicates that ICT integration has direct impact on operational performance of ECX Jimma branch at ( $\alpha \leq 0.05$ ) these result the same with result of Rashid (2010) and Cao (2010). The result was identical with that of made by Ketokivi and Schroeder (2004), Vehovar (2007); SanJose, (2009) and Campo (2011) who arrived on conclusion that ICT impacts directly on firm performance. Few researches reported different result. Brynjolfsson and Hitt (2000); Boothy, et al. (2010) and Cao (2010) found that ICT integration has no direct effect on operational performance.

## **4.5 Discussion**

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 ICT integration to empirically test a framework identifying the relationships between supply chain integration variables and operational performance of the case company ECX. The literature has suggested that there is a relationship between supply chain integration and operational performance. From supply chain integration the of standard mean result Shows that supply chain integration in ECX is low as its mean is 2.4267. The employees show their disagreement on supply chain integration. According to the results on obtained mean values of independent variables is between 1.8 and 3.07 with standard deviations between 0.6311 and 0.8008 the overall mean of the variables is 2.4267 with standard deviation 0.72, which mean there is agreement among employees of ECX on moderate implementation of supply chain integration in the company.

The overall mean value of the four measures of operational performance is 2.16 with standard deviation 0.57 which indicate that there is an agreement among ECX employees in the Jimma branch that there is a moderate operational performance.

The relationships among supply chain integration variables are very strong, since R-value ranges between 0.448 and 0.769 and P values are less than 0.001.

We have observed that the F value of 69.367 which is significant with  $p < 0.000$ . This informs us that independent variables taken together as a set are significantly related to the dependent variable.

The coefficient of determination, adjusted R<sup>2</sup> is 0.742 meaning that 74.2% of the variation in operational performance (OP) is explained by the variations in supplier in, customer, and warehouse and ICT integrations. This means that the remaining 25.6% of the variation in operational performance can explain by other exclude variable.

Shows that there is a positive direct effect of human recourse integration on operational performance since (Beta= 0.126, t=4.6, sig. 0.000 p<0.05). Therefore the null hypothesis is rejected and the alternative hypothesis is accepted, which indicates that Internal intergration integration has direct impact on operational performance of ECX Jimma branch at ( $\alpha \leq 0.05$ ). These result the same with result of Kumar 2017, stank 2001 flyan 2010 and swik 2007.

From the customer integration the result shows that there is a positive direct effect of customers integration on operational performance since (Beta= 0.062, t=4.044, sig. 0.000 p<0.05).

Warehouse integration there is a positive direct effect of warehouse integration on operational performance since (Beta= 0.109, t=2.208, sig. 0.029 p<0.05). ICT integration that there is a positive direct effect of ICT integration on operational performance since (Beta= 0.119, t=10.100, sig. 0.000 p<0.05).

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATION**

#### **5.1 Introduction**

This chapter provides the summary, conclusion of the study and recommendations. The other topic included here is suggestions for area of future research.

#### **5.1 Summary of the Findings**

The present study measured the operational performance of ECX Jimma. The research distributed 141 questionnaires to the target respondents. The collected data analyzed by using SPSS Version 20. Out of 141 samples distributed, the researcher managed to collect back all (141) questioners. Based on the analysis made on chapter four the following major findings summarized. The mean value of supply chain 2.42 and standard deviation 0.71 effects on performance of EXC Jimma branch.

The result from correlation shows that all the independent variables used in the study, human recourse, ICT, and customer integration, have statistical significant relationship with the dependent variable (operational performance of ECX Jimma branch).

The regression result of this study confirms that all independent variables (Warehouse t, ICT, human resource, and customers Integration) are significant Effect on operational performance of ECX Jimma branch.

#### **5.3 Conclusions**

Currently supply chain is a key business process of great importance for the realization of business strategy. It determines various key performance indicators of an organization and has a major influence on its profitability and competitiveness. Therefore, supply chain can be considered as the most suitable operational framework for a transformation process to be based on. Overall organizational performance is meant to reflect the satisfaction rate of all interested parties (customers, employees, stakeholders, suppliers and social partners).

Relying on the results of the study and the summary of findings, the study concludes that there is a significantly positive relationship between SCI and operational performance. Hence, firms are expected to enhance their customer, warehouse and ICT integrations so as to gain better operational performance. The analysis result represents that the mean score values for human resource in integration dimensions were above the average mean value showing that human resource in integration of ECX is moderate. The mean value result in the internal integration part that different departments in the company collaborate with the company development program is the least value of 1.26. Thus the employees agree that among internal integration items, the employees are less aligned with other departments.

ICT integration has better results compared to others except internal integration. But the results in the survey related to information exchange with major suppliers, exporters and customers through ICT network and the ordering system with major suppliers and exporters is very poor result compared to other items. So as to enhance operational performance ECX Jimma branch should find mechanisms to focus on supply chain integration practices especially on its internal and ICT integrations.

## **5.4 Recommendations**

In view of the ends first light over, a few proposals are proposed as a methods for Reducing the issues established as follows:-

- Internal integration is an essential movement in any association. ECX Jimma branch ought to need to give a basic emphasis on arrangement among offices and making nonstop interdepartmental contact among inner capacities. Most importantly, the undertaking ought to need to furnish itself with present day advancements like venture asset arranging frameworks (ERP) which benefits the organization through better mix.
- ICT joining inside upper and downstream of SC accomplices is a significant action in SCI. The firm ought to need to work intimately with SC accomplices keep itself from the issues that influence its business.
- Without client joining it is difficult to get by on the lookout. Connecting the client through data network with the organization to quantify consumer loyalty and making an entrance of data sharing is urgent regardless of whether the outcome shows no immediate

impact of operational execution and client joining.

- Long term vital supplier coordination for center wares is significant which are viably ordering dependent on their degree of importance.
- The discoveries of the examination demonstrate that inside mix and ICT mix have contributed significantly more to the operational presentation of ECX. So endeavors ought to be made to all the more likely incorporate inside the distribution center also since it is center to the business straightforwardly affecting its presentation.

## **5.5 Future Research Directions**

Future research is needed to extend the findings of this study. This study has addressed only effect of SCI on the operational performance of the case company ECX Jimma branch. Hence the following are recommendations for future research.

- ❖ The research recommends adding other variables including the addition of a variable to an intermediary such as the impact of the external environment also it is possible to add that can give clearer results.
- ❖ This study focuses on operational performance of ECX Jimma branch hence recommends future studies by considering other factors like profit.
- ❖ The study recommends incorporating all branch offices in the country as the scope was the Jimma branch in the study so as to know the perception of all employees.
- ❖ This study is dedicated to a commodity exchange, so it is advisable to study the supply chain integration on other service giving organizations.
- ❖ It is recommended that to restudying the same topic on the company over a period of time to evaluate the progress resulting from the application of supply chain integration.
- ❖ Finally, the research recommends conducting similar studies from the perspective of suppliers and customers.

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## Appendix .A descriptive of independent data

Table 4.1 Mean and STD of warehouse integration items

	N	Mean	Std. Deviation
warehouse	141	1.4930	.51566
warehouse	141	1.6620	.48942
warehouse	141	2.3944	1.24887
warehouse	141	1.7113	.56595
warehouse	141	3.9718	.33567
<b>Mean</b>	<b>141</b>	<b>2.2465</b>	<b>0.631114</b>

Table 4.2 Mean and STD of ICT integration items

	N	Mean	Std. Deviation
Ict	141	4.1197	1.39646
Ict	141	2.5070	.90504
Ict	141	.9930	.08392
<b>Mean</b>	<b>141</b>	<b>2.5399</b>	<b>0.79514</b>

Table 4.3 Mean and STD of internal integration items

	N	Mean	Std. Deviation
Internal Integration	141	1.8662	.47979
Internal Integration	141	1.4930	.51566
Internal Integration	141	1.6620	.48942
Internal Integration	141	2.3944	1.24887
Internal Integration	141	1.7113	.56595
Internal Integration	141	3.9718	.33567
Internal Integration	141	4.1197	1.39646
<b>Mean</b>	<b>141</b>	<b>2.459</b>	<b>0.718831</b>

Table 4.4 Mean and STD of supply integration items

	N	Mean	Std. Deviation
supply integration	141	2.5070	.90504
supply integration	141	1.7113	.56595
supply integration	141	3.9718	.33567
supply integration	141	4.1197	1.39646
<b>Mean</b>	<b>141</b>	<b>3.077</b>	<b>0.80078</b>

Table 4.5 Mean and STD of customer integration items Descriptive Statistics

	N	Mean	Std. Deviation
Customers integration	142	2.5070	.90504
Customers integration	142	.9930	.08392
Customers integration	142	1.4930	.51566
Customers integration	142	1.6620	.48942
Customers integration	142	2.3944	1.24887
<b>Mean</b>	<b>142</b>	<b>1.809</b>	<b>0.648582</b>

**APPENDIX .B DESCRIPTIVE OF DEPENDANT DATA**

Table 4.6 Mean and STD of cost

	N	Mean	Std. Deviation
Cost	141	1.8865	0.46433
Cost	141	2.1560	0.60100
Cost	141	1.8794	0.56663
Cost	141	1.8794	0.45474
<b>Mean</b>	<b>141</b>	<b>1.950</b>	<b>0.521675</b>

Table 4.7 Mean and STD of quality

	N	Mean	Std. Deviation
Quality	141	1.5035	.50177
Quality	141	1.6738	.47051
Quality	141	2.4113	1.23676
Quality	141	1.7234	.54911
<b>Mean</b>	<b>141</b>	<b>1.828</b>	<b>0.689538</b>

Table 4.8 Mean and STD of time

	N	Mean	Std. Deviation
Time	141	4.0000	.00000
Time	141	4.148	1.35718

Time	141	2.5248	.88303
Time	141	1.0000	.00000
<b>Mean</b>	<b>141</b>	<b>0.729</b>	<b>0.560053</b>

Table 4.9 Mean and STD of flexibility

	N	Mean	Std. Deviation
Flexibility	141	1.8865	.46433
Flexibility	141	2.1560	.60100
Flexibility	141	1.8794	.56663
Flexibility	141	1.8794	.45474
<b>Mean</b>	<b>141</b>	<b>1.950</b>	<b>0.521675</b>

**APPENDIX  
JIMMA UNIVERSITY**

**COLLEGE OF BUSINESS AND ECONOMICS**

**DEPARTMENT OF MANAGEMENT**

**MA – In Logistics and Supply Chain Management (LSCM)**

**Dear participant,**

My name is Abdusalam Usman and I am a student undertaking a master of degree of Science in logistic and supply chain management at the University of Jimma, Ethiopia. To fulfill the completion of this course, I am carrying out a study on the Effects of supply chain integration on operational performance. I am inviting you to participate in this research proposal study by completing the attached questionnaire. If you choose to participate in this research proposal, please answer all questions as honestly as possible.

Participation is strictly voluntary and you may decline to participate at any time. In order to ensure that all the information was remain confidential, you do not have to include your name.

The data collect was being for academic purposes only.

**Thank you.**

**Research Questionnaire**

**SECTION ONE: Background Information**

1. Gender:                     Male                     Female
2. Academic position): Diploma or less    Bachelor        Master
3. Years:                     >2                    3-5     6-8  9-12                     >
4. Department:                     Audit    CEO  facility management     finance  
HRM  ICT Compliance  facility management

**SECTION TWO: Perceived Trust**

Below are lists of statements pertaining to effects of supply chain integration on operational performance? Please indicate whether you agree or disagree with each statement by ticking (√) on the spaces that specify your choice from the options that range from “strongly agree” to „strongly disagree“.

Note: SA- Strongly Agree = 5, A- Agree = 4, N- Neutral = 3, DA- Disagree = 2, SD- Strongly Disagree = 1

10 Operational performances: is how well an organization achieves its market oriented goals as well as its financial goals in the next years?

To what extent do you agree on the operational performance of ECX based on the following parameters? (Please mark X in appropriate box to your opinion)

Operational performance						
S no		Strongly Disagree(1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree(5)
A	ECX is attempt to find adequate and efficient use of resources					
B	ECX is working to reduce out of order commodities					
C	ECX is placing its internal processes in a manner to shorten performing activities					
D	ECX is working to reduce inventory to minimum level to the extent that does not delay the continuation of work					
2	Quality	1	2	3	4	5
A	Correct actions have been taken for any in service delivery					
B	ECX give a service to suit customers' needs					
C	ECX chooses commodity suppliers on the basis of high quality					
D	ECX is committed to proper storage conditions according to the standardized specifications to maintain the quality					
3	Time/Speed	1	2	3	4	5
A	ECX is committed to provide fast service to its customers					

B	Suppliers are committed to supply orders by the agreed timetables					
C	ECX bears the differences in transportation costs in order to meet the deadlines					
D	ECX is characterized by quick exchange of information with stakeholders					
4	Flexibility	1	2	3	4	5
A	ECX chooses suppliers who are flexible in responding to requests of the company when needed					
B	ECX is characterized by openness to new ideas at work					
C	ECX gives its customers pay facilities after checking their financial status					
D	ECX has the ability to respond to and accommodate periods of poor supplier performance					
Internal integration						
1	Warehouse integration	1	2	3	4	5
A	ECX warehouse location is very accessible for distribution.					
B	The inventory system in the warehouses is well integrated.					
C	ECX has inventory accuracy (full visibility of its inventory).					
D	ECX has proper handling system of the commodity at the warehouse (store layout, stacking, bin no, inventory management)					
E	The warehouse at the ECX is optimized for picking routes for customers.					
2	ICT integration					



A	ICT adoption in supply chain creates a transparent, visible demand pattern in the entire supply chain					
B	ICT helps monitoring operations and strategic processes					
C	Using ICT it minimized that supply chain integration errors					
3	Human Resource	1	2	3	4	5
A	provided adequate support from my supervisor					
B	The way your boss handles his/her workers					
C	Is satisfied with more friendly working atmosphere with colleagues					
D	The freedom to use my own judgment					
E	Extent of job security affects your level of satisfaction					
F	The way company policies are put into practice					
G	The extent to which the company policy supports job security					

A	<i>External integration</i>					
1	Supplier integration	1	2	3	4	5
A	We have continuous improvement programs that include our key suppliers					
B	We have helped our suppliers to improve their product quality					
C	We include our key suppliers in our planning and goal-setting activities					
D	ECX has long-term relationships with					

	its suppliers					
2	Customer integration	1	2	3	4	5
A	ECX has Active communication with its customers about the organization and also the market condition					
B	ECX shares its plan to its customers and also customer have deep know-how about the system					
C	ECX and its customers share idea with each other for doing the activities effectively and efficiently					
D	ECX has efficient and effective ways measure customer satisfaction					
E	ECX has high level of linkage with Customers for doing sustainable process.					

**Thank you!!!**