Addis Ababa University
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Department Of
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The Effect of supply chain integration on the operational performance of food manufacturing industry in Ethiopia: The case of FAFFA Foods Share Company

By
Alazar Abate

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Advisor: Busha Temesgen

Addis Ababa Ethiopia

Addis Ababa University School of Commerce

Department of Logistics and Supply chain management

This is to certify that the thesis presented by Mr. Alazar Abate, entitled "The effect of supply chain integration on the operational performance of food manufacturing industry in Ethiopia: The case of FAFFA Foods Share Company." Thesis Submitted to Addis Ababa University School of Commerce in partial fulfillment of the requirements for the award of the degree of Masters of Logistics and Supply Chain Management.

Signed by:	Signature
BushaTemesgen	_____
Advisor	
Tariku Jebena (PhD)	_____
Internal Examiner	
Nakachew Bashu (PhD)	_____
External Examiner	

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Acronyms

AHP- Analytical Hierarchical Program

NT- Network Theory

OLS- Ordinary Least Square

PAT- Principal Agent Theory

RBV- Resource Based View

SC- Supply Chain

SCI- Supply Chain Integration

SCM- Supply Chain Management

TCA- Transaction Cost Analysis

3PL- Third Party Logistics

Abstract

This study examined the effect of supply chain integration on the operational performance of food manufacturing industry in the case of FAFFA Foods Share Company. The objective of the study was to assess the effect of internal, customer and supplier integration on the operational performance of FAFFA Foods Share Company. Both the primary and secondary sources of data were employed to gather the necessary information. As a primary source of data, structured questionnaire was distributed for 102 respondents to gather the necessary data of which 91 was correctly filled and returned for further analysis. The study used both descriptive statistics (mean and standard deviation) and regression analysis (Pearson correlation matrix and multiple linear regression model) to examine which variables significantly affects the operational performance of the organization. The result of the study indicates that there is positive relationship between the dependent variable operational performance and the independent variables internal integration (r= .593), customer integration (r= .773), and supplier integration (r= .719). In addition, the regression analysis showed the two variables customer and supplier integrations significantly affect the operational performance of FAFFA Foods at one percent significance level (99 percent confidence) with β= .427, sig= .000 and β= .324, sig= .001 respectively. Whereas, internal integration affects the operational performance of FAFFA Foods at 10 percent significance level with β= .149, sig= .086. Therefore, the study concluded that all supply chain integration variables have a direct significant effect on the operational performance of the organization. In order to enhance the operational performance, Creation of a platform that drives to frequent interaction with selected supplier collaborates, provision of training on new production process to internal workers and creation of frequent departmental contact within the internal functions are advisable. In addition, adopting flexible production techniques based on market demand, sharing adequate information with strategic customers may be beneficial to the organization.

Key Words: Supply chain, Operational performance, Supply chain integration

Chapter One

Introduction

1.1Background of the Study

The concept of supply chain management had introduced in 1980's evolving from logistics and first mentioned by the two management consultants Oliver and Webber. Yet nearly three decades later, supply chain management is as diffuse as documented and sometimes difficult to separate from logistics(Tovio, 2009; Werner and Albers, 2000). Supply chain Management (SCM) is '*The integration of key business processes from end user through original suppliers that provide products, services, and information that add value for customer and other stakeholder*' (Chan and Qi, 2003). Afterwards, Lawrence and Lorsch in 1967 indicated that differentiation and integration were basic principles to understand organizational structures. This explains that integration is often mentioned as one of the key characteristics of supply chain management (Duong, 2017).

Integration is the quality of collaboration and coordination that guides to achieve efficiency and effectiveness. Therefore, Supply Chain Integration (SCI) is the degree to which firms strategically collaborate with their supply chain partners so that to maintain intra- and inter-organizational processes (Malekiand Cruz-Machado, 2013).

As an insight about the company under consideration shows, FAFFA Foods Share Company was established in 1962. It started as an Ethio- Swedish joint venture, to produce a balanced diet for malnourished children under five. Currently, FAFFA is home to 185 permanent employees. FAFFA Foods was a public enterprise, which privatized to Petram Private Limited Company in 2009.FAFFA Foods Share Company is producing baby foods, fortified foods, milk products, corn flakes, snacks, relief supplies, and bread improvers. The vision of FAFFA Foods is to play a leading role in building mentally and physically capable generation by producing highly nutritional value products while becoming an internationally competitive business entity, and a mission to deliver nutritious and healthy food products to tackle malnutrition in Ethiopia, with a reputation for excellence and outstanding service to our customers local and abroad. We seek to deliver our mission through healthy financial rewards to shareholders and through the provision of opportunities for growth and enrichment to our employees, our business partners and the communities in which we operate, And in everything we do, we strive for honesty, fairness and integrity.

Supply chain integration is one aspect that drives organizations realize a better performance. However, it was not empirically tested and known whether supply chain integration is the factor that really affects the firms' operational performance of FAFFA Foods Share Company. Therefore, the researcher is motivated to conduct the study and come up with empirical evidence. The other motivation is to create an integrated and efficient string along the supply chain network and build a collaborative relationship among the company and its supply chain partners (to enlighten the notion of supply chain management and integration along with its benefits) and help to improve the performance and create more value. According to Msimangira and Venkatraman (2014), many investigations in the past decade confirm that supply chain integration creates value through improved customer service levels, operational performance and reduced costs. The organization also gains benefits by implementing supply chain integration in their organizational system like increased competitive advantage and market share, better resource management and long-term relationship that leads to a cost effective production and deliver better value for customers (Lam, 2015).

1.2Statement of the Problem

In principle, with the increasing level of competition in the global economy, the search of improved ways of gaining advantage and make bigger market performance to stay relevant or outwit the competition is evolving. This has made supply chain managers and professionals look at integration as a possible strategy of creating strategic partnerships to improve supply chain performance and achieve cost reduction and reduced lead-time (Kumar et al., 2017). In particular, according to market assessment conducted by FAFFA food Share Company in 2014, the organization possess a market share of 20% in baby foods, 18% in milk, 30% in relief and 1% in snack. Therefore, running for about 56 years in the market, it is not a satisfying level of market share and can be further strengthen the stake up high.

According to Singhry et al., (2015), the concept of supply chain management is a recent phenomenon, as well the understanding and practice of supply chain management is at an infant stage of development. In today's competitive market, firms cannot reduce their operational cost, bring efficiency and maintain quality and flexibility by their own. From the preliminary interview with company's management personnel, the researcher was able to realize that the knowledge and practice of supply chain management is low. As a result, the

study-hypothesized that lack of proper supply chain management may lead the organization to an excessive production, inventory and distribution costs.

The other problem the study was able to recognize was lack of long-term partnership with suppliers. Firms operating in a competitive market structure cannot produce all necessary inputs by themselves, rather they purchase from other suppliers who gains a comparative advantage than them. This leads to high procurement cost affect the efficiency of the production process. In addition, lack of integrated supply chain may result in reduction in value in-terms of cost, delivery and flexibility (Saidon et al., 2015).

1.3Research Hypotheses

The research aims to test the following Hypotheses:

Hypothesis 1- Internal Integration has no direct effect on the operational performance of FAFFA Foods Share Company.

Hypothesis 2- Supplier integration has no direct effect on the operational performance of FAFFA Foods Share Company.

Hypothesis 3- Customer integration has no direct effect on the operational performance of FAFFA Foods Share Company.

1.4Objectives of the Study

1.4.1 General Objective

The general objective of conducting this study is to assess the effect of supply chain integration on the operational performance of the food manufacturing industry particularly on FAFFA Foods Share Company.

1.4.2 Specific Objectives

The specific objective of the study includes:

1. To assess the effect of internal integration on the operational performance of FAFFA Foods Share Company,
2. To examine the effect of supplier integration on the operational performance of FAFFA Foods Share Company,
3. To examine the outcome of customer integration on the operational performance of FAFFA Foods Share Company

1.5Significance of the Study

This particular study will help the company under consideration (FAFFA Foods Share Company) to look deep into their supply chain relations internally as well as externally, and help the top managers to make appropriate decisions. This will enhance the performance of their respective supply chain based up on the analysis of the study, which will help reduce their cost and becomes effective and more efficient in the production process.

The other significance of the study is that it will be used as a source of reference for other fellow researchers on the issue of integration and help them capture the major theoretical knowledge about supply chain integration.

1.6Scope of the Study

Geographically, the study is delimited to food manufacturing industry particularly on FAFFA Food Share Company, which is located in Addis Ababa around Saris to D/Zeit road.

The other delimitation of the study is variables under consideration. In order to assess the effect of supply chain integration the study used internal integration, supplier integration, information integration and customer integration in the specified organization. As well the study tried to reflect the perception of strategic customers and suppliers; it only evaluate the phenomena from the view point of the Department staff of the company that have a direct contact with supply chain works (including production unit, store operation, sales and marketing and quality assurance).

1.7Limitation of the Study

The basic limitation of the study is monetary constraints, second there are no sufficient literatures written in food supply chain integration in Ethiopian context and Generalizing outputs of this study to other sector industries as well as other food manufacturing industries is uncertain, since the data collected only represents FAFFA Foods Share Company. The other limitation of the study is the econometric model used is only delimited to the types of supply chain integration; it does not take into account other variables that may affect performance of an organization (like return on investment, profitability and net income).

1.8 Definition of Terms

- **Supply chain management**-encompasses every effort involved in producing and delivering a final product, from the supplier's supplier to the customer's customer that will facilitate a smoother flow of material, information and money through the network (Rhonda R. et al., 1999).
- **Supply chain integration**- is the degree to which a manufacturer strategically collaborates with its supply chain (SC) partners and collaboratively manages intra- and inter-organization processes(Malekiand Cruz-Machado, 2013).
- **Internal integration**- represents the integration of all internal functions from material management to production, sales, and distribution (Baharanchi, 2011).
- **Supplier integration**- refers to the practices amongst companies and their suppliers, that enable the efficient transfer of knowledge and resources, required for generating mutual benefits (Ebrahimi, 2015).
- **Information integration**- refers to sharing of critical information among supply chain partners that is detailed enough, frequent enough and timely enough to meet the requirements of the firm (Johansson, 2012).
- **Customer integration**- defined as the organizational practices of identifying, understanding, and utilizing customer requirements with the objective of producing customer-defined goods/products and increasing customer satisfaction (Ebrahimi, 2015).
- **Operational Performance**- refers to improvement in response of a firm to a changing environment relative to its competitors to gain advantage on the favor of the organization (Flynn et al., 2010).
- **Supply chain Collaboration**- is a long-term relationship where participants generally cooperate, share information, and work together to plan and even modify their business practices to improve joint performance (Ralston, 2014).

1.9 Organization of the Study

The study comprised of five relevant chapters in which the study clearly state the entire process of the study, these includes:

The first chapter contains the background of the study, statement of the problem, basic research questions, objectives of the study, definition of terms, significance of the study, limitation and delimitation (scope) of the study and finally organization of the study. The

second chapter of the study deals with the literature (Theoretical, Empirical and Conceptual frameworks) relevant to the proposed study. The third chapter of the study illustrates the research methodology. This includes the approach and design for the proposed study that is adapted from books and earlier studies, unit of analysis, Population of the study, the sources of the data and data collection instruments to be employed, data analysis and statistics as well the validity and reliability issues and the ethical consideration subjects are included. The fourth chapter summarizes the results, and findings of the study, interpretation and discussion of major findings and post estimation results are included. The last chapter of the study includes summary of findings, conclusions and recommendations, as well as directions for future research are included.

Chapter Two

Review of Related Literature

Under this chapter, included are the theoretical, empirical and conceptual frameworks/ literatures that are relevant to the study. Under the theoretical literature review, Definition and concept of supply chain, theories of supply chain management, the notion of supply chain integration as well classification and approaches of supply chain integration are discussed. Under the empirical review, studies conducted earlier on the effect of supply chain integration on performance stated both internationally and in Ethiopian context and studies on the relationship between supply chain integration and performance were depicted. As well, the conceptual framework illustrates the relationship between supply chain integration and operational performance using a diagram.

2.1 Review of Theoretical Literature

2.1.1 Definition and Concept of supply chain and Supply chain integration

Many authors have defined the term supply chain. The definition stated bellow is the most easily understandable and useable definition for Supply chain.

> *Supply chain is a network of partners who collectively convert a basic commodity (upstream) into a finished product (downstream) that is valued by end customers, and who manage returns at each stage (Harrison and Hoek, 2005 as cited in Ensermu., 2015, p1).*

Therefore, we are able to understand that supply chain is a link that connects the upstream and downstream actors with the impression of creating value for end users. Then after, it is important to understand the concept of supply chain management. According to Delfmann (2000), the root of supply chain management can be localized in logistics literature; the two management consultants Oliver and Webber first mentioned the term supply chain management in the early 1980s in order to shift attention to cross-functional integration.

Delfmann (2000), also states some important points about the four main supply chain management schools of thoughts, which are helpful in drawing the best definition of the subject Supply chain management:

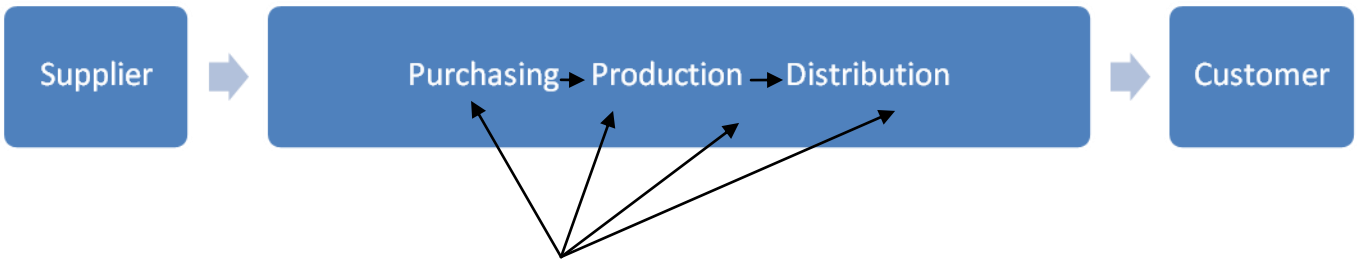
- **The Functional Chain awareness School**

Houlihan in 1988 presented this school's definition of supply chain management. He stated that SCM covers the flow of goods from suppliers through manufacturer and distributor to the end customer. The definition of SCM by the Functional Chain School had criticism from two aspects. The first one is that the definition mainly gave emphasis on material flow thus it concentrates on the movement of goods and second, the whole value adding process of a product is interpreted as a chain of different actors and functions.

- **The Linkage-Logistics School**

The linkage logistics school of thought mainly emphasized on the linkage, which exists between different functional areas within the chain, the school, also exploits these links in order to expand considerable competitive advantages from superior linkage management. The Linkage-Logistics school adds up on the functional chain awareness school, SCM is management of flow of goods and is laid through different elements of the chain and formulated logistics and transportation are seen as the major variables for gaining a competitive advantage. Figure 1 shows depict the Linkage-Logistics school (Delfmann, 2000).

Figure 1-Linkage-Logistics School

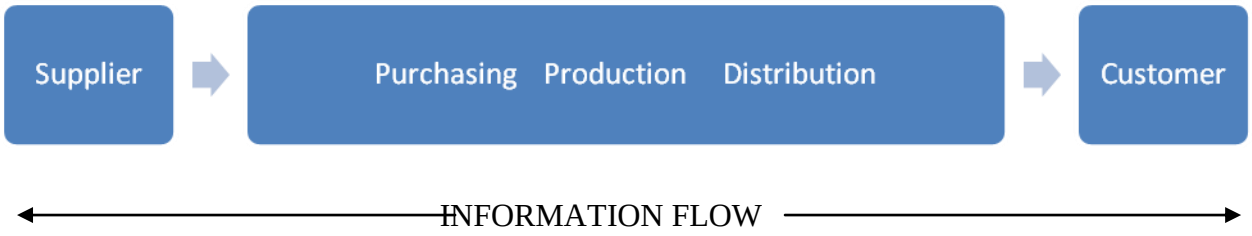


***Source**:* Delfmann. (2000)

- **The Information School**

Unlike the above two school of thoughts previously presented, the information school advocates the consideration of the flow of information alongside the flow of goods through the supply chain. The information school also urges the flow of information should not only be on a forward direction like that of flow of goods but also in opposite (backward) direction. Figure 2 illustrates the perspective of Information school of thought (Delfmann, 2000).

Figure 2- Information school of thought



Source: Delfmann (2000)

- **The Integration/ Process School**

In the integration school, supply chain management considered as a paradigm exceeding the ideas of all earlier depicted schools. Under this school, even if they do belong to the same element, different processes of the chain can be managed and controlled differently.

The integration school provides the definition that upholds and more elaborates the above three schools perspective of SCM. The school defined SCM as integration of key business processes from end user through original suppliers that provides products, services and information that add value for customers and other stakeholders (Delfmann, 2000).

2.1.2 Theories of Supply chain Management

There are four major Supply chain management theories. Namely, mitigating agency problem (Principal Agent Theory), Transaction cost Analysis (TCA), The Network Perspective (NT) and The Resource-Based View (RBV).

2.1.2.1 Principal Agent Theory (PAT)

According to Kalsaas (2014), Principal Agent Theory (PAT)is designed to deal with exchanges and transactions on dyadic relationship among firms. The theory is also based up on three behavioral assumptions; the first one is both the principal and the agent wants to fulfill their own self-interest or there is conflict of interest, second, asymmetry of information between both parties and third there is bounded rationality.

Since a contract is an agreement that governs the relationship between the principal and the agent, the Principal Agent Theory (PAT) is to design a contract that minimizes a potential agency problem among the parties. The most efficient contract includes the right mix of behavioral and outcome based incentives to motivate the agent to act on the interest of the principal (Ensermu, 2015).

Stock (1997), stated that the Principal Agent Theory (PAT), helps top level managers better understand behaviors of supply chain by focusing their attention on development of inter- and intra-organizational relationships, maintenance of complex relationships between suppliers

and customers, dynamics of risk sharing, capital outlay, power and conflict between channel intermediaries and identifying the costs and benefits of SC integration.

Therefore, creating a better contact and smooth flow of information among supply chain partners can further develop the integration between the parties.

2.1.2.2 Transaction Cost Analysis (TCA)

According to Garfamy (2012), transaction costs are the costs of creating, using, maintaining, changing and governing the organization of economic activity within a vertically integrated firm or in a market. To broaden the image of the relationship between supply chain management and Transaction Cost (TC) a key question "why do firms exist?" should be assessed from the view point of supply chain management, under SCM we need to figure out which activities should be performed by the firm and which activities should be outsourced (Ensermu, 2015).

Fundira (2004) stated that transaction cost arises because of inefficiencies within the supply chain and results in uncertainty, bounded rationality, opportunism, asset specificity and risk in conducting an exchange or business. Bounded rationality may occur because of insufficient information, limits in management perception or limited capacity for information processing. Therefore, TCA helps in the decision making process of make or buy in a supply chain (Ensermu, 2015).

2.1.2.3 The Network Perspective (NT)

Cooperation among direct business partners is not the only determining factor for the performance of any firm, but also the relationship of those allies with their own business partners is a crucial feature, in the network theory markets are viewed as a system of relationship among various entities like suppliers, customers and manufacturers (Wellenbrock, 2013). Here, long-term interaction between the associates of the business is an important phenomenon in the creation of new resources. The generated resources through the network does not create value by their own rather the combination with other resources makes them more valuable which is why inter- organizational bonds are crucial than acquiring resources for own use. The development of this network among firms is created through two separate but closely related links; the first one is the exchange process (information, goods and services and social processes), the second link is through adaptation processes like personal, technical and logistical interactions (Ensermu, 2015). Generally, NT is descriptive in nature and had primarily applied in SCM to map activities, actors, and

resources in a supply chain. The focus has been on developing long-term, trust-based relationships between the supply chain members (Mose, 2015).

2.1.2.4 Resource- Based View (RBV)

According to Barney (1991), RBV theorists argue that firms consist of a collection of heterogeneous resources and that these resources are the source of competitive advantage or in other term the uniqueness of resources possessed by a firm are a source of competitive advantage; the resources may be tangible (maintain physical features) or intangible (does not contain physical substances).

According to Abushaikha (2014), there are four attributes of resources and capabilities, which are regarded to be the key determinants of the sustainability of competitive advantage. These characteristics include durability, transparency, transferability and replicability. Durability represents the lifetime (rate) at which the competitive advantage generated from the firm's resources depreciates. Transparency refers to the extent to which a firm can protect its competitive advantage from being duplicated by other firms. Transferability refers to the degree of mobility of resources to competitors who may implement the same strategies. Replicability implies to the extent to which the firm's resources underlying competitive advantage can be replicated by rival firms.

For many supply chain decisions, RBV is an implicit assumption. Often, outsourcing decisions are based on the idea of focusing on core competencies and outsourcing complementary competencies to external partners. 3PL and outsourcing of standard components and processes to sub-contractors are examples. Outsourcing of design, New Product Development (NPD) is one aspect to become unique in the chain and work on other members' core competencies through inter-organizational collaboration (Ensermu, 2015).

All in all RBV advocates the possession of resources that is unique from other firms operating in the supply chain line which in will turn increase the competitive advantage of the firm and allow the functioning in the core competencies of other firms. The RBV is an implicit assumption in many supply chain decisions. Often, outsourcing decisions are based on the idea of focusing on core competencies and outsourcing complementary competencies to external partners (Mose, 2015).

2.1.3 The Notion of Supply chain Integration

Over the past recent years, supply chain integration has received a considerable attention by practitioners and academicians. In the late 1980 and 1990, the concepts of customer and supplier integrative relationships gained renewed attention. Business in general began to develop extremely close relationships with selected clients, sometimes termed strategic customers, and significantly, more emphasis had placed on improving working arrangements with suppliers (Awad and Nassar, 2010).The term Supply chain integration had given many scholarly definitions and all the definitions emphasized on the issue of collaboration and cooperation. According to Osei and Kagnicloglu, (2017), Supply chain integration is generally considered to involve integration, coordination, and collaboration across organizations and throughout the supply chain. Therefore, Supply Chain Integration (SCI) can be defined as:

> *"SCI is the extent to which a manufacturer has strategic collaboration and cooperation with supply chain partners and processes within and outside the organization runs, aim to achieve effective and efficient flow of products, services, information, money that lead to decisions which provide maximum value to the customer with low cost and high speed (Flynn et al., 2010)."*

There are factors that drive members of a supply chain to engage into a collaborative and integrated supply chain practices. According to Lisanza (2013), the most important motivators for supply chain integration in a firm are the need for supply chain agility, need for cost reduction, profit motives, satisfaction of customers, the need for collaboration with other organizations and bringing better relationship with suppliers. There are also other driving factors for applying supply chain integration, Power (2005), stated that the main drivers of integration are information revolution, increased level of global competition which creates a more demanding customer and demand driven markets and the emergence of new types of inter-organizational relationships.

Therefore, if a company is going to succeed in today's dynamic environment, specialization can be only part of the equation. All the parts of the organization that were originally segmented for the sake of efficiency have to be put back together in a way that maximizes customer outcomes and increases performance. In short, the internal and external functions of a business must become integrated for the enterprise to stand a chance (Chad and Mark, 2016).

2.1.4 Classification and Approaches to supply chain integration

Academicians under their study classified supply chain integration into different levels (categories). According to Hosseini, et al., (2012), Supply chain integration has been measured based on three dimensions; internal integration, integration with suppliers, integration with customers and information integration. In another Study conducted by Bete-Georgise et al., (2014), integration in a supply chain context have classified in to six different types. These are customer integration, internal integration, material and service supplier integration, technology and planning integration, measurement integration, and relationship integration. Under this review literature the four classifications, internal integration, integration with customer, integration with supplier and information integration had discussed.

2.1.4.1 Internal Integration

Internal integration refers to the coordinated management of the company's internal operations. Most companies have the same functions as marketing, finance, human resources, production / operations, logistics, etc. each of these functions should be well integrated to achieve the goals and objectives. Internal integration is related to easy access to key operational data from integrated databases. Information systems are integrated to connect to various internal departments within an organization, access inventory information throughout the supply chain, taking inventory status in real time, using computer-based systems planning between marketing and production, and with a high level of integration of information systems for the production process. Internal integration as an important step that must be done before the external integration can be easily achieved. Internal integration is the first step to achieving supply chain integration (Hamid and Sukati, 2011). Theoretically, studies imply that a better internal integration will lead to enhanced supply chain management. According to Otchere et al., (2013), internal integration is a prerequisite for supply chain management. In addition, companies with a low internal integration strategy will achieve low level of external integration and companies implementing the full internal integration strategy will have the highest levels of external integration. Generally, it is believed that firms achieve a relatively high degree of internal integration before they attempt to develop a higher degree of external integration. Internal integration can be accomplished through automation and standardization of each internal logistics function, the introduction of new technology, and continuous performance control under formalized and centralized organizational structure.

2.1.4.2 Integration with Supplier

Integration with customer and supplier are collectively termed as external integration. According to Otchere et al., (2013), external integration mainly deals with customers and suppliers integration also known as forward and backward integration respectively. Supplier integration plays several key roles in the relationship between suppliers and buyers for instance, it supports adaptations to changes through mutual adjustment, it mitigates occurrence of uncertainty problems and it reassures the partners to learn and organize their business to improve value-adding process (Salema, 2015).

In a manufacturing industries, integrated Suppliers helps improving the part of the supply chain between manufacturers and their suppliers of ingredients, raw materials and packaging by sharing information for both parties are able to exercise judgment on costs, quantities and timing of deliveries and production in order to streamline the product flow and to move to a collaborative relationship. In the study conducted by ECR (2000), supplier integration will lead to the following benefits:

Reduction of inventories: -one of the main factors essential for the improvement of efficiency of the supply chain is reduction and optimization of stock levels. The impact of high stock levels on the costs is multilateral: high working capital, handling and storage and the costs related to the waste of obsolete goods (ECR, 2000).

Reduction of administrative costs: - many practices in integrating suppliers aim to remove complexity from the relationship through the integration of processes, the elimination of double work and non-value-adding process steps. This will result in reduced administrative costs in departments involved in the supply process. Moreover, the use of efficient and reliable communication media reduces the need for manual work and the likelihood of time-consuming clarifications (ECR, 2000).

Reduction of lead-time: - sharing the forecast with suppliers enables them to plan according to the needs of the manufacturers. Consequently, this will lead to a reduction of lead times. Moreover, the use of efficient communication media and the streamlining of the whole supply process will lead to a further reduction in lead times (ECR, 2000).

Reduction of production costs: - improved transparency of the future demand enables the supplier to optimize production planning in terms of capacity utilization. This will lead to a significant reduction of the costs for production without adding unnecessary inventories or risking stock out situations to the supply chain (ECR, 2000).

Improved service levels: - the availability of the supply at the right time, at the right place and in the required quantity and quality is crucial for the success of the relationship among the supply chain (ECR, 2000).

2.1.4.3 Integration with customer

Customers Integration emphasizes with cooperation and interaction between a given company and its customers, to ensure the effective flow of products or services to customers. Customer's integration involves sharing of customer's demand information, aiding producers to understand customer's demand in a better manner and expecting customer's demand as well as collaborating and cooperating with customers to design, to reach products with better quality, lower costs and greater flexibility in response to customer's demand. Customer integration is directly related to operational performance (Otchere et al., 2013).

2.1.4.4 Information Integration

Information integration refers to the sharing of key information along the supply chain network, which is enabled by information technology (IT). One of the main purposes of information integration is to achieve real-time transmission and processing of information required for supply chain decision-making. Supply chain integration concept, logistics and information integration reflect two interrelated forms of integration, which flow in opposite directions (i.e. forward and backward respectively). Forward integration is concerned with the physical flows of materials from suppliers to manufacturers, which we refer to logistics integration. On the other hand, backward integration is concerned with the coordination of information technologies and the flows of information from manufacturers to suppliers (Prajogo and Olhager, 2009).

External information integration also known as information sharing is essential for firms who collaborate and integrate their activities and processes beyond firms boundary. In addition, information systems and technologies facilitate and exchanges information integration, literatures acknowledges the usage of information technology (IT) is one of the main components to stay competitive in a rapidly changing market environment. Effective information management will lead to greater coordination in the chain. Information integration is the extent that operational, tactical and strategic information are transferred between business partners and the central company. Using information technology has the potential of developing supply chain partners in order to work together for efficient delivery of products to consumers. Information technology allows the supply chain partners act as a single entity (Mose, 2015; Johansson, 2012).

Regarding the approaches Flynn et al., (2010), stated that there are two approaches to supply chain integration, the configuration approach and contingency approach. The configuration approach describes an organization as a set of interrelated activities and provides a detailed examination of the relationship between the dimensions of SCI and performance, the interpretation of the results drawn from the theory is difficult, and evens some interactions are insignificant. Whereas, the configuration approach to SCI suggests that it treats organizations as a decomposable into independent elements and should operate within shapes its structures and processes. Therefore, organizations should match their structures and processes to their environment in order to maximize performance and customer and suppliers are an important part of manufacturer environment. The structural contingency theory when applied to SCI suggests that the individual dimensions of SCI should be aligned, in order to achieve the best performance.

2.1.5 Content and Nature of Operational Performance

Agami et al., (2012), states that a successful SCM is enhanced by performance measurement; lack of adequate performance measurement in an organization is a drawback for efficient and effective supply chain management. Mainly, the major reasons why organizations should engage in measuring their firms' performance can be summarized through three basic reasons. First, it is used as a drive for organizations action meaning it can be seen as a motivational factor for workers of an institute to accomplish high performance, as well it is useful to indicate areas of improvement so that a better work can be done. Second, measuring performance is necessitated to make relevant decisions and oversee alternatives in a tactical and strategic manner. Finally, performance measurement is a mechanism to have a closed loop control, which is done by collecting feedbacks, correction of problems, identifying areas of improvement, facilitate inter-organizational understanding and communication among supply chain members.

Literatures suggested that in order to realize the effectiveness of one such of organization, both the financial as well as operational performances are necessary to be measured. According to Venkatraman and Ramanujam (1986), the two determining factors are delimited to certain indicators. The financial measurements of performance includes growth in sales, profit earnings and earnings per share while the operational measures include areas like market share, introduction of new products, quality of products and value add in manufacturing.

According to Saleh (2015), supply chain integration is one of the pivotal factors that affect operational performance of a firm, and further the organizations business performance.

2.1.5.1 Operational performance measurement

According to Lu et al., (2017), cost, delivery and flexibility listed as the basic measures of operational performance. Therefore, under this sub-section, detailed explanation has been given for the performance measurements.

- **Cost-** organizations performing in the market tend to decrease their operational costs in order to deliver a cost effective goods and services. Cost management produces valuable resource endowment, which leads to create value to the end customers and also increase satisfaction to customers (Lu et al., 2017).
- **Delivery-**Delivery performance can be defined as the level up to which products and services supplied by an organization meet the customer expectation. It provides an indication of the potentiality of the supply chain in providing products and services to the customer. This metric is most important in supply chain management as it integrates (involves) the measurement of performance right from supplier end to the customer end (Rao et al., 2011). In manufacturing industries, delivery is seen in both directions from the suppliers and customers side. A delayed delivery will lead to a higher procurement cost in the supplier and a potential lose in sales to end customers.
- **Flexibility-**Flexibility can be defined as the ability of a system to respond effectively to changing circumstances (Suarez et al., 1991). In the supply chain, the main purpose for flexibility is to increase the simplicity of processes that adds value and to shorten the time of response to the demand of the customer.

2.2 Review of Empirical Literatures

2.2.1 Related empirical literature review on supply chain integration: International countries experience

Under the empirical sub-section of the review, studies that have been conducted earlier on the subject of supply chain integration abroad were reviewed.

Van Der Vaartet al., (2006), conducted a research on supply chain integration and performance: The impact of business condition. While performing the study the researchers aim to achieve the following related goals; the first one is develop a framework for measuring the relationship between integration and performance that incorporates different aspects of integration and explicitly takes into account the influence of business conditions. The second

goal is to investigate the relationship between integration and performance by conducting a survey among suppliers. Finally, to explore different aspects of supply chain integration (attitudes, patterns and practices) In the study, the researchers assumed that high level of integration is only needed in case of complex business conditions like when there is high level of uncertainty in demand, high variety; small batches etc…, under this circumstances integration will result in better supply chain performance. In order to measure performance, the researchers focus on buyer-supplier relationship like that of lead-time and customer satisfaction. Regarding methodology, primary data collection method (questionnaire) was employed to gather the necessary inputs for the study. From the total of 349 respondent located in Netherlands and Spain, only 31.7% were found to be valid for the analysis. The data manipulation process was performed by using two analysis techniques, factor analysis and correlation analysis and drawn the following major findings:

Under the factor, analysis different types of attitudes were distinguished. Among them, Long-term relationship and Cooperative behavior were found correlated, but in the study the researchers found that cooperative behavior is the one that have a direct relationship in the development of integration between partners.

Prajogo and Olhager (2009), performed another study on the effect of supply chain information integration and logistics integration on firm performance. The main reason for conducting this research is to fill the gap of empirical evidences on the impact of logistics integration of the material flow between supply chain partners. The aim of the paper investigates the relationship among information integration, logistics integration, and strategic supplier relationships on the effect of operational performance, to undergo the study the researchers formulated six working hypothesis:

- Logistics integration has a positive relationship with firm's operational performance,
- The intensity of information technology connection between firms and their suppliers has a positive relationship with logistics integration,
- The intensity of information sharing between firms and their suppliers has a positive relationship with logistics integration,
- The strategic relationship between firms and their suppliers has a positive relationship with information technology connection between firms and their suppliers,
- The strategic relationship between firms and their suppliers has a positive relationship with information sharing between firms and their suppliers and finally,

- The strategic relationship between firms and their suppliers has a positive relationship with firm's operational performance.

To collect the necessary data, the researchers employed a five point Likert scale questionnaire was designed on strategic supplier relationship, information technology, information sharing, and logistics integration study variables. The study used 1800 sample respondents of which 232 responses are valid enough for the analysis.

The analysis of the study provides effective external logistics integration is engendered by strategic buyer–supplier relationships and information integration, the study finds that integration of material flow needs to be underpinned by information integration and additionally, the study demonstrates strategic buyer–supplier relationships helps foster collaborative behaviors.

Hosseini et al., (2012), carry out a research on an investigation on the effect of supply chain integration on competitive capability: an empirical analysis of Iranian food industry. With the aim of testing the influence of supply chain integration on competitive capability and investigate the strategic role of supply chain integration in improvement of competition capabilities, the elements used to evaluate the impact are integration with suppliers, internal integration, and integration with customers. To undergo the research, the researchers followed a primary data collection-using questionnaire, of the distributed 275 questionnaires only 86 were completed and returned. The findings of the study are presented in three subsections, first the overall impact of supply chain integration on competitive capability was presented; second the impact of supply chain integration on cost leadership and finally, the impact of supply chain integration on differentiation were illustrated. Under the first section, the finding implies supply chain integration has direct positive influence on competitive capability also supply chain integration provides an environment for a company so that it can benefit from its internal competencies, and become competitive. In addition, trust and commitment between a company, its suppliers, and its customers lead to integration between them and create a network that mutually benefits for all members. In other words, integration helps company and its partners to extend their competitive capabilities and achieve sustainable competitive advantage. Under the second section, the finding indicates integration with suppliers affects cost leadership to some extent and finally the analysis on the impact of supply chain integration on differentiation stated supply chain integration has direct positive influence on differentiation capability. In addition, the analysis outcome point out that internal integration has no effect on competitive capabilities but integration with customers

directly and positively influences on competitive capabilities so that cost leadership and differentiation capabilities can be improved.

A research conducted by Mose (2015), titled impact of supply chain integration strategies on performance of pork processing industry in Rwanda (case of German butchery in Kigali); the basic problem identified by the researcher is lack of resource exploitation in the pork industry of Rwanda. The study used a quantitative descriptive case study utilizing primary data collection method by using close-ended questionnaires that contains internal integration, customer integration and supplier integration as study variables. In order to execute the research 52 samples from employees of German butchery had targeted. Out of the distributed 52 questionnaires, 48 of them had found to be relevant for further analysis. Stated below are some of the major findings of the study:

- The correlation results indicated that customer integration and performance of pork industry's relation with Pearson correlation value of 0.808 were highly positive and significant with having 1 % error (99 percent confidence interval).
- The results indicated that supplier integration and performance of pork industry with a correlation value of 0.784are positively and significant.
- Internal integration and performance of pork industry were positively and significantly related (0.822 Pearson correlation value).
- Periodic interdepartmental meetings among internal functions had utilized largely.
- Strategic partnership with the industry supplier was done to a lesser extent.

In general, the findings of the study concluded that supply chain integration has a positive influence on the performance of the Pork industry in Rwanda.

2.2.2 Related empirical literature review on supply chain: Experience from Ethiopia

Alemayehu T. (2017), conducted a research on supply chain integration to enhance the performance of Ethiopian footwear industry, the main objective of the study is improving the performance of the Ethiopian Footwear subsector through supply chain integration. The major problems identified by the researcher are lack of accessories and components from local supply, which causes higher cost for the acquisition of accessories and mismanagement of the flows of product/material, information and financial flows of a supply chain. To assess the effect the researcher employed both primary and secondary data collection methods through questionnaires and interviews and documents, articles and profile of footwear

industry respectively. The researcher distributed 16 questionnaires for the targeted four shoe factories and all the questionnaires were returned and are valid for analysis. The major findings of the study are presented as follows:

- The three variables in the study (internal, supplier and customer integration are positively correlated with performance. In other terms, performance of the footwear industry increases with an increase in supply chain integration.
- There is no horizontal linkage among companies participating in the footwear industry mainly because of lack of trust
- Performance of the Ethiopian Footwear sector is low. As well, effective communication between supply chain actors is not adequate due to lack of effective communication tools.

Samuel S. (2012) performed another research with a title "Investigation on the effect of supply chain integration on Ethiopian garment industry's performance". The main objectives of the study are to assess whether product quality and competitive position are affected by SCI and to examine SCI and related problems effect on performance of the garment sector. In addition, the researcher identified problems in the industry that needs to be resolved to enhance the performance of the sector. Among the problems identified, failure to use the sectors competitive advantage to penetrate into the global economy, underdeveloped industrial culture in the garment industry, mismanagement and lack of adequate knowledge of supply chain management are the critical ones. To carry out the study the researcher employed a quantitative research method in addition with primary data collection method by targeting 41 garment industries located in Ethiopia, out of the 41 target industries 29 were sorted out for the study using a lottery sampling method. From the distributed 29 questionnaires for the garment industries, all are completed and returned and are valid for further operation. The major findings drawn by the researcher are stated as follows:

- There is no long term customer integration in the garment industry. Of the produced end products more than half (58.62%) are sold to any buyer found in the market.
- The correlation between supply, customer, and internal integration and product quality is statistically significant at 5% level.
- The correlation between supply, customer, and internal integration is statistically significant at 1%, 1%, and 10% level, respectively.

- Supply and customer integration have positive and strong relationship with competitive advantage. However, internal integration has positive but weak correlation with competitive advantage.

Additionally, Gizaw B. (2016) also conducted a research on the effect of supply chain integration on operational performance in Ethiopian trading enterprises. Major problems identified by the researcher that influence business performances are:-

longer lead times, supply disruptions caused by global customs, foreign regulations and port congestion, political and/or economic instability in a source country, changes in economics (such as exchange rates which in turn leads to increasing cost of product), reduces speed of delivery of product and flexibility of the company.

Another problem cited by the researcher specifically on the enterprise are lack of alignment among store operation, finance and supply chain with inventory management, the inculcation of some units like maintenance under supply chain, problem of undertaking reordering based on the need of the market are the major. To evaluate the effect of SCI, the necessary data were collected by the researcher using both primary (structured questionnaires) and secondary (from books, journals and articles), the researcher used an explanatory research on 108 sample respondents', here the researcher only used the perception of employees and does not incorporate customers perception about the issue. Out of the distributed 108 questionnaires, 103 were completed and returned for analysis. Stated next are the major findings of the research:

- The analysis result depicts that the mean score values for supply chain integration dimensions were below the average mean value (only between 1.65 and 2.07) which really indicates the supply chain integration of Ethiopian trading enterprise is ineffective/poor.
- There is positive correlation among the four (supplier integration, information integration, customer integration, and internal integration) supply chain dimensions
- Supplier integration, customer integration and internal integration have a statistical significant effect on operational performance.

2.2.3 Empirical evidences on the relationship between supply chain integration and performance and performance measurement.

Table 1-Major Findings on the relationship between SCI and Performance

No	Researcher/s	Methodology used	Variables under consideration	Major Findings on the relationship between SCI and Performance
1	Kang and Moon, (2016)	Primary data (collected by using a five-point Likert-type scale questionnaire	• Information Exchange • Relational Competence	Empirical evidence of the study shows that relational competence in SCM has a positive effect on supply chain integration through information exchange for a sustainable competitive advantage and showing that information exchange has a positive effect on supply chain performance through supply chain integration.
2	Njagi and Ogutu, (2014)	Primary data (collected by using a five-point Likert-type scale questionnaire	• Internal Integration • Integration with suppliers • Integration with customers	The findings indicate that supply chain integration is an effective way of competing, and the implementation of supply chain integration (Integration with suppliers, customers and internal integration) does have a strong impact on supply chain performance and competitive advantage of the firm.
3	Mose (2015)	Primary data (Closed ended questions)	• Customer Integration • Supplier Integration • Internal Integration	The analysis shows that there is a positive relationship between Customer, Supplier and Internal integration and performance in pork industry in Rwanda
4	Flynn et al., (2010)	Primary data (Interview and Questionnaires)	• Operational and Business Performance* • Customer Integration • Supplier Integration • Internal Integration	Evidences of the study indicates that internal integration was directly related to both business and operational performance and that customer integration was directly related to operational performance. But supplier integration is not related to performance

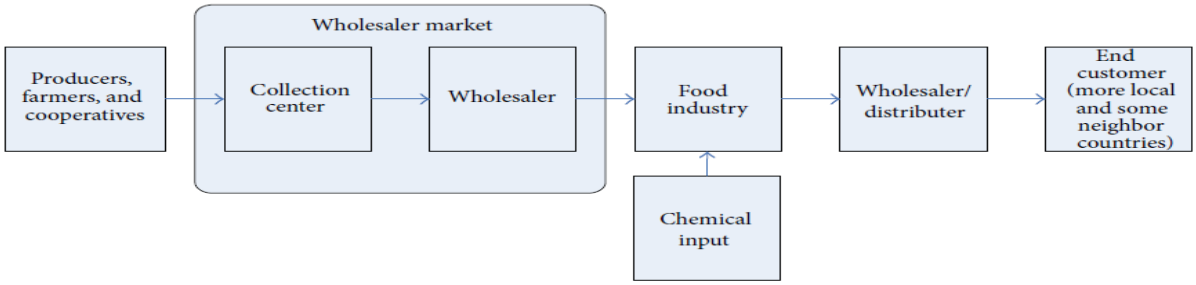
5	Liu (2013)	Primary data (questionnaires)	• Operational and Business Performance * • Customer Orientation • Operational coordination • Information sharing	The results suggested that information sharing has a positive influence on operational performance but it does not have a significant direct impact on business performance. On the other hand customers orientation moderates the relationship between SCI and performance
6	Lisanza (2013)	Primary data in addition with additional model	• Joint Planning • Information • Technology • Functional Coordination • SCM activities	The findings indicate that SCM integration has significantly contributed to the level of performance that is achieved among the international humanitarian organization in East Africa.
7	Dametew(2016)	Secondary data from articles and websites (analyzed using AHP)	• Technology • Resource integration • SCI • Knowledge integration • Production and design integration	The result indicates that knowledge, technology, production and design and resource integration directly related and impact on quality performance for manufacturing companies. Supply chain integration has also positively linkage on Production, knowledge, Technology and Resource integration so as to improve quality performance in a supply chain
8	Lu et al., (2017)	Both Primary data (Questionnaires) and Secondary data (Ordinary List Square (OLS))	• SCI • Operational Performance* • Market Uncertainty	The findings suggested that the overall pattern of the correlation between the supply chain integration and operational performance tends to be 'nonlinear', and the nature of the 'nonlinearity' is significantly influenced or moderated by the market uncertainty as an exogenous environmental factor. Therefore, the study concluded SCI is not highly influential in operational performance

***Dependent variables in the study**

Source: *Summarized from literatures and tabulated by author*.

Additionally to the measurements of operational performance a graphical representation illustrated below presented a framework for a food manufacturing industry.

Figure 3- Supply chain of Food manufacturing industry



Source: Bete-Georgise et al., (2014).

Summary of Literatures and Gap

From the reviewed studies, researchers arrive into similar conclusions on some aspects and on the contrary different findings on others. For instance, Hosseini et al., (2012), in his study in investigation on the effect of supply chain integration on competitive capability in Iranian Food industry suggested that internal integration does not have direct influence on competitive capability whereas customer and supplier integration have direct significance influence. Mose (2015) suggested that there is a positive relationship between customer, supplier and internal integration and performance. Where as in his study Flynn (2010), concluded that there is a positive relationship between internal and customer integration and performance but supplier integration does not have any effect on performance. Similarly, Lu et al., (2017), stated in their findings that there is a non-linear correlation between SCI and operational performance other external factors are accountable for the operational performance of a firm. However, researchers like Lisanza (2013); Njagi and Ogutu (2014) and Kang and Moon (2016), advocate implementing supply chain integration on a firm is an effective way to enhance performance of the organization. As a result, there are inconsistencies noticed whether the variables (like supplier integration and information integration) have positive or negative effect on performance. Therefore, this study also suggested its own judgment based on its own finding on effect of supply chain integration.

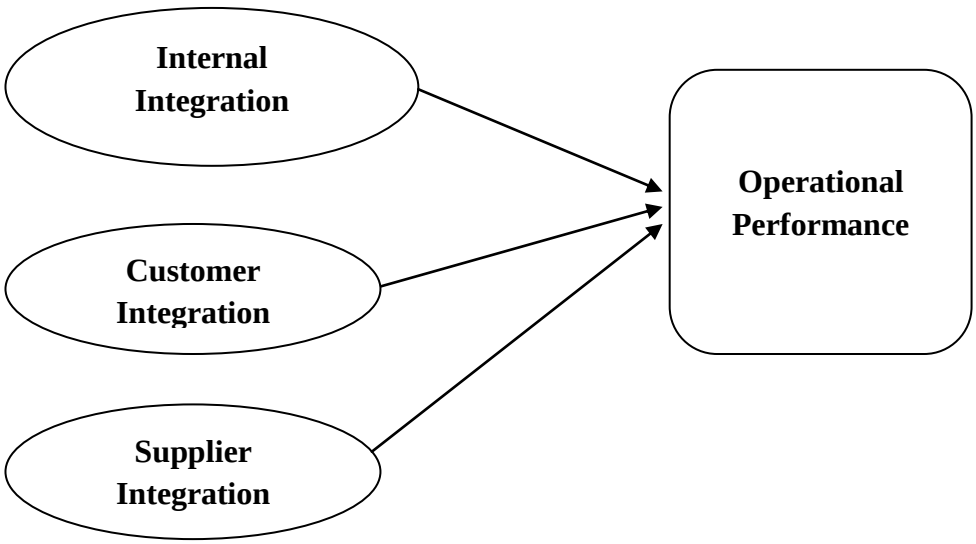
2.3Conceptual framework

Under this subsection, a framework suggesting the relationship between supply chain integration and operational performance illustrated diagrammatically.

Different authors proposed a framework relating supply chain integration and performance. Bete-Georgise et al., (2014); Kumar.et al, (2017); Mose(2015) and Mansoori.et al, (2014) are

some among the many suggesting a conceptual model for research on the relationship between supply chain integration and operational performance.

Figure 4- Conceptual Framework



Source: Developed for the study

This framework describes supply chain integration (which includes internal, customer and supplier integration) as independent and operational performance as dependent variable. The theoretical relationship between the variables stated in the conceptual framework is illustrated as follows:

Internal Integration

Internal integration refers to the degree to which a company can organize its practices, procedures, information, decisions and conduct in a collaborative and synchronized way between its different areas (Flynn et al., 2010). Authors suggested that internal integration helps to increase the performance of an organization. According to Kumar et al., (2017), Internal integration has internal integration improves the firms performance by reducing costs and limiting the ability of departments within the organization from taking steps that would distort the overall goals of the organization.

Customer Integration

Customer integration, also called forward integration refers to the process of interaction and collaboration between an organization and its customers to ensure an effective flow of products and services to customers (Otchere et al., 2013). Customer integration enhances the

performance of firms by enabling them to increase order fulfillment, quality of products and quicker response to customers demand in an efficient manner (Flynn et al., 2010; Kumar et al., 2017; Saleh, 2015).

Supplier Integration

Supplier integration also called backward integration refers to the process of interaction and collaboration between an organization and its suppliers to ensure an effective flow of supplies (Otchere et al., 2013). As that of the above two integration types, supplier integration also increases the performance of the firm by enabling the organization improve lead-time, speed and quality of outputs.

Chapter Three

Methodology

Under this section of the study, the researcher stated approaches that are used in the study, research design, population and sample size, data source and type and the ethical considerations taken while conducting the study are discussed.

3.1 Description of the study setting

Generally, the study is set to assess the effect of supply chain integration in food manufacturing industry in Ethiopia, in the case of FAFFA Foods Share Company. By using a five point Likert scale questionnaire (primary data) were collected from relevant departments that has a direct connection in the supply chain process in addition with strategic suppliers and customers extracted from the company database.

3.2 Research approach

According to Creswell (2014), there are three research approaches namely, the quantitative, qualitative and mixed approaches. The study used Quantitative approach, which isused for examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analyzed using statistical procedures.

3.3 Research Design

The study is designed to review the effect of supply chain integration in food manufacturing industry; therefore, an explanatory research is a suitable method. According to Zikmund et al.,(2012), an explanatory research also called a causal research is conducted in order to identify the extent and nature of cause-and-effect relationships, to assess impacts of specific changes on existing norms, various processes etc. Causal studies focus on an analysis of a situation or a specific problem to explain the patterns of relationships between variables. Hence, the reason to use an explanatory research for this study is to justify the cause-effect relationships between the study variables (internal, supplier, customer and information integration) on operational performance of the firm.

3.4 Unit of Analysis

The unit of analysis for this study is FAFFA food Share Company in Ethiopia. The analysis is conducted at a firm level by examining the cause effect relationship among variables of interest (SCI and operational performance).

3.5 Population of the study

In the earlier section, it was defined that the scope of supply chain encompasses the network from suppliers to the customers. Therefore, in order to assess the effect of supply chain integration, census survey was used on the target population. Numerically, the total population that was used in the study is 102. Since it is manageable to include all the study population, the study implemented a census survey.

To identify the relevant respondent population in the organization, it is necessary to sort out departments that have direct relationship with supply chain activities; Figure 6 (as shown in the Annex) illustrated the organizational setup of FAFFA Foods Share Company.

The following departmental setups were included in the study population:

- ✓ SHEQ service (Quality control and assurance)
- ✓ Procurement and management department (including inventory management)
- ✓ Commercial Department (Marketing division and sales and distribution division of commercial products in Addis Ababa)
- ✓ Manufacturing department (Production division)
- ✓ Strategic suppliers and customers

As it is demonstrated in the annex B section, the total population of the study are extracted based on their relevance to the supply chain activities. Table 2shows the number of respondents in the department under consideration.

Table 2-Number of respondents in the department

No	Department	Number of respondents
1	Manufacturing department (production unit)	60
2	Marketing Department	20
3	Procurement and Inventory management department	6
4	SHEQ Service (quality assurance)	4
5	Strategic Suppliers and customers	12
Total		**102**

Source: FAFFA Foods Share Company Database, (2017)

3.6 Source of Data Collection

In order to gather the necessary data the researcher used two types of data collection techniques; primary and secondary data collection methods. Structured questionnaire (on which its validity was known from previous analysis) was employed as the primary data gathering mechanism and books, journal articles, web pages and other materials was used as secondary data source. The necessary data was collected using self-administered close-ended questionnaire from the above stated departments of FAFFA Foods Share Company and strategic suppliers and customers.

The structured questionnaire that is closed-ended was distributed to the departments, strategic suppliers and customers. In order to facilitate the data collection process as well as to assure gathering of relevant information on the issue, the researcher collected the distributed questionnaires. The indicators of supply chain integration are measured using a five point Likert scale (1=strongly disagree; 5=strongly agree) where higher values indicated stronger integration.

3.7 Data Analysis and Statistics

After the collection of data, the manipulation process was conducted using statistical tools like STATA 13, SPSS 20, Microsoft Word and Microsoft-Excel.

Specifically, the data's that were gathered from the structured questionnaires was analyzed as follows:

- The demographic information obtained from the respondents was analyzed and presented using descriptive statistics in the form of frequency and percentage tables.
- To evaluate the practice of supply chain integration, measures of central tendency like that of mean and standard deviation was applied.
- To determine the relationship between supply chain integration study variables and operational performance correlation analysis (Pearson correlation) was used.
- The investigation of cause-effect analysis was made by using multiple linear regression analysis since there are more than two independent variables as presented in the model below.

Citrus Paribus Assumption

The study tried to investigate which integration type highly affects the operational performance of the organization using ordinal regression. Note that the regression model

constructed in the study only attempts to see the effects from supply chain integration viewpoint, no other performance influencing factors are included in the model.

PERF= β0+ β1INI+ β2SUI+ β3CUI+ε

Where; PERF- operational performance (Dependent variable);

INI- Internal Integration;

SUI-Supplier integration;

CUI- Customer Integration;

ε- Error term.

3.8 Validity and Reliability of study variables

According to Weiner (2007), reliability is the degree to which a measurement technique can be depended up on to secure consistent results upon repeated application. Green B.S. (2003), Cronbach's Coefficient alpha is the most popular reliability coefficient in social-science research for measures with multiple components. Therefore, to test the reliability of the items used to assess the effect of supply chain integration on the operational performance a Cronbach's alpha reliability coefficient has calculated.

According to Gliem and Gliem (2003), Cronbach's alpha reliability coefficient normally ranges between 0 and 1. However, there is actually no lower limit to the coefficient. The closer Cronbach's alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale. Additionally, by rule of thumb, Cronbach's alpha coefficient greater than 0.7 is said to be acceptable.

Table 3-Cronbach's Reliability Alpha Coefficients for all the variables

Variables	No of Items	Cronbach's Alpha
Internal Integration	4	0.870
Supplier integration	6	0.733
Customer integration	5	0.833
Operational performance	5	0.820

Source: *Own computation from survey results, 2018.*

The validity of the study includes the construct validity and internal validity. The construct validity was assured by structuring questions on the questionnaire based upon the research objectives and hypotheses. The internal validity was maintained by including recommendations given by supervisor (advisor) to the final questionnaire distributed to the respondents.

3.9 Ethical Consideration

The available information provided by the company is kept confidential to not risking the competitiveness of the firm in the market; also, identity of individuals has been involved in the study will not to be disclosed under any circumstances. In the data collection process, respondents will be informed that the activity will be performed if they are willing to assist. If necessary and requested by the firm, the researcher is willing to submit a copy of the research paper before it is publicized. In addition, everyone involving in the data provision process should be aware that the materials organized by the researcher are intended for academic purpose only.

Chapter Four

Data presentation, interpretation and Analysis

Under the fourth chapter of the study, major findings of the study had illustrated by using statistical instruments. As indicated in the third chapter, the study have an introductory (demographic characteristics) section, descriptive statistics (mean and standard deviation), correlation analysis and finally regression analysis. Therefore, the fourth chapter is comprised of four sub-sections.

In general, the study used 102 respondents for assessing the effect of supply chain integration on operational performance of FAFFA Foods Share Company. Out of the total respondents, 91(89.2%) responses are correctly filled and returned.

4.1Demographic characteristics

Under this sub-section the general information about sex, age, educational background (Qualification), departments of work and number of years working in/with the organization are discussed below.

Table 4-Demographic Characteristics of Respondents (Gender, Age and Department)

Item	Description	Frequency	Percent	Cumulative Percent
Gender	Male	56	61.5	61.5
	Female	35	38.5	100
	Total	**91**	**100**	
Age	18-25	18	19.8	19.8
	25-40	56	61.5	81.3
	40-65	17	18.7	100
	Total	**91**	**100**	
Department	Quality control and assurance	4	4.4	4.4
	Production unit	51	56	60.4
	Procurement and inventory management	6	6.6	67
	Marketing and distribution	20	22	89
	Strategic customers and suppliers	10	11	100
	Total	**91**	**100**	

Table 5-Demographic Characteristics of Respondents (Qualification and number of years working in/with the organization)

Item	Description	Frequency	Percent	Cumulative Percent
Qualification	Primary School	7	7.7	7.7
	Secondary School	18	19.8	27.5
	Certificate	19	20.9	48.4
	Diploma	17	18.7	67
	BA Degree	28	30.8	97.8
	Master's Degree	1	1.1	98.9
	PhD	1	1.1	100
	Total	**91**	**100**	
Number of years working with/in the organization	Less than one year	10	11	11
	1-5 years	46	50.5	61.5
	6-10 years	22	24.2	85.7
	Above 10 years	13	14.3	100
	Total	**91**	**100**	

Source*: Questionnaire survey result, 2018. (For table 4 and 5)*

Description of Demographic Characteristics

Gender

As indicated in Table 4, from the total 91 respondents included in the analysis 56 were male, which accounts 61.5 percent and the rest 35 (38.5 percent) were female. The statistics shows more than half of the respondents are male.

Age

Majority of the respondent's age rest between 25-40 years, which accounts for 61.5 percent and the rest 19.8 and 18.7 percent of respondent's age lay between 18-25 and 40-65 respectively. This shows that more than half of the respondents are at a productive age of labour (Table 4).

Department

As illustrated in Table 4, 56 percent of respondents are production unit workers which accounts the highest percentage followed by marketing and distribution by accounting 22 percent and the rest 11 percent, 6.6 percent and 4.4 percent are subdivided between strategic suppliers and customers, procurement and inventory management and quality control and assurance respectively. The departments in which the data are collected from have a direct relationship in the supply chain process and can convey the appropriate information for the study.

Qualification

Majority of the respondents are BA degree qualifiers (30.8 percent) followed by certificate, secondary level and Diploma qualifiers by about 20.9 percent, 19.8 percent and 18.7 percent respectively. Only one respondent each are qualified in MA degree and PhD (Table 5).

Number of Years working with/in the organization

As shown in table 5 above, half of the respondents engaged in the organizational activities for 1-5 years period while 24.2 percent of the respondents worked from 6-10 years' time. The rest 11 percent and 14.3 percent of the respondents engaged with the organization for less than a year and above ten years respectively.

4.2 Descriptive statistics of Independent variables (Internal, Customer and Supplier Integration)

The descriptive statistics of the variables included in the study was presented by using measures of central tendency (mean) and measure of dispersion (Standard Deviation). According to Zedatol (2008), cited by Oumar (2012), mean score 3.80 is high, 3.40 – 3.79 is moderate and below 3.39 is low.

4.2.1 Internal Integration

As indicated in Table 6, the statistics suggested the mean value for the questions asked to assess internal integration of the company shows a mean value between (M= 3.21 and M= 3.47). The acquisition of new knowledge about new production process with (M=3.21, S.D=0.949) and transparent information dissemination about inventory status (M=3.33, S.D=0.943) registered a lower mean value. Having a collaboration between different departments and employees in the organization with (M= 3.46, S.D= 1.036) and effectiveness of communication among departments in the firm shows a moderate mean value (M=3.47, S.D=1.058).

Table 6-Descriptive statistics (Mean and Standard Deviation) of internal integration

Internal integration	Mean	Std. Deviation
There is an effective communication among departments in the firm about new production plan or introduction of new process	3.47	1.058
There is an essence of collaboration between different departments and employees in the organization	3.46	1.036
There is a way that employees can gather a new knowledge about new production process	3.21	.949
Different but related production sections have transparent information about the inventory status of each other	3.33	.943

As the mean value imply, there is poor internal integration in FAFFA Foods but there is also room for improvement for workers to gather new knowledge's regarding the production process, this problem may arise due to lack of training facility and adoption of routine production process. By strengthening the knowledge of the employees on production, the internal integration can be further developed to very higher level.

4.2.2 Customer Integration

Table 7- Descriptive statistics (mean and standard deviation) of customer integration

Customer Integration	Mean	Std. Deviation
The organization and strategic customers are aware of each other's long-term business strategies	3.36	.888
The organization have transparent information sharing about current status of inventory with strategic customers	3.30	.994
There is a long-term relationship between the organization and its customers	3.46	.992
The organization collects major customers feedback and develop based up on the markets demand	3.63	.890
The organization assess customers satisfaction on the goods provided to the market	3.75	.889

The mean values for the indicators of customer integration illustrates a moderate mean values for the indicators by having (M= 3.30 and M= 3.75). Assessing customers satisfaction on the

goods provided to the market with (M= 3.75, S.D= .889) and collection of feedbacks from customers for based on market demand scored (M= 3.63, S.D= .890) shows a moderate mean value. On the other hand, awareness of strategic customers and the organization about each other's long-term business plans and transparent information sharing about inventory status of the organization registered (M= 3.36, S.D= .888 and M= 3.30, S.D= .994) respectively depicts a lower mean value (Table 7).

According to the study conducted by Flynn et al., (2010) customer integration is pivotal operational performance of a firm. As the previous sub-sections, there are also voids to be filled and increase the customer integration of FAFFA Foods by further increasing the interaction between strategic customers and the organization on long-term business plan and inventory status.

4.2.3 Supplier Integration

Table 8- Descriptive statistics (mean and Standard deviation) of supplier integration

Supplier integration	Mean	Std. Deviation
The company provides necessary information to its major suppliers about its production plans	3.55	.873
There is a strong connection with major suppliers	3.38	.986
The organization helps its suppliers in improving their product quality	2.80	1.067
The organization depends on few and long-term suppliers	2.46	.860
The organization tries to solve unsatisfactory problems from both parties jointly	3.36	.850
The company and its suppliers are aware of each other's long term business ideas	3.59	.816

Among the independent variables supplier integration have the lowest range mean score between the indicators (M= 2.46 M= 3.59). According to the benchmarking scale for interpretation of mean value, Helping of suppliers to improve the quality of inputs supplying to the company and the organizational dependence on few and long-term suppliers registered low with (M= 2.80, S.D= 1.067 and M=2.46, S.D= .860) respectively showed the lowest mean score. On the other hand, suppliers being aware of the company's business plan and

provision of information to major suppliers about its production plan scored moderate mean value with (M= 3.59, S.D= .816 and M= 3.55, S.D= .873).

According to the study findings of Njagi and Ogutu, (2014) Supplier integration does have a direct influence on the operational performance of a firm. As shown above lower mean values was registered for helping suppliers to improve quality and dependability on few and long-term suppliers, this may adversely affect the operational performance of FAFFA which may hinder the firm from achieving its goals (Table 8).

4.2.4 Descriptive Statistics of the Dependent Variable Operational Performance

Table 9- Descriptive Statistics (mean and standard deviation) of Operational performance

Operational Performance	Mean	Std. Deviation
There is on time delivery of products by the company	3.92	.718
There is flexibility in the products and production process whenever it is necessitated by the market	3.45	1.046
The company provides cost effective products to the customers	3.89	1.069
There is an effective performance by the organization	3.85	.930
The company have the ability to respond to and accommodate the periods of poor supplier performance	3.52	1.158

The descriptive statistics result shows that the organization is strong at delivering the product on timely bases, provision of cost effective products to the customers and having a good performance by the organization shows (M= 3.92, S.D= .718, M= 3.89, S.D= 1.069 and M=3.85, S.D= .930) respectively showed a higher mean value. Whereas, flexibility in production process (M= 3.45, S.D= 1.046) and ability to respond and accommodate periods of poor supplier performance (M=3.52, S.D= 1.158) showed a moderate mean value. This is an indicator that the organization lacks flexibility and provision of goods to the market when there is lack of supplies, which may be a problem of inventory operation (Table 9).

4.2.5 Descriptive statistics for upstream and downstream supply chain on selected cases

Table 10- Descriptive statistics (mean and standard deviation) for upstream and downstream supply chain

	Mean	Std. Deviation
The organization helps its suppliers in improving their product quality	2.60	.516
The organization depends on few and long-term suppliers	2.50	.972
There is on time delivery of products by the company	4.10	.568
The company provides cost effective products to the customers	4.20	.422

From the mean values derived from the upstream and downstream supply chain respondents the support from the organization in helping the suppliers improve the qualities of the products they provide as an input and dependability on few selected suppliers are low with (M= 2.60 and M= 2.50) respectively. On the contrary, in terms of time and cost indicators the organization provides a higher mean value with (M=4.10 and M= 4.20) this gives a concrete evidence from the upstream supply chain respondents for not having long-term supplier relationship and lower support for improvement of product quality (Table 10).

4.3Correlation Analysis

According to Freeman and Young (2009), a correlation coefficient is a measure of linear association between two continuous variables and represented by 'r'. The correlation coefficient 'r' takes a value between -1 and +1 ($-1 < r < +1$), -1 means there is perfect negative association between the variables, 0 means there is no association among the variables of interest and +1 indicates there is perfect positive relationship between the variables. In addition, Mukaka (2012) recommended a range of size for the interpretation of the correlation coefficients (Table 11).

Table 11- Rule of thumb for the interpretation of the correlation coefficient

Size of correlation	**Interpretation of coefficients**
0.00 to 0.30 (0.00 to -0.30)	Negligible Correlation
0.30 to 0.50 (-0.30 to -0.50)	Low Positive (negative) Correlation
0.50 to 0.70 (-0.50 to -0.70)	Moderate Positive (negative) Correlation
0.70 to 0.90 (-0.70 to -0.90)	High Positive (negative) Correlation
0.90 to 1.00 (-0.90 to -1.00)	Very high positive (negative) Correlation

Source: *Mukaka, (2012).*

Table 12- Linear relationship (Pearson Correlation) between the variables

Correlations

		Operational_performance	Internal_Integration	Customer_integration	Supplier_integration
Operational_ performance	Pearson Correlation	1	.593**	.773**	.719**
	Sig. (2-tailed)		.000	.000	.000
Internal_ Integration	Pearson Correlation	.593**	1	.676**	.480**
	Sig. (2-tailed)	.000		.000	.000
Customer_ integration	Pearson Correlation	.773**	.676**	1	.757**
	Sig. (2-tailed)	.000	.000		.000
Supplier_ integration	Pearson Correlation	.719**	.480**	.757**	1
	Sig. (2-tailed)	.000	.000	.000	

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

Source: *Own computation, (2018)*

As illustrated in table 12, all the variables are significantly correlated at 1 percent significance level.

4.3.1 Correlation between Operational performance and independent Variables (Internal, Customer and Supplier Integration)

The Bivariate Pearson correlation coefficient outcome indicates there is a moderate positive correlation between operational performance and internal integration (r=.593**). However, the other two independent variables (supplier integration and Customer integration) have a high positive correlation with the dependent variable operational performance with r= .719** and r= .773** respectively.

Therefore, the finding of the correlation analysis shows that all the independent variables (internal, customer and supplier integration) are positively related with the dependent variable operational performance at 99 percent confidence interval. Among the three independent variables, supplier and customer integration are more relatively have a higher degree of correlation coefficients, which means that FAFFA Foods Share Company should enhance customer and supplier integration to increase the operational performance of the organization.

4.3.2 Correlation between the independent variables (Internal, Customer and Supplier integration)

From the independent variables customer integration has a high positive relationship with supplier integration with r= .757** which means that enhancing supplier integration has a potential to develop customer integration or vice versa. Note that the correlation analysis does not imply causation between variables. On the contrary, internal integration has a low positive relationship with supplier integration (r= .480**) meaning that even though the variables are positively correlated the magnitude of correlation is low.

4.4Regression Analysis

A regression analysis is the determination of relationship between explanatory variables and explained variable, which is used to generate a predicted value or estimates of variables and cause-effect inferences (Wooldridge, 2015; Gujarati, 2003; Campbell and Campbell, 2008). The study takes three explanatory variables, which makes the regression analysis a multivariate regression analysis. According to Wooldridge (2015), a multiple regression analysis is conducted when there are two or more independent variables on the specified model.

4.4.1 Model Adequacy

The ANOVA table is used to determine the adequacy of the model specified. The Assumptions weather to accept the model or not is stated as follows:

HO: The model is not adequate to explain the dependent variable
H1: The model is adequate to explain the dependent variable

Table 13- ANOVA table for model adequacy test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33.825	3	11.275	54.294	.000[b]
	Residual	18.067	87	.208		
	Total	51.892	90			

a. Dependent Variable: Operational_performance

b. Predictors: (Constant), Supplier_integration, Internal_Integration, Customer_integration

Source: *Own computation, (2018)*

As indicated in Table 13, the model is adequate with 1 percent significance level. Therefore, we reject the null hypothesis (H0) and we accept the alternative hypothesis (H1) and can say the model is adequate to explain the dependent variable. The F-value 54.294 indicates that the joint effect of the variables is significant at 99 percent confidence level.

4.4.2 Interpretation of model summary

As illustrated in the table below, R^2 value shows 65.2 percent of the variation is explained by the independent variables included in the model while the rest 34.8 percent of variation is explained by variables that are not included in the model (Table 14).

Table 14- Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.807[a]	.652	.640	.45570

a. Predictors: (Constant), Supplier_integration, Internal_Integration, Customer_integration

Source: *Own computation, (2018)*

4.4.3 Interpretation of Significant Beta Coefficients

Table 15- Regression Beta Coefficients

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.387	.273		1.417	.160
	Internal_Integration	.134	.077	.149	1.737	.086
	Customer_integration	.449	.121	.427	3.702	.000
	Supplier_integration	.412	.123	.324	3.339	.001

a. Dependent Variable: Operational_performance

Source: *Own computation, (2018)*

Table 15 indicates that beta coefficients for the independent variables and the significance of the explanatory variables in relation to the explained variable. The study output indicates that only customer, supplier integration significantly affects the operational performance of FAFFA Foods Share Company at 1 percent significance level, and internal integration significantly affects the operational performance at 10 percent significance level.

The null hypothesis (H0= Customer integration has no direct effect on the operational performance of FAFFA Foods Share Company.) the standardized coefficient β= .427, sig= .000 which is significant at 1 percent, 5 percent and 10 percent. In addition, the β coefficient is positive. Therefore, the result leads to rejection of the null hypothesis and accept the alternative hypothesis stated as (H1= customer integration has direct p effect on the operational performance of FAFFA Foods Share Company). Therefore, the study rejects H0 and accepts H1 at 1 percent significance level.

The other significant variable that affects the operational performance of the organization is Supplier integration, β= .324, sig= .001 which indicates that supplier integration is also significant at 1 percent, 5 percent and 10 percent and have a positive effect on operational performance. Therefore, as that of customer integration, supplier integration also has a direct positive effect on the operational performance of FAFFA Foods Share Company. Therefore, the study accepts H1 at 1 percent significance level and state that supplier integration has direct significant effect on the operational performance of FAFFA Foods Share Company.

In addition, internal integration significantly affects the operational performance of the organization, β= .149, sig= .086 which indicates that supplier integration is significant at 10 percent and have a positive effect on operational performance.

The model takes a level-level interpretation of the coefficient. Therefore, a one standard unit increase in customer integration will increase operational performance of the organization by .427 units, one standard unit increase in supplier integration will increase the operational performance of the organization by .324 amounts and one standard unit increase in internal integration increases operational performance of the organization by .149 unit.

The output of the study goes in line with the studies of GizawB. (2016), Flynn et al (2010),Alemayehu T. (2017), Samuel S. (2012).The study finding opposed the outputofHosseini et al., (2012), since the output advocates internal integration insignificantly affect Iranian food processing industry whereas goes in line with the findings that supplier and customer integration significantly effect.

Multiple Regression Assumption Tests

The multiple regression assumption tests include a multicollinarity test-meaning test for strong association between the independent variables, normality of the variables (conducted using Histogram), Autocorrelation between residuals (Durbin-Watson test statistics) and Homoscedasticity(equal variance of errors across all levels of the independent variables, conducted using scatter plot and p-p plot). According to Gujarati (2003), a multicollinarity test can be conducted using tolerance or VIF factor and by rule of thumb, VIF $\leq$ 10 or tolerance > 0.2 are acceptable to say there is no multicollinarity problem. As shown in the Annex, the variables used in the study do not have a multicollinarity problem since they fulfill the criteria stated. The normality test also indicates that all the variables are normally distributed meaning that of the variables is neither positively nor negatively skewed. According to Wooldridge (2015), The Durbin-Watson statistic ranges in value from 0 to 4. A value near 2 indicates non-autocorrelation. As indicated in the annex, the Durbin-Watson test statistics shows a value 1.598 which approaches to two therefore we say there is no autocorrelation problem between residuals. Finally, the scatter plot shows there is a normally scatter data in the study (See Annex C).

Chapter Five

Summary of Major Findings, Conclusion, Recommendation and Direction for Future Research

The final chapter of the study deals with the conclusion, recommendation on how to enhance drawbacks faced and hint on areas that can be added to broaden the study scope in terms of variable as well as study area.

5.1Summary of major findings

The demographic characteristics, the descriptive statistics and the regression analysis of the study are summarized as follows:

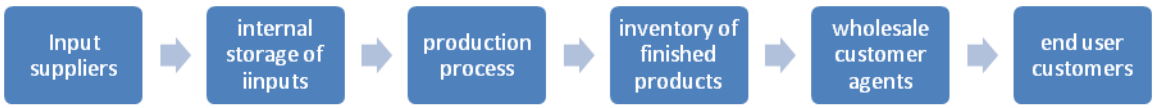
- The descriptive statistics illustrated in terms of mean and standard deviation states there is a moderate performance in most of the indicator questions discussed to measure the variables under consideration. A lower mean value was registered for indicators like the acquisition of new knowledge about new production process with (M=3.21, S.D=0.949), transparent information dissemination about inventory status (M=3.33, S.D=0.943), awareness of strategic customers and the organization about each other's long-term business plans (M= 3.36, S.D= .888), transparent information sharing about inventory status of the organization (M= 3.30, S.D= .994) and flexibility in production process (M= 3.45, S.D= 1.046) are few among the most. However, the descriptive statistics is only stating the average response collected from the survey. Therefore, further investigation was needed to determine the cause effect relationship.
- The association between variables was conducted using a Pearson correlation matrix. The result suggested that there is strong positive association between the dependent variable operational performance and the explanatory variables customer and supplier integration with r= .773 and r= .719 respectively. Even though there is strong positive association between operational performance and internal integration the degree of correlation is relatively lower of the former variables with r= .593. In addition, there is a moderate relationship between most of the independent variables, which leads to reduce a multicollinarity problem.
- Finally, the regression analysis of the study indicates all the independent variables internal, customer and supplier integrations significantly affect operational performance of the organization. Customer and supplier integrations are

significant at 1 percent significance level with standardized Beta coefficients (β= .427, sig= .000 and β= .324, sig= .001 respectively).Whereas, internal integration is significant at 10 percent (90 percent confidence interval) with Standardized beta coefficient β= .149, sig= .086).

5.2Conclusion

Theoretically, supply chain encompasses activities from the upstream to downstream (end user) members of the chain. The following diagram helps better understand the supply chain activities of FAFFA Foods and which activities should be integrated in order to enhance the operational performance.

Figure 5- Supply chain activities of FAFFA Foods Share Company



In short, as it is indicated in the above flow diagram, FAFFA Foods engage into procurement of input materials from suppliers for production process, transform of procured inputs into outputs, keeping inventory of finished items and provide those items to wholesale customers and end users. As the correlation analysis of study indicated, all supply chain integration types (internal, supplier and customer integration) have a positive relationship with the operational performance of FAFFA Foods; in addition, the regression analysis indicated all the variables internal, supplier and customer integrations significantly affect the operational performance of FAFFA Foods. The following table draws a conclusion summary:

Table 16- Summary of conclusion

Independent variables	Dependent variable	Correlation Coefficient and relationship between dependent and independent variables	Standardized Beta coefficient	Significance level
Internal Integration	Operational Performance	Moderate positive relationship (r= .593)	0.149	Significant at 10 percent
Supplier Integration		Strong Positive relationship (r=.773)	0.324	Significant at 1 percent
Customer Integration		Strong Positive relationship (r=.719)	0.427	Significant at 1 percent

Source: Developed for the study

Therefore, greater emphasis should be given for internal integration among company workers, collaborative interaction with input suppliers and wholesale customers to enhance the operational performance of the organization. For the hypotheses drawn for the study, it is concluded that all the variables have direct and significant effect on the operational performance of FAFFA Foods Share Company. Therefore, the question should be asked here is by what mechanisms can FAFFA Foods be integrated internally, as well as with suppliers and customers?

5.3Recommendation

- Supplier integration is the one type of SCI that significantly affects the operational performance of FAFFA Foods Share Company. Therefore, Creation of a platform that drives to frequent interaction with selected supplier collaborates on the issues of quality improvement and cost. In addition, make these selected suppliers partners of the organization. This benefits the organization gain advantage by possessing quality inputs, which helps to provide quality outputs and become more competitive in the market.
- The other type of SCI integration that significantly affects the operational performance of FAFFA Foods S.C is integration among internal functions. To strengthen the internal integration of the organization, provision of training on new production process to internal workers and creation of frequent departmental contact within the internal functions benefits the organization through efficient use of resources.
- Attention must also be given for customer integration by creating information linkages, with having flexible production techniques based on market demand, sharing adequate information with strategic customers is pivotal in enhancing the operational performance of the organization.

5.4Direction for Future Research

Fellow researchers who have an interest of conducting a research on supply chain integration in relation with business performance can add the following points to their research:

- If possible, increasing the number of up-stream and down-stream supply chain members might be an option.
- Inclusion of financial viability (like profit and return on investment) may be an option to broaden the scope.
- Broadening the scope of study from one organization into two or more may also be an option.
- Finally, conducting this study in other food manufacturing industries in Ethiopia is also an option.

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Annex

Annex A- Questionnaire

Addis Ababa University School of Commerce

Department Of Logistics and Supply Chain Management

Questionnaire to be filled by respondents

Dear Participants;

I am Alazar Abate conducting a thesis entitled "The effect of supply chain integration on the operational performance of food manufacturing industry in Ethiopia: The case of FAFFA food Share Company" for partial fulfillment of M.A in Logistics and Supply chain management. With sincerity, I would like to extend my deep appreciation to your company and respondents for the willingness and cooperation in undertaking this valuable research. I request your kind cooperation in answering the questions as truthfully as possible. The information obtained from this questionnaire will be kept confidential and will be used only for research purposes.

NB:

- It is not necessary to write your name
- Try to address the entire question given below
- For the closed ended questions use (√) mark for your choice in the given box

SECTION 1: DEMOGRAPHIC CHARACTERISTICS

1. Gender:

   Male ☐ Female ☐

2. Age

   18-25 ☐ 25-40 ☐ 40-65 ☐

3. Department:

   Quality control and assurance ☐

   Production unit ☐

   Procurement and inventory management ☐

   Marketing and distribution ☐

   Strategic suppliers and Customers ☐

4. Qualification:

   Primary School ☐

   Secondary School ☐

   Certificate ☐

   Diploma ☐

   BA Degree ☐

   Masters Degree ☐

   PhD ☐

5. Number of years working on/ with the organization:

   Less than one year ☐

   1-5 years ☐

   6-10 years ☐

   Above 10 years ☐

SECTION 2: Questions on the levels of supply chain integration

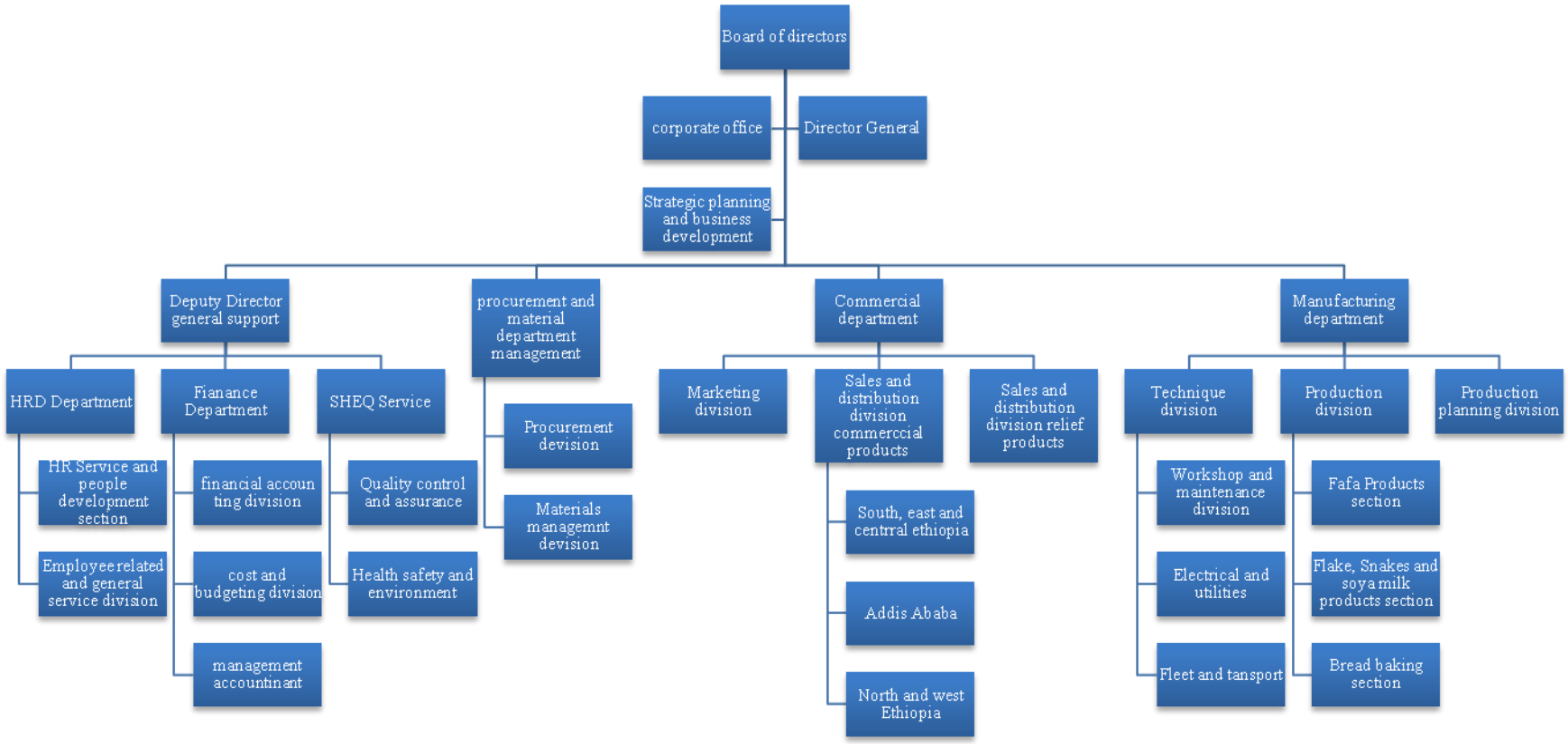
Please indicate the extent of integration of your Firm. (1=strongly disagree;2=disagree;3=neutral ;4=agree;5=strongly agree)	1	2	3	4	5
Internal Integration					
There is an effective communication among departments in the firm about new production plan or introduction of new process					
There is an essence of collaboration between different departments and employees in the organization					
There is a way that employees can gather a new knowledge about new production process					
Different but related production sections have transparent information about the inventory status of each other					
Customer Integration					
The organization and strategic customers are aware of each other's long-term business strategies					
The organization have transparent information sharing about current status of inventory with strategic customers					
There is a long-term relationship between the organization and its customers					
The organization collects major customers feedback and develop based up on the markets demand					
The organization assess customers satisfaction on the goods provided to the market					
Supplier integration					
The company provides necessary information to its major suppliers about its production plans					
There is a strong connection with major suppliers					

The organization helps its suppliers in improving their product quality					
The organization depends on few and long-term suppliers					
The organization tries to solve unsatisfactory problems from both parties jointly					
The company and its suppliers are aware of each other's long term business ideas					
Operational performance					
There is on time delivery of products by the company					
There is flexibility in the products and production process whenever it is necessitated by the market					
The company provides cost effective products to the customers					
There is an effective performance by the organization					
The company have the ability to respond to and accommodate the periods of poor supplier performance					

Thank You for your cooperation!

Annex B- Organizational Structure

Organizational setup of FAFFA food Share Company



***Source**:* FAFFA Draft report on organizational setup, (2014)

Annex C- Multiple Regreesion assumption test results

Multicollinarity Test

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	Internal_Integration	.541	1.848
	Customer_integration	.300	3.330
	Supplier_integration	.425	2.350

a. Dependent Variable: Operational_performance

Autocorrelation (Durbin-Watson Test)

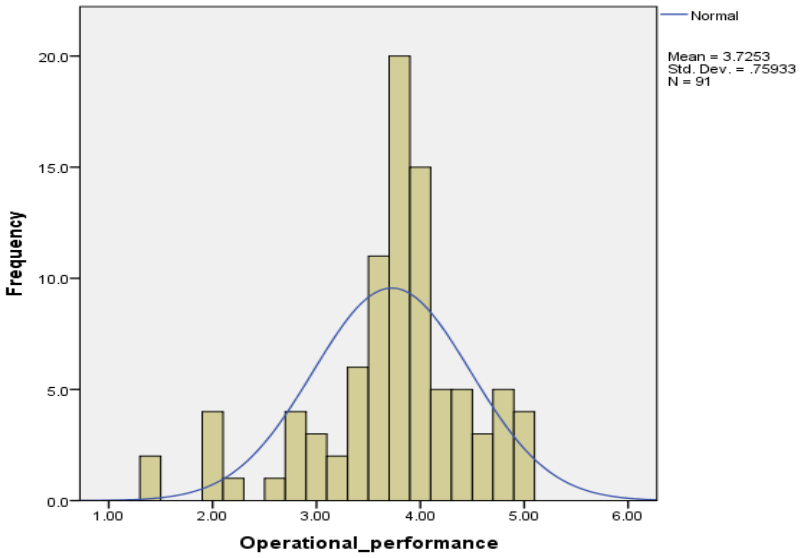
Model Summary[b]

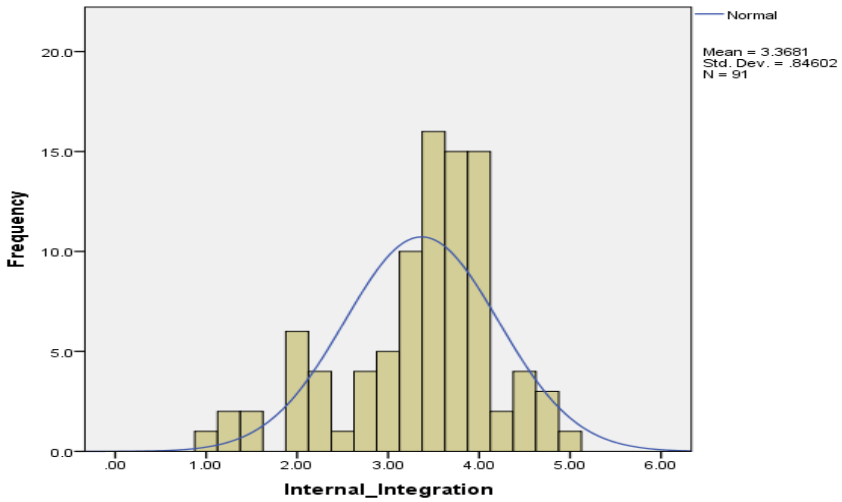
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.807[a]	.652	.640	.45570	1.598

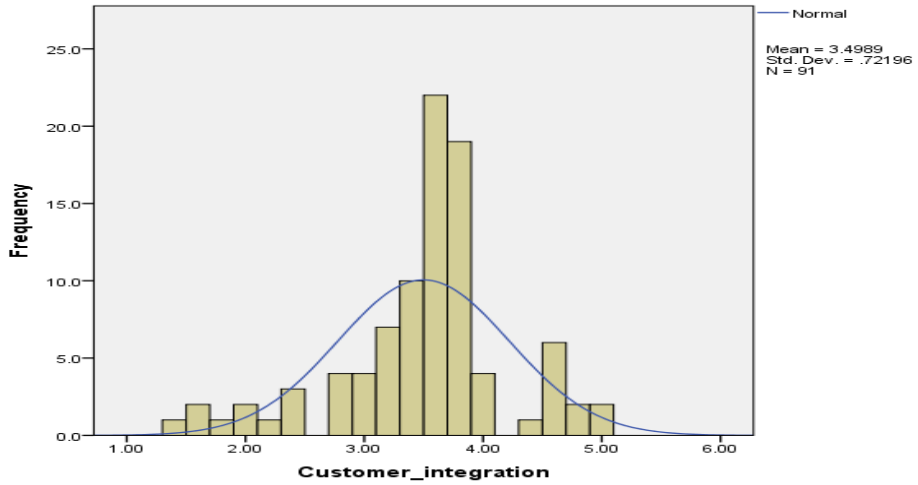
a. Predictors: (Constant), Supplier_integration, Internal_Integration, Customer_integration

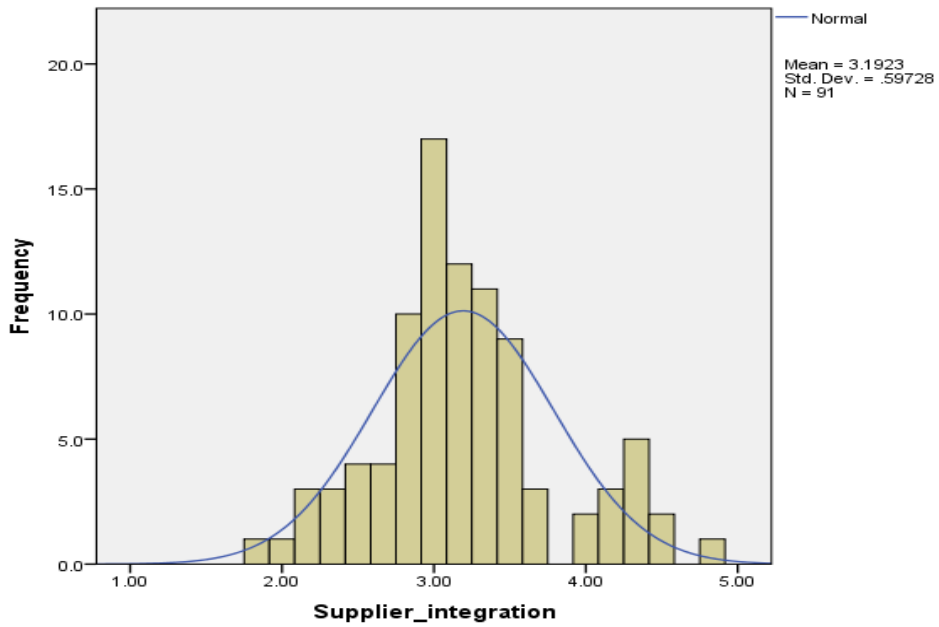
b. Dependent Variable: Operational_performance

Normality Test of variables (Histogram)

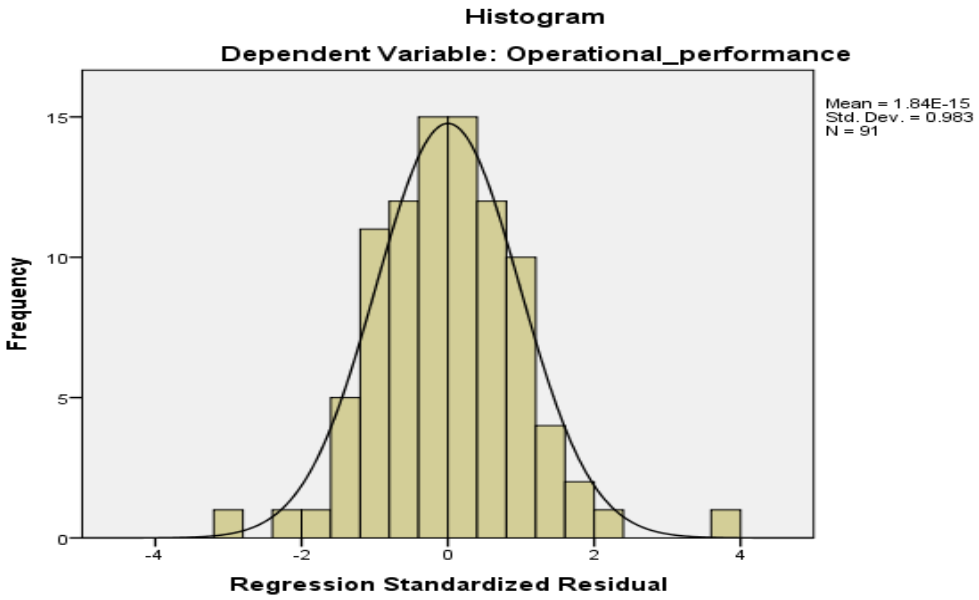


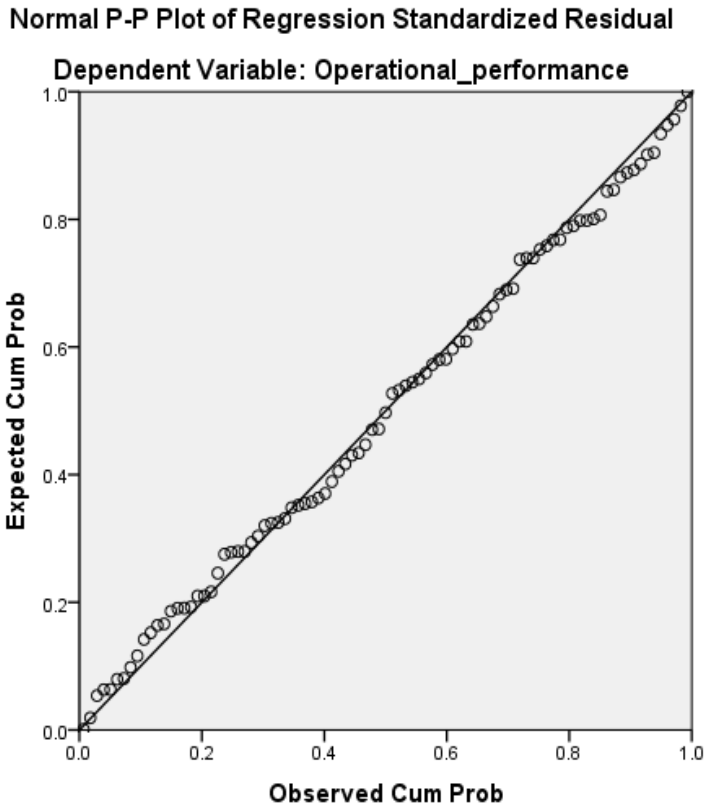

Normal
Mean = 3.3681
Std. Dev. = .84602
N = 91
Frequency
Internal_Integration

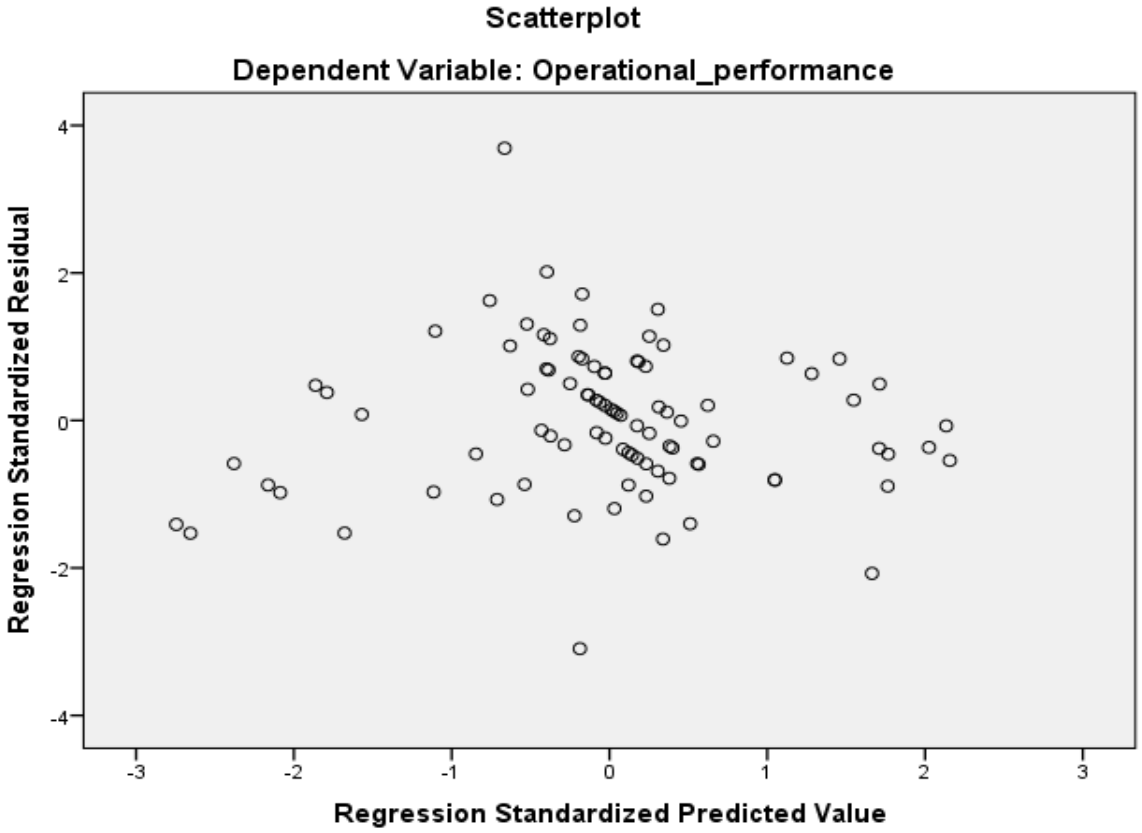

Normal
Mean = 3.4989
Std. Dev. = .72196
N = 91
Frequency
Customer_integration


Normal
Mean = 3.1923
Std. Dev. = .59728
N = 91
Frequency
Supplier_integration

Homoscedasticity






Scatterplot
Dependent Variable: Operational_performance
Regression Standardized Residual
Regression Standardized Predicted Value
4
2
0
-2
-4
-3
-2
-1
0
1
2
3