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Effect of Supply Chain Process Integration on Operational Performance in Case of Choice Flour Factory in Bahir Dar City

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Thesis Submitted to Bahir Dar University College of Business and Economics Department of Logistics and Supply Chain Management in Partial Fulfillment of the Requirements for the Degree of Masters of Arts in Logistics and Supply Chain Management

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Declaration

This is to certify that the thesis entitled "effect of supply chain process integration on operational performance in case of Choice Flour Factory", submitted in partial fulfillment of the requirements for the degree of Master of Arts in logistics and supply chain management, Bahir Dar University, is a record of original work carried out by me and has never been submitted to this or any other institution to get any other degree or certificates. The assistance and help I received during the course of this investigation have been duly acknowledged.

Abraraw Zemene   _____   _____

Signature   Date

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Acronyms

EDI- Electronic data interchange

NPD- New product development

NPT- Network perspective theory

NT-Network theory

PAT- Principal agent theory

RBV- Resource based view

SC- Supply chain

SCI- Supply chain integration

SCM- Supply chain management

SPSS- Statistical package for social science

TC- Transaction cost

TCA- Transaction cost analysis

TPL- Third party logistics

Abstract

Supply chain process integration is very important to enhance the various aspects of operational performance. The main target of the study was to investigate the effects of Supply chain process integration on operational performance in Choice Flour Factory. Successful supply chain process integration offers competitive advantage to firms operating in a wide range of industries. Explanatory research design and census methods were employed in the study. A questionnaire was used as a research tool for collecting data. In order to analyze, interpret and present the data captured via questionnaire, Statistical Package for the Social Sciences (SPSS) version 23 was used. The collected data was analyzed using both descriptive statistics (mean & standard deviation) and inferential statistics (correlation and multiple linear regressions). Main findings of the study depicts that, there is good supply chain process integration dimension as the mean values of the (information integration, supplier integration, customer integration and internal integration) were above the minimum requirement (i.e. greater than the mean value of 2.5). From the finding of supply chain process integration variables which are used to measure operational performance, customer integration and internal integration were correlated with operational performance. Moreover, customer integration and internal integration the dimensions of supply chain process integration had a significant effect on operational performance of the factory in which information integration and supplier integration dimensions had failed to signify the effect on operational performance.

Keywords: supplier integration, information integration, customer integration and internal integration

CHAPTER ONE

INTRODUCTION

The introduction section of this study consists of background of the study, statement of the problem, objectives of the study, hypothesis of the study, significance of the study, delimitation of the study, definitions operational of terms and organization of the study.

1.1. Background of the Study

According to Notteboom & Rodrigue (2008) supply chain is a critical concept in manufacturing sector for effective management of businesses involved in the ultimate provision of product and service packages required by end customers. In the manufacturing sector, the methods and practices faces have being challenges in competitive pressure, the volatility of demand and dynamic globalization of business have changed over the years. These changes have impacted on manufacturing organizations significantly. Areas affected include the nature of manufacturing organizations' market offers, their products and services, their methods of manufacture and delivery, their assets and technologies employed. Adoption of supply chain process integration is a critical element to manage these changes and help to organizations improve customer service, market offers their products and services, flexibility and delivery speed from supplier to end customers (Stevens, 2016).

In the recent years, supply chain process integration is the point that strategically coordinates producers with wholesaler, retailer and customers, coordinates and manages inside and outside of organizational process (Wang et al., 2018). Effectively manage supply chain process integration has significantly contribute to necessary information sharing, more rapidly the required customer needs and to minimize the receipts of customer order to delivery among business competitors (Sezen, 2008).

Lee (2000) recommended that fully-integrated supply chain process make value preposition for the stakeholders by reducing costs and raising market share. The importance of supply chain process integration, in the last studies have examined different topics to understand the work of supply chain integration along with the factors that enhances it, and the cost of achieving it. Researchers that followed Frohlich and Westbrook's (2001) concept of full integration have studied supply chain process integration through different dimensions like strategic integration, relationship integration, internal integration, external integration and

information integration. However other studies categorized supply chain integration into internal and external integration (e.g. Gimenez & Ventura 2005; Sanders, 2007), the other studies view that divided external integration in the perspective of customer and supplier (Devaraj et al.2007; Flynn et al.2010; Zhao et al., 2015). According to Flynn et al. (2010) recognized the link between SC integration (external and internal integration) and their connections on performance.

According to Davis & Fitzgerald (2002) supply chain process integration is the network of adding value based on the idea of internet based linked processes, obvious, relevant, timely and correct information, universal goals and assessment measures of those goals and collective decision making (Davis &Fitzgerald, 2002). Based on the available supply chain integration literature, extant studies primarily focused on wholesaler and retailer trading enterprise business in different countries. However, there is evident paucity of research on the flour manufacturing industry (Biniyam, 2016). Moreover, in Ethiopia, very limited research had been conducted thus far in supply chain process integration, that exploring flour manufacturing industry is particularly scarce. According to Ellinger et al. (2006) investigated barriers to effectively implementing supply chain process integration in a manufacturing industry: these are; insufficient knowledge of functional units, poor communication, poor working relationship, misaligned goals and objectives, lack of direction from top management and lack of trust. Bahir Dar Choice flour factory is a medium sized factory in Bahir Dar, Ethiopia, but currently its production system has problems related to lack of alignment among departments, problem of reordering based on the need of market due to lack of coordination with demand forecasting which leads to backlog delay, lack of integrated information system and as well as absence of uniform framework that governs the production system in the factory 12 February 2018 (Choice Flour Factory annual report, 2018).

Given the above shortcomings, it is vitally important to examine the effect of supply chain process integration for improving operational performance of Choice Flour Factory and identify the key elements on which a modern supply chain process integration framework can be built in the future. Consequently thisstudy aims to identify the effect of supply chain process integration on operational performance in Choice Flour factory at Bahir Dar city.

1.2. Statement of the Problem

The aim of supply chain process integration is to build effectiveness and accuracy in overall operations of company and make more efficient product, information and cash flow from suppliers to end users (Sammuel & Kashif, 2013). In recent year's interest in supply chain integration has been sensitive as firms seek to establish a competitive advantage in a competitive dynamic market place. Evidence from the literature suggests that more integration is better than less integration (Kannan et al., 2009). Mapes and Armistead cited in Narashiman & Jayaram (1998) claims that, the most admired and feared competitors are companies that link their customers and suppliers into tightly integrated networks. Moreover, the important of supply chain integration has been widely discussed and supported on empirical bases: many studies also accepted that the higher the level of integration, the higher the operational and business performance of the firm (Frohlich & Westbrook, 2001; Raffaeila et al., 2006). With the development of information and communication technologies: supply chain integration has been considered a strategic tool for firms to enhance their competitiveness. The supply chain integration within processes and between organizations has improved value creation. According to Mentzer et al. (2001) supply chain integration is a process of a collaborative effort in linking functions and supply chain networks in terms of process, information and physical flows. Hence, coordination and collaboration in linking business process become the key components of supply chain process integration which is the focal point of any business. Supply chain process integration is important for achieving operational performance (Frohlich & Westbrook, 2001). There is direct effect between supply chain process integration and operational performance (Koufteros et al. 2005; Gimenez, 2003). Associated with integration approach it is the intra and inter-businesses processes in order to optimize the whole. As illustrated by companies such as Hewlett-Packard, Wal-Mart and Georgia-Pacific Corp, an effective supply chain network can competitively outperform the standalone model (Lummus & Alber, 2007). This superior performance manifests itself as performance advantages on aspects such as supply chain lead time, delivery reliability, ability to respond to customer demand changes, cost and inventory levels (Shin et al., 2000). Supply chain management is a multi-faceted concept that, in the broad sense SCM covers all aspects of a supply chain's activities from tier 'n' supplier to tier 'm' customer and includes all of the intra-business and

inter-business processes that are linked with the flow of products and orders from raw materials to final consumer (Lummus & Vokurka, 1999).

According to Sammuel & Kashif (2013) in global competitive business environment manufacturers stay on the global market, it's difficult because of more intensive global competition challenges. Thus the challenges are more serious in developing countries like Ethiopia because, lack of information technology, lack of information sharing, lack of trust, demand distortion-bullwhip, system incompatibility, lack of knowledge, cost of integration. Because of these challenges the needs of supply chain process integration more initiated in manufacturing industry. According to Ellinger et al. (2006) investigated barriers to effectively implementing supply chain process integration in a manufacturing industry: these are; insufficient knowledge of functional units, poor communication, poor working relationship, misaligned goals and objectives, lack of direction from top management and lack of trust.

Bahir Dar Choice flour factory is a medium sized factory in Bahir Dar, Ethiopia, but currently its production system has problems related to lack of alignment among departments, problem of reordering based on the need of market due to lack of coordination with demand forecasting which leads to backlog delay, lack of integrated information system and as well as absence of uniform framework that governs the production system in the factory 12 February 2018 (Choice Flour Factory annual report, 2018). However based on so, many logistics and supply chain management literatures, some empirical evidence dealing with aspects of supply chain process integration in flour factory. Previous researches on supply chain management done in our country, focus on downstream supply chain integration in brewery industry the case of BGI Ethiopia's product (Mulugeta, 2018), internal supply chain performance analysis of Ethio telecom (Afera ,2014). The impacts of supply chain management practice on performance of pharmacy and governmental health facility (Addis, 2015). An assessment of supply chain management practices and its challenges on competitiveness: the case of Mugher cement factory (Yohannes, 2014). Previous studies has been conduct comprehensive concept of the subject including subcontracting, holding and safety stock, just in time supply, supplier partnership, managing environmental issues and information communication. Therefore the study differs from previous studies the compressive concept of the subjects including supplier integration, information integration, customer integration and internal integration. So the previous studies have not focus on supply chain process integration on operational

performance in Choice Flour Factory. Therefore the study was fill the knowledge gap through examine the effect of supply chain process integration on operational performance of Choice Flour Factory in Bahir Dar city.

1.3. Objectives of the Study

1.3.1. General Objective of the Study

To investigate, the effect of supply chain process integration on operational performance in the case of Choice Flour Factory in Bahir Dar city.

1.3.2. Specific Objectives of the Study

1. To investigate the effect of supplier integration on operational performance
2. To determine the effect of information integration on operational performance
3. To examine the effect of customer integration on operational performance
4. To investigate the effect of internal integration on operational performance

1.4. Hypotheses of the Study

H.1 Supplier integration has a positive and significant effect on operational performance in Choice Flour Factory

H.2 Information integration has a positive and significant effect on operational performance in Choice Flour Factory

H.3 Customer integration has a positive and significant effect on operational performance in Choice Flour Factory

H.4 Internal integration has a positive and significant effect on operational performance in Choice Flour Factory

1.5. Significance of the Study

The findings of this study will help management in manufacturing firms to understand the role that supply chain process integration plays in the operational performance. By understanding supply chain process integration, they will be able to effectively implement it for solving the challenges they face through flexibility, lead time and delivery performance for enhancing operational performance. In the academic world, the study will be added to the body of knowledge for future generations and stimulate ideas for further research in different fields. Academicians and researchers will be used the findings of this study for further research in the field of supply chain process integration especially in determining the effect of supply chain process integration on operational performance in different manufacturing firms. And the

benefit of the study to the researcher is to gain depth knowledge about the importance and effect of supply chain process integration on operational performance. The key policy makers within the government can also use the findings of this study to set policies that encourage adoption of supply chain process integration not only Bahir Dar Choice flour factory but also in other manufacturing firm.

1.6. Delimitation of the Study

The geographical scope of the study was focused on Choice flour factory in Bahir Dar city. The study focused on only Bahir Dar Choice Flour Factory because the study of all Ethiopian flour factory is located in deferent area one flour factory is far from the other flour factory so the study was not cover all area of each flour factories because its constraint of cost, time and consumed large amount of effort so its selected one flour factory located in Bahir Dar city. The conceptual scope of the study was delimited to supply chain process integration on operational performance. The subject scope of supply chain process integration of the study was also delimited towards internal integration, supplier integration information integration and customer integration also with in operational performance of the company delimited in to flexibility, lead time and delivery performance. The methodological scope the study was used correlation and regression method of analysis and the target population of the study were covering all employees of the choice flour factory.

1.7. Definition of Operational Terms

Supply chain Management: The organization of upstream and downstream relationships with suppliers and customers in order to deliver better customer value with a cheap cost to the supply chain as a whole (Christopher, 2011).

Integration: is a process of re-identifying and connecting an entire parts in order to form a new one (Award & Nassar, 2010).

Supply chain process Integration: The close internal and external coordination across the supply chain operations and process under the shared vision and value amongst the participating members (Lu, 2011).

Firm performance: Is the concept of how successful an organization is in achieving the Outcomes the organization intends to produce (Field, 2004).

Flexibility: means the ability to adapt to the changing environment or new requirements Slack et.al, (2010) that means supply chain process integration is implemented in the organization to

improve operational performance. Flexibility as the ability of organization to adapt to fluctuation in demand in term of product or service specification, volume, and on-time delivery.

Delivery performance: means an indication of how successful the supply chain is at providing products and services to the customer. This metric is most important in supply chain management as it integrates the measurement of performance right from supplier end to the customer end (Ellinger, 2000).

Lead Time: is the amount of time between process start and completion. For our customers lead time is the time between a definite customer order and its scheduled pick up or delivery based on our terms and conditions (Follett, 2013).

Information integration: is merging of information from heterogeneous source with differing conceptual, contextual and typographical representation (Woods, 2016).

Supplier integration: integration back down to the suppliers represents a change in attitude conflict to cooperation starting with new product development, supply of high quality products, process and specification in given period of time (Baharanchi, 2009).

Internal integration: it represents the integration of all internal function from material management to sale and distribution (Baharanchi, 2009).

Customer integration: the firm will penetrate deep into the customer organization to understand the product, culture, market and organization so that it can respond rapidly to the customer's needs and requirements (Baharanchi, 2009).

1.8. Organization of the Study

The study structured into five chapters. Each chapter has its own subunits. The first chapter outline introduction part is consists of background of the study, statement of the problem, objectives of the study, hypothesis of the study, significance of the study, delimitation of the study, definitions of operational terms and organization of the study. The second chapter deals with review of related literature it includes; theoretical literature review, empirical literature review, conceptual framework of the study and literature gap. The third chapter includes: research design, the research approach, research paradigm, target population and, sampling method, sample size, data sources and collection techniques, reliability and validity of instruments, research ethics and methods of data analysis and interpretation. Chapter four deals data presentation; analysis and interpretation it consists descriptive analysis, correlation

analysis, regression analysis of the research and discussion of major findings. Finally, the fifth chapter deals with the summary, conclusions, recommendations and limitation of the study and recommendations for further research.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1. Introduction

This section includes overview of supply chain management, theoretical review of the study, empirical review of the study and conceptual framework of the study with detail description.

2.2. Overview of Supply Chain Management

The word supply chain management arose in the late 1980's and came into well-known use in the 1990's.Proceeding to that time, businesses used terms such as "logistics" and "operation management" instead. Some of the definitions of a supply chain management are offered below.

Supply chain management (SCM) is the integration in the flow and transformation of goods from raw materials stage (extraction) through to the end user, as well as the associated information flows. The supply chain includes the management of information systems, sourcing and procurement, production scheduling, order processing, inventory management, warehousing, customer service and aftermarket disposition of packaging and materials (Handfeild & Nichols, 2002). Supply Chain is a linkage of various organizations and the chain comprises vendors that supply raw materials, producers who convert the raw material into finished product, warehouses that store products, distributors that deliver products to retailers and retailers who deliver products to the ultimate consumer through upstream and downstream linkages in different kinds of activities and processes (Christopher, 1998). Meanwhile, according to Stadler (2005) summarized various definitions of SCM given by different authors as, an activity of linking different units of organizations along a SC and coordinating materials, financial and information flows in order to fulfill customer demands with the objective of boosting competitiveness of the supply chain of an organization as a whole. The basic elements of Supply Chain and its management from these definitions are the upstream parties, the downstream parties and the integration of all the organizations involved, in line with the internal function of an organization itself. The upstream parties consists of an organization's functions, processes and network of suppliers while the downstream function on the other hand concerns the distribution channels, processes and functions where the product passes through to the end customer (Handfield & Nichols ,2002).According to external downstream and upstream functions, the managers that are involved in each upstream

and downstream supplier and functions are responsible in the delivery of products and services as scheduled to their destinations. But if delays had happened, the managers have to ensure that the impact of the delays to the SC and the value it carries will be minimal. Managers in a Supply Chain which deals with external organizations have to give an emphasis to its own people, in this way mutual understanding between the managers of departments inside the company itself can be reached easily. However, the concept of Supply Chain Management has been used to explain the planning and the proper control of materials and the flow of information including the practice of logistics activities both internally within the organization and externally among organizations (Cooper, 1997).The existence of large number of players and forces within the organization and outside the organization results to create a well-developed and designed Supply Chain that is integrated through a supply network management system.

2.3. Theoretical Review

The theoretical review this study organized based on five theories of supply chain management namely; the principal-agent theory, transaction cost analysis theory, the network theory, and resource based view theory and system theory. The reasons for the researcher choose these five supply chain management theories: these theories are relevant for the study to limit the scope of the relevant data by focusing on specific variables and defining the specific viewpoint (framework) that the researcher will take in analyzing and understand the data to be gathered, understanding concepts and constructs according to the given definitions, and building knowledge by confirming or challenging theoretical statement.

2.3.1. Principal-Agent Theory (PAT)

The theory is based on the separation of ownership and control of economic activities between the agent and the principal. This theory mainly expressed three characteristics that behave by the agent, asymmetric information, moral hazard and adverse relationship. Asymmetric information also known as information failure occurs when one party to an economic transaction possesses greater material knowledge than the other party. This typically manifests when the seller of a good or service possesses greater knowledge than the buyer. However the reverse dynamics is also possible almost all economic transaction involves information asymmetries (Mas-Colell et al., 1995). Moral hazards occur when insured parties engage in activities that increase their chance of being victimized by the risk against which they are

insured. In other words, moral hazard refers to the tendency of people with insurance to change their behavior in a way that increases claims against the insurance company. The principal-agent problem in moral hazard stems from the inability of the principal to directly monitor the actions taken by the agent (Kuperman 2008). Along with moral hazard, economists point to a second common type of principal-agent problem known as adverse selection (Kreps, 1990). Whereas moral hazards stem from asymmetric information while a contract is in effect, adverse selection is the result of asymmetric information prior to entering into a contract. Here uncertainty stems not from hidden action, but instead from a lack of information about the agent's preferences over outcomes. There are different agency problems that arise due to, difference in terms of information between the principal and the agent, conflicting objectives, differences in risk aversion, outcome uncertainty, behavior based on self-interest, and bounded rationality. The relationship between the principal and the agent is governed by the binding contract between the two parties, and the aim of the theory is to design a contract that can reduce potential agency problems. A contract that had the right mix of behavioral and outcome-based incentives which motivate the agent to act according to the interests of the principal is considered as the "most efficient contract". In supply chain management the issue of alignment of incentives is an important aspect. Mostly the concept of misalignment emanates from hidden actions or hidden information. However, in order to reduce misalignment it is substantial to create contracts with supply chain partners that balance rewards and penalties (Ensermu, 2015). Contracts are used as authority and managing instrument whilst incentives are provided for meeting the least expected standards of the law. This theory ailing incentive mechanism, investment in relationship –specific asset, outcome and behavior management techniques etc between the parties for sharing risk which can lesson goal incongruity, bullwhip effect and reduce the opportunistic behavior (Min et al. 2008 & Narayanan, 2004). This theory plays its own role on supply chain process integration by reducing misalignment and conflict objectives among the member of supply chain partners.

2.3.2. Transaction Cost Analysis (TCA)

The analysis provides a normative economic approach which determines the boundaries of a firm and can be used to present efficiency as motives for entering inter organizational arrangements (Williamson, 1996).An organization may minimize its total transaction costs by cooperating with external partners. From SCM context, this question is addressed as: what are

the activities that should be performed within the boundary of each firm, and what are the activities that should be outsourced? The relationships of SCM are represented by the hybrid mode of governance between markets and hierarchies. The most influential attribute of the transaction is asset specificity (Ensermu, 2015). Transaction costs can be influenced by behavioral assumptions of bounded rationality and the risk of exposure to opportunistic behavior from a partner. Bounded rationality may arise from lack of sufficient information, limits in management perception or limitation of capacity to process information. There are different Mechanisms to reduce the risk of opportunism which include safeguards and credible commitments such as long-term contracts, penalty clauses if a partner fails to fulfill the contract, equity sharing, and joint investments. According to Williamson (1996), trust among parties should have to be based on "calculated risk" and not on simple personal trust between individuals. In supply chains the analysis of transaction cost has been used widely in make-or-buy decisions. For instance outsourcing of logistics activities (Halldorsson, 2002) buyer supplier relationships and restructuring of supply chains (Croom, 2001).Transaction cost analysis provides a frame work to understand the supply chain as core of this theory is making or buying (outsource) alternatives. Supply chain process integration i.e. building a long term relationships with the suppliers which as a result helps the firm in reducing the cost associated in market decision (Mikkola, 2003).

2.3.3. Network Perspective Theory (NPT)

The performance of an organization depends both on how efficiently it cooperates with its direct partners, and on how well these partners cooperate with their own business partners. The theory is used to provide a basis for the analysis of concepts of reciprocity in cooperative relationships (Croom, 2001). Here, the continuous interaction of an organization with other players becomes an important factor in the development of new resources and the interaction combine the resources of two organizations to achieve more advantages than through individual efforts. Such a combination can be viewed as a quasi-organization (Halldorsson, 2002). The value of a given resource is based on its combination with other resources, which is the basic reason for inter-organizational ties and makes more important than possessing resources. Thus, the structure of the supply chain is determined by the resource structure of an organization and becomes its motivating force. The basic contribution of network theory is to provide an understanding on the dynamics of inter-organizational relations by emphasizing the

importance of "personal chemistry" between the parties, through building-up of trust based on positive long-term cooperative relations and the mutual adaptation of routines and systems through exchange processes. Through direct contact, the relationships pass on a sense of uniqueness, finally the result in supply chains as customization to meet individual customer requirements. The parties progressively build up common trust through the social exchange processes. A network does not need an optimal equilibrium; rather it is in a constant state of movement and change. Links between firms in a system to develop in two separate way, but closely related types of interaction: exchange processes (information, supplies and services, and social processes) and adjustment processes (individual, scientific, legal, logistics, and managerial elements) (Ensermu, 2015). Network theory collectively helps in forming a collaborative relationship in a supply chain which consequently helps in plummeting opportunistic type behavior; improve trust deficit and better process development and competitive edge.

2.3.4. Resource Based View (RBV)

Only a few studies used the resource-based view to the field in focus in order to get the sources of competitive advantage through SCM or to analyze the structure of chains and industrial clusters. The RBV concerns with competitive advantages obtained through the possession of heterogeneous resources (financial, physical, human, technological, organizational, and reputational) and capabilities (combination of two or more resources) by an organization. These resources and capabilities hold the core competence of an organization and serves as source of competitive advantage. The static stream of research focuses on attributes that contribute to the heterogeneity of resources and capabilities. The main barriers that may prevent competitors from imitating a firm's resources and capabilities include: durability, transparency, transferability and replicability. The more dynamic aspects of the RBV consider a firm's core competence to be its ability to react quickly to situational changes and build further competencies (Miller & Ross, 2003). Hence, a firm's competitiveness is associated with the configuration of resources and capabilities as the markets evolve. However, inter-organizational relationships may also facilitate and advance the learning processes of individual firms. As such, relationships are not only output-oriented but also learning oriented. Efficiency may not only be explained in terms of productivity or operational measures, but also in terms of the opportunity to access another firm's core competencies

through cooperative arrangements as an option to building such competencies in-house (Ensermu,2015). The RBV is an implicit statement in many supply chain result. Often, outsourcing decisions are based on the idea of focusing on core competencies and outsourcing complementary competencies to external partners. TPL and outsourcing of standard components and processes to subcontractors are examples. However, outsourcing of design, New Product Development (NPD), or software development is often a way to gain access to other supply members" core competencies through inter-organizational collaboration. The TCA reflect on mix such as integrated supply chains as the result of a market collapse, whereas the NT and the RBV see the supply chains as a means to access assets and competencies outside the focal firm (Skjoett, 1999). Thus this perspective of resource based provides an insight in the context of supply chain that firms needs to understand their competitiveness is enhanced as they moved to the integrated supply chain process through coordination and sharing of the important information. This is because that the complimentary capabilities of both the firm and its partners are the real source to stay competitive. Thus this theory highlights the importance of exploitation of all types of resource which are either present inside or across the boundary of the organization through establishing and forming integration with all stakeholders.

2.3.5. System Theory

The theory described under this research can be categorized under system theory, as it is under the assumption of the totality of a system is greater than the sum of its part, which is the concept of holism. This links to the uniqueness of every system based on interaction and interdependence among components (Lai, 2008). The most general definition of system is the ordered composition of materials or mental elements in to a unified whole. The various fields of systems research concentrate on differing aspects or perspectives of the elements and systems (Lin, 2006).

The concept of system theory is introduced by Aristotle. Since Aristotle's claim that knowledge is derived from the understanding of the whole and not that the single parts (Aristotle's Holism), System theory is an interdisciplinary theory about every system in nature, in society and in many scientific domains as well as a framework with which we can investigate phenomena from a holistic approach (Cristina et al., 2019).

Most scholars attribute the idea of holism, central to system thinking, to the German philosopher Hegel who stated that the whole was greater than some of its parts. This idea that systems consist of a number of interconnected and unified parts, that once put together, make the behavior of the whole unlike and separate than the behavior of its individual parts. Holism asserts that we cannot understand the behavior of the whole by studying the behavior of its various components (Ansari, 2004). Therefore this theory has a direct effect on supply chain process integration by unified the whole members of supply chain partner for improving operational performance of the firm.

2.4. Empirical Review

2.4.1. Supplier Integration

It signifies the systematic process of linkage and interaction between company and suppliers to strengthen the effective flow of resources. The integration of suppliers leads to significant improvements in terms of cost and quality while delivering products to customers. Through the management of suppliers strategically it is possible to increase the company's competitive power in terms of flexibility, reliability, lead time and quality improvements (Otchere, Jonathan & Emanuel, 2013). A supply chain includes different stages involved, directly or indirectly, to satisfy customer requirements. The reflection of integration depends on the quality of collaboration among departments that is required to acquire unity of efforts by the interest of the environment. The touch point of supplier integration are many where a buyer's process integrates with their seller's process and provides solutions for each of those touch points and increases the value of both organizations when implemented. In the integration of supplier, a number of studies have found that, there is a positive association between supplier integration and operational performance (Petersen, Handfield & Ragatz, 2005; Devaraj , Krajewski & Wei, 2007). As for business performance, similar to customer integration, the few existing studies focusing on this aspect have not found a direct positive association between supplier integration and business performance or between integration intensity and business performance (Rosenzweig, Roth, & Dean, 2003). But, according to Evans (2013) has a different view on this aspect and illustrates, supplier integration and performance are positively and significantly related and it is an indication that enhancing supplier integration will lead to increased performance. Likewise ignoring supplier integration aspects can significantly affect the productivity of the industry. Supplier integration is a great linkage and

interaction between company and suppliers to build up the effective flow of resources. The integration of Suppliers leads to important role in terms of flexibility, profitability and delivering products to customers. During the management of suppliers tactically it is possible to raise the company's competitive power in terms of flexibility, reliability, cost and quality improvements (Emanuel, 2013). A number of studies show that, there is a positive effect between supplier integration and operational performance (Ragatz et al., 2002).Therefore, a positive effect of supplier integration on operational performance can be proposed.

Hypothesis 1: Supplier integration has a positive and significant effect on operational performance in Choice Flour Factory

2.4.2. Information Integration

Information integration refers to the free sharing of accurate and timely sharing of information across the members of the supply chain which is a key success factor for an organization. According to Lisa (1999), Supply chain management emphasizes on the flow of information and products along the members of supply chain in an organization and also encompasses; suppliers, customers, producers, and service providers that integrates together the acquisition, purchase, manufacture, assemble and distribute products from suppliers to the ultimate users. Proper information utilization will lead to greater coordination in the chain and a better coordination in the flow of information between partner's results to growing impacts on the timely delivery (speed), accuracy, quality of products. A critical emphasis on information technology without the interest of sharing information will not contribute to associate organizations together. Effective utilization of information technology has the potential to develop supply chain partners in order to perform together for better delivery of products to consumers. One of the main aspects of technology was to integrate the supply chain by using industry standards Electronic Data Interchange (EDI) to properly communicate key business documents. The critical emphasis is that EDI could not be used to automate poor business practices rather we streamline the business "handoffs" then use automation to drive the process. According to the study of Koçoglu, Salih, Hüseyin & Halit (2011) sharing of information across the chain is a key and critical component in achieving an integrated supply chain because it is believed that SCI increases collaboration, minimizes uncertainty, increases the speed of material flow, accelerate order fulfillment, reduction of inventory costs, increases the satisfaction of customer through reliable and fast delivery of products, improve

performance and increase operational effectiveness. While the technological aspect of information integration is significant, it is the frequency of the quantity and the quality of information that is shared that really matters (Dong et al., 2001).

According to the study of Koçoglu,Salih, Hüseyin & Halit (2011) successful information integration leads to better coordination in the chain and a better harmonization in the flow of information between partner's results to positive impacts on the timely delivery (speed), of the operational performance of the organization. Effective exploitation of information technology has the potential to develop supply chain process integration in order to perform for better delivery of products to end customers. Sharing of information across the chain is a key and vital component in achieving an integrated supply chain because supply chain process integration increases collaboration, minimizes uncertainty, increases the speed of material flow, accelerate delivery performance, of the company through reliable and fast delivery of products and improve operational performance of the organization (Lisa, 1999).Therefore, a positive effect of information integration on operational performance can be proposed.

Hypothesis 2: Information integration has a positive and significant effect on operational performance in Choice Flour Factory

2.4.3. Customer Integration

Customers' integration focuses on the cooperation and interaction between a given company and the customers, to ensure the effective flow of products or services to customers. Customers' integration involves sharing of customer's demand information, aiding manufacturers to understand customer's demand in a superior manner and expecting customer's demand as well as collaborating and cooperating with customers to design, to make 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). From the customer side of integration, different researches indicate that this aspect is directly and indirectly (Devaraj et al., 2007).However, associated with improved operational performance other, studies oppose the customer-facing to operational performance relationship (Swink, Narasimhan & Wang, 2007).Customer integration and performance in the manufacturing industry are positively related. This means that enhancing the degree to which the industry ensures better customer integration has a great role to improve the operational performance. Basics of customer integration deal with in the study such as computerization for

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simplicity of customer ordering and establishment of fast ordering system should be ensured for improved performance (Evans, 2013). Effective customer integration has important to a continuous growth and competitiveness in the market in terms of value creation (Storey et al. 2006; Reichhart & Holweg, 2002). Strategies of value-creation for example, creating a strong close relationship with customers results for structure of a working operational capability for the firm. One of the vital plots is that, relationship between organizations with its valued customer is a basic means to achieve competitive advantage and better operational performance.

From the conceptual views of the transaction cost theory, customer integration enables firms to decrease an opportunistic manner, to reduce production and transaction costs and to enhance their ability to obtain resources. Customer integration has a great role to improve operational performance of the company. According to Otchere et al. (2013) customer integration has a positive effect on flexibility, lead time and delivery performance. Therefore, a positive effect of customer integration on operational performance can be proposed.

Hypothesis 3: Customer integration has a positive and significant effect on operational performance in Choice Flour Factory

2.4.4. Internal Integration

Internal integration is described as the strategic system of cross functioning and a joint responsibility across various functions where collaboration will be made along product design, procurement, sales and distribution functions that will be undertaken to meet customer requirements at a lower possible cost (Follett, 2013). Organizations must have willingness to integrate capabilities through data, system and process internally before they engage in meaningful external integration. According to Flynn et al. (2010) explained internal integration, as a systematic way of creating inter-functional interaction, collaboration, coordination, communication and cooperation that takes functional areas together to create a cohesive organization. The great problem here is that, firms still practice the traditional information exchanges between the different functions such as telephone, letter, and verbal instructions. The inventory management policy was governed by high stock level for long period of time to control supply and demand uncertainty. In particular for import items some firms kept up to highest of one-year stock level. This practice has created economic constraints and storage problem. These challenges were true also for seasonal agricultural products such

food, wood, textile, and leather manufacturers also (Fasika, Klaus & Marcus, 2014). It requires the connection along different units in order to perform the activities of the organization in a better way and integration along the supply chain through sharing of information helps an organization to identify the needs of customers and to provide a timely response to the market. Furthermore, Gimenez & Ventura (2005)they argue that, companies with a weak strategy of internal integration will be unable to achieve high level of external integration and companies which implement the full strategy of internal integration encompasses the highest levels of external integration. The above reflection focuses on, internal integration has a great contribution for proper external integration and then internal integration can be done through proper coordination of each internal logistics function, the beginning of new technology, and uninterrupted performance run under formalized and centralized organizational structure. The effort of internal integration breaks the barriers of functional activities and paves a way to facilitate sharing of real-time information across key functions. Researches done previously, have found a positive relationship among internal integration and operational performance. For instance according to Stank, Daugherty & Ellinger (1999) found a positive association between frequent collaborative integration along marketing, logistics and firm performance.

Many literatures assured that, great roles of internal integration for achieving operational performance (Frohlich & Westbrook, 2001). According to Koufteros et al. (2005); Gimenez (2003) recognized there is a positive effect between internal integration and operational performance, it shows a positive effect of internal integration on, flexibility, lead time and delivery performance. Therefore, a positive effect of internal integration on operational performance can be proposed.

Hypothesis 4: Internal integration has a positive and significant effect on operational performance in Choice Flour Factory.

2.5. Operational Performance

The concept of operational performance has been emerged from supply chain strategy which derived from overall business strategy. A competitive strategy defined as "the set of customer needs that it seeks to satisfy through its products and services"(Chopra & Meindal, 2001). Each organization attempt to adopt different competitive strategy that fit to its strategy, then it seeks to afford the suitable capabilities and resources that help to achieve it. Gimenez, et al. (2011) studied flexibility, delivery performance and lead time as a performance measures.

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According to Vanichchinchai (2014) investigated firm's operational performance that composed of flexibility, delivery performance and responsiveness. According to Frohlich &Westbrook (2001);Yu et al. (2001)stated that eliminating non-added value activities, decreasing variance of orders and speeding product flows affect organizations performance. According to Wheelen & Hunger (2012)indicated that supplier network resources have a significant impact on firm's performance. According to Bowersox, et al. (2000) & Croxton, et al. (2001) said that the use of external linkage performance metrics leads to the creation of end customer value through integrating activities and communication with other member firms along the supply chain. According to Harrison & New (2002) pointed out the importance of operational performance metrics as a standard framework to assess operational performance which includes internal and external firm links. According to Vaidya & Hudnurkar (2012) presented the criteria of performance evaluation through cost, customer service, productivity, asset measurement, quality, time, innovativeness, price, flexibility / adaptability, ability to collaborate, supplier profile, and marketing measures. In this study operational performance was measured by the following dimensions: Flexibility, lead time (Speed), and delivery performance because they are considered the most common dimensions that were investigated between previous studies.

2.5.1. Flexibility

According to Sun et al. (2012) building the competitive strategy to be flexible requires the commitment toward certain actions and activities, among these are educating the employee for different tasks, motivate employee for flexible work schedules, working in teams, and enhancing communication in the organization. Rosenzweig et al. (2013) defined flexibility as" the ability of the firm to develop flexible operations in hypercompetitive environment to meet the frequent changes in volume, product mix and schedules occur". And also flexibility is the ability of organization to adapt to fluctuation in demand in term of product or service specification, volume, and on-time delivery. It was measured by specific items that reflect the ability of the organizations to overcome these fluctuations in demand.

2.5.2. Lead Time (Speed)

Building a strategy on the basis of reducing the time between customer demands until meeting these demands entails work on the following: forecasting demand system, coordination of work processes, and change organizational layout, and managing the transportation. Different

studies were defined time, lead time, and cycle time. Cycle time is the time between one completion jobs or tasks to another, i.e. from starting one process or task to start the same process or task again. Lead time is the time that is required from setting the order by customer to deliver the product or service (company and supplier) including manufacture, transportation, processing, warehousing, and delivering the product or service to the final customer. Gimenez, et al. (2011) defined the lead time as the time needed for the delivery of the products to the key buyer.

2.5.3. Delivery Performance

Delivery performance can be defined as delivery accuracy, delivery reliability or on-time delivery. On time delivery also referred to as delivery precision, is one of the most common order-to-delivery performance measurements (Forslund, Jonsson & Matsson, 2008). It determines if a perfect delivery has been achieved or not. The measurement is a driver for customer satisfaction and supply chain excellence (Gunasekaran, Patel & Tirtiroglu,2001). Delivery performance can be measured according to different dates, such as Delivery-to-request date and Delivery-to commit date (Stewart, 1997). The delivery performance deeply relies on the quality of the information exchanged across the distribution channels and the way the information is presented. To be able to achieve high delivery performance are location, delivery channel and vehicle scheduling important factors. To be able to improve delivery performance is a reduction of lead time important (Stewart, 1997).

2.6. Conceptual Framework of the Study

The study introduces a conceptual framework that intended to determine the effect of supply chain process integration on operational performance of Choice Flour Factory. In more detail, below the figure indicated that, the conceptual framework of the study examines causal relationships between independent variables and dependent variables

| **Independent variables** **Supply chain process integration** Supplier integration Information integration Customer integration Internal integration | → | **Dependent variables** **Operational performance** Flexibility Delivery performance Lead time |
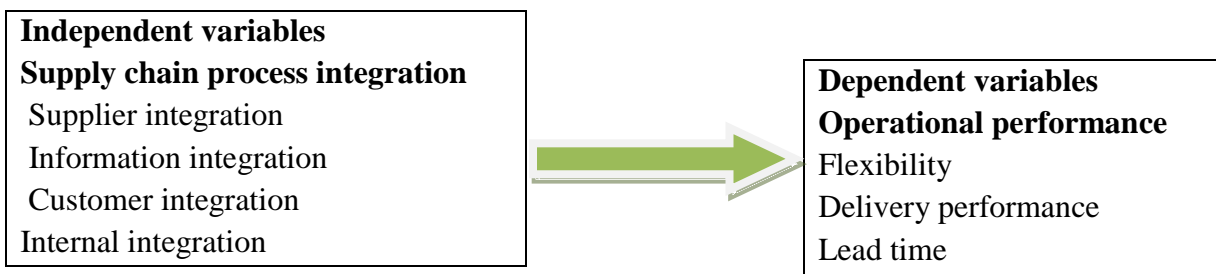
Source: researcher, (2020) by reviewing different literature

Figure2. 1Conceptual Framework of the Study

2.7. Gaps in Literature

There are several studies that have been conducted to analyses the effect of supply chain process integration for improving operational performance. Those studies mostly focused on supply chain integration for improving operational performance on wholesaler, retailer trading enterprise business and also studies mostly focus on upstream and downstream part of supply chain.The studies Mulugeta (2018), Addis(2015), Yohannes (2014) had been conduct comprehensive concept of the subjects including subcontracting, holding and safety stock; just in time supply, supplier partnership, managing environmental issues and information communication and those studies the methodology used both qualitative and quantitative data analysis. While this study differs from those studies that, the compressive concept of the subjects including supplier integration, information integration, customer integration and internal integration. And in this study, the method that used to analyze data was only quantitative data and primary data sources. Therefore the study fills this knowledge gap of supply chain process integration on operational performance of Choice Flour Factory in Bahir Dar City.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1. Introduction

Research methodology concentrates around the problems to be investigated in a research study and differs from according to the problems investigated. It is important to have consistency between research hypothesis, the research methodology and theoretical approaches. Research strategy is one of the components of research methodology. Research strategy provides overall direction of the research including the process by which the research is conducted (Churchill & Sanders, 2007).The different components of the research methodology was used in the study are discussed below.

3.2. Research Paradigm

Research paradigms assist a researcher to establish the type of methodology suitable for the study. Therefore, a selection of paradigm has consequences on the selection of research methodology. A paradigm is "the progress of scientific practice based on people's philosophies and assumptions about the world and the nature of knowledge" (Collis & Hussey, 2013). A paradigm reflects people's primary assumptions concerning the world and the foundation of knowledge. Sarantakos (2000) argues that a paradigm is a set of propositions that explain how the world is perceived, contains a world view, and a way of breaking down the complexity of the real world.

3.2.1. Positivist Paradigm

Positivist paradigm is based on the assumption that: Social reality is independent of us and exists regardless of whether we are aware of it. According to positivist, laws provide the basis of explanation, permit the anticipation of phenomena, predict their occurrence, and therefore allow them to be controlled. Explanation consists of establishing causal relationships between the variables by establishing causal laws and linking them to a deductive or integrated theory (Collis & Hussey, 2013). In general, the positivist research aims: to explain social life, predict course of events and discover the laws of social life. According to Collis and Hussey (2013) provide the features of positivistic paradigm as follows: trends to produce quantitative data, uses large samples, concerned with hypothesis testing, data is highly specific and precise, the location is artificial, reliability is high, validity is low and generalizes from sample to

population. Positivism perceives social research in an instrumental way; research is a tool for studying social events and learning about them and their interconnections so that general causal laws can be discovered, explained and documented. Assumptions about the nature of physical and social reality (ontology), together with assumptions about what constitutes valid knowledge (epistemology), influence what are considered acceptable methods for obtaining knowledge (methodology) (Doolin, 1996). Positivist research is based on the assumption that there is a set of universal laws out there waiting to be discovered (Cavana et al., 2001). The advantage of positivist research is that it can identify the precise relationships between chosen variables. Using analytical techniques, the aim is to make generalizable statements applicable to real life situations (Chalmers, 1978). Therefore the study was used positivist research paradigm, because of positivist paradigm advocates the use of quantitative research methods as the bedrock for the researcher's ability to be precise in the description of the parameters and coefficients in the data that are gathered, analyzed and interpreted, so as to understand relationships embedded in the data analyzed.

3.3. Research Approach

A well starting of a research study means the study has half completed (Burney, 2008). Thus, it is important for the researcher to focus on the best approach to resolving any problems. According to Creswell (2017) divided research approach into three broad categories they are quantitative, qualitative and pragmatic approach. Quantitative research approach is generally related with the positivist/post positivist paradigm. It usually involves gathering and converting data into numerical form so that statistical calculations can be made and conclusions drawn (Saunders, 2012). According to Thornhill (2012) quantitative researchers will have one or more hypotheses. These are the questions that they want to address which include predictions about possible relationships between variables. Consequently, researchers have taken great care to eliminate their own presence, conduct or outlook touching the results. Quantitative approach is a means of testing objective theories by observing the association among variables. These variables, in turn, can be measure by instruments, so that numbered data can be analyzed using statistical procedures. It also frequently coverts into the use of statistical analysis to compose the interaction between what are known and what can be cultured by research. Thus, to interpret the data with quantitative strategy requires to accepting the relationships of among the variables by either descriptive or inferential statistics (Kothari,

2004). In this study the researcher used quantitative research approach to address the purpose of the study to examine the effect of supply chain process integration on operational performance. Quantitative research involves the collection of data so that information can be quantified and subjected to statistical treatment in order to help to alternate claims (Creswell, 2017) and this is consists with the positivist philosophy adopt for the study. According to Saunders et al. (2012) quantitative research approach is concerns with general to specific approach, moving from data to theory testing, this is a line the main approach of the study and what is adopt for the study. The quantitative researchers separate and define variables, these variables linked together from a hypothesis, usually begin for data collection, the collected data thereafter is used to test these hypothesis (Brannen, 2005; Saunders et al., 2012), and this is in line with explanatory research design was used in the study. Further, the characteristic of quantitative research is to test relationship between and causal effect of variables, which are measured numerically and using statistical technique in performing the analysis (Saunders et al., 2012). This is the case in the study; the effects of supply chain process integration on operational performance were examined by collecting numeric data and performing statistical analysis for the purpose of theory testing.

3.4. Research Design

According to Burns and Grove (2003) defined research design as "a blueprint for conducting a study with maximum control over factors that may interfere with the validity of the findings". Parahoo (1997) explains a research design as a map that describes how, when and where data are to be gathered and analyzed. Polit et al. (2001) define a research design as the researcher's overall for responding the research survey or to check the research hypothesis. According to purpose, research could be broadly divided into descrptive,exploratory and explanatory (Saunders, Lewis & Thornhill,2000).

Descrptive research studies are those studies which are concerned with describing the nature of particular individual, or of a group (Kothari, 2004). A descrptive researchis a study that seeks to portray an accurat profile of a person, events or situtations (Saunders, Lewis & Thornhill,2007). It involves formalizing the study with real stractures in order to better describe or present reality about a phenomenon as it is percived or as it is in reality.Explanatory research is conducted in order to identify the extent and nature of cause and-effect relationships (Griffin, 2012). Explanatory research can be conducted in order to

assess impacts of specific changes on existing norms, various processes etc. Explanatory studies focus on an analysis of a situation or a specific problem to explain the patterns of relationships between variables, i.e. between independent and dependent variables. Based on the above justification explanatory research was applied under these research because explanatory research is more suitable for the studies that examine cause and effect relationship by taking dependent and independent variable so as the objective of this study is to investigate the effect of supply chain process integration on operational performance and identify the extent and nature of cause-and-effect relationships. Interms of time horizon, research design can be cross sectional or longitidunal (Saunders et al.,2000). A cross-sectional study examines aparticular phenomena at a specific period of time (Saunders et al.,2007). So the study was used a cross sectional study design because to understand a problem or attitude at a given time the researcher was collected data at one a time.

3.5. Population and Sampling

Population is defined as the entire set of individuals or other entities to which study findings are to be generalized (Schutt, 2011). According to Mugenda (2003) defined population as a complete set of individuals, with common characteristics. It is a sum of gathering elements about which the study wishes to make some implications (Cooper& Schindler, 2008). The population of the study was the employees of the factory because important data was obtained from the employees who are worked in the factory. Currently the factory has 62 total employees includes security officers and janitorial employees of the factory were the target population of the study. Because all these employees have their own, role on the success of supply chain process integration on operational performance.

3.5.1. Sample Size

Sample size refers to the number of units or people that are chosen from which the researcher wish to gather information or data (Evans et al., 2013). The study population for this study was small in size (62); therefore the entire population was treated as the "sample" in order to achieve accuracy and reliability of data. The total numbers of target populations were below hundred. So according to central statics theorem if the total numbers of target population are below hundred censuses is more appropriate and there was no any sampling technique is deployed under these research (Hair, 2010).

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The study was used census method because the population is small and the data were collected from the entire population that have a particular set of characteristics involves collecting data from the entire population. The method has an advantage over sample in that the data obtained is more reliable and accurate.

3.6. Sources and Methods of Data Collection

In order to address the objectives and questionnaires established ahead, the study was used only primary data for data collection and related studies, books and different web sites for literature review and definitions. Structured questionnaire could be employed as a primary data gathering mechanism. Data was collected using self-administered close ended questionnaire from employees. Questionnaires which, was closed ended were prepared and distributed to employees of the factory. The questionnaires were distributed and collected by the researcher to facilitate the study in order to effectively gather pertinent information to the study. The primary data collection technique is close ended questionnaires i.e. for such questionnaires, the respondents was asked to indicate their level of agreement and disagreement using a five-point Likert scale (1 = strongly disagree 2= disagree, 3= neutral 4=agree and 5 = strongly agree) where higher values indicate stronger integration. Instruments measure the supply chain process integration and operational performance of the organization.

3.6.1. Data Collection Instruments

According to Saunders (2003) there are different types of data collection methods through which data can be collected. Some of the techniques used are observation, interviews & questionnaires. "Accordingly for this study a questionnaire was used to collect primary data". Structured questionnaires were distributed for the employees of the Factory. The questionnaire include statements under supply chain process integration and operational performance (1= strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree) and measuring using five point Likert scale.

3.7. Reliability and Validity Instruments

3.7.1. Research Reliability

Reliability refers to whether your data collection techniques and analytic procedures would reproduce consistent findings if they were repeated on another occasion or if they were replicated by another researcher (Mugenda, 2003).The researcher was used Cronbach alpha to test reliability. As cited by Zohrabi (2013) one of the main requirements of any research

process is the reliability of the data and findings. And reliability deals with the consistency, dependability and reliability of the results obtained from a piece of research.

Pilot study: Pilot studies are a vital part of survey-based research, as they are conducted prior to commencing the main study, allowing the researcher to test the data collection instrument on a group of respondents drawn from the same population as the individuals that would respond to the main survey. The main aim of pilot study is identifying problems in the questionnaire instructions or design. Thus, its findings indicate whether the respondents would have any difficulty in understanding the questionnaire due to ambiguous questions (Sekaran, 2003). Pilot study should replicate the main survey exactly, i.e., the respondents should be selected from the target population, yet not take part in the main study, and the same procedures and protocols that will be adopted in the data collection should be followed.

The main purpose of a pilot survey are:- testing the wording of the questionnaire, assessing the question sequencing, evaluating the questionnaire layout, gaining familiarity with the respondents, testing fieldwork arrangements (if required), training and evaluating fieldworkers (if required), estimating the response rate, estimating the interview or questionnaire completion time and testing the data analysis procedures (Ticehurst and Veal, 2000).

The pilot group size may range from 25 - 100 participants, depending on the target population that would be included in the main study (Cooper & Schindler, 2006).

For the purpose of the present study, based on the pilot study, 25 respondents from the factory, who were distributed questionnaires on April 30th, 2020. Twelve days were allocated for the data collection phase of the pilot study, the questionnaires that were returned by May 13th, 2020. During this period, all questionnaires were returned, which corresponded to the response rate of 100%. These questionnaires were subjected to reliability and validity tests, as well as some basic data analyses. Based on the results obtained, the researcher some minor changes were made to the questionnaire format, in order to improve the respondents' understanding. The pilot study data was analyzed through basic statistical methods using SPSS software version 23. Responses were analyzed in terms of their validity and relevance to the research objectives.

3.7.2. Research Validity

Validity determines whether the research truly measures that which it will be intended or to measures how truth full the research results is. In other words does the research instrument allows you to hit the bull's eyes of your research objective (Kazemian, 2015). On the other hand validity will be achieved by having objective questions including in the questionnaire. This will be achieved by pre testing of the instrument to be used to identify and change any ambiguous or offensive questions and techniques, Mugenda (2003), as cited by (Kiprop, 2015). In the study the researcher was addressed the research validity through, formulating objective questions, the review of literature and adopting instruments were used in previous study to measure how truth full the research results are and how the research instruments allow to hit the bull's eye ; of research objective.

Several types of validity tests that can be applied to assess the goodness of measures, including content validity, criterion-related validity, and construct validity (Sekaran, 2003).

Content validity, or face validity, assesses the correspondence between the individual items and the concept through, among other means, ratings by expert judges, and pre-tests (or pilot studies) with multiple sub-populations (Hair et al., 2006). Content validity can be determined by experts that use the questionnaire prior to the main study and point out any deficiencies that can be addressed. In line with this study, the questionnaire was rigorously tested by several academic experts, who confirmed its content validity. In this research, both expert judges and pre-tests strategies were employed. Thus, to test content validity (face validity) all the survey questions were first proofread by target population of the factory, whose feedback was used to validate survey content, wording, layout, and sequencing. This also helped estimate the approximate time required to complete the survey (Veal, 2005). This approach is often used, as responses in the pre-test can be evaluated by using item-to-total correlations or contribution to Cronbach's α (Churchill, 1979).

Construct validity pertains to how well the results obtained from the use of the measure fit the theories that served as a foundation for test design. In other words, construct validity verifies that the instrument reflects the theoretical understanding of the concept (Peter, 1981). Construct validity can be divided into convergent validity and discriminate validity. Convergent validity examines whether the measures of the same construct are highly correlated, while discriminate validity determines whether the measures of a construct are not

correlated too highly with other constructs (Sekaran, 2000). In other words, convergent validity indicates that items pertaining to a specific construct should converge, or have a high proportion of variance in common (Hair et al., 2006). In other words, it assesses the degree to which two measures of the same concept are correlated, with high correlation indicating that the measurement item is measuring its intended concept (Hair et al., 2010). Discriminate validity is also used to test construct validity, as this measure is characterized by discriminate validity when it has a low correlation with measures of dissimilar concepts (Zikmund et al., 2010). According to the pertinent literature, the most widely accepted forms of validity are convergent and discriminate validity (Peter, 1981). Construct validity can be established through correlation analysis (convergent and discriminate validity). Construct validity results of these tests are presented in Chapter four.

Criterion-related validity is synonymous with convergent validity (Zikmund et al., 2010), and is confirmed by calculating the relevant statistics. It is used to establish whether the measurement items pertain to the same construct or concept. In this study, in addition to all the aforementioned tests, the items included in the final version of the questionnaire were assessed via criterion-related validity, as was previously done in relevant literature sources presented above.

3.8. Research Ethics
According to Saunder and Thorn (2001) ethics refers to the appropriateness of your behavior in relation to the rights of those who became the subject of your work, or are affected by it. All the research participants included in this study will be appropriately informed about the purpose of the research and their willingness and consent is secured before the beginning of distributing questionnaire. Regarding the right to privacy of the respondents, the study maintains all participants has been briefed about the research and joined with their full consent, the confidentiality of the identity of each participant and the researcher will report the findings in complete honesty.

3.9. Method of Data Analysis and Interpretation
The study was used both correlation and regression analyses by using SPSS version 23. The research was analyzed through close ended questionnaires. In order to analyze the data, the two sets of Statistics were used: Descriptive statistics summarizes and describes quantitative information in the form of frequency distributions and measures of central tendency (mean and standard deviation), whereas inferential statistics was used to determine the effect of a set of

independent variables (supply chain process integration) on dependent variables (operational performance). The results were reported using tables and diagrams.

3.9.1. Regression Analysis

The researcher used multiple regression model to link the independent variables to the dependent variable. The following regression equation was used. $P = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + e$ Where: a= the P intercept, $b_1, b_2, b_3,$ and b_4, are regression coefficient of respective variables; e is the error term; x_1= supplier integration; x_2= information integration x_3= customer integration x_4= internal integration. By applying these statistical tools, the study was pointed up the current operational performance level of Choice Flour Factory from supply chain process integration perspectives.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1. Introduction

Under this chapter the analysis and interpretation were carried out based on the data collected through questionnaire from employees who work along the line of Choice flour factory. The data was analyzed using Statistical Package for Social Science (SPSS version.23).Based on the methodology of the research the data was collected from 62 respondents. From the total (62) questionnaire distributed all questionnaire were returned. Hence all (62) questionnaires were effectively used for analysis that shows the response rate of 100 percent. This is a best response rate based on Fowler (2002) a 75 percent response rate is considered adequate.

Data analysis, discussion and interpretation of the results are presented in the following Sub headings: presentation of demographic data and frequency of respondents, analysis of mean, analysis of correlation and regression coefficient.

4.2. Reliability Test

The internal consistency of the instrument was tested using reliability analysis. Chronbanch's coefficient alpha is an internal consistency estimator where the values exceed 0.60 (Hair, 1995).Therefore, this rule will be the guiding line to measure the internal consistency of data collection instrument to be used, i.e. Questionnaire.

The following table 4.1 shows the summery of reliabilities of all constraints Cronbanch's Alpha is used. According to George and Mallery (2003), Chronbanch's Alpha is an indicator of degree of internal consistency of scales. The higher the coefficient the higher degree of consistency denotes; >0.9-Excellent, >0.8-Good, >0.7-Acceptable, >0.6 Questionable, >0.5Poor, <0.5-Unacceptable. Therefore, as shown in the table 4.1 below, the result of the reliability test revealed that the items in the questionnaire exhibited Chronbanch's Alpha rate more than enough to be called consistent or acceptable and it discussed on the table 4.1 below.

Table4. 1Cronbach's alpha of Constructs

Construct	Items	Cronbach's	Internal Consistency
Supplier integration	4	0.725	Acceptable
Information integration	4	0.783	Acceptable
Customer integration	4	0.801	Good
Internal integration	4	0.782	Acceptable
Flexibility	4	0.807	Good
Lead time	4	0.808	Good
Delivery performance	4	0.871	Good
Average mean value		**0.796**	**Acceptable**

Source: Owen survey data, 2020

4.3. Descriptive Analysis

4.3.1. Demographic Data Presentation and Analysis

Observing the demographic trend or characteristics of the sample population before starting the data analysis is useful to make the analysis more meaningful for the reader. This part of the questionnaire requested limited amount of information related to personal and demographic status of respondents. The purpose of demographic analysis in this research is to describe the characteristics of the sample such as proportion of male and female in the sample, department of respondents, academic qualification of respondents and experience of respondents. Accordingly these variables are summarized and described in the tables 4.2 shown below.

Table 4. 2 Demographic Profile of Respondents

Variable		Frequency	Percent	Valid percent	Cumulative percent
Gender of Respondent	Male	34	54.8	54.8	54.8
	Female	28	45.2	45.2	100
	Total	62	100	100	
Department of respondent	Purchasing	4	6.5	6.5	6.5
	Finance	4	6.5	6.5	12.9
	Sales and Marketing	5	8.1	8.1	21.0
	Store operation	16	25.8	25.8	46.8
	Quality assurance	4	6.5	6.5	53.2
	Production	9	14.5	14.5	67.7
	Others	20	32.3	32.3	100
	Total	62	100	100	
Qualification of respondents	G-12	8	12.9	12.9	12.9
	Certificate	13	21.0	21.0	33.9
	Diploma	19	30.6	30.6	64.5
	First degree	21	33.9	33.9	98.4
	Masters and above	1	1.6	1.6	100

	Total	62	100	100	
Experience of respondents	<1 year	12	19.4	19.4	19.4
	1-5 year	33	53.2	53.2	72.6
	6-10 year	14	22.6	22.6	95.2
	>10 year	3	4.8	4.8	100
	Total	62	100	100	

Source: Own survey result, 2020

From table 4.2 depicts that the gender distribution of respondents in Choice flour factory covers 54.8% of male and 45.2% of female respectively. This implies that the gender distribution of Choice flour factory is dominated by male employees. The respondents were also asked to indicate the departments they had assigned while they are in Choice flour factory and the result implied that, the department of purchasing covers 6.5 percent and store operations 25.8 percent respectively. And also the department of finance counts 6.5 percent, sales and marketing 8.1 percent, quality assurance 6.5 percent, production 14.5 percent and others are 32.3 percent. Accordingly, the dep't of store operation and other department accommodate large number of employees who work under the line of choice flour factory. This implies that the number of store operation and other department employees of the factory are dominated. Concomitantly, the results of respondents associated with their educational background show that, 30.6 percent of the respondents have Diploma, 33.9 percent of the respondents are under Graduate, 12.9 percent are G-12, 21 percent are certificate, and 1.6 percent are post graduates. This indicates that the majority of respondents are first degree and diploma holders and also the number of certificate holders are considerable figure. This suggests that the respondents provide relevant and accurate information needed for the study on the effect of supply chain process integration on operational performance. Irrespective of the high educational levels of the respondents, the researcher finds it necessary to find the specific professional qualifications of the respondents in order to have a fair view of their capacity to comply with the current supply chain process integration on operational performance of the company.

Ultimately, the output in table 4.2 shows that, 19.4 percent of the respondents indicated that they had work experience of less than one year, 53.2 percent of the respondents indicated that they had work experience of 1 to 5 years while 22.6 percent of the respondents said they had experience of 6 to 10 years and also 4.8 percent of the respondents replied that they have worked for more than 10 years. The results indicates that majority of the respondents have an experience in work area between 1 to 5 years which is an indication that they understand the effect of supply chain process integration on operational performance because they had the chance to work in different areas in different positions where it paves a way to analyze the circumstances of different problems. The implication of the result is that most of the respondents are professionals which dominated the factory (1-5 years) and they are more cooperative and easily understand the questionnaire which is required to complete by them to provide information. The respondents are aware of the integration of supply chain within the factory and therefore they gave the correct and accurate information the researcher needed for the study.

4.3.2. Descriptive Analysis of Supply Chain Process Integration and Operational Performance

The mean or average is a measure of central tendency that offers a general picture of the data without unnecessarily covering one with each of the observations in the data set. The mean of respondents in each dimensions of supply chain process integration suggest that the average amount that each dimension has positive or negative response of respondents. In this case, the mean of each item together with their respective dimension overall mean/average mean was calculated in order to conclude the overall supply chain process integration of choice flour factory. According to Zelalem (2019) the means statistical values of the items were based on the 5 point Likert scale and will be illustrated through the following assumptions: if the mean (M) score is below 2.5 it implies that the respondents "disagree" with the statement, if the mean score is equal to 2.5 it indicates that the respondents prefer to stay "Neutral" and finally if the mean score is above 2.5 it implies that the respondents "agree" with the statement.

Accordingly, the mean scores have been computed for all the four supply chain process integration dimensions that includes supplier integration, information integration, customer integration and internal integration and also the dependent variable operational performance by equally weighting the mean scores of all the items under each dimension. The average

mean result of each supply chain process integration dimension together with their respective variables was separately presented, analyzed and interpreted as follows.

4.3.2.1. Supplier Integration

Supplier integration signifies the systematic process of linkage and interaction between company and suppliers to strengthen the effective flow of resources.

Table4. 3Mean Value of Supplier Integration

Items	N	Mean	Std. Deviation
Company has sharing of production plan with major suppliers	62	3.18	1.048
It established quick ordering system with major suppliers	62	2.98	.878
Company has strong strategic partnership with major suppliers	62	3.56	.985
company has stable procurement network with major suppliers	62	3.34	1.039
Valid N (list wise)	62		
Average mean value		3.27	

Source: Own survey (2020)

Table 4.3 illustrates responses to the item of supplier integration which shows their agreement on the issue of sharing of production plan with major suppliers, established quick ordering system with major suppliers, Company has strong strategic partnership with major suppliers and Company has stable procurement network with major suppliers. These items have mean and standard deviation score of (M=3.18, SD=1.048), (M=2.98, SD=0.878), (M=3.56,

SD=0.985) and (M=3.34, SD=1.039) respectively. As the results acquired from Choice flour factory indicated that, there is strong supplier integration with in the factory. The extent of sharing of production plan with major suppliers, Company has strong strategic partnership with major suppliers and company has stable procurement network with major suppliers the functions that were not neglected. However, the established quick ordering system with major suppliers is the variables that have given emphasis. This has an implication, that the factory has strong in terms of supplier integration and understand the supply chain process integration that can play a great role in enhancing factory operational performance. In today's business environment, companies are expected to perform in collaboration rather than competition where the integration among businesses plays a central role. Moreover, the results obtained depicts that supplier integration has a significant influence on operational performance of the factory which aligns with the finding of (Christina 2011& Petersen *et al.,* 2007).

4.3.2.2. Information Integration
Information integration indicates the free sharing of accurate and timely sharing of information across the members of the supply chain which is a key success factor for an organization.

Table4. 4Mean Value of Information Integration

Items	N	Mean	Std. Deviation
There is accurate information sharing within the members of SC	62	3.29	1.014
There is timely sharing of information across the members of the SC	62	3.26	1.100
company has strong coordination in the flow of information	62	3.06	1.006
company facilitate integration to the use of information technology	62	3.27	1.162
Valid N (list wise)	62		
Average mean value		3.22	

Source: Own survey result (2020)

Information integration is another core dimension of supply chain process integration. The preceding table 4.4 pinpoints the mean value of each item related to information integration

with its aggregate average. They show the agreement on timely sharing of information with members of supply chain, accurate information sharing within the members of supply chain, company has strong coordination in the flow of information among partners and company facilitate integration through use of information technology in the line of choice flour factory with a mean and standard deviation score of (M=3.26, SD=1.100), (M=3.29, SD=1.014), (M=3.06,SD=1.006)and (M=3.27,SD=1.162) respectively. This has an implication, that the factory has strong in terms of information integration and understand the supply chain process integration that can play a great role in enhancing factory operational performance.

4.3.2.3. Customer Integration

The third critical dimension of supply chain process integration is customer integration. Customers' integration involves sharing of customer's demand information, aiding manufacturers to understand customer's demand in a superior manner and expecting customer's demand as well as collaborating and cooperating with customers to design, to make products with better quality, lower costs and greater flexibility in response to customer's demand.

Table4. 5Mean Value of Customer Integration

Items	N	Mean	Std. Deviation
Company establishes quick ordering system with major customers.	62	3.61	0.912
Company has computerized system for major customers ordering	62	1.9	0.694
there is sharing of available inventory with major customers	62	3.69	1.095
There is regular follow up with major customers for feedback	62	3.56	1.196
Valid N (list wise)	62		
Average mean value		3.19	

Source: Own survey result, 2020

The table 4.5 depicts that the respondents shows absences of computerized system for major customers ordering that is given emphasis a mean and standard deviation score of (M=2.19, SD=0.694). consequently the existence of regular follow up with major customers for

feedback, sharing of available inventory with major customers and the establishment of quick ordering system with major customer that were not neglected with a mean and standard deviation score of (M=3.56, SD=1.196), (M=3.69, SD=1.095) and (M=3.61, SD=0.912) respectively. This has an implication that the factory has well in terms of customer integration and understand the supply chain process integration to enhance factory operational performance.

4.3.2.4. Internal Integration

Internal integration is described as the strategic system of cross functioning and a joint responsibility across various functions where collaboration will be made along product design, procurement, sales and distribution functions that will be undertaken to meet customer requirements at a lower possible cost.

Table4. 6Mean Value of Internal Integration

Items	N	Mean	Std. Deviation
company has better data integration among internal function	62	3.50	1.036
There is cross functional teams, working with each other	62	3.44	1.034
Company has formal interdepartmental meeting among internal functions	62	2.21	0.613
Company use cross functional teams in process improvement	62	3.42	1.139
Valid N (list wise)	62		
Average mean value		3.14	

Source: Own survey 2020

As per table 4.6 from the dimensions of supply chain process integration respondents their complain due to the absence of, formal interdepartmental meeting among internal functions with the mean score of (M=2.21, SD=0.613) and they shows their agreement on the issue of better data integration among internal functions, on Cross functional teams working with each other interactively and use of functional teams in process improvement on with mean score of (M=3.5 SD=1.036),(M=3.44,SD=1.034) and (M=3.42,SD=1.139) respectively. This has an inference that the factory has well in terms of internal integration and understand the supply

chain process integration that can play a great role in enhancing the factory's operational performance.

4.3.2.5. Operational Performance

It the concept of how successful an organization is in achieving the outcomes the organization intends to produce.

Table 4.7 Mean Value of Operational Performance

Items	N	Mean	Std. Deviation
Flexibility	62	3.54	.72
Lead time	62	3.31	.54212
Delivery performance	62	3.58	.67261
Valid N (list wise)	62		
Average mean values		3.47	

Source: Own survey result, 2020

As per table 4.7 from the dimensions of operational performance respondents agree on the issue of there is flexibility, lead time and delivery performance with mean score of (M=3.54, SD=0.72), (M=3.31, SD=0.54), (M=3.58, SD=0.67).This has an inference that the factory has well in terms of operational performance

4.4. Correlation Analysis

Under research investigations have expected to understand the concepts are means and standard deviations of the dependent and independent variables. So that needs to know how one variable is related to another which comes with the concept of correlation. Correlation is the relationship between two variables. So would like to see the nature, direction, and significance of the bivariate relationship of the variables used in the study. The Bivariate Correlations procedure computes the pair wise associations for a set of variables and displays the results in a matrix. It is useful for determining the strength and direction of the association between two scale and ordinal Bivariate Correlations. As noted above, a Pearson correlation matrix indicates the direction, strength, and significance of the bivariate relationships of all the variables in the study. According to Field (2005) correlation coefficient is a very useful means to summarize the relationship between two variables with a single number that falls between - 1 and +1.The general symbol for the correlation coefficient is "r". So, a perfect positive

relationship (r=+1.00) indicates a direct relationship and an "r" of -1.00 indicates a perfect negative relationship.

Hence, in this study Bivariate Pearson Coefficient (r) was used to examine the relationship between the four supply chain process integration dimensions by using a two-tailed test of statistical significance at the level of 95% significance, $P< 0.05$. Interpretation of correlation coefficient (r) size is as follows: if the correlation coefficient falls between 0.1 to 0.20, it is slight correlation or small; if it is between 0.20 to 0.40 is low correlation or weak relationship, if it lies between 0.40 to 0.70 moderate; if it falls along 0.70 to 0.90 high correlation or substantial relationship and if it is within 0.90 to 1.00 it is very high correlation or very strong correlation between variables (Burns, 2008).

Table 4.8 shows the correlation coefficient of the four variables measuring supply chain process integration which of supplier integration and information integration uncorrelated with operational performance of the factory within value of r= 0.034 and r=0.054 respectively. Because their p value is 0.390 and 0.331 are greater than alpha value (0.05). From the variables of customer integration has positive relation to operational performance at r=0.225 and p=0.009 and at the same time internal integration has a negative relation to the dependent variable with correlation score r=-0.517and p=0.00.

When we further look at into each variables with their coefficients which indicates the four independent variables: supplier integration (r=0.034), information integration (r=0.054), customer integration (r=0.225) and internal integration (r=-0.517). Some are important determinants of supply chain process integration and significant to show the association between supply chain process integration and operational performance. Regarding the relationship between independent variables, the below correlation table 4.8, depicts that two of the independent variables are correlated at $P<0.01$ and at $P<0.05$ level of significance.

Supplier integration has a negative relationship with information integration and it is not statistically significant with a confidence of 95 percent. This is displayed in the table 4.8 as (r=-0.146, p >0.05) which actually means there is no a true or significant correlation between the two variables. Supplier integration dimension shows no association with customer integration with the result of (r=0.107, p >0.05).Thirdly information integration and customer integration with the value of (r=0.175, p >0.01) are not correlated. There is also no a direct,

positive and significant association between information integration and internal integration (r=0.002, p >0.01).

Table 4. 8 Correlation of Independent Variables with Dependent Variables

		Operational performance	Supplier integration	Information integration	Customer integration	Internal integration
Operational performance	Pearson Correlation	1	.034	.054	.225*	-.517**
	Sig. (2-tailed)		.397	.338	.009	.000
	N	62	62	62	62	62
Supplier integration	Pearson Correlation		1	-.146	.107	.048
	Sig. (2-tailed)			.128	.203	.355
	N		62	62	62	62
Information integration	Pearson Correlation			1	.175	.002
	Sig. (2-tailed)				.086	.493
	N			62	62	62
Customer integration	Pearson Correlation				1	.039
	Sig. (2-tailed)					.383
	N				62	62
Internal integration	Pearson Correlation					1
	Sig. (2-tailed)					
	N					62

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

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

4.5. Regression Analysis

Regression analysis is a way of predicting an outcome variable from one predictor variable (simple regression) or several predictor variables (multiple regressions) (Andy field, 2009). The model of regression shows how much of the variance in the measure of supply chain process integration is illustrated by the underlying dimensions of predictors of supply chain model. If the VIF values of independent variables are beyond 10, then it is suggested that further investigation is required (Robert, 2006). So Multicollinearity is not the problem of this model, because VIF of the model approaches to 1.The value of VIF ranges between1.003 to 1.062. Tolerance value is an indication of the percentage of variance in the predictor that cannot be accounted for by the other predictors implying the fact that very small values indicate overlap or sharing of predictive power. The tolerance of the variables ranges between 0.942 and 0.997.

Table 4.9Multicollinearity Coefficients

	Collinearity Statistics	
Model	Tolerance	VIF
Supplier integration	.958	1.043
Information integration	.942	1.062
Customer integration	.950	1.053
Internal integration	.997	1.003

A Dependent Variable: Operational performance

Source: own survey result, 2020

Based on this table 4.9 it is possible to conclude that there is no multicollinearity effect and the inter relationships among independent variables doesn't cause concern. Therefore as the indication of statistics that multicollinearity is not the problem of the study.

Linearity Test of Independent Variables

Linearity defines the dependent variable as a linear function of the predictor (independent) variables (Darlington, 1968). According to Bedru & Seid (2005) the model should be linear in the parameters regardless of whether the explanatory and the dependent variables are linear or not. This is because the difficulty to estimate the parameters if they are non-liner and not

known their value given with data of both dependent and independent variable. Plot the standardized residuals against the standardized predicted values to check for linearity and equality of variances. So, the data distributed without any increment or decrement. This indicates there is linearity between the dependent and independent variables.
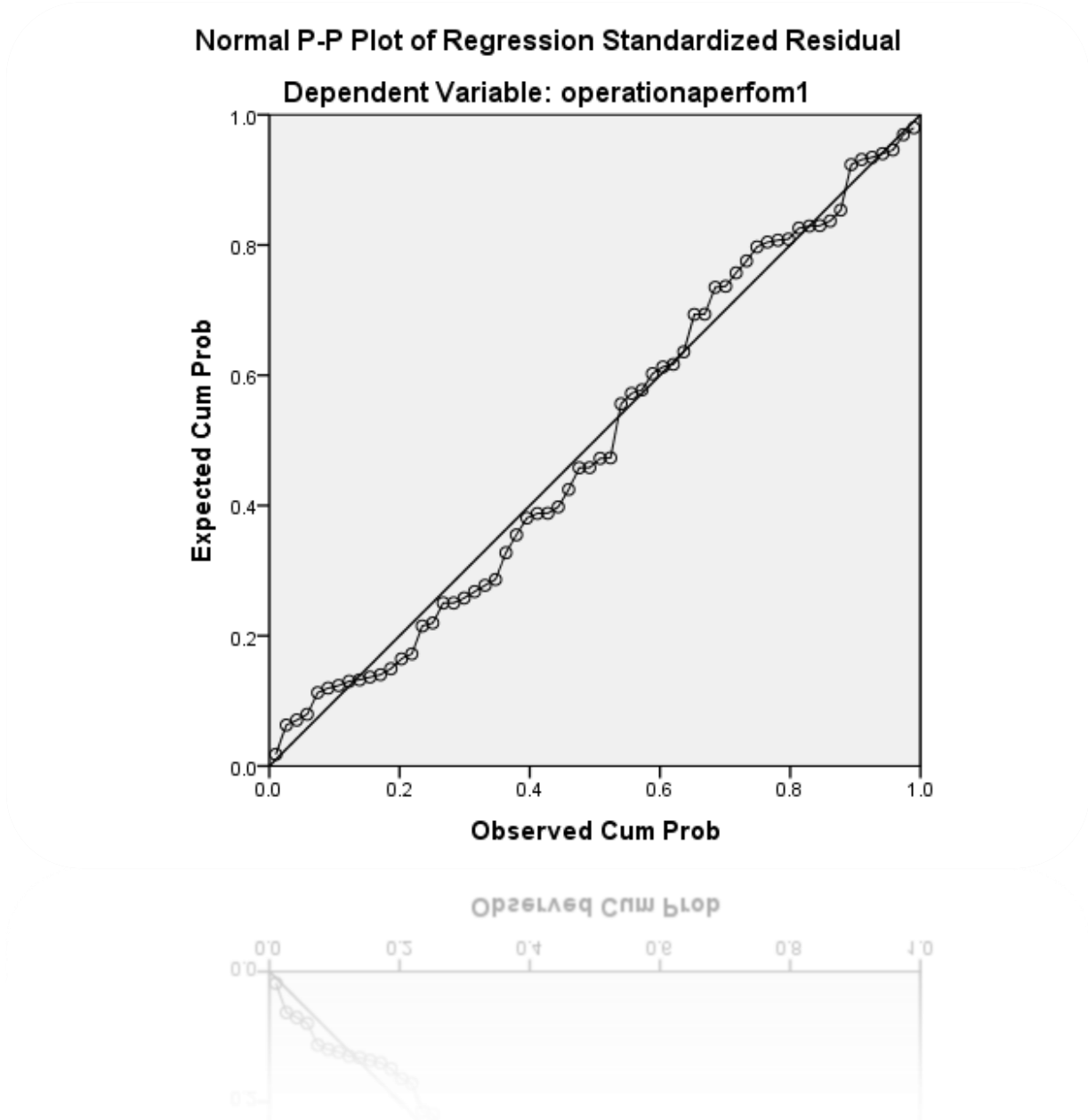
Figure4.1Tests of Linearity

Test of Homoscedastic of Independent Variables

According to Tabachnick & Fidell, (2013) homoscedastic assumption tells that the variance remains constant for all observations. For each value of the predictors the variance of the error term should be constant. But there are many situations in which this assumption may not hold. So, plot the standardized residuals against the standardized predicted values to check for linearity and equality of variances. For example, the variance of the error term may increase or decrease.
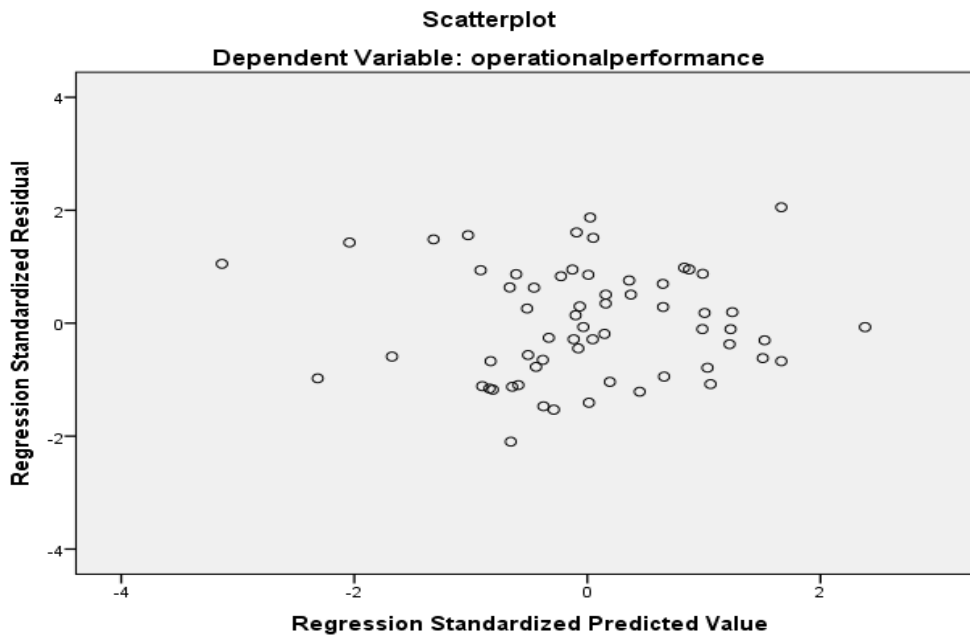
Figure 4.2Test of Homoscedastic

Based on the above figure 4.2, it can be concluded that there is no Hetroscedasticity problem the point distributes randomly and no increment or decrement behaviors

Table4. 10 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.8074[a]	.783	.762	.31145

A Predictors: (Constant), internal integration, information integration, supplier integration, customer integration.

The model summary displays the significance and percentage of variation in supply chain process integration which is caused by independent variables. Multiple correlations R of +0.8074 represent the combined correlation of all the independent variables. Adjusted R^2 tells us that 76.2% of the variation in operational performance can be explained by variation in the four independent variables taken together. This leaves 23.8% unexplained.

Table4. 11ANOVAa

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	10.462	4	2.616	6.996	.000[b]
Residual	21.310	57	.374		
Total	31.772	61			

a. Dependent Variable: operational performance

b. Predictors: (Constant), internal integration, supplier integration, customer integration, information integration

In the ANOVA table 4.11 we have the F value of 6.996 which is significant with p =000 which is less than 0.05. This informs that the some independent variables taken together as a set are significantly related to the dependent variable. In order to see the contribution of factors that affect supply chain process integration, regression analysis of operational performance were employed.

Table 4.12, provides the result of multiple regression analysis beta coefficient and significance.

Table4. 12Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
(Constant)	3.516	0.708		4.969	.000
Supplier integration	0.042	0.127	.037	.330	.743
Information integration	0.023	.134	.019	.171	.865
Customer integration	0.264	.124	.238	2.138	.037
Internal integration	-0.494	.102	-.529	-4.864	.000

a. Dependent Variable: operational performance

Source: Own survey result, 2020

The unstandardize beta value shows the number of standard deviations that the outcome will change as a result of one standard deviation change in predictor. The standard deviation units are directly comparable; therefore, they provide a better insight in to the importance of a predictor in the model. The large value of beta coefficient in an independent variable has the more important determinant in predicting the dependent variable. The unstandardize beta value for internal integration dimension is -0.494. This implies that, this variable has relatively negative degree of effect for analyzing the effect of supply chain process integration. Respectively, the unstandardized beta value for customer integration, supplier integration and information integration are 0.264, 0.042 and 0.023 respectively. Finally we have a model $Y = 3.516 + 0.042X1 + 0.023X2 + 0.264X3 - 0.494X4 + \varepsilon$

The coefficient table 4.12 depicts that the significant regression coefficients, such as internal integration and customer integration are significant at p=0.05.But, supplier integration and information integration is not significant. This significance level tells us that those variables uniquely contribute to the regression equation there by making a significant contribution to the prediction, but supplier integration and information integration don't contribute to the regression equation. Since, the two coefficients of predictor variables are internal integration and customer integration statistically significant effect on operational performance the null hypothesis related to these dimensions are rejected. Whereas supplier integration and information integration statistically are not significant and as a result null hypothesis related to this dimension is fail to reject.

4.6.Test of Hypothesis and Discussions of Major Findings

H0.Supplier integration has not a significant effect on the operational performance of choice flour factory.

H0: fail to reject   ß=0.042   p>0.05

The findings of the study pointed out that supplier integration, statistically has no significant effect on operational performance, since (Beta= 0.042, (P>0.05).But from the other studies finding supplier integration has significant effect on operational performance(Yang et al.2014;Evans, 2013) and also the studies, supplier integration has a significant effect on operational performance (Petersen & Handfield, 2002). In this study supplier integration has insignificant effect on operational performance when comparing with the results of previous studies that means supplier integration has actually well performed in the factory.

H0. Information integration has not a significant effect on the operational performance of choice flour factory.

H0: fail to reject   ß=0.023   p>0.05

The findings of the study pointed out that information integration, statistically has no significant effect on operational performance, since (Beta= 0.023, (P>0.05).But from the other studies finding information integration has significant effect on operational performance (Beta= 0.115, sig. 0 .002, p<0.05) (Zelalem Gebreyesus, 2019). In this study information integration has insignificant effect on operational performance when comparing with the results of previous studies that means information integration has actually well performed in the factory.

H0: Customer integration has not a significant effect on the operational performance of choice flour factory.

H0: Reject   ß=0.264   p<0.05

The findings of the study pointed out that customer integration, statistically has a positive and significant effect on operational performance, since (Beta= 0.264, (P<0.05). The finding of the study supported, by (Koufteros et al., 2005). And also customer integration has a positive and significant effect on flexibility, lead time and delivery performance(Otchere et al., 2013).Subsequently, it can result in better understanding of their supply chain process integration needs and improvement in overall customer satisfaction (Panayides & So, 2005).

H0: Internal integration has not a significant effect on the operational performance of choice flour factory.

H0: Reject   ß= -0.494   p<0.05

The findings of the study pointed out that internal integration, statistically has a significant effect on operational performance, since (Beta= -0.494, (P<0.05). The finding of the study supported, by (Zelalem Gebreyesus, 2019) with the value of (Beta= 0.468, sig. 0.00, p<0.05). And other empirical studies expressed more the need of internal integration; the absence of trust in internal integration could affect interactions and consequently, the successful implementation of supply chain process integration (Kwon & Suh, 2004).

Generally the results of the study pointed out that internal integration and customer integration are statistically a significant effect on operational performance whereas information integration and supplier integration are statistically has no significant effect on operational performance.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1. Introduction

This chapter presents, summary of findings, conclusions, recommendations, limitation of the study and areas for further research.

5.2. Summary of major Findings

The study objective was to examine the effect of supply chain process integration dimensions (information integration, customer integration, internal integration and supplier integration) and operational performance measurement (flexibility, delivery performance and lead times), aiming to identify the factory changes and strategies for improving the operational performance in Choice Flour Factory. In order to meet these objectives, a research framework was developed based on the following seven variables (constructs) obtained from extant literature and theory. The framework consists of four independent and three dependent variables (see Figure 2.1). The independent variables are: (1) information integration (based on PAT, TCA, NPT, RBV and ST), (2) customer integration (based on PAT, TCA, NPT, RBV and ST), (3) internal integration (based on PAT, TCA, NPT, RBV and ST), and (4) supplier integration (based on PAT, TCA, NPT, RBV and ST). The dependent variables consist of (1) flexibility (2) delivery performance and (3) lead time. These constructs were utilized in the development of the final model, which is analytically proven to provide the best fit to the data. This has been ascertained by developing multiple linear regression model that has been tested as a part of this research. In addition, the final model yielded results that were aligned with the theories underpinning this research. And the study to achieve these objectives, primary data was collected from the employees of the company and to analysis the data, quantitative approach was used. The results of the study are summarized as follows:

The analysis result depicts that; the first dimension of supply chain process integration is supplier integration the average mean score of 3.27. Therefore the result is under the category of agreement. So as the results indicated that, there is strong supplier integration with in the factory. The correlation result between, supplier integration and operational performance showed that there is no association with a Pearson coefficient of value of ($r=0.034$, $p >0.05$). Besides, to correlation the result of the study pointed out that supplier integration, statistically

has no significant effect on operational performance, since (Beta= 0.042, (P>0.05).But from the other studies finding supplier integration has significant effect on operational performance (Yang et al.2014; Evans, 2013).

The analysis result depicts that; the second dimension of supply chain process integration is information integration the average mean score of 3.22. Therefore the result is under the category of agreement so as the results indicated that, there is strong information integration with in the factory. The correlation result between, information integration and operational performance showed that there is no correlation with a Pearson coefficient of value of (r=0.054, p >0.05). Besides, to correlation the findings of hypothesis pointed out that information integration, statistically has no significant effect on operational performance, since (Beta= 0.023, (P>0.05).But from the other studies finding information integration has significant effect on operational performance (Beta= 0.115, sig. 0 .002, p<0.05) (Zelalem Gebreyesus, 2019).

The analysis result depicts that; the third dimension of supply chain process integration is customer integration the average mean score of 3.19. Therefore the result is under the category of agreement so as the results indicated that, there is strong customer integration with in the factory. But under each statements of this dimension, the respondents they show disagreement on the issue of company has computerized system for major customers ordering with mean score of (M=1.9, S D=0.694).

 The correlation result between, customer integration and operational performance showed that, there is association with a Pearson coefficient of value of (r=0.225, p <0.05). The finding of the study conducted, by Flynn et al. (2010) provide support for this result, as the authors indicated customer integration is strongly related with operational performance more so than supplier integration. Besides, to correlation the findings of the study pointed out that customer integration, statistically has a positive and significant effect on operational performance, since (Beta= 0.264, (P<0.05). The finding of the study supported, by (Koufteros et al., 2005).

The analysis result depicts that; the fourth dimension of supply chain process integration is internal integration the average mean score of 3.14. Therefore the result is under the category of agreement so as the results indicated that, there is strong internal integration with in the factory. But under each statements of this dimension, the respondents they show disagreement

on the issue of company has formal interdepartmental meeting among internal functions with mean score of (M=2.21, S D=0.613).

The correlation result between, internal integration and operational performance showed that there is strong negative association with a Pearson coefficient of value of (r= -0.517, p <0.05). The finding of the study conducted, by Flynn et al. (2010) provide support for this result, as the authors indicated internal integration is strongly related with operational performance more so than supplier integration. Besides, to correlation the findings of the study pointed out that internal integration, statistically has a significant effect on operational performance, since (Beta= -0.494, (P<0.05). The finding of the study supported, by (Zelalem Gebreyesus, 2019) with the value of (Beta= 0.468, sig. 0.00, p<0.05)

Generally the findings of the study from the descriptive analysis the average mean value of all dimensions of supply chain process integration and operational performance above the acceptance range of Likert scale 2.5. From the correlation result of the study concluded as regarding to the relationship between independent variables all supply chain process integration dimension, there is no association between them. And the findings of the study pointed out that internal integration and customer integration are statistically a significant effect on operational performance whereas information integration and supplier integration are statistically has no significant effect on operational performance.

5.3. Conclusions

From the descriptive statistics analysis result of the dimensions of supply chain process integration (i.e. information integration, supplier integration, customer integration and internal integration) and operational performance in the factory achieved a composite mean score above the average rate 2.5. This shows that as far as the perception of the respondents concern the factory is currently good supply chain process integration and operational performance. Under dimensions of supply chain process integration, supplier integration the highest average mean value from other constructs. As result the company has strong supply chain process integration in terms of supplier integration can play a great role in enhancing factory operational performance.

The research concluded as from all dimensions of supply chain process integration customer integration and internal integration were associated with operational performance but supplier integration and information integration were uncorrelated with operational performance. From

the results of correlation customer integration has the highest correlation results followed by, internal integration. Therefore, it can be inferred that the customer integration has a high correlation with operational performance. The multiple regression results of beta value shows that customer integration has the highest effect on operational performance followed by supplier integration, information integration and internal integration.

Generally researcher concluded as the result of study pointed out internal integration and customer integration are statistically significant effect on operational performance whereas information integration and supplier integration are statistically has no positive and significant effect on operational performance.

5.4. Recommendations

Based on the results of study, the researcher recommends the following;

- In the study, infer from the results of mean analysis recommended as, from customer integration the issue of company has computerized system for major customers ordering was weak in the factory. So the factory give emphasis computerized system for major customers ordering, because the factory knowing the exact orders of customers, minimize communication barriers related to the customer order and simply predicts customer's requirement.

- Without the integration of customer into the factory it is impossible to survive in the market. So the factory focus linking with customer through information network to get feedback from the customer and creating an access of computerization for customer ordering is crucial factors while considering the integration of customer.

- The integration of internal function within the organization is a primary activity in any organization. So the factory have to give a critical emphasis on alignment among departments through better data integration & creating continuous interdepartmental meeting among internal functions because the factory can build trust among the members, minimize problems at infant stage this leads to achieve common goals

- Finally the researcher recommends that even if the factory has not performing effectively all supply chain process integration dimensions, the factory has good information integration and supplier integration. So the factory maintains the sustainability of these two constructs.

5.5. Limitation of the Study

The findings of this study are significant for academic researchers and practitioners in logistics supply chain management. However, the study is subject to three key limitations that need to be borne in mind when interpreting its findings

Firstly the research has methodological limitation because, under the study only close ended questionnaires data collection techniques were employed and the researcher did not use other data collection techniques such as, Panel, interviews, and etc. So, it may have an influence on the data obtained because close ended questionnaires are mostly limited alternatives which may limit responses. The reason for using these methods of data collection is respondents would not have enough time to respond open ended questionnaires.

The second limitation of the study has low generalizability due to its case area is limited only on Choice Flour Factory. As it was not assessed for other flour factories in Ethiopia, so, it is difficult to generalize the finding at national level.

Also the study was conceptually limited only on the following supply chain process integration constructs and operational performance, such as information integration, supplier integration, customer integration, internal integration and operational performance measurements the study only flexibility, delivery reliability and lead time. So, the study is not incorporated with other variables of operational performance.

5.6. Recommendation for Future Studies

- ❖ In future research, this framework can be adopted in other economic sector, for instance Banks, Hotels, and lather industries as it might yield different outcomes with respect to its ability to improve operational performance.
- ❖ Moreover, the framework of this study consisted of four constructs, each of which included several significant dimensions that were deemed capable of enhancing operational performance.

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APPENDIX

Questionnaires to be filled by employees of Choice Flour Factory

Greetings! My name is Abraraw Zemene from Bahir Dar University College of Business and Economics from the department of logistics and supply chain management. I am conducting a research study on the effect of supply chain process integration on operational performance in Choice Flour Factory.

Dear respondent, first I want to put my gratitude for your time in responding to the research questions provided below. The response you provide me gives a critical input to my research "The effect of supply chain process integration on operational performance in Choice Flour Factory" You have been identified as one of the respondents for this study and you are kindly requested to fill the questionnaire. Information given will be held with confidentiality and will be used purely for research purposes.

Instruction: You are not expected to write your name and I kindly request you to respond to each item of the question very carefully. Please fill the following listed questions frankly and honestly by making tick **"√"**symbol in the box that corresponds to your answers.

PART-I: Demographic Characteristics

1. Gender   1) Male ☐   2) Female ☐

2. In which department do you belong?

 1) Purchasing ☐   2) Finance ☐

3) Sales and marketing ☐   4) Store operation ☐

5) Logistics ☐   6) Quality assurance ☐

7) Others departments ☐   8) production ☐

3. Your educational qualification: 1) G-12 completed ☐ 2) Certificate ☐ 3) Diploma ☐

4) First degree ☐   5) Masters and above ☐

4. Year of work experience in the company 1) Less than 1 year 2) 1-5 year ☐   3) 6-
10 year ☐ 4) More than 10 years ☐

PART- II

The key factors influencing supply chain process integration in Choice Flour Factory

The following statements relate to the effect of supply chain process integration on operational performance in case of Choice Flour Factory. Follow the instructions given for your responses.

Please tick mark the appropriate box against each statement according to the degree of agreement on the basis of a given scale (1=strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=strongly agree)

1	**Supplier integration**	1	2	3	4	5
5	Company sharing of production plan with major suppliers					
6	Company established quick ordering system with major suppliers					
7	Company has strong strategic partnership with major suppliers					
8	Company has stable procurement network with major suppliers					
2	**Information integration**					
9	There is accurate information sharing within the members of supply chain					
10	There is timely sharing of information across the members of supply chain					
11	Company has Strong coordination in the flow of information among partners					
12	Company facilitate integration through use of information technology					

			1	2	3	4	5
3	**Customer integration**						
13	Company establish quick ordering system with major customers						
14	Company has computerized system for major customers ordering						
15	There is sharing of available inventory with major customers						
16	There is regular follow up with major customers for feedback						
4	**Internal integration**						
17	Company has better data integration among internal functions						
18	There is Cross functional teams, working with each other interactively						
19	Company has formal interdepartmental meeting among internal functions						
20	Company use cross functional teams in process improvement						

PART-III: Operational performance:

Please indicate the degree to which you agree to the following statements concerning your company's operational performance. (1=strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=strongly agree)

	Operational performance	1	2	3	4	5
1	**Flexibility**					
21	The ability to quickly and efficiently adjust output to much demand fluctuations.					

22	There is ability to change the planned delivery dates.					
23	There is quickly respond to changes in the demand market.					
24	There is the ability to change the output level of products produced					
2	**Lead time**					
25	The period between placing an order and receiving the ordered item from the supplier is short enough					
26	The company is committed to provide fast service to its customers					
27	The company committed to deliver orders to customers within agreed delivery times					
28	Suppliers are committed to supply orders by the agreed timetables					
3	**Delivery Performance**					
29	Logistic provider were capable to delivery of product to the right customers					
30	The orders from company departments were meet					
31	There is the ordered quantity delivered on time					
32	The company records on-time delivery of products					

Thank you for your cooperation!!!