EFFECT OF INTERNAL INTEGRATION ON SUPPLY CHAIN PERFORMANCE: THE CASE OF ETHIOPIAN PHARMACEUTICAL SUPPLY AGENCY (EPSA), ADDIS ABABA, ETHIOPIA

BY

ZEWDU DEMISSIE

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ADVISOR

MATIWOS ENSERMU (PhD)

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Addis Ababa University

School of Commerce

Graduate Studies

Approved by Board of Examiners

Matiwos Ensermu (PhD)	_____	_____
Advisor Name	Signature	Date
Mengistu Bogale (PhD)	_____	_____
Internal examiner Name	Signature	Date
Baynesagn Asfaw (PhD)	_____	_____
External Examiner Name	Signature	Date
_____	_____	_____
Chairman of Graduate Committee	Signature	Date

DECLARATION

"I hereby declare that this research paper entitled "**The effect of internal integration on supply chain performance in EPSA**" is my own and to the best of my knowledge and belief, it is free from previously published materials or written by another person, nor material which to a substantial extent that has been submitted for the award of any other degree or diploma of a university or other institution of higher learning."

Student Researcher	**Signature**	**Date**
Zewdu Demissie	_____	_____

LETTER OF CERTEFICATION

This to certify that Zewdu Demissie has carried out his thesis work on the topic entitled "**The effect of internal integration on supply chain performance in EPSA**" under my guidance and supervision. Accordingly, I here assure that his work is appropriate and standard enough to be submitted for the award of Master of Arts in Logistics and Supply Chain Management.

Research Advisor	**Signature**	**Date**
Matiwos Ensermu (PhD)	_____	_____

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List of Abbreviations and Acronyms

AIDS	Acquired Immuno Deficiency Syndrome
CSCMP	Council of Supply Chain Management Professionals
ERP	Enterprise Resource Planning
EPSA	Ethiopian Pharmaceuticals Supply Agency
HCMIS	Health Chain Management Information System
HIV	Human Immuno Virus
IPLS	Integrated Pharmaceutical Logistics System
MCH	Maternal and Child Health
NPPL	National Pharmaceutical Procurement List
PFSA	Pharmaceuticals Fund and Supply Agency
RDF	Revolving Drug Fund
RRF	Report and Requisition Form
SC	Supply Chain
SCM	Supply Chain Management
SCMS	Supply Chain Management System
SOP	Standard Operating Procedure
SPSS	Statistical Package for Social Sciences
USAID	United States Aid International Development
WHO	World Health Organization

Abstract

The aim of this thesis is to examine the effect of internal integration on pharmaceutical supply chain performance at EPSA. This thesis conceptualizes three dimensions of internal integration (information integration, coordination and resource sharing and organizational relationship linkage) and examines the relationships among internal integration dimensions and supply chain performance. The data collection instrument used was a questionnaire which was administrated to a total 114 employees using a census method. Statistical techniques such as descriptive statistics, correlation, and multiple regressions were employed to analyze the data. Measured from the three dimensions of internal integration, it can be concluded that the current level of internal integration of the company is low. The company has relatively better information integration, but it is weak in terms of coordination and resource sharing and organizational relationship linkage. The result of the analysis also proved that there is moderate positive and significant relationship between internal integration and supply chain performance. The results also indicated that coordination and resource sharing had the highest positive effect on supply chain performance, followed by information integration and organizational relationship linkage. Therefore, for improving supply chain performance, the study recommends improving the three components of internal integration together as they are interrelated.

Keyword: Internal Integration, Information Integration, supply chain performance

CHAPTER ONE

INTRODUCTION

In this chapter background of the study, statement of the problem, research questions, research objectives (general and specific), significance of the study, scope of the study, limitation of the study, definition of terms and organization of the study are included.

1.1 Background of the study

Supply chain is the network created among different companies that produce, handle, and distribute a specific product (Susarla & Karimi, 2012). Supply chain management involves the planning and directing of all operations included in sourcing and procurement. Supply chain management encompasses collaboration and coordination with supply chain members, which can be departments within the supply chain organization, suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies (Council of Supply Chain Management Professional, 2011).

Fulfilling consumers' needs and improved service is expected from channel partners that work jointly during supply chain integration. Good management of the system is gained through integration of flow of goods and information. Additionally, supply chain activities are arranged across channel partners and within the organization so as to reduce costs, increase customer value and overall performance across the supply chain for all partners (Wand et al, 2018).

Internal integration has often been defined as the state of collaboration that exists between departments. Vickery et al. (2003) stated that internal integration decentralizes decision making thus accelerating the decision making process and increasing cooperation and collaboration between teams in different departments. Internal integration is related to easy access to key operational data from integrated databases. When there is internal integration; information systems are integrated to connect to various internal departments within an organization, access inventory information throughout the supply chain, taking inventory status in real time, using

computer-based systems planning between marketing and production, and with a high level of integration of information systems for the production process. Internal integration as an important step that must be done before the external integration can be easily achieved. Internal integration is the first step to achieving supply chain integration (Hamid and Sukati, 2011). Theoretically, studies imply that a better internal integration will lead to enhanced supply chain management. According to Otchere et al. (2013), internal integration is a prerequisite for supply chain management. In addition, organizations which go through poor internal integration will have poor external integration while excellent external integration is achieved by organizations with maximized internal integration action plan. Overall, organizations need to implement internal integration in a higher extent before aiming to have maximum external integration. Internal integration can be accomplished through automation and standardization of each internal logistics function, the introduction of new technology, and continuous performance control under formalized and centralized organizational structure(Baofeng Hou, 2012).Internal integration creates value through improved customer service levels, operational performance and reduced costs(Msimangira and Venkatraman,2014).

Although the internal and external integration is the key element for SCI, there is much emphasis on customer and supplier integration only, ignoring the important central link of internal integration (Flynn et al. 2010).

Ethiopian Pharmaceutical Supply Agency EPSA is a legal entity established under the law of Federal Democratic Republic of Ethiopia Government to overcome the problems and assure uninterrupted supply of pharmaceuticals to the public at an affordable price.

The current Ethiopian Pharmaceuticals Supply Agency was first established in 1947 with a capital of 80 million birr under the name "the Main Pharmacy." Then after it had re structured itself for several times and re-established with reformed vision, mission and goals in 2007 under proclamation No. 553/2007 bearing the name "Pharmaceutical Fund and Supply Agency (PFSA)." PFSA is structured to sustainably supply basic pharmaceuticals used for treating the main health problems in the country along with medical equipment and to consider the purchasing capacity of the society in providing its services.

PFSA has once again changed its name at the beginning of the 2019 to "Ethiopian Pharmaceuticals Supply Agency (EPSA)." Despite the changes in organizational structure, naming and goal throughout its history, the institution's primary activity has always been supplying pharmaceuticals mainly to governmental health institutions.

Ethiopian Pharmaceuticals Supply Agency (EPSA) has nineteen branches located throughout the country and anchored together by a head office in the capital – Addis Ababa. As it supplies pharmaceuticals, chemical reagents, medical supplies and equipment to over 4,000 health facilities nationwide, it musters a big number of employees. It currently has 2,535 permanent employees and 314 contract employees. As expected, there are some professions that have a special affinity with the Agency's activities. Accordingly, 409 of EPSA's staff members are pharmacists; 220 of them have bachelor's degree or above while 189 are diploma holders. There are 26 laboratory technicians, 25 of who have bachelor's degree and above. The fourteen bio-medical engineers in EPSA have a minimum of bachelor's degree. Although the number of branches and their distribution across corners needs a high level of communication, EPSA staff members have a weak bond among them even if their job entails to communicate on a daily basis. In EPSA different departments are concerned with achieving their own objectives separately. Such problems happened due to poor supply chain integration in general and internal supply chain integration problems in particular (Admasu, 2017). Although the internal and external integration is the key element for SCI, there is much emphasis on customer and supplier integration only, ignoring the important central link of internal integration and operational performance (Flynn et al. 2010). The researcher's intension is to come up with empirical evidence on the effect of internal integration on supply chain performance. In addition there is lack of studies that are conducted on performance and supply chain integration on pharmaceutical sectors in Ethiopia. The aim of this study is to fill the above listed literature gaps.

1.2 Statement of the problem

Flynn et.al (2010) stated that supply chain integration is the extent in which an organization strategically coordinates with members of the supply chain and direct inter and intra firm activities, in order to have efficient and effective movement of goods, decisions, data, and capital to come up with increased advantage to the consumers. Supply chain integration is one of the key elements in improving firm performance. Advancement of total functional collaboration with

in the organization and continuous connection with towards the source suppliers and downstream end users is a clue to supply chain integration. So supply chain integration can be successful via internal supply chain management, supplier relationship management and customer relationship management (Alfalfa-Luque, Madina-Lopez and Kumardey, 2012).

Supply chain faces various obstacles that mainly affects its performance like prolonged lead times, interrupted supply, port overcrowding and overseas regulation, unpredictable economy and politics and foreign exchange inflation which in turn leads to product cost inflation, decreased rate of delivery of goods and flexibility of the organization (Binyam, 2014).

Effective and efficient supply chain integration via the organizations and across the organization has a great contribution for a better operational performance. Frohlich and Westbrook (2001); Swink et al. (2007) and Zhao et al. (2011) have been suggested that supply chain integration play different roles in operation performance improvement and capability development. So knowing the effect of supply chain integration is a key factor for each company to improve their integration (Zahra, et al. 2013). The case company, EPSA has many supply chain related performance problems which includes warehouse storage space problems, higher level of inventory for low movable items, stock outs for vital and essential pharmaceuticals, obsolescence etc. In addition different departments are concerned with achieving their own objectives separately. Such problems happened due to poor supply chain integration in general and internal supply chain integration problems in particular (Admasu, 2017). So through analyzing the effect of internal supply chain integration, this study will help to identify improvement areas that can solve supply chain performance problems. Many studies have found that integration across the supply chain has a positive impact on organizational performance (e.g. Flynn et al., 2010, BaofengHou, 2012, La Hatani, 2013; Sohail, 2009).

Despite the importance of supply chain integration on supply chain performance there is a lack of studies in Ethiopia that link supply chain integration practices and supply chain performance in pharmaceutical sectors. In addition, although the internal and external integration is the key element for SCI, there is much emphasis on customer and supplier integration only, ignoring the important central link of internal integration and operational performance (Flynn et al. 2010). Therefore this study will contribute in filling these gaps since it has examined the effect of internal integration on supply chain performance in EPSA.

1.3 Research Questions

- What is the effect of information integration on supply chain performance in EPSA?
- What is the effect of coordination and resource sharing on supply chain performance in EPSA?
- What is the effect of organizational relationship linkage on supply chain performance in EPSA?
- What is the relationship among internal integration dimensions and supply chain performance in EPSA?

1.4 Objectives

1.4.1 General Objective

The general objective of this study is to assess the effect of internal integration on pharmaceutical supply chain performance in EPSA.

1.4.2 Specific Objectives

- To examine the effect of information integration on supply chain performance in EPSA
- To assess the effect of coordination and resource sharing on supply chain performance in EPSA
- To assess the effect of organizational relationship linkage on supply chain performance in EPSA
- To assess the relationship among internal integration dimensions and supply chain performance in EPSA

1.5 Significance of the study

This study will help the company under consideration (EPSA) to look deep into their supply chain relations internally, and help the top managers to make appropriate decisions. This will enhance the performance of their respective supply chain based up on the analysis of the study, which will help to reduce their cost and lead time and becomes effective and more efficient in the Supply chain process.

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

1.6 Scope of the study

Geographically, this thesis had assessed effect of internal integration between operational departments directly involved to supply of pharmaceuticals at central EPSA on supply chain performance. These departments include quantification and market shaping, tender management, contract management, warehouse and inventory management and distribution and fleet management directorates. It only evaluated the phenomena from the view point of the staff of the company that have a direct contact with supply chain works (including forecasting, procurement, contract management, warehousing and inventory management and distribution). The operational scope covered the effect of internal integration dimensions; information integration, coordination and resource sharing and organizational relationship linkage on supply chain performance dimensions including flexibility, delivery, cost and quality.

1.7 Limitation of the study

The two main limitations of this study was, first no primary research was carried out to validate the proposed framework and the limited number of articles that were analyzed to develop the conceptual framework. Second there were no sufficient literatures written in pharmaceuticals supply chain integration effect on performance and most conducted researches bypass internal integration.

1.8 Definition of terms

Supply chain integration: is a close alignment and coordination with in a supply chain, often with the use of shared management information system.

Supply chain: is the sequence of processes involved in the distribution of a commodity from manufacturers to end users.

Internal integration: represents the integration of all internal functions from forecasting to tender, contract management, inventory management and distribution.

Performance: is the ability of the organization to fulfill customer needs in accordance with flexibility, delivery, cost and quality.

Pharmaceuticals: substances used for treatment, prevention, mitigation and diagnosis of diseases. It includes drugs, medical supplies, and medical equipment's and laboratory reagents.

1.9 Organization of the study

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

Chapter one covers background of the study, statement of the problem, research questions, research objectives, significance of the study, scope of the study, limitation of the study, definition of terms and organization of the study.

In chapter two theoretical and empirical literature reviews, conceptual framework of the study and identified literature gap have been addressed.

The third chapter includes description of the study area, research approach, research design, population, data source and data collection instruments, method of data analysis and procedure, validity and reliability and ethical considerations.

In the fourth chapter the results and findings of the study, interpretation and discussion of major findings and post estimation results are included.

The last chapter of the study includes summary of findings, conclusions and recommendations, as well as directions for future research.

CHAPTER TWO

RELATED LITERATURE REVIEW

This chapter discusses theoretical literature review, empirical literature review, and conceptual framework of the study and identified literature gap. Under theoretical literature review overview of supply chain management, pharmaceutical supply chain in Ethiopian context, integrated pharmaceutical logistics method, supply chain integration, internal integration with its dimensions and supply chain performance with its dimensions have been addressed. The empirical literature review part addresses earlier conducted research results about effect of internal integration on supply chain performance and the relations ship between variables. Finally the conceptual framework of the study is presented by diagram and identified literature gap is presented.

2.1 Theoretical Literature Review

2.1.1 Supply Chain Management Overview

Supply chain management is a process of associating several business entities consisting of suppliers, manufacturers, distributors, retailers and customers. These integrated entities are important in managing the flow of resources such as material flows (products, servicing, recycling), information flows (order transmission, tracking, and coordination of physical flows), and financial flows (credit terms, payment schedules, and consignment arrangements). As supply chains compete against supply chains, it is vital that they are managed effectively so as to enhance their performance (Hasan, Zulkifli, Malak and Nizaroyani, 2016).

Supply chain management is the model being used increasingly in the business world, leading organizations necessities in rethinking their strategies. Improvement on the proceedings involved in the network links of supplies has the synergetic effect on global network performance (Machado, 2013).

Moreover, supply chain management creates value for companies, customers and stakeholders whom interacting throughout the supply chain (Estampea . et al. 2013). In today's complex and

changing business environment, enterprises must carefully develop their business strategies to gain a competitive advantage over the long term. Therefore, how to plan and formulate strategies for enterprises plays a decisive role (Chih, et al., 2016).

According to Heizer and Render (2011) SCM is the integration of the activities that procure materials and services, transform them into intermediate goods and final products and deliver them to customers. These activities include purchasing and outsourcing activities, plus many other functions that are important to the relationship with suppliers and distributors. SCM includes determining transportation vendors, credit and cash transfers, suppliers, distributors, warehousing, and forecasting and production information. On the other side, supply chain management encircles the planning and management of overall operations included in sourcing and procurement and all logistics management operations. Supply chain management also comprises collaboration and coordination with supply chain members that are manufacturers, mediators and end users. Supply and demand are integrated by supply chain management intra and inter organizations (Council of Supply Chain Management Professionals, 2012).

2.1.2 Pharmaceutical supply chain in Ethiopia

Pharmaceutical supply chain of Ethiopia is performed with two wings. The first is addressing those of the public health facilities through EPSA. The second is addressing the private health facilities through different importers, wholesalers and also EPSA to some extent. EPSA is a sole provider of forecasting, procurement, storage, inventory management and distribution of pharmaceuticals to the public health sector in Ethiopia. EPSA's current supply chain starts with the import of most drugs via the port of Djibouti and airport. These products are then trucked into central EPSA based in Addis Ababa, before being distributed to the various distribution centers (Hubs) and to the hospitals and health centers (Sutton and Kellow, 2010).

2.1.3 Integrated Pharmaceutical Logistics System

EPSA has established pull system known as integrated pharmaceutical logistics system primarily using the essential data items reported from health facilities regularly every other month. Using its distribution centers (Hubs), EPSA distributes drugs and supplies to public health facilities throughout the country (PFSA, 2012).

In 2009, as part of a major intervention to improve the supply chain situation in the country, PFSA, in partnership with its support partners the USAID | DELIVER PROJECT, Supply Chain Management Systems (SCMS), and others in the sector developed and began implementing the IPLS (Mereid, 2015). IPLS is the term applied to the single pharmaceuticals reporting and distribution system based on the overall mandate and scope of the PFSA. It aims to ensure that patients always get pharmaceuticals they need (PFSA, 2015).

EPSA is responsible for the procurement and distribution of pharmaceuticals for the public sector. To successfully achieve its main objective, which is to ensure that patients get pharmaceuticals that they need, EPSA designed and implemented the integrated pharmaceuticals logistics system (IPLS). IPLS is the term applied to the single pharmaceuticals reporting and distribution system based on the overall mandate and scope of EPSA (PFSA, 2014).

The IPLS is the primary mechanism through which all public health facilities obtain products that are included on the National Pharmaceuticals Procurement List (NPPL). The list includes essential pharmaceuticals including HIV/AIDS, Malaria, TB and Leprosy, EPI and MCH that used to be managed vertically (PFSA, 2014).

The IPLS defines the reporting and re-supply schedules. Accordingly, health facilities (hospitals and health centers) are expected to complete the Report and Requisition Form (RRF) every two months for program pharmaceuticals, the data of which will be used to determine re-supply quantity. To help maintain adequate stock levels, the maximum months of stock, minimum months of stock and an emergency order point have been established for each health facility in the system. For Revolving Drug Fund (RDF) pharmaceuticals, health centers and hospitals will complete the RRF as per the facilities review period which can be every two month, every quarter or every six months and collect products from affiliated EPSA branches (PFSA, 2014).

The ‘Standard Operating Procedures (SOP) Manual for IPLS in Health Facilities of Ethiopia’ (herein after referred to as the IPLS SOP) defines the roles and responsibilities of the relevant stakeholders that are involved in the supply chain. The system also lists out the basic logistics data that are required to make logistics decisions with the accompanying definitions and data sources. All the relevant recording and reporting forms are also included with detailed instructions.

2.1.4 Supply Chain Integration

Supply chain integration can be defined as the degree to which a manufacturer strategically collaborates with its supply chain partners and collaboratively manages intra- and inter-organization processes to provide maximum value to the customer at low cost and high speed. This definition indicates that SCI is comprehensive and encompasses a variety of activities, some of them are internal, and others are external including both upstream with suppliers and downstream with customers. In order to comprehensively identify SCI, it breaks SCI into three dimensions: internal integration, supplier integration, and customer integration (Flynn et al., 2009).

Firms tend to integrate their supply chain systems with the channel partners to increase performance. The developments in supply chain management in the form of supply chain integration had not only offered the potential to reduce costs but also to increase revenues, profits and performance of the firms. But it also stated that there were some challenges associated with the integration of supply chain management by the channel members. The most significant form of supply chain integration was information sharing (Awad & Nassar, 2010).

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

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

There are factors that drive members of a supply chain to engage into a collaborative and integrated supply chain practices. The most important motivators for supply chain integration in a firm are the need for supply chain agility, need for cost reduction, profit motives, satisfaction of customers, the need for collaboration with other organizations and bringing better relationship

with suppliers (Lisanza, 2013). As a result, if a company is going to succeed in today's dynamic environment, specialization can be only part of the equation. All the parts of the organization that were originally segmented for the sake of efficiency have to be put back together in a way that maximizes customer outcomes and increases performance. In short, the internal and external functions of a business must become integrated for the enterprise to stand (Chad and Mark, 2016).

Supply chain integration composed of strategic initiatives in the supply chain through integration of communications, activities, tasks, processes and locations for continuous communication among customers, suppliers, producers and other members of the supply chain that emphasizes in creating an efficient and integrated system. There are three basic types of Supply Chain Integration (SCI), which include supplier integration, internal integration, customer integration (Lai et al, 2012). Supplier integration refers to acquiring operational, technical and financial information with the supplier's manufacturers and suppliers may share information including production plans, demand forecasts and levels of inventory. This information sharing results in enhancing the product and production requirements and better utilizing the supplier's and the firm's capability and structure of cost (Zahra et al., 2013).

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

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

SCI goal is to achieve effective and efficient flow of products and services, information, money and decisions, to provide a maximum value to customer at low cost and high speed (Flynn, Huo and Zhao, 2010) and many researchers like Flynn et.al. (2010) and Baofeng (2012) pointed out

that supply chain integration influences performance. Effective integration involves mutual understanding, a common vision, shared resources, and achievement of collective goals.

The main advantages of SCI are as follows (Palomero & Ricardo, 2012):

- The Integration of tasks and information exchange, cost reduction and identifying new business opportunities.
- Cooperation and coordination of all components along the chain, innovation of products, improving inventory management and warehousing, and improving performance.
- Advancing in selection and customer service providers and sharing and processing information simultaneously.

Although the internal and external integration is the key element for SCI, there is much emphasis on customer and supplier integration only, ignoring the important central link of internal integration. Internal integration and external integration play different roles in the context of SCI. Internal integration acknowledges that the units and functions within an organization has to operate as part of an integrated process, while external integration acknowledges the significance of creating proximate, bilateral links with customers and suppliers (Flynn et al., 2010).The SCI entails all internal and external dimensions of work. Advancement of total functional collaboration with in the organization and continuous connection with towards the source suppliers and downstream end users is a clue to supply chain integration. So supply chain integration can be successful via internal supply chain management, supplier relationship management and customer relationship management. The focus of this study is mainly on the internal integration dimension.

2.1.5 Internal Integration

The concept of internal integration (also mentioned as intra organizational or inter functional) is widely accepted in the field of Organizational Theory. An important concept was created by Lawrence and Lorsch (1967), presented as "the quality of the collaborating status among departments necessary to perform the effort unit according to the environmental demands." In the SCM context, internal integration is defined as “the degree to which an organization structures its own organizational strategies, practices and processes into collaborative, synchronized processes, in order to fulfill its customers’ requirements and efficiently interact

with its suppliers and “the chain of activities or functions within a company that results in providing a product to the customer” (Flynn; Huo; Zhao, 2010).

Internal integration is the coordinated and strategic alignment of business processes and functions within an organization that is organized to ensure that firm achieves maximum performance. SCI starts first with internal integration among the different departments and functions within an organization before external integration is pursued (Basnet, 2013).

Internal integration mainly involves data and information system integration through the use of enterprise resources planning (ERP), real-time searching of inventory and operating data, and integration of activities in different functional areas. Internal integration also involves cross-functional cooperation, or working together across different functions in process improvement or new product development. Internal integration recognizes that different functions within a firm should not act as functional silos, but instead as part of an integrated process (Zhao et al., 2011).

Without an internal culture focused on integration, the efforts towards external integration will occur slowly and in a more complicated way (Yunus and Tadisina, 2016).Internal integration to SCI should occur before the external integration with suppliers and customers (Zhao et al. 2011; Basnet, 2013; Vallet-Bellmunt; Rivera-Torres, 2013; Zsidisin et al., 2015). Some studies show that one of the reasons that hinder the achievement of a high-level external integration is low level of internal integration (Gimenez and Ventura, 2005).

Intra-organizational integration is possible through developing appropriate synergy between each SC drivers (e.g. facility utilization and inventory policy, inventory policy and warehousing, logistics and information, etc.). Intra-company integration is the starting point for broader integration across the supply chain (Cagliano et al., 2006).Internal integration among functional areas is related to the increase of external visibility upstream and downstream of the supply chain (Barrat and Barrat, 2011).Results demonstrated that the internal integration among functional areas is a pre-requisite for external integration success with suppliers in global supply chains (Horn, Scheffler and Schiele, 2014).Literature suggests that firms must achieve a relatively high degree of collaboration among internal processes before initiating external integration (Cagliano et al., 2006). Maturity for the global performance is related to internal integration (Horn, Scheffler and Schiele, 2014).

Integration of these functions involves the holistic performance of activities across departmental boundaries" (Basnet, 2013). In essence, internal integration refers to knowledge and information collaboration and sharing within and between functional areas (Braganza, 2002; Pagell, 2004). Collaboration refers to the development of unstructured activities of social and affective nature, and implies the existence of close and cohesive relationships. Interaction activities are also part of the internal integration process as formal and coordinated activities. These activities occur between functional areas, such as formal meetings and formation of committees. Both interaction and collaboration are described as "dimensions" of cross-functional integration (Vallet-Bellmunt; Rivera-Torres, 2013).

More consideration should be given to interplay in the middle of functional departments, for instance production, procurement, logistics, inventory, marketing, sales and distribution (Zahra Lotfi et al., 2013).

Reducing the ordering cycle, improving communication, creating new product projects quickly, developing better levels of customer service, improving the level of coordination across activities and increasing involvement of professionals are among the benefits of internal integration (Ralston et al., 2015). Internal integration also improves the firm's performance by reducing costs and limiting the ability of departments within the organization from taking steps that would distort the overall goals of the organization (Ralston et al., 2015).

Overall, in this thesis internal integration is viewed in terms of the three dimensions (information integration, coordination and resource sharing and organizational relationship linkage). Each dimension is discussed as follows.

2.1.5.1 Information Integration

Under information integration two aspects of supply chain information integration (information technology connection and information sharing and trust) will be discussed. Information and communication technology plays a central role in supply chain management in the following aspects. First, IT allows firms to increase the volume and complexity of information which needs to be communicated with in the firm and their trading partners. Second, IT allows firms to provide real-time supply chain information, including inventory level, delivery status, and production planning and scheduling which enables firms to manage and control its supply chain

activities. Third, IT also facilitates the alignment of forecasting and scheduling of operations between departments, firms and suppliers, allowing better intra firm and inter-firms coordination. As such, the problems in coordinating supply chain activities which often are hindered by time and spatial distance can be reduced (Paulraj and Chen, 2007).

While the technological aspect of information integration is important, it is the frequency, the quantity and the quality of information that is shared that really matters. As Fawcett et al. (2007) held, large investments in IT could fail to produce expected benefits if it is not supported by willingness to share needed information. This is because information sharing requires firms to exchange strategic information of supply chain. The strategic supply chain information provides leverages to the supply chain partner for making strategic decision in their operations. For example, point of sale history helps suppliers to successfully forecast demand which subsequently improves service level and efficiency to their customers. Similarly, real-time inventory position helps suppliers to plan their replenishment and delivery schedules; thus, improving service levels and reducing inventory costs (Seidmann and Sundararajan, 1997). Such level of information sharing requires frequent and intense communication between firms and suppliers in order to build trust between the two parties. It is also true for intra firm information sharing between departments. For example inventory level information helps tender management directorate for initiating purchase orders.

Indeed, trust is one of the key ingredients for all cooperative behaviors, including information sharing. High levels of trust in supply chain relationships constitutes high levels of cooperative behavior between supply chain partners which leads to high degree and symmetry of strategic-information flows between them (Klein, Rai and Straub, 2007). In the absence of trust, the IT investment will be used at a minimal level as only transactional data is exchanged, such as materials or product orders. A number of studies have demonstrated various benefits of having information sharing with supply chain partners, including inventory reductions (Lee, So, and Tang, 2000; Yu, Yan, and Cheng, 2001), lower costs (Cachon and Fisher, 2000), and shorter lead times of order processing (Dejonckheere, Disney,Lambrecht and Towill, 2004).

2.1.5.2 Coordination and Resource Sharing

Supply chain resources usually refer to the organization's production factors, such as personnel, equipment, capital, technologies, knowledge, and information in supply chain services and working processes. Furthermore, with the development of the supply chain, the system will become increasingly complex, the bodies are very diverse, and supply chain activities cannot be achieved until there source bodies are motivated and united. In particular, effectively coordinating and integrating resources is essential for effective supply chain management (Rafaela et al., 2012).

Supply chain resources mainly include those that can be transferred across organizations, such as physical resources (manpower and equipment), information resources, explicit knowledge resources (patents and brands) and capacity resources (individual capacity), as well as those that are embedded in the organization, such as tacit knowledge resources and organizational resources. Supply chain resource sharing aims to integrate different resources in the value chain. Additionally, effectively coordinating and integrating these flows is essential to have an effective supply chain management (Zhao et. al., 2011).

2.1.5.3 Organizational Relationship Linkage

Organizational relationship linkage is the ability to develop and maintain a shared mental framework with customers and suppliers and internally between functions regarding inter-enterprise dependency and principles of collaboration (Mollekopf and Dapiran, 2005). It mainly focuses on the relationship between departments within the firm and between organizations to designing and maintaining communication channels, joint establishment of objectives for all parties in the chain, sharing of ideas, skills and institutional culture, drawing up of contingency plans for quick problem solving and creating teamwork among supply chain partners and cross functional teams.

2.1.6 Supply Chain Performance

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

composed of flexibility, cost, relationship and responsiveness. Many researchers assume it to be improved by SCI take very different types of performance into account: from pure operational logistics performance (such as inventory level, response time, service quality or logistics cost) to broad strategic performance (e.g. improved competitive position, profitability and growth), often including customer value and satisfaction. They also look a performance for differing units of analysis such as the whole supply chain, a company, a business unit or a plant in respect of how performance is measured the majority includes items related to logistics and SCM performance (Fabbe-Costes, 2008).

The most common indicators of supply chain performance that are investigated in the previous studies are flexibility, delivery (speed) and cost. This thesis will study the above indicators of supply chain performance.

2.1.6.1 Flexibility

Flexibility is described as the ability of a system of an organization in responding quickly to changes occurred both inside and outside the system. The final achievement in the performance of an organization is to gain competitive advantage and creating customers satisfaction (Flynn et al., 2010).

Flexibility is expressed through the capability of a system to undertake proactive and reactive adaptation of settings to deal with uncertainties which occur both internally and externally uncertainty. In the supply chain, the main purpose for flexibility is to increase the simplicity of processes that adds value and to shorten the time of response to the demand of the customer. In today's business world the complexity of business process is rising, so businesses must be customer oriented. Companies can take different measures to improve their products and increase their flexibility and one of the measures is to outsource some of their products to other companies (Singh &Sharma, 2014).

2.1.6.2 Delivery

Delivery performance can be defined as the level up to which products and services supplied by an organization meet the customer expectation. It provides an indication of the potentiality of the supply chain in providing products and services to the customer. The traditional dimensions to measures performance are expressed by delivery time and lead time. Different studies defined

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

This metric is most important in supply chain management as it integrates (involves) the measurement of performance right from supplier end to the customer end (Roa et al., 2011). In manufacturing industries, delivery is seen in both directions from the suppliers and customers side. A delayed delivery will lead to a higher procurement cost in the supplier and a potential lose in sales to end customers.

2.1.6.3 Cost

One of the indexes for improving operational performance is reduction of cost. Cost is defined as the summation of all costs that includes: inbound and outbound freight, warehouse cost, third party storage cost, order processing cost, direct labor cost, administrative and service costs (Vaidya and Hudnurkar, 2012). Cirtita and Segura (2012) defined the cost as "the total costs associated with operating the supply chain". Building the strategy based on reducing the overall costs entail to run out reducing inventories, maximum utilization of resources, work- in- process inventory turnover, and eliminating non-value added activities. Proper cost management implies the optimal use of resources for the efficiency of organization in order to create value for customers. Due to this rationale the satisfaction of customer's and loyalty and long lasting wealth for the organization will be created. Effective way of managing cost is the result of managing decisions (Patterso, 2007). Cost management produces valuable resource endowment, which leads to create value to the end customers and also increase satisfaction to customers (Lu et al., 2017).

2.1.6.4 Quality

Quality is highly related with the extent of communication among members of the supply chain. At this point quality of communication is expressed based on the degree accuracy, adequacy, level of update, and completeness in the process of communication among partners of supply chain (Vaidya and Hudnurkar, 2012). Quality of communication is inferred based on the system of information; outsourcing and other related organizational relationships are considered as key

variables in the relationship along partners of supply chain. In order to establish and maintain effective cooperation, the company should strive to create a meaningful and high-level communication with supply chain partners to enhance the quality and involvement along the supply chain. Quality of communications plays a pivotal role in integrating activities related to organizational system in which quality of effective communications aids to integrate sustainable supply chain. The ultimate point is that, there is an acceptable relationship between quality of communication and supply chain integration in which the effect may be direct and indirect (Liu, 2013).

2.2 Empirical Literature Review

Almost all studies concluded that the supply chain integration is considered as vital process that affects operational performance, consequently the organizations' overall business performance. Internal integration aims at unifying the firm's skills, ideas and culture, thus enhances decision making and reduces the conflict of interest, risks and cost implications imposed to the firm (Lisanaza, 2013).

Flynn, et al. (2010) found that internal integration and customer integration were more strongly related to performance improvement than supplier integration. Members of a supply chain who share information continuously are able to operate as a single institution, and can recognize the needs of the consumers and hence have a higher extent of flexibility. Gimenez, et al. (2011) found that a positive effect of internal integration on performance in terms of profits, delivery speed, and transportation cost. Westbrook and Frohlich (2001); and Vickery, et al. (2003) found a positive and direct relationship between information technology integration and supply chain performance. Chen and Paulraj (2004) said that: internal integration of different departments within a firm should act as integrated process. A research conducted by Mose (2015) in Rwanda on pork processing organizations stated that internal integration and performance of pork industry were positively and significantly related. A prerequisite for successful SCM is internal integration and organizations which go through poor internal integration will have poor external integration while excellent external integration is achieved by organizations with maximized internal integration action plan (Gimenez and Ventura, 2005). Overall, organizations need to

implement internal integration in a higher extent before aiming to have maximum external integration (Otchere et al., 2013).

According to the study of Koçogluipek, SalihZekiimamoglu, Hüseyinince, HalitKeskin (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.

Sahin and Robinson (2005) concluded that the major benefit of SC collaboration comes from improved coordination, while information sharing unlocks only a small portion of the potential benefits associated with channel integration. Rodriguez et al. (2004) concluded that if internal and external operations are separated, there may not be much impact on performance. However, when internal and external operations are integrated with each other along with internal business processes, there is a positive impact on performance.

Stank et al. (2001) conducted a research on supply chain collaboration and logistical service performance. The researchers used internal and external collaboration as variables and the finding of the research indicated internal collaboration has a positive impact on logistics service performance.

Liu (2013) also conducted a thesis on effects of supply chain integration and market orientation on firm performance. The study addressed customer orientation, operational coordination, information sharing and operational and business performance as variables. The study finding showed that information sharing has a positive influence on operational performance but it does not have a significant direct impact on business performance. On the other hand customer's orientation moderates the relationship between SCI and performance.

(Dametew et al., 2016) carried out a research on supply chain integration for improving performance on manufacturing industries. The researchers considered technology, resource integration, supply chain integration, knowledge integration and production and design integration as research variables. The study finding suggested knowledge, technology,

production and design and resource integration directly related and impact on quality performance for manufacturing companies. Supply chain integration has also positively linkage on Production, knowledge, Technology and Resource integration so as to improve quality performance in a supply chain.

2.3 Conceptual framework of the study

The conceptual framework for this study was developed from the individual effects which presented the unique influence of internal integration on the success of an organization. In history, supply chain integration was explained using separate aspects. According to Lee (2000) coordination and resource sharing (CRS), information integration (II) and organizational relationship linkage (ORL) were sketched as elements of SCI. Bagchi et al. (2005b) grouped SCI into five correlated aspects: communication and information sharing, collaboration and shared decision-making, collaboration leading to hazard, profit and cost sharing (operational and strategic collaboration), sharing of knowledge, ideas and institutional norms.The level of information sharing and decision-making coordination were considered as two main aspects of SCI (Sahin and Robinson, 2002, 2005). (Kulp, et al., 2004) and (Sahin and Robinson, 2005) found that coordination and resource sharing have a positive and direct impact on performance. Bagchi et al. (2005b) found organizational relationship linkage has a positive effect on supply chain integration in turn can influence performance.

Many studies confirm that the higher the level of integration the higher the operational and business performance of the firm (Gimenez & Ventura, 2005).

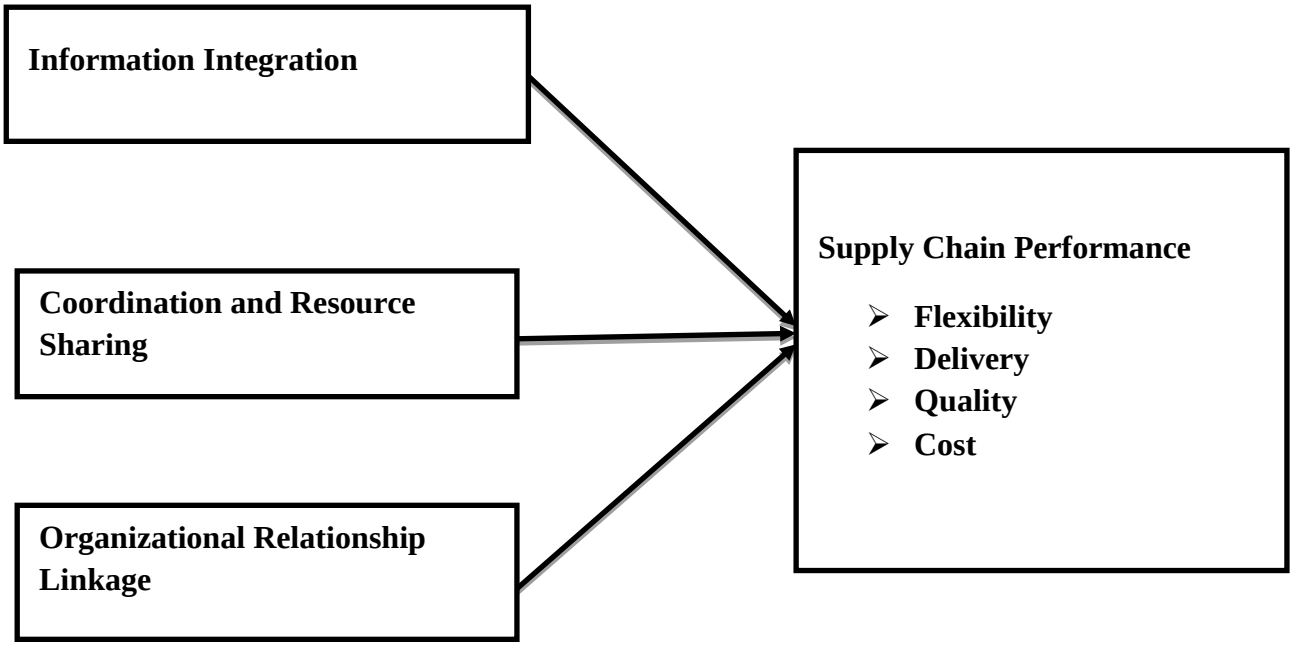

Figure 2.1 Conceptual Framework (Rafaela et al, 2012)

2.4 Identified Literature Gap

The literatures that are conducted on integration are mostly on firms other than pharmaceutical supply chain. It makes the area of pharmaceutical supply chain integration the most valuable area to conduct a thesis and there are more ideas that are not covered by such type of studies.

2.5 Hypothesis

Previous studies like Vickery et al. (2003) have found that of internal integration elements like cross-functional collaboration and integrative inventory management systems have positive impacts on a firm's performance.

A study conducted by Liu (2013) stated that information integration has a direct positive impact on operational performance. Increased information transparency allows firms to choose suppliers with lower prices, enabling them to produce and deliver products or services at lower cost (Chen et al. 2004, p.54 and Wu et al. 2006).

Prior studies indicated that the relationship between SCI and performance needs greater attention. Researchers generally agree that a higher level of SCI positively influences the

performance of the focal organization and its supply network (Frohlich and Westbrook 2001, Vickery et al. 2003, Bagchi et al. 2005b). Sahin and Robinson (2005) concluded that the major benefit of SC collaboration comes from improved coordination, while information sharing unlocks only a small portion of the potential benefits associated with channel integration. Rodriguez et al. (2004) concluded that if internal and external operations are separated, there may not be much impact on performance. However, when internal and external operations are integrated with each other along with internal business processes, there is a positive impact on performance. Therefore, the following hypothesizes will be tested.

H0= Information integration has no a positive effect on supply chain performance.

H1= Information integration has a positive effect on supply chain performance.

H0= Coordination and resource sharing has no a positive effect on supply chain performance.

H2= Coordination and resource sharing has a positive effect on supply chain performance.

H0= Organizational relationship linkage has no a positive effect on supply chai performance.

H3= Organizational relationship linkage has a positive effect on supply chai performance.

H0= Internal integration dimensions (information integration, coordination and resource sharing and organizational relationship linkage) have no a direct positive relationship with supply chain performance.

H4= Internal integration dimensions (information integration, coordination and resource sharing and organizational relationship linkage) have a direct positive relationship with supply chain performance.

CHAPTER THREE

METHODOLOGY OF THE STUDY

Description of the study area, research design, population, sample and sampling methods, data source and data collection instruments, ethical considerations, validity and reliability, data collection procedures and method of data analysis will be discussed in this chapter.

3.1 Description of the study area

The study area of this thesis was Ethiopian Pharmaceuticals Supply Agency specifically the five directorates of central EPSA including quantification and market shaping, tender management, contract management, warehouse and inventory management and distribution and fleet management. The first three are led by one deputy director general and the last two (warehouse and inventory management and distribution and fleet management) are led by another deputy director general. Each directorate has its own director and under each director there are team coordinators and officers. Including the team coordinators and directors, the above mentioned directorates have 114 staffs which are either druggists, pharmacists, laboratory technologists or biomedical engineers. Generally the study is set to assess the effect of internal integration on pharmaceutical supply chain performance at EPSA. By using a five point Likert scale questionnaire primary data were collected from relevant departments that has a direct connection in the supply chain process.

3.2 Research Approach

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

3.3 Research Design

Research design is defined as a strategic framework for action that serves as a bridge between research questions and the execution or implementation of the research (Ornstein, 2013).It is a

framework of methods and techniques chosen by a researcher to combine various components of research in a reasonably logical manner so that the research problem is efficiently handled. It provides insights about "how" to conduct research using a particular methodology. Saunders & Lewis (2014) outlined different types of research methodology into categories as exploratory, descriptive and explanatory.

In this study explanatory research designs was used. In the explanatory research design explanation about internal integration aspects were provided. The reason to use an explanatory research for this study was to justify the cause-effect relationships between the study variables (information integration, coordination and resource sharing and organizational relationship linkage) on pharmaceutical supply chain performance.

3.4 Unit of Analysis

The unit of analysis of this study includes employees that work in the five directorates at central EPSA. The analysis was conducted at organizational level by examining the cause effect relationship among the variables of interest (internal integration dimensions and supply chain performance).

3.5 Population of the Study

Population of a study is explained as a comprehensive group of individuals, institutions, objects and so forth which have a common characteristics that are the interest of a researcher (Rafeedale, 2013). So according to the above definition the population of this study was all the 114 professionals' those working in the five directorates of central EPSA and directly involved in the supply chain of pharmaceuticals. Since this study investigates the effect of internal integration of the five directorates at central EPSA, the population included all professionals (druggists, pharmacists, laboratory technologists and biomedical engineers) that were participated in the quantification, procurement, contract management, warehousing and inventory management and distribution and fleet management.

The population was extracted from the total organizational setup according to their proximity to the main functions of EPSA. The respondents was identified from the five directorates of central EPSA who are directly involved in the supply of pharmaceuticals according to the following list.

S.No	Stratum	Population
1	Forecasting and market shaping directorate	20
2	Tender management directorate	18
3	Contract management directorate	13
4	Warehouse and inventory management directorate	51
5	Distribution and fleet management directorate	12
Total number of population		114

Table 3.1 population list by strata

Source: EPSA Website, 2019

Since the number of the population (114) is manageable and easy to address, the study used a census survey that all the population had been participated in the study.

3.6 Data Source, Data collection Instruments and Data Collection Procedures

The data needed to assess the effect of internal integration on supply chain performance was obtained from the study participants by a five point Likert scale (1=strongly disagree; 5=strongly agree) questionnaire. By questionnaire primary data was collected. Books, journal articles, web pages and other materials were used as secondary data source. The necessary data was collected using self-administered close-ended questionnaire from forecasting and market shaping, tender management, contract management, warehouse and inventory management and distribution and fleet management directorates.

The researcher targeted all professionals that are directly involved in the supply of pharmaceuticals which are stated in the population. The questionnaires were administered to the participants directly by hand in hard copies and were returned to the researcher based on the negotiated time.

3.7 Methods of Data Analysis

The collected data was reviewed for completeness and accuracy upon completion of the data collection process. After that, the data was sorted and coded, then entered into the Statistical

Package for Social Sciences (SPSS) version 20. Demographic information obtained from the respondents was analyzed and presented using descriptive statistics in the form of frequency and percentage table. Measure of central tendency and measure of dispersion like mean and standard deviation was used to analyze the practice of internal integration. Correlation analysis was used to determine the relationship between internal integration study variables and supply chain performance. Cause-effect analysis was made by using multiple linear regression analysis since there are more than two independent variables. The results of analyzed data are presented using tables with a brief description.

3.8 Validity and Reliability

The validity of the study included the content validity, construct validity and internal validity. The content validity was assured by using multiple sources of data (literature such as previous studies, expert interviews) to develop and refine the model and measures. The construct validity which deals with the consistency of the questions has been assured by structuring the questionnaire according to the specific objectives. Internal validity was ensured by supply chain management theory explanations and rival explanations for the outcomes. Practitioners and researchers review was conducted to confirm that the findings generalizability. According to the comments from the researchers and practitioners the questions were re arranged.

According to Weiner (2007), reliability is the degree to which a measurement technique can be depended up on to secure consistent results upon repeated application. The reliability was tested by using the Cronbach's Alpha coefficient value. Cronbach Alpha should be over 0.70 to produce a reliable scale and any scale with Cronbach Alpha less than this standard should be eliminated (Sekaran, 2003).At least a value of 0.7 is recommendable and therefore the instrument is accepted as highly reliable.

Table 3.2 Cronbach's Alpha coefficient value

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.926	.927	37

Source; own computation, 2020

As indicated in table 3.2 the Cronbach's Alpha value is 0.926 which is greater than 0.7.So the instrument utilized was highly reliable.

3.9 Normality

The data were assessed to determine normality of distribution because correlation analysis and regression analysis both need variables to be normally distributed (Hair et al. 2006).

A visual examination of the normal probability plots of the residuals (errors in predicting sample data), indicated a normal distribution of the values, and meet the assumption of normality.

The normality was measured by two indicators: skewness and kurtosis. Skewness assesses whether the distribution of responses are heavily concentrated on one end of the scale. The actual deviation from the normality of distribution was determined using skewness and kurtosis. Skewness refers to the "measure of symmetry of a distribution; in most instances the comparison is made to a normal distribution," and Kurtosis refers to the "measure of the peakedness or flatness of distribution when compared with a normal distribution" (Hair et al., 2006). Thus, there was no reason to exclude variables based on skewness because all variables in this study are based on Likert-type scales. Kurtosis is another measure, compared with normal distribution, to check if the distribution is flat or peaked. Both data that are tightly distributed or distantly distributed around the mean have kurtosis issues.

Table: 3.3 skewness and kurtosis

	N	Skewness		Kurtosis		Fisher skewness Coefficient	Fisher Kurtosis Coefficient
	Statistic	Statistic	Std. Error	Statistic	Std. Error		
Information Integration	108	.166	.233	-.489	.461	1.2334	1.886
Coordination and Resource Sharing	108	.426	.233	.084	.461	1.8766	1.338
Organizational Relationship Linkage	108	.277	.233	-.045	.461	-1.2534	.855
Supply Chain Performance	108	.314	.233	-.463	.461	0.8673	.845
Valid N (listwise)	108						

Source: own computation, 2020

If the results falls between -1.96 and 1.96, it suggests that the distribution is not significantly different from normal distribution (kellar and kelvain, 2012). Table 3.3 showed that, the skewness and kurtosis coefficient of the study were lies between -1.96 and 1.96 and therefore the data were free from any skewness and kurtosis issues. A variable with an absolute value of Kurtosis index greater than 10.0 indicates there is a problem with normality and values greater than 20.0 indicate a more serious normality problem (Kline 2005, p.11). Therefore, the acceptable absolute value of skewness and kurtosis should not exceed three and ten respectively and the study results were also in the acceptable range.

3.10 Ethical Considerations

Ethics in social studies refers to a code of conduct and adherence to expected social norms and behaviors while conducting research. Ethical conduct should also be reflected in the behavior of the researchers who conduct the investigation, the participants who provide the data, the analysts who provide the results and the presentation of the study findings (Veal, 2005).In conducting this thesis the privacy of the participants was kept in secret and it has not any impact or harm either

on participants or the organization. Instead it will give a direction to avoid any defect regards to internal integration. So it is beneficial for both the study participants and the organization. The study ensured adequate level of confidentiality of the research data and any exaggeration about the aims and objectives of the research has been avoided. In the data collection process, respondents had been informed that the activity will be performed if they are willing to assist. In this study, in order to ensure that all ethical standards and requirements were met, the research method, survey procedure, consent form and ethical application were submitted. Various aspects of ethical considerations have already been covered in the study. If necessary and requested by the firm, the researcher is willing to submit a copy of the research paper before it is publicized. In addition, everyone involving in the data provision process was aware that the materials organized by the researcher are intended for academic purpose only.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter presents results and related analysis of the data on the effect of internal integration on pharmaceutical supply chain performance at EPSA. Major findings of the study have been illustrated by using statistical instruments under this chapter. It includes four subsections which discuss about demographic characteristics, descriptive statistics (mean and standard deviation), correlation analysis and finally regression analysis.

Out of 114 questionnaires distributed to respondents 108 questionnaires are filled and returned correctly to the researcher. This represented 94.7% response rate. Mugenga (2003) pointed that for generalization a response rate of 50% is adequate for analysis and reporting, 60% is good and a response rate of 70% and over is excellent. So the response rate of this thesis was reliable.

4.1 Demographic Characteristics

This section discusses the general information about gender, age, educational background, profession of in charge and departments of work in EPSA. The data processed by SPSS version 20 is presented as follows.

Table 4.1: Gender distribution of respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	75	69.4	69.4	69.4
Female	33	30.6	30.6	100.0
Total	108	100.0	100.0	

Source; Survey Results and Own Computation, 2020

As indicated on table 4.1 from 108 respondents 75 (69.4%) were male and the rest 33 (30.6%) were female. This statistics shows most of the respondents were males.

Table 4.2:Age group of respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
<25 years	23	21.3	21.3	21.3
25-34 years	64	59.3	59.3	80.6
35-44 years	17	15.7	15.7	96.3
45-54 years	3	2.8	2.8	99.1
>54 years	1	.9	.9	100.0
Total	108	100.0	100.0	

Source; Survey Results and Own Computation, 2020

Table 4.2 describes the age distribution of respondents for the questionnaire distributed to study the effect of internal integration on pharmaceutical supply chain performance. The statistics showed 23 respondents were less than 25 years which have 21.3 percentages from the total 108 respondents. 64 respondents were in the age group 25-34years with 59.3 percentages. 17 (15.7%) respondents were from 35-44 years, 3(2.8%) respondents were 45-54 years and only 1(0.9%) was above the age of 54. So according to the statistics computed most of the respondents (59.3%) were in the age group 25-34 years which is known as the young age group. This means the respondents can easily understand the questions and give relevant information.

Table 4.3: Educational Background of respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
Diploma	10	9.3	9.3	9.3
BA/BSc	81	75.0	75.0	84.3
MSc/MA	17	15.7	15.7	100.0
Total	108	100.0	100.0	

Source; Survey Results and Own Computation, 2020

According to the statistics presented on table 4.3, 10 (9.3%) respondents were diploma holder, 81 (75%) had BA/BSc degree and 17 (15.7%) had MSc/MA. The statistics shows 81 (75%) of respondents had first degree which is the highest percentage of respondents. This suggests that the respondents provide relevant and accurate information needed for the study on the effect of internal integration on pharmaceutical supply chain performance.

Table 4.4 Profession of respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
Druggist	10	9.3	9.3	9.3
Pharmacist	77	71.3	71.3	80.6
Laboratory Technologist	16	14.8	14.8	95.4
Biomedical Engineer	5	4.6	4.6	100.0
Total	108	100.0	100.0	

Source; Survey Results and Own Computation, 2020

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 research questions. The research established that understanding prospects of internal integration requires professionalism and therefore requires staff with supply chain qualification and training in order to understand the practice of internal integration. As indicated in table 4.4 pharmacists took the highest percentage with 77(71.3%) from the total of 108 respondents. The rest professions were 10 (9.3%) druggist, 16 (14.8%) laboratory technologist and 5(4.6%) biomedical engineers. From these 16 pharmacists had masters in logistics and supply chain management and 1 laboratory technologist had master's degree in public health. All respondents were with a great understanding about internal integration since most of them had an academic base of supply chain.

Table 4.5: Experience of respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
1-5 years	61	56.5	56.5	56.5
6-10 years	37	34.3	34.3	90.7
11-15 years	7	6.5	6.5	97.2
>15 years	3	2.8	2.8	100.0
Total	108	100.0	100.0	

Source; Survey Results and Own Computation, 2020

Ultimately, the output in Table 4.5 shows that, 56.5% of the respondents indicated that they had work experience of 1 to 5 years while 30.4% of the respondents said they had experience of 6 to 10 years and also 6.5% of the respondents replied that they have worked for 11-15 years. 2.8% of respondents had an experience of greater than fifteen years. The results indicated that majority of the respondents have an experience in working area between 1 to 5 years. The respondents were aware of the modern application and implication of supply chain procedures and therefore they gave the correct and accurate information the researcher needed for the study.

Table 4.6: Department of respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
Forecasting and market shaping	19	17.6	17.6	17.6
Tender management	18	16.7	16.7	34.3
Contract management	12	11.1	11.1	45.4
Warehouse and inventory management	48	44.4	44.4	89.8
Distribution and fleet management	11	10.2	10.2	100.0
Total	108	100.0	100.0	

Source; Survey Results and Own Computation, 2020

The respondents were also asked to indicate the departments they are working in. 19 of respondents (17.6%) were working in forecasting and market shaping directorate and 18 (16.7%) respondents were from tender management directorate. From the five directorates of the researchers target contract management and distribution and fleet management directorates had the minimum number of respondents with a figure of 12 (11.1%) and 11 (10.2%) respectively. The largest number of respondents 48(44.4%) were from warehouse and inventory management directorate since it has many supply chain operations.

4.2 Descriptive Analysis

Descriptive analysis is the analysis of data that helps to describe, show or summarize data in a meaningful way. It is very important because raw data would be hard to visualize what the data was showing, especially if there was a lot of it (Kline, 2010). Descriptive statistics therefore enable the researcher to present the data in a more meaningful way, which allows simpler interpretation of the data.

Measure of central tendency like mean 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 internal integration suggest that the average amount that each dimension has positive or negative response. 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 internal integration of EPSA. The mean statistical values of the items were based on the 5 point Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree). According to Zedatol (2008), cited by Oumar (2012), mean score 3.80 and above is high, 3.40 – 3.79 is moderate and below 3.39 is low.

4.2.1 Internal Integration in EPSA

Table 4.7: Application of internal integration in EPSA

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	99	91.7	91.7	91.7
No	9	8.3	8.3	100.0
Total	108	100.0	100.0	

Source; Survey Results and Own Computation, 2020

Respondents were asked to rate EPSA in terms of application of internal integration and 91.7% of respondents replied EPSA considered internal integration and the rest 8.3% of respondents didn't agree by the majority.

Table 4.8: Extent of internal integration in EPSA

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very high	1	.9	1.0	1.0
	High	8	7.4	8.1	9.1
	Moderate	70	64.8	70.7	79.8
	Low	20	18.5	20.2	100.0
	Total	99	91.7	100.0	
Missing	System	9	8.3		
Total		108	100.0		

Source; Survey Results and Own Computation, 2020

Participants who respond "yes" for internal integration application in EPSA were asked to respond for the extent of internal integration in EPSA and table 4.8 showed most of respondents (64.8%) replied there is moderate internal integration in EPSA while only 1 respondent (0.9%) said EPSA had very high internal integration. The rest 7.4% evaluated EPSAs internal integration as high and 18.5% as low. Respondents who respond "no" for internal integration application in EPSA are represented by missing system in table 4.8 above.

Table 4.9 Respondents knowledge on influence of internal integration on supply chain performance

	N	Mean	Std. Deviation
Improve understanding of market trends and customer needs	108	3.93	1.108
Improve identification of ways of improving supply chain performance	108	4.16	0.949
Reduce total cycle time	108	4.06	1.007
Reduce total logistics costs	108	4.07	0.993
Enhance value to customers	108	4.23	0.923
Reduce days of stock out	108	4.11	1.044
Valid N (list wise)	108		
Average mean value		4.09	

Source; Survey Results and Own Computation, 2020

Respondents were asked for the extent of their knowledge towards the influence of internal integration on pharmaceutical supply chain performance and the statistics on table 4.9 showed the mean value between 3.93 and 4.23 and a standard deviation between 0.923 and 1.108. The overall mean of respondent's knowledge on influence of internal integration on pharmaceutical supply chain performance is 4.09 which indicated respondents agree on the higher influence of internal integration on pharmaceutical supply chain performance.

The highly influenced item was value to customers with a mean of 4.23 followed by identification of ways of improving supply chain performance with a mean value of 4.16. Days of stock out was influenced by internal integration with a mean of 4.11. Total logistics cost and total cycle time were influenced by internal integration with a mean value of 4.07 and 4.06 respectively. The item which was less influenced from the others was market trends and customer needs with the mean value of 3.93.

4.2.2 Descriptive Analysis of Independent Variables

The independent variables information integration, coordination and resource sharing and organizational relationship linkage were statistically analyzed with SPSS version 20 and the mean values of the above dimensions are presented below.

4.2.2.1 Information Integration

Table 4.10: Mean and standard deviation of information integration

	N	Mean	Std. Deviation
All employees are allowed to access all information they may require in execution of their tasks	108	2.86	1.072
Employees utilize IT tools in facilitating information access	108	3.09	1.046
Different departments engage in information exchanges	108	2.90	1.067
All functional departments have information access to inventory level of pharmaceuticals	108	3.06	1.138
Common Computerized data base system available	108	3.10	1.059
There is strong information sharing strategy	108	2.60	1.102
Valid N (list wise)	108		
Average mean value		2.94	

Source; Survey Results and Own Computation, 2020

The above table 4.10 showed that the mean and standard deviations for questions asked to rate the effect of information integration in pharmaceutical supply chain performance at EPSA. The mean values for the questions range between 2.6 and 3.10. According to Zedatol (2008) mean value below 3.39 indicates low. The statistics showed that availability of common computerized data base system and employees utilization of IT tools in facilitating information access have a mean value of (M=3.10, 3.09 and S.D= 1.059 and 1.046) respectively which is higher than the other mean values. Functional departments information access to inventory level of pharmaceuticals has a mean value (M=3.06) and standard deviation (S.D=1.138).The least mean values are scored by different departments engagement in information exchanges (M=2.9, S.D=1.067), employees access to all information they may require in execution of their tasks (M=2.86, S.D=1.072) and availability of strong information sharing strategy (M=2.6, S.D=1.102). The overall mean value for information integration is 2.94 and rated as there is low information integration at EPSA.

According to the study of Koçogluipek, et al. (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. So the low level implementation of information integration in EPSA adversely affects the organization in terms of supply chain performance.

4.2.2.2 Coordination and Resource Sharing

Table 4.11: Mean and standard deviation of coordination and resource sharing

	N	Mean	Std. Deviation
Employees regularly interact with each other through such means as meetings, email	108	2.81	.997
The activities in various departments are coordinated centrally	108	2.78	1.008
The resources required in task execution are shared among the different departments	108	2.64	.912
There is an essence of collaboration between different departments and employees in the organization	108	2.82	.946
There is use of cross functional teams in demand forecasting	108	2.83	1.028
Valid N (list wise)	108		
Average mean value		2.78	

Source; Survey Results and Own Computation, 2020

As table 4.11 stated the mean values for the coordination and resource sharing questions range between 2.64 and 2.83. Use of cross functional teams in demand forecasting has (M=2.83, S.D=1.028) which is the highest from the rest. Next, essence of collaboration between different departments and employees in the organization has (M=2.82, S.D=0.946). Employees regular interaction with each other through such means as meetings, email scored (M=2.81, S.D=0.997). The last two questions coordination of activities in various departments centrally and sharing of resources required in task execution among the different departments have a score of ((M=2.78,

S.D=1.008) and (M=2.64, S.D=0.912) respectively. The average mean value of coordination and resource sharing (M=2.78) indicated there is low coordination and resource sharing in EPSA.

The result indicated EPSA adversely affected by lack of efficient coordination and resource sharing. Dametew et al. (2016) founds that resource integration affects quality of supply chain performance.

4.2.2.3 Organizational Relationship Linkage

Table 4.12: Mean and standard deviation of organizational relationship linkage

	N	Mean	Std. Deviation
Information systems in different departments are connected in to a single department	108	2.58	.948
Departmental plans and objectives are set jointly	108	2.78	1.044
The pursuit of various departmental objectives is harmonized	108	2.76	.965
Linkages have been established across various departments with the use of integration tools such as ERP systems	108	2.64	.942
Valid N (list wise)	108		
Average mean value		2.69	

Source; Survey Results and Own Computation, 2020

The result stated in table 4.12 showed that the mean value for organizational relationship linkage items is between 2.58 and 2.78. Joint departmental planning and objective setting took the highest mean value (M=2.78, S.D=1.044) while the least mean value (M=2.58, S.D=0.948) is scored by connection of information systems in different departments in to a single department. Harmonization of departmental objectives (M=2.76, S.D=0.965) and establishment of linkages across various departments with the use of integration tools such as ERP systems (M=2.64, S.D=0.942) have scored between the maximum and minimum mean values. The overall mean value for organizational relationship linkage is 2.69 and is at low level. As of coordination and resource sharing and information integration, EPSA lowly implemented organizational relationship linkage.

4.2.3 Descriptive Analysis of Supply Chain Performance

Table: 4.13 showed that the average mean of dependent dimensions is between 2.57 and 2.95, with standard deviation between 0.888 and 1.086, which indicate that there is a low supply chain performance in EPSA among four dependent dimensions.

Table 4.13 depicts that the respondents said flexibility, delivery, cost and quality of EPSA is low with average mean value of (M=2.85, 2.68, 2.75 and 2.72) respectively.

Table 4.13: Mean and standard deviation of information integration

Dimension	**Item**	**N**	**Mean**	**Std. Deviation**
Flexibility	The organization can quickly modify the supply chain process to meet customer's requirements.	108	2.76	1.058
	The organization can quickly introduce new products into the market.	108	2.84	.978
	The organization can quickly respond to changes in customer demand.	108	2.84	.888
	The organization can quickly adjust and refill unexpected (emergency) need from customers	108	2.95	.931
	Average mean value of flexibility		2.85	
Delivery	The organization has an outstanding (excellent) on-time delivery record to customers.	108	2.72	1.058
	The lead time for fulfilling customers' orders (the time which elapses between the receipt of customer's order and the delivery of the goods) is short.	108	2.57	.969
	The organization delivers pharmaceutical products to customers on time and when needed	108	2.74	.931
	Average mean value of delivery		2.68	

Cost	The organization reduces logistics cost	108	2.75	.958
Quality	The organization provide better quality of service	108	2.86	1.063
	The organization provides a high level of customer service	108	2.58	1.086
	Average mean value of Quality		2.72	
	Valid N (list wise)	108		
	Average Mean of supply chain performance		2.76	

Source; Survey Results and Own Computation, 2020

On the first dimension flexibility, respondents were asked four questions and the response for each question indicated a value of organizations ability to quickly respond to changes in customer demand (M=2.176 and SD=1.058), The organizations ability to quickly introduce new products into the market (M=2.84 and SD= 0.978), The organizations ability to quickly respond to changes in customer demand ((M=2.84 and SD= 0.888) and The organizations ability to quickly adjust and refill unexpected (emergency) need from customers (M=2.95 and SD= 0.931). The delivery practices were the other dimensions assessed by the study and the respondents have expressed the low duration to fulfill customers demand (M=2.57and SD=0.969) and on time delivery record of the organization (M=2.72 and SD=1.058). The respondents were also disagreed on delivery of pharmaceutical products to customers on time and when needed with a low mean value (M=2.74 and SD=0.931).

Under supply chain performance cost is the other dimension that was expected to be responded and for the question reduction of logistics cost the mean value is (M=2.75 and SD=0.958) which is still at lower range.

The last dimension of supply chain performance was quality and for the asked questions under quality, the respondents answer for the organizations ability to provide better quality of service (M=2.86 and SD=1.063) and the organizations ability to provide a high level of customer service (M=2.58 and SD=1.086). The quality of service EPSA provides is also low according to the statistics.

The overall mean of the four dimensions of supply chain performance is 2.76, which mean there is low supply chain performance at EPSA. This is due to the poor implementation of internal integration dimensions. Flynn et al. (2011), Gimenez et al. (2011) and Frohlich (2001) found a

positive effect of internal integration on performance in terms of profits, delivery speed, and transportation cost.

4.3 Correlation Analysis

Correlation is the relationship between two variables. So, the researcher would like 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 variables. A Pearson correlation matrix indicates the direction, strength, and significance of the bivariate relationships of all the variables in the study. 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) indicates a direct relationship and an "r" of -1 indicates a perfect negative relationship while zero "r" value indicates there is no association between the variables. The specific assumption on correlation coefficient indicates that if "r" is between zero and 0.3(-0.3) the correlation is negligible. For "r" between 0.3 and 0.5 (-0.3 and -0.5) low positive (negative) correlation is assumed. "r" value from 0.5 to 0.7 (-0.5 to -0.7) indicates moderate positive (negative) correlation and "r" value between 0.7 and 0.9 (-0.7 and -0.9) indicates high positive (negative) correlation. Very high positive (negative) correlation is represented by "r" value between 0.9 and 1 (-0.9 and -1) (Mukaka, 2012).

Hence, in this study Bivariate Pearson Coefficient (r) was used to examine the relationship between variables by using a two-tailed test of statistical significance at the level of 95% significance, $P< 0.05$.

Table 4.14: Bivariate Pearson Correlation between Variables

Correlations

		Information Integration	***Coordination and Resource Sharing***	***Organizational Relationship Linkage***	***Supply Chain Performance***
Information Integration	Pearson Correlation	1	.518**	.587**	.640**
	Sig. (2-tailed)		.000	.000	.000
Coordination and Resource Sharing	Pearson Correlation		1	.640**	.696**
	Sig. (2-tailed)			.000	.000
Organizational Relationship Linkage	Pearson Correlation			1	.665**
	Sig. (2-tailed)				.000
Supply Chain Performance	Pearson Correlation				1
	Sig. (2-tailed)				

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

Source; Survey Results and Own Computation, 2020

The Bivariate Pearson correlation coefficient outcome indicated there is a moderate positive correlation between supply chain performance and information integration (r=.640**).

Westbrook and Frohlich (2001); and Vickery, et al. (2003) also found a positive and direct relationship between information technology integration and supply chain performance. The other two independent variables (coordination and resource sharing and organizational relationship linkage) have a moderate positive correlation with the dependent variable supply chain performance with r= .696** and r= .665** respectively. Liu (2013) and Damtew et al. (2016) also found that information technology and coordination have a direct positive relationship with supply chain performance.

Therefore, the finding of the correlation analysis shows that all the independent variables (information integration, coordination and resource sharing and organizational linkage) are positively related with the dependent variable supply chain performance at 99 percent confidence interval. All the three independent variables have a moderate degree of correlation coefficients, which means increasing these independent variables implementation leads EPSA in increased supply chain performance so the result lead the researcher to reject the null hypothesis and accept the alternative hypothesis that states internal integration dimensions (information integration, coordination and resource sharing and organizational linkage) have direct positive relationship with supply chain performance.

There is also positive correlation between the independent variables as indicated in table 4.14. Information integration has a moderate positive relationship with both coordination and resource sharing and organizational relationship linkage with r= .518** and r= .587** respectively. Coordination and resource sharing has also a moderate positive relationship with organizational relationship linkage with r= .640**.

4.4 Regression Analysis

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

4.4.1 Multi Collinearity

Multicollinarity is the extent to which a particular construct can be explained by other constructs in the analysis (Hair et al., 2010). It occurs when the variables that appear distinct and unrelated actually measure the same thing. Multicollinarity test can be conducted using tolerance or VIF factor and by rule of thumb, VIF $\leq$ 10 and tolerance > 0.2 are acceptable to say there is no multicollinarity problem (Gujarati, 2003).

Table 4.15multicollinarity

Model	Collinearity Statistics	
	Tolerance	VIF
Coordination and Resource Sharing	.560	1.786
Information Integration	.621	1.609
Organizational Relationship Linkages	.502	1.994

Source; Survey Results and Own Computation, 2020

As the result in table 4.15 states there is no multicollinarity effect since the tolerance of independent variables is above 0.2 and VIF value is less than 10. The inter relationships among independent variables doesn't cause concern. Therefore, as the indication of statistics that multicollinarity is not the problem of the study.

4.4.2 Model Summary

Table 4.16 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.788[c]	.621	.610	.46512	1.718

a. Predictors: (Constant), Coordination and Resource Sharing Information Integration, Organizational Relationship Linkage

b. Dependent Variable: Supply Chain Performance

Source; Survey Results and Own Computation, 2020

R^2 is called the coefficient of determination, it is the proportion of the variance in the dependent variable (supply chain performance) explained by variations in the independent variables. It shows the level of variance explained by the model; which indicates how the supply chain

performance varies with variation in internal integration practices, Information Integration, Coordination and Resource Sharing and Organizational Relationship Linkage.

The finding showed that, the independent variables (Information Integration, Coordination and Resource Sharing and Organizational Relationship Linkage) that were studied, explain only 62.1% performance of the organization, in case of EPSA as represented by the R^2while the rest 37.9 percent of variation is explained by variables that are not included in the model. Therefore, further research should be conducted to investigate the internal integration dimensions (37.9%) that have a role for the performance of the organization.

According to Wooldridge (2015), The Durbin-Watson statistic ranges in value from 0 to 4. A value near 2 indicates non-autocorrelation. As indicated in table 4.16, the Durbin-Watson test statistics showed a value 1.718 which approaches to two; therefore there is no autocorrelation problem between residuals.

Table 4.17: ANOVA Table

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	36.793	3	12.264	56.691	.000[b]
	Residual	22.499	104	.216		
	Total	59.292	107			

a. Dependent Variable: Supply Chain Performance

b. (Constant), Coordination and Resource Sharing, Information Integration, Organizational Relationship Linkage

Source; Survey Results and Own Computation, 2020

As indicated in Table 4.17, the model is adequate with 1 percent significance level. The F-value 56.691 indicates that the joint effect of the variables is significant at 99 percent confidence level. Thus the model is statistically significant in predicting how information integration, coordination and resource sharing and organizational relationship linkage affect the supply chain performance of the organization.

4.4.3 Regression Coefficient

Table 4.18: Regression coefficient

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.243	.199		1.223	.224
	Coordination and Resource Sharing	.392	.082	.386	4.776	.000
	Information Integration	.270	.070	.296	3.866	.000
	Organizational Relationship Linkage	.238	.083	.245	2.871	.005

a. Dependent Variable: Supply Chain Performance

Source; Survey Results and Own Computation, 2020

Table 4.18 indicated that beta coefficients for the independent variables and the significance of the explanatory variables in relation to the explained variable. The study output indicates that all dimensions; coordination and resource sharing, information integration and organizational relationship linkage (at 1% significant level) significantly affects supply chain performance of EPSA.

The statistics showed that keeping organizational relationship linkage and coordination and resource sharing at zero, a unit increase in information integration will lead to a 0.27increase in supply chain performance in EPSA. The standardize 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 into 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 standardize beta value for coordination and resource sharing dimension is 0.386. This implies that, this variable has relatively strong degree of importance for analyzing the effect of internal

integration than others. The standardized beta value for information integration and organizational relationship linkage are 0.296 and 0.245 respectively.

The null hypothesis (H0=coordination and resource sharing have no direct effect on pharmaceutical supply chain performance at EPSA) is rejected since the standardized coefficient β= .386, sig= .000 which is significant at 1 percent. In addition, the β coefficient is positive. Therefore, the result leads to rejection of the null hypothesis and accept the alternative hypothesis stated as (H2=coordination and resource sharing has direct effect on the pharmaceutical supply chain performance of EPSA). Therefore, the study rejects H0 and accepts H2 at 1 percent significance level.

The β= .296, sig= .000 of information integration also indicated information integration has a positive impact on pharmaceutical supply chain performance of EPSA at 1 percent significance level. Therefore, the study accepts H1 at 1 percent significance level and stated that information integration has direct significant effect on the pharmaceutical supply chain performance of EPSA.

The last dimension that affects supply chain performance is organizational relationship linkage. Since it has β= 0.245, sig= 0.005 at 1 percent significant level, organizational relationship linkage also positively affects pharmaceutical supply chain performance of EPSA. So the null hypothesis has been rejected and alternative hypothesis is accepted.

Zhao, et al. (2011), Basnet (2013), Ralston et al. (2015), Liu (2013) and Sahin and Robinson (2005) also stated internal integration positively affects the whole supply chain performance.

Liu (2013) conducted a thesis on effects of supply chain integration and market orientation on firm performance. The study addressed customer orientation, operational coordination, information sharing and operational and business performance as variables. The study finding showed that information sharing has a positive influence on operational performance but it does not have a significant direct impact on business performance. On the other hand customer's orientation moderates the relationship between SCI and performance.

Kulp, et al. (2004) and Sahin and Robinson, (2005) found that coordination and resource sharing have a positive and direct impact on performance. Bagchi et al. (2005b) found organizational

relationship linkage has a positive effect on supply chain integration in turn can influence performance.

As of the previous studies the result of the thesis also prove that internal integration can significantly affects the supply chain performance of a firm.

CHAPTER FIVE

SUMMARY, CONCLUSION, RECOMMENDATION AND DIRECTION FOR FUTURE RESEARCH

This chapter presents the summary of the data findings on effects of internal integration on pharmaceutical supply chain performance of EPSA, besides conclusion and recommendation are drawn there to. The chapter is therefore structured into summary, conclusions, recommendations and areas for further research.

5.1 Summary of Findings

The objective of the study was to determine the effect of internal integration dimensions on pharmaceutical supply chain at EPSA. Based on the objective, the major findings of the thesis are summarized as follows.

The thesis revealed that the overall level of internal integration in the organization is low. The mean values of internal integration dimensions showed that each dimension is implemented poorly. Information integration is relatively implemented with higher degree (M=2.94) than the others. The other two dimensions of internal integration (coordination and resource sharing and organizational relationship linkage) have a mean of M=2.78 and M=2.69 respectively.

The overall mean value (M=2.76) of supply chain performance also indicated that there is poor supply chain performance at EPSA. From supply chain performance dimensions in terms of flexibility EPSA has greater performance from the other dimensions with mean value of (M=2.85). The least performance of EPSA according to the research finding is delivery with mean value of (M=2.68).

The association between variables was conducted using a Pearson correlation matrix. The result suggested that there is moderate positive association between independent variables and dependent variable with “r” value of information integration(r=.640**), coordination and resource sharing(r= .696**) and organizational relationship linkage(r= .665**) on supply chain

performance. Since there is a moderate relationship between independent variables the multicollinarity problem is reduced.

The final analysis was regression analysis and the result from regression analysis showed that all independent variables affect supply chain performance significantly. The result shows all independent variables (coordination and resource sharing, information integration and organizational relationship linkage) affect supply chain performance positively with a beta value of (β= .386, sig= .000, β= .296, sig= .000 and β= 0.245, sig= 0.005) respectively.

5.2 Conclusion

The result showed that internal integration dimensions (organizational relationship linkage, information integration and coordination and resource sharing) are lowly implemented at EPSA. This indicates there is low implementation of internal integration at EPSA. The mean value of supply chain performance indicated that there is relatively low supply chain performance in the organization which needs improvement. This is due to the low level implementation of internal integration.

The correlation analysis indicated there is a positive relationship among internal integration dimensions and supply chain performance. The regression analysis indicated the independent variables (information integration, organizational relationship linkage and coordination and resource sharing) affect supply chain performance significantly at ($P<0.01$). From the three internal integration dimensions coordination and resource sharing have a relatively higher effect on supply chain performance of EPSA with β= .386.

5.3 Recommendation

As the result of indicated the internal integration dimensions can significantly affect supply chain performance of EPSA. So in order to alleviate the problem of internal integration in EPSA, the low level implementation of organizational relationship linkage, coordination and resource sharing and information integration have to be transformed to a high level.

Information integration can be improved through utilization of IT tools for information access, allowance of information access for employees, participation of different departments in information exchange and preparing strong information sharing strategy.

The other internal integration dimension coordination and resource sharing can be enhanced by coordinating the activities in various departments, using cross functional teams in demand forecasting, creating essence of collaboration between different departments and employees in the organization and sharing resources required in task execution.

The final dimension organizational relationship linkage can be improved by using integration tools such as ERP systems. As the thesis result indicates, overall EPSA have a lot to work on internal integration to improve its supply chain performance.

5.4 Areas for Future Research

- This study is dedicated to the pharmaceutical sector, so it is advisable to study the internal integration on other organizations and additional pharmaceutical sectors other than EPSA.
- It is recommended that to restudying the same topic on the same sector over a period of time to evaluate the progress resulting from the application of internal integration.
- Moreover, the framework of this study consisted of three constructs, each of which included several significant dimensions that were deemed capable of improving supply chain performance. In future studies in this field, additional factors related to supply chain performance could be tested, in order to assess their significance.

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APPENDIXES

APPENDIX I; CONSENT FORM

ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE

DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Dears,

My name is Zewdu Demissie conducting a study on the effect of internal integration on supply chain performance at EPSA for the partial fulfillment of master's degree in logistics and supply chain management at Addis Ababa University, School of commerce. I would like to extend my deep appreciation to your agency and you for the willingness and cooperation in undertaking this valuable research. Taking part in this study you will contribute towards alleviating the problems of internal integration in your organization. I request your cooperation to fill and respond truthfully for the asked Questions. I would like to reassure you that this is strictly confidential and won't be shared to anyone about your responses; no personal identifier will also be attached to the questions. It will be only the researcher who will be looking the data. Please also make sure that you are not forced to reply any of the questions that you are not comfortable with. However, I encourage you to provide your best of knowledge on the questions so that the study will be useful.

If you have any question, you can contact me through the following my personal addresses. I would like to appreciate and thank you in advance for your dedication, time and genuine response to the questions.

Zewdu Demissie

Cell Phone: +251 920 63 22 09

Email: abushds@gmail.com

Appendix 2 – Questionnaire on measuring knowledge of internal integration

Questionnaire No:_____ Date: _____

Part I: General Information and Demographic Background of Respondents in the Selected Directorates

1.1. Gender

1. Male 2. Female

1.2. Age

1. Less than 25 Years 2. 26-34 Years 3. 35-44 Year

4. 45-54 Years 5. Over 54Years

1.3. Educational Background

1. Certificate 2. Diploma 3. BA/BSC Degree

4. MSc/ MA 5. Other Specify _____

1.4. Profession of in-charge

1. Druggist 2.Pharmacy 3. Laboratory Technologist

4. Biomedical Engineer 5. Other Specify _____

1.5. How many years have you been employed in EPSA?

1. 1-5 Years 2. 6-10 Years

3. 11-15 Years 4. Over 15 Years

1.6 Kindly, Indicate the directorate that you are working in.

1. Forecasting and Market shaping 2. Tender Management

3. Contract Management 4. Warehouse and Inventory Management

5. Distribution and Fleet Management

Part II: Internal integration in EPSA

1. Does your organization consider supply chain integration to improve its supply chain performance?

Yes [ ] No [ ]

2. If yes, how do you rate the extent of internal integration (between departments) in your organization?

1. Very high 2. High

3. Moderate 4. Low

3. Kindly indicate your level of agreement on your knowledge of influence of internal integration to supply chain performance? Use a scale of 1-5, where 1- strongly disagree, 2- disagree, 3- neutral, 4- agree, 5- strongly agree.

Internal integration:

	1	**2**	**3**	**4**	**5**
Improve understanding of market trends and customer needs					
Improve identification of ways of improving supply chain performance					
Reduce total cycle time					
Reduce total logistics costs					
Enhance value to the customer					
Reduce days of stock out					

4. Please indicate your level of agreement on the following internal integration aspects (1=strongly disagree,2=disagree, 3=neutral, 4=agree, 5=strongly agree)

Aspects	Statement	1	2	3	4	5
Information integration	All employees are allowed to access all information they may require in execution of their tasks					
	Employees utilize IT tools in facilitating information access					
	Different departments engage in information exchanges					
	All functional departments have information access to inventory level of pharmaceuticals					
	Common Computerized data base system available					
	There is strong information sharing strategy					
Coordination and resource sharing	Employees regularly interact with each other through such means as meetings, email					
	The activities in various departments are coordinated centrally					
	The resources required in task execution are shared among the different departments					
	There is an essence of collaboration between different departments and employees in the organization					
	There is use of cross functional teams in demand forecasting					
Organizational relationship linkage	Information systems in different departments are connected in to a single department					
	Departmental plans and objectives are set jointly					
	The pursuit of various departmental objectives is harmonized					
	Linkages have been established across various departments with the use of integration tools such as ERP systems					

Part III: Supply chain Performance

1. Please indicate the degree to which you agree to the following statements concerning your organization performance. (1=strongly disagree,2=disagree, 3=neutral, 4=agree, 5=strongly agree)

Dimension	Item	1	2	3	4	5
Flexibility	The organization can quickly modify the supply chain process to meet customer's requirements.					
	The organization can quickly introduce new products into the market.					
	The organization can quickly respond to changes in customer demand.					
	The organization can quickly adjust and refill unexpected (emergency) need from customers					
Delivery	The organization has an outstanding (excellent) on-time delivery record to customers.					
	The lead time for fulfilling customers' orders (the time which elapses between the receipt of customer's order and the delivery of the goods) is short.					
	The organization delivers pharmaceutical products to customers on time and when needed					
Cost	The organization reduces logistics cost					
Quality	The organization provide better quality of service					
	The organization provides a high level of customer service					

THANK YOU!!

Appendix III: Multiple Regression Assumption Test results

Multi Collinearity test:

Model	Collinearity Statistics	
	Tolerance	VIF
Coordination and Resource Sharing	.560	1.786
Information Integration	.621	1.609
Organizational Relationship Linkages	.502	1.994

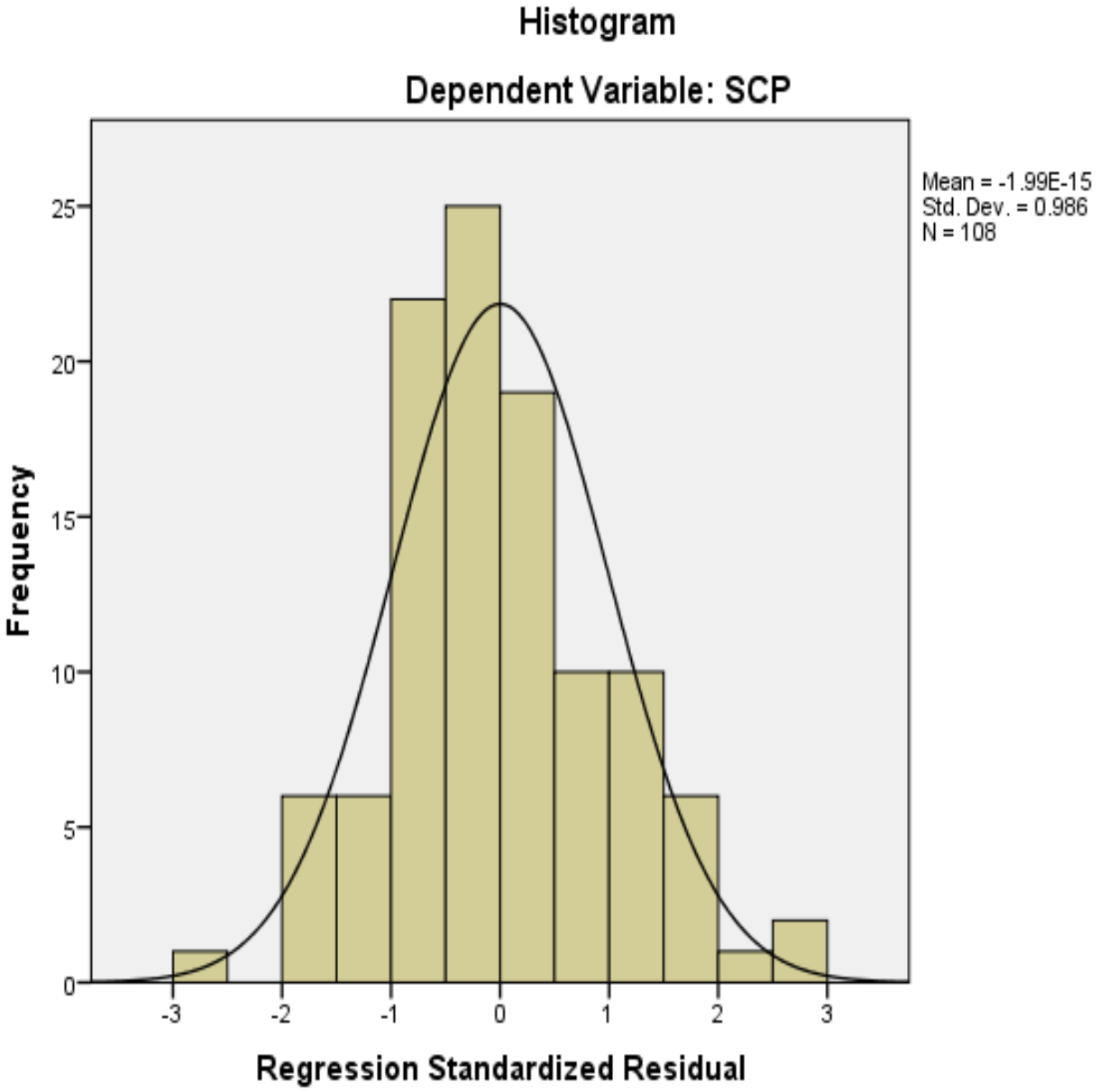
Model Summary:

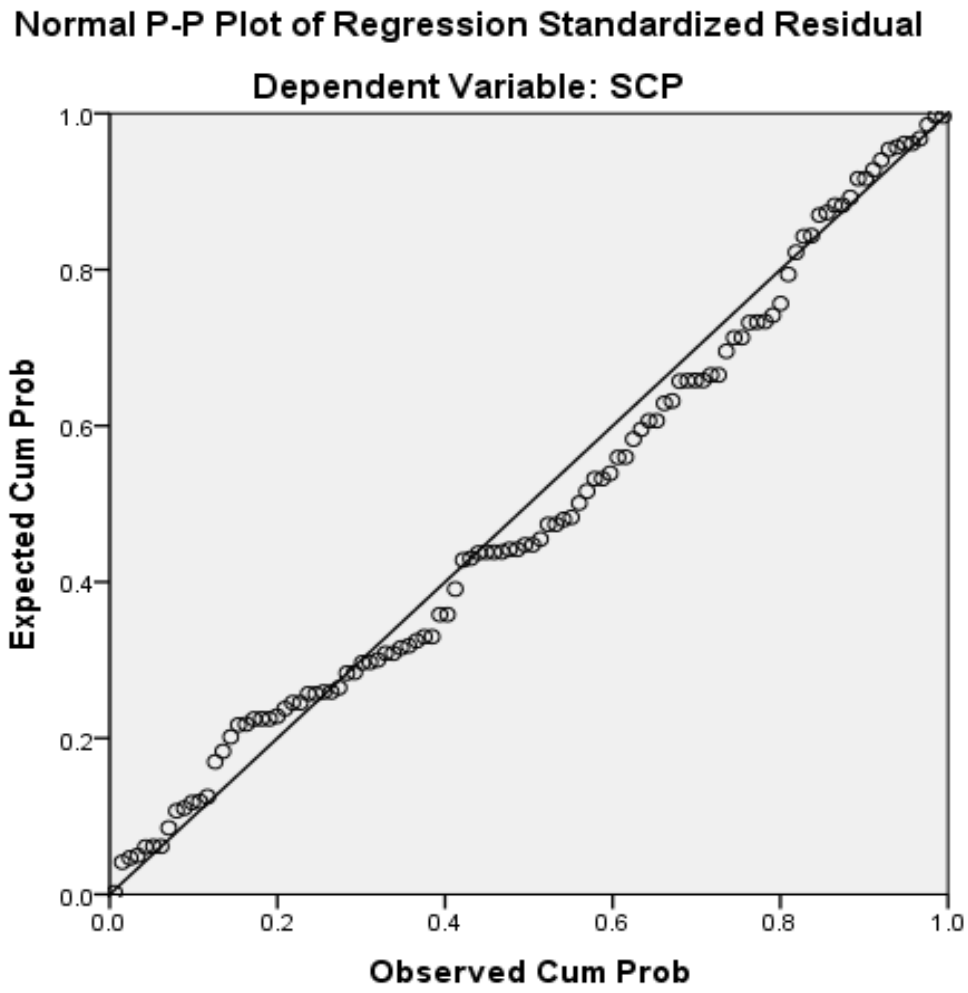
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.788[c]	.621	.610	.46512	1.718

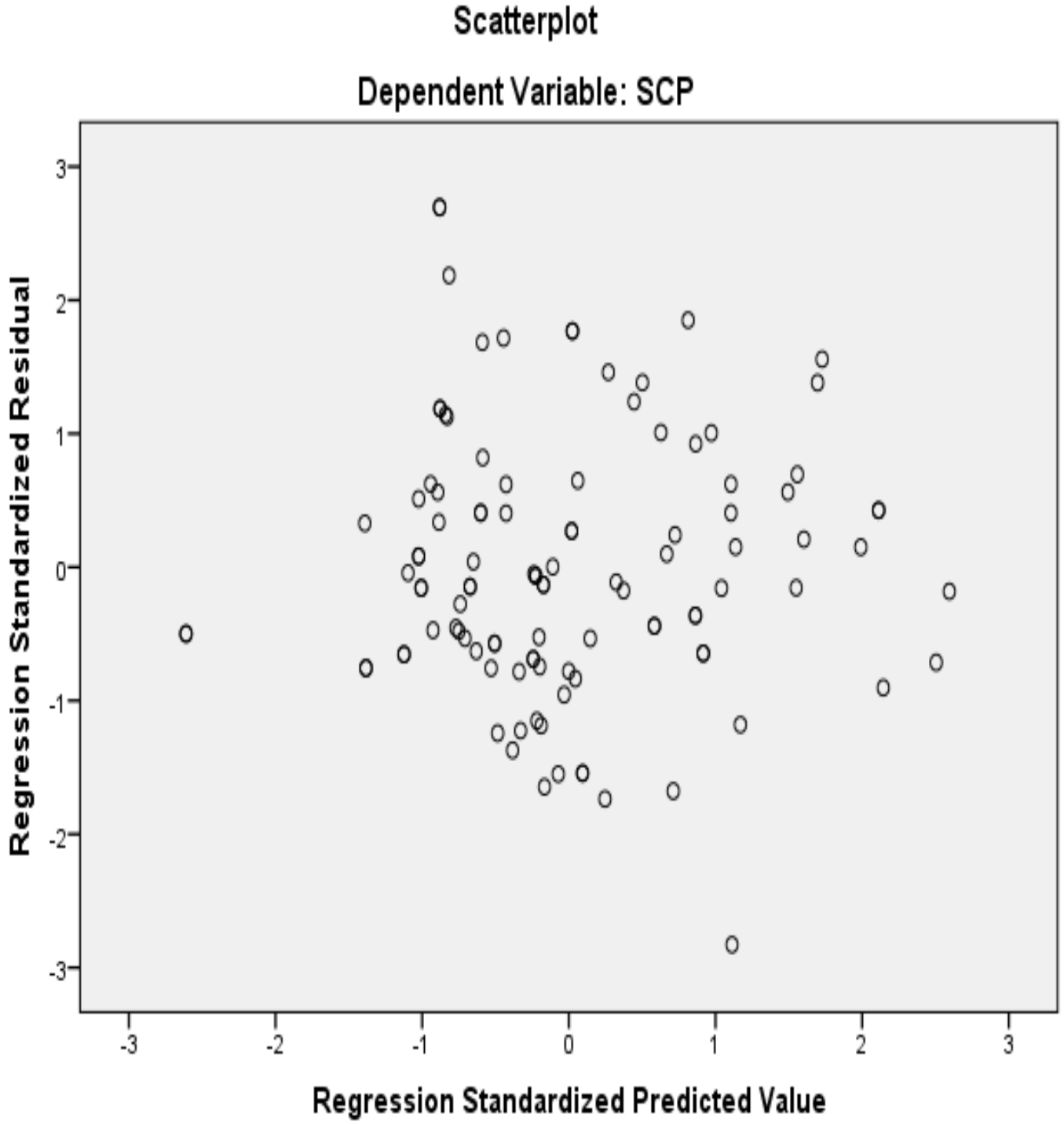
a. Predictors: (Constant), Coordination and Resource Sharing Information Integration, Organizational Relationship Linkage

b. Dependent Variable: Supply Chain Performance

Source; Survey Results and Own Computation, 2020


Histogram
Dependent Variable: SCP
Mean = -1.99E-15
Std. Dev. = 0.986
N = 108
Frequency
25
20
15
10
5
0
-3
-2
-1
0
1
2
3
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: SCP
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


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